

**CHANGING TRENDS IN DENTAL CLINIC WITH PEDIATRIC CONSIDERATIONS  
DURING COVID-19****Dr. Kritika Choubey\*<sup>1</sup>, Dr. Ankur Jain<sup>2</sup>, Dr. Rinky Sisodia<sup>3</sup>, Dr. Satish Maran<sup>4</sup>, Dr. Anaya Kulkarni<sup>5</sup> and  
Dr. Sapna Mishra<sup>6</sup>**<sup>1</sup>Post Graduate Student 2<sup>nd</sup> Year Department of Pedodontics and Preventive Dentistry People's Dental Academy, Bhopal.<sup>2</sup>Professor and H.O.D Department of Pedodontics and Preventive Dentistry People's Dental Academy, Bhopal.<sup>3,4</sup>Reader Department of Pedodontics and Preventive Dentistry People's Dental Academy, Bhopal.<sup>5,6</sup>Senior Lecturer Department of Pedodontics and Preventive Dentistry People's Dental Academy, Bhopal.**\*Corresponding Author: Dr. Kritika Choubey**Post Graduate Student 2<sup>nd</sup> Year Department of Pedodontics and Preventive Dentistry People's Dental Academy, Bhopal.

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**ABSTRACT**

We are facing a global health crisis unlike any which the world has seen in many decades. The coronavirus disease (COVID-19), which has been characterized as a pandemic by the World Health Organization, is attacking societies at their core. In the human body, this coronavirus is abundantly present in nasopharyngeal and salivary secretions of affected patients, and its spread is predominantly thought to be respiratory droplet/ contact in nature therefore dentists, auxiliaries as well as patients undergoing dental procedures are at high risk of cross-infection. Most dental procedures require close contact with the patient's oral cavity, saliva, blood, and respiratory tract secretions. Also while treating paediatric patients dental professionals indulge in close, face-to-face, communication with patients and parents, which could possibly introduce them to droplets generated from an unprotected cough or sneeze. Saliva is rich in COVID 19 viral load. Dental professionals, may encounter patients with suspected or confirmed SARS-CoV-2 infection and should act diligently not only to provide care but at the same time prevent nosocomial spread of infection. Thus, the aim of this article is to provide specific modifications in dental home for practice regarding patient screening, infection control strategies, and patient management protocol and also providing guidance to all paediatric dentist while attending patients <16 years of age.

**KEYWORDS:** COVID-19, SARS-CoV-2, dentistry, hygiene, infection control, dental practice.**INTRODUCTION**

World Health Organization (WHO) proclaimed the rapidly spreading novel coronavirus outburst as a pandemic viral disease on 11<sup>th</sup> March 2020. It started in the late December 2019 in Wuhan City as an emergent pneumonia outbreak which was originated and taken into account as major general public health problem crisis for the entire world. On 11<sup>th</sup> February 2020, WHO named the novel viral pneumonia as "Corona Virus Disease (COVID19)."<sup>[1]</sup>

Novel Corona-virus (COVID-19) is a deadly protein molecule devastating the human kind and has brought down the life to a standstill. Its effect is determined by the interaction among the agent, the host and the environment. It is better prevented than treated for all in general and pediatric, geriatric and medically compromised individuals in particular. Home quarantine is the best possible way of preventing it which involves social distancing as a first step. Avoiding to touch the T-zone of face involving the eyes, nose and mouth coupled

with frequent hand washing by soap after every 15-20 minutes and frequent application of alcohol-based sanitizer is advocated for self-protection.

The proven fact that the spread of COVID-19 is also air-borne has made it mandatory for the dental fraternity to follow a systematic protocol in clinical practice. It is imperative to consider only emergency and essential dental procedures to be carried out under strict aseptic measures, not only for suspects but also for routine patients.

