COVID-19 THE NEW HAVOC AMONG PEDIATRIC DENTISTS : A REVIEW

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ABSTRACT

The novel virus severe acute respiratory syndrome coronavirus 2(SARS - Cov -2) causing coronavirus disease has become one of the global pandemics. This has become one of the most significant challenges to the health care profession. Dental practices are focal points of cross-infection. This is because the work environment of a dentist involves close patient contact and aerosol production. Children are also more prone to this infection. As the number of COVID - 19 cases may increase in the future, the pediatric dentist should be well informed about the signs and symptoms as well as the strict infection control measures to be followed in these cases. Also, parents should be reassured that pediatric dentists use all the necessary precautions needed to avoid the spread of the disease. The pediatric dentist should also try to reduce the stress in parents and children and create a relaxed and anxiety-free environment. The aim of this paper is to highlight the clinical recommendations to be followed by pediatric dentists providing care for children during this pandemic. Special attention should be given to medically compromised children. Minimization of aerosol-generating procedures and case-based selection of minimally invasive methods are recommended.

Keywords: COVID-19, Pandemic, Pediatric dentistry, Aerosol generating procedure, Atraumatic Restorative Technique, Interim Therapeutic Restoration, Filtering Facepiece, Personal Protection Equipment, Silver Diamine Flouride.

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INTRODUCTION

At the beginning of 2020, a novel virus, the Severe Acute Respiratory Syndrome Coronavirus (SARS - Cov - 2) resulted in Coronavirus disease (COVID - 19), a global pandemic. It was declared as Public Health Emergency of International Concern (PHEIC)[1] by the World Health Organization (WHO) Director-General based on the recommendations of the International Health Regulations Emergency committee (2005).[2] In December 2019 "COVID - 19" Originated in China. The virus exposed about 7 billion humans on our planet to one of the worst pandemic known to the global population since the Spanish flu Pandemic in 1918 -19 (Synder and Ravi 2018).[3] This has even infected the pediatric population (Dong et al. 2020).[4] Pediatric COVID - 19 infections are reported to be relatively mild in symptoms when compared to adults. Children and adolescents are also reported to have a better prognosis (Shen et al 2020).[5] Mortality in children is also found to very rare (Sinha et al 2020).[6] Clinical features of COVID - 19 in children include fever and cough, but many children can remain asymptomatic and may contribute significantly to the transmission of disease. (Quietal 2020).[7]

The American Academy of Pediatric Dentistry (AAPD) issued a re-emergence practice checklist to help prepare the pediatric dentist to start their practice (American Academy of Pediatric Dentistry 2020).[8] Although the literature concerning the impact of COVID - 19 on pediatric dentistry is quite limited, this critical review aimed to provide a summary of the guidelines issued by different authorities regarding the management of pediatric patients during the COVID 19 pandemic.

Risk factors associated with Pediatric Dental Treatment

Because of the long incubation period (2-14 days approximately)[9], children can be asymptomatic or present with mild, non-specific symptoms. Hence all child patients should be considered as potential carriers of the virus as COVID 19 can be transmitted through direct and indirect contact mainly via respiratory droplets and splatter from saliva and blood.[10] The reason why COVID 19 cases in children are less severe than in adults is still confusing. It may be due to the active innate immune response, healthier respiratory tracts because they have not been exposed to cigarette smoke and air pollution as adults, and less underlying illness. Due to these specific features, the true rate of COVID 19 infection in children is underestimated.

As the possible COVID19 transmission routes include inhalation of airborne microorganisms, direct contact with blood; contact of conjunctival nasal and oral mucosa with droplets; aerosols containing microorganisms generated from an infected individual and propelled by coughing and squeezing and indirect contact with contaminated surfaces[11], pediatric patients present an additional risk of transmission. The use of a removable orthodontic appliance increases the risk of contamination if handling is not carried out with proper precautions. Another problem is related to the difficulty for the child to use personal protective equipment during dental visits. The presence of care givers with whom the pediatric dentist must unavoidably interact will increase the risk of infection. Following measures can reduce the transmission of virus from and to, to the child patients.

Tele Screening

The scheduling of patients should be performed via telephone contact. Caregivers must inform in advance if the child has been unwell in the last 24 hrs. If so, the appointment should be rescheduled. Parents are asked to arrive on time, avoid more than one bystander, and use a face mask. Brief medical history must be taken as certain chronic diseases like asthma, diabetes and immunodeficiencies are responsible for increasing the severity of COVID 19.[12] If a child who is COVID positive needs dental assistance, it should be scheduled at the end of the day. Extraoral radiography is preferred as a diagnostic aid because intraoral radiography induces salivation and favors cross-contamination.