**Modifications required for a dental Clinic setup**

The dental clinics should prepare themselves for modifications - (I) Preparatory Phase, (II) Implementation Phase.<sup>[2]</sup>

**Phase I: Preparatory phase for a dental clinic  
Dental Clinic**

1. Proper management of ventilation and air quality should be maintained in dental clinics. Natural air

circulation through windows and installation of independent exhaust blower to extract the room air into atmosphere should be present.<sup>[2]</sup>

2. Instead of using a ceiling fan while performing procedure a table fan behind the operator for the airflow away from the patient and an installment of strong exhaust fan in order to create a unidirectional flow of air away from the patient.<sup>[2]</sup>
3. The window air condition system/ split AC should be frequently serviced, and the filters should be cleaned regularly.<sup>[2]</sup>
4. Hepa Filters: HEPA Filters are efficient in absorbing 0.01 microns and above air particulate so they are extensively used in the dental environment as there are more aerosols producing procedures taking place.<sup>[3]</sup>

### Clinic entrance, reception and waiting

Show visual alarms at the passage of the office and in key regions (e.g., holding up zones or lifts) about respiratory cleanliness, cough decorum, social separating and removal of debased things in garbage jars. Introduce glass or plastic obstruction at the front counter, with a two-way speaker framework and accessibility of adequate three-layer masks, sanitizers and paper tissue at the reception and nearby work areas. Distant seating arrangements ideally a meter separated and liberation from all fomite for example, magazines, toys, television remotes should be done. Cashless/contactless payment modes should be installed. A trash can with top ought to be accessible at triage where patients can dispose of utilized paper tissues.<sup>[2]</sup>

### Area for Authorized Personnel Only

**Changing Room:** Changing space to be accessible for staff and all co-workers. Committed zone for wearing and doffing of PPE.<sup>[2]</sup>

**Dedicated area for sterilization:** A committed and prepared individual ought to be accessible to attempt Transport, Cleaning, Drying, Pressing, Disinfection, Stockpiling and testing the nature of sanitization according to the standard rules and producer's guidelines.<sup>[2]</sup>

Adequate and devoted space for keeping a stock of extra PPE, cleansing and sterilization instruments and synthetic concoctions must be guaranteed.<sup>[2]</sup>

### Washrooms

#### Automatic hand sanitizer dispensers

Usually manual operated hand sanitizers are used in dental clinics but they increase the chances for the transmission of coronavirus as the contaminated surface is touched repeatedly. Thus, electrically operated with sensor attached Automatic Hand Sanitizer Dispensers should be encouraged in reducing the transmission of covid-19 infection.<sup>[3]</sup> Use of Paper towels are fore choose over Towels.

### Equipment and instrumentation

1. Fogger Machine: A fog machine is a device that generates dense vapors called fog. Fogger machine adjunct with sodium hypochlorite can be used for sterilizing frequently contacting surfaces such as dental chair, tables, chairs. The practice could be repeated 2 to 3 times daily to minimize the transmission of covid-19 virus in dental home.<sup>[3]</sup>
2. High volume extra oral suction: High-speed extra oral suction should be used for dental procedures in order to reduce generating aerosols (for e.g. In Endodontic procedures or ultrasonic scaling).<sup>[4]</sup>
3. The indoor air cleaning system/ Plasma Air Sterilizer: University of Michigan has invented a non-thermal plasma reactor which leaves airborne microorganisms in a state that they do not infect host organisms, including people. Plasma oxidizes the pathogen which impair their mechanism of entering the cells. Which means that the plasma didn't kill the pathogen, but preferably altered its efficiency to infect. Plasma air sterilizers can be continuously utilized for disinfection of air in an environment in the presence of human activity. So this can be used as a suitable modification in a dental setup.<sup>[3]</sup>
4. Anti-retraction handpiece: Anti-retraction handpiece designed with particularly anti-retractive valves are intensely suggested that can significantly decrease the backflow as an additional preventive factor for cross infection. Dental handpieces without anti-retraction function should be forbidden during the 2019-nCoV outbreak which may further contaminate the dental setup thus leading to potentially cross-infection.<sup>[5]</sup>
5. Chemicals required for disinfection: The infected surrounding surface caused by droplets containing infective pathogens coronaviruses, such as SARS and MERS can effectively be inactivated by surface disinfectants within one minute. These surface disinfectants contain 62%–71% ethanol, 0.5% hydrogen peroxide, and 0.1% (1 g/L) sodium hypochlorite (Kampf et al., 2020). Surfaces should be disinfected after each patient visits, especially surfaces near to the operating areas should be disinfected after each patient visit.<sup>[6]</sup> Maintain a supply of all consumables related to PPE, Sterilization and Disinfection.

**Hand hygiene:** Fecal–oral transmission has been accounted for 2019-nCoV, which underlines the significance of hand cleanliness for dental practice. Though proper hand cleanliness is the normal essential for dental practice, hand-washing measures is moderately low, which offers a challenge in controlling the transmission of 2019-nCoV.<sup>[7]</sup>

A two-before and-three-after hand cleanliness rule proposed by West China Clinic of Stomatology should be incorporated.<sup>[10]</sup> In particular, the oral experts should wash their hands before patient examination, before dental procedures, after touching the patient, subsequent

to contacting the environmental factors and gear without disinfection, and after touching the oral mucosa, damaged skin or wound, blood, body fluid, secretion, and excreta. More alert ought to be taken for the dental experts to abstain from contacting their own eyes, mouth, and nose.<sup>[7]</sup>

### Environment and Surface Disinfection

**Floors:** 2 Step Cleaning Methodology (Detergent and freshly prepared 1% sodium hypochlorite) for 10 minutes. Mop the floor from the far corner of the room to the door.<sup>[2]</sup>

**Rest of the surfaces:** Mop the area with freshly prepared 1% sodium hypochlorite for 10 minutes. Damp dusting should be done before beginning with daily work, after every procedure and after finishing daily work.<sup>[2]</sup>

**Delicate Electronic equipment** Should be cleaned with alcohol-based rub/spirit (60-90% alcohol) swab before every patient contact.<sup>[2]</sup>

### Phase II Implementation Phase

#### Tele-consult Tele-screening

Early screening through telephone could help in identifying a patient with suspected or possible COVID-19 infection during the time of scheduling appointments. The 3 most relevant questions to be included at the time of screening should be whether the patient had any exposure with a person known or suspected COVID-19 presentation, whether any recent travel history from a place with high occurrence of cases, whether has any symptoms of cough, fever or any respiratory illness. A positive response to any of the three above questions should be a matter of concern, and the elective dental treatment should be delayed for at least 2 weeks. Such patients should be motivated to go in self-quarantine and should consult their physician via telephone or email.<sup>[8]</sup>

#### Dental history and remote TRIAGE

Examination and consultancy related to the problems could be done via telephone and analgesics could be prescribed. Dental clinics should enclose a consent form. Dental appointments should be given according to the urgency of the treatment.<sup>[2]</sup> Pediatric patients should be given prime concern specially those children with underlying medical conditions, autistic children, children who have gone through dental trauma or any orofacial pathology calling for urgent assessment.<sup>[9]</sup> Only those patients who have taken prior appointments via telephone and remote electronic or web-based systems and whose history, and proper screening is done should be allowed in the clinic.<sup>[2]</sup>

#### Modifications of armamentarium while handling patient in the clinic area

**Use of N-95 masks/Guidelines for extended use link:** Since the main route of nCoV-19 transmission are the respiratory droplets, so using of particulate respirators such as, "N-95 masks which are recommended by the

National Institute for Occupational Safety and Health or FFP2 standard masks which are reliable by the European Union are most advised for routine dental practice.<sup>[1]</sup>

**Non contact infrared thermal device:** The non-contact infrared thermometer is used to record the body temperature of a patient while maintain a distance of 3 to 15cm. The benefits of this device are that it brings ease of operating to the patient and the doctor, in comparison with conventional thermometer. It is frequently used in mass screening as it does not come in contact with the body of the patient.<sup>[3]</sup>

**Personal protective measures for the dental professionals:** It is compulsory for the health care providers to use full Personal Protective Equipment (PPE), including masks, gloves, gowns, shoe covers, head covers and goggles or face-shields, in order to protect both skin and mucosa from infected blood droplet or secretion.<sup>[1]</sup> When treating Pediatric patients it might add anxiety to the child watching the health care providers following the PPE Protocol so therefore proper explanation in simple terms should be delivered to them along with the value and use of this equipment.<sup>[10]</sup>