Preoperative period

Care should be taken to prevent the transmission of the virus from infected children to professionals and other patients. Visual alerts like signs and posters should be placed at the office

entrance as well as in strategic locations like waiting areas and elevators. The waiting room should have spacing between the chairs. Magazines and toys should be removed to avoid surfaces exposed to contamination. There should be easy access to hand sanitizer in a different office setting.[13]

Environments should be well ventilated with an open window to renew the circulating air to reduce contamination by droplets suspended in the environment and deposited on surfaces for long period.[14] It is suggested to follow strict protocols of periodic clearing of the air conditioning system and installation of high-performance air filters. Upon arrival at the office, the body temperature of the patient and accompanying person should be checked using an infrared thermometer. Personal protective equipment such as a shoe protector, mask and cap for the child and companion should be provided. The patient should be instructed to wash hands before entering the clinical room. Filtering facepiece class 2 (FFP 2, equivalent to N 95) mask is recommended for both non-COVID 19 and COVID 19 confirmed cases irrespective of the use of aerosol-generating procedures(AGP)[15] (Clarkson et al 2020). 1% Hydrogen peroxide mouth rinse has been recommended due to its oxidative potential thereby reducing the viral load. In children, the use of 1% hydrogen peroxide with the addition of flavoring agents has been recomended[16].

Operative Period

The professional must remove all accessories like earrings, rings, bracelets, and watches. Men should avoid beard for the better sealing effectiveness of the face mask. The pediatric dentist should be friendly, casual, positive, and motivating to the patient. Avoid prolonged conversations during the pandemic period[17].A printed format of post procedural instructions for each procedure would be handy. Behavior modification of uncooperative children might pose a big challenge and use of pharmacological means of behavior modification should be considered as and when necessary. Regarding PPE, the dentist must wear PFF 2 respirator (without valve) waterproof and disposable grown, cap, protective goggles, disposable gloves, and face shield. The correct sequence of PPE donning involves wearing the mask, the protective goggles, the cap, the face shield, the disposable gown, and the protective gloves. The doffing of PPE must follow the reverse order.[18]

A pediatric dentist should be familiar with treatment options that eliminate aerosol-generating procedures as much as possible. This can be achieved by the use of sealants, Atraumatic restorative technique (ART), Interim therapeutic restorations (ITR), the Hall technique for stainless steel crowns, and Silver Diamine Fluoride(SDF) for arresting caries. Anticipatory Guidance and delivery of prevention information and preventive measures on a regular basis will reduce the need of aerosol generating procedures and should be practiced diligently, The importance of tooth brushing with fluoridated toothpaste to prevent tooth decay should be emphasized. Telephone and video consultations with parents to promote positive oral health behavior should be conducted.

Sealants

To arrest or reverse a non cavitated carious lesion on the occlusal surfaces of both primary and permanent teeth sealants along with 5% Sodium Fluoride varnish is recommended by ADA (Slayton et al 2018).[19] For the approximal surface, ADA suggests the use of 5% Sodium Fluoride varnish (application every 3-6 months) or resin infiltration alone or along with 5% Sodium Fluoride(Slayton et al).

Atraumatic Restorative Technique (ART)

The use of ART for both primary and permanent teeth in children presents a valid option to manage caries successfully during the pandemic. ART along with sealants presented a high caries preventive effect (De Amarim et al 2018).[20]

Interim Therapeutic Restorations

ITR is used to restore and prevent further decalcification and caries in young patients, uncooperative patients, and patients with special health care needs. The ITR procedure involves removal of caries using hand or slow speed rotary instruments followed by restoration with an adhesive material like RM-GIC (Breg 2002).[21]

The Hall technique

This is a non-surgical/non-invasive method used to restore a carious but asymptomatic primary molar. It relies on sealing non - pulpally involved carious lessons on primary molars using a preformed metal crown (PMC) and GIC (Welbury 2017).[22] No local anesthesia is used and no attempt to surgically remove the carious tissue is made (Innes et al 2015).[23]

Silver diamine fluoride (SDF)

SDF is a clear odorless liquid indicated for the desensitization of non-carious tooth lesions and molar incisor hypoplasia. The ADA recommends using SDF to arrest advanced caries lesions on any coronal surface of primary and permanent teeth (Slayton et al 2018).[24]

Postoperative period

Waste management should be performed in a safe and environmentally correct manner. Residues must be packed in impermeable bags made of material resistant to rupture and leakage. It should be placed in closed containers until disposal.

Appropriate measures for cleaning and disinfecting the dental operatory must be carried out. This should be done after a period of 1 to 2 hrs. This is because aerosols settle on the surfaces after this period.[25] Cleaning surfaces with neutral detergent are recommended followed by disinfection with 70% alcohol and 1% sodium hypochlorite.[26]

Patient recalls must take into consideration the risks and benefits of a dental appointment during the COVID-19 pandemic. Preventive measures should be reinforced for the patient. Oral hygiene measures should be reinforced.

Medically compromised Children

Children with medical conditions are at a significantly increased risk from COVID 19. This is because these children will have long term respiratory conditions like chronic lung disease, cystic fibrosis, asthma, etc. These children should not attend the hospital or dental clinic unless the dental condition is considered life-threatening (RCSENG 2018).[26] The AAPD recommended that the dental office should be prepared with the hospital office should be prepared with hospital protocols before treating children with special needs.

CONCLUSION

COVID - 19 will continue to have a major impact on the practice of pediatric dentistry. Dentists who treat children during this pandemic should use high standards of infection control procedures. Minimally invasive procedures that minimize or eliminate aerosol generation should be employed throughout the pandemic. The end of the pandemic will mark the beginning of new methods of approach and management in the field of pediatric dentistry. Since the COVID - 19 situation continues to evolve day by day, the pediatric dentist should keep a high level of awareness to help patients, minimize risk, and prevent viral spread.

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