**Hazmat Suit:** Hazmat suit aim to provide free from atmospheric air breathing in order to protect from virus. This can be beneficial for surgeons dealing frequently with aerosol generating procedure and emergency dental treatment for COVID positive patients.<sup>[3]</sup>

**Pre-procedural mouth rinse:** Prior examinations have demonstrated that SARS-CoV and MERS-CoV were exceptionally effective to povidone mouth rinse. Hence, pre-procedural mouth rinse with 0.2% povidone-iodine may lessen the heap of corona viruses in saliva. Another option is to utilize 0.5-1% hydrogen peroxide mouth flush, as it has vague virucidal movement against corona viruses.<sup>[8]</sup>

**Rubber dam isolation:** The utilization of rubber dams can noticeably reduce the production of contaminated saliva and blood splatter while using when high-speed handpieces and dental ultrasonic devices. It has been observed that the use of rubber dam could noticeably reduce airborne particles in ~3-foot diameter of the operational field by 70%.<sup>[7]</sup>

#### Modifications in Dental Procedures

The Practitioner should use their clinical judgement and preferably opt for minimally invasive techniques over AGP (Aerosols generating procedures) which includes: Single step adhesive restorations, Atraumatic restorative treatments (ART), Pit and fissure sealants, arresting carious lesions with Silver Diamine Fluoride, Interim therapeutic restorations (ITR), Selective caries removal and Hall Technique.<sup>[9]</sup>

**Arbat Safety Box:** Dr. Sameer Arbat from Nagpur, India recently invented a safety box for performing

bronchoscopy procedures in suspected or confirmed COVID-19 patients. His invention is the first of its kind in the world, and was examined by doctors from Italy, USA and India and gathered international recognition. The box aid in prevention of aerosol transmission in environment and can be easily disinfected and reused.<sup>[3]</sup>

**Disinfection of the clinic settings** Medical organization should take appropriate and powerful disinfection measures in both clinic settings and public area. Appliances in the public areas should regularly cleaned and disinfected, including door handles, chairs, and desks.<sup>[7]</sup> Toys provided for Pediatric patients may potentially be a source of cross infection and therefore should be removed from clinical setting and waiting area. Restraining devices used for pediatric patients such as Velcro Straps may be a source of contamination and should therefore be cautiously disinfected.<sup>[11]</sup> People using lifts should wear masks and abstain direct contact with buttons and other objects.<sup>[7]</sup>

**Management of medical waste:** The clinical and local waste created by the treatment of patients with suspected or affirmed 2019-nCoV contamination are viewed as irresistible clinical waste. Double-layer yellow color medical waste package bags and “gooseneck” ligation should be used. The surface of the package bags should be marked and discarded according to the necessity for the management of medical waste.<sup>[7]</sup>

**Environmental surface disinfection:** During airborne creating procedures, droplets scattered on the surrounding surface containing infective pathogens. An analysis of 22 investigations discovered that human coronaviruses, for example SARS and MERS, can endure on lifeless surfaces for up to 9 d. Though, they can be thoroughly inactivated by surface disinfectants within one minute. These surface disinfectants contain 62%–71% ethanol, 0.5% hydrogen peroxide, and 0.1% (1 g/L) sodium hypochlorite (Kampf et al., 2020). Surfaces are cleaned after every patient visits, particularly surfaces near to the operating areas.<sup>[6]</sup>

## CONCLUSION

Dental specialists, ordinarily, are at high danger of facing to irresistible infections. The development of COVID-19 has carried new difficulties and obligations to dental experts. A superior knowledge of aerosol transmission and its suggestion in dentistry can assist us with distinguishing and restore carelessness in day to day dental practice. In addition to the standard precautions, incorporation of some modifications could stop disease transmission from asymptomatic carriers.<sup>[6]</sup> Dentists treating Pediatric patients during this pandemic should follow universal infection control procedures to the highest standard. Choosing minimally invasive procedures over AGPs<sup>[12]</sup> and opting for several other special modifications would not just aid to control the spread of COVID-19 but also work as a guide for handling other respiratory diseases.<sup>[6]</sup>

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## Conflicts of interest

There are no conflicts of interest.

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