

The Changing Perceptions of Pediatric Dental Practice Post Covid: The New Normal

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ABSTRACT

Background: Dental practices are the focal points for cross-infection with risk even more in Pediatric dentistry. The main key to unlocking dental care post-Covid by meticulous prevention and infection control with comprehensive management strategies, by careful consideration of the available evidence and national body guidelines.

Keywords: Post Covid, pediatric dentistry, dental care, prevention & control, infection control, App.

INTRODUCTION

The novelty of this crisis has made our approach in the renewal of our practices a mix of application of existing science along with the creative interpretation of new findings.^[1] Post-pandemic, practices have to be focused on patient-centred outcomes like the consistency of care, interaction with patients, collaboration with medical and dental fraternities and infection control adhering to Government norms and regulations. Having a strong digital identity should be aimed at improving the quality of management of dental patients prioritizing the safety and well-being of professionals, adult, and child patients. Pediatric dentistry now needs a complete structural change with newly redesigned dental set-ups with investment in the right equipment to maintain strict hygiene and sterilization and cultural changes in the approach by adopting Tele-mentoring and shift focus to preventive dental care.

2. 'COVID-ified' future for pediatric dentists

- ❖ Doctor-patient communication- Introduction of a user friendly App.

- ❖ Infection control strategies:
 - Pediatric Dentists and dental auxiliaries
 - Dental set-up (Redesigning)- Structural changes (clinical set up), Equipment
 - Sterilization and disinfection- Instruments and dental clinic
 - Waste management
- ❖ Classifying dental procedures- Prior planning and scheduling treatments
- ❖ Clinical recommendations: Behaviour management, Preventive dentistry- Biological caries management procedures & Holistic orthodontics, Emphasis on AGP's (Aerosol generating procedures), single sitting procedures, "Outcome-based fee model"-giving flexibility of paying
- ❖ Online training for teachers, students, special schools.

2.1 Doctor-patient communication

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A doctor's communication and interpersonal skills encompass the ability to gather information to facilitate accurate diagnosis, therapeutic instructions, appropriate counselling, and to establish caring relationships with patients. These are the core clinical skills in the practice of Pediatric dentistry, with the goal of achieving the best outcome and patient satisfaction, which are essential for the effective delivery of health care.^[2]

With the emergence of the COVID-19 pandemic, teledentistry made us remain accessible to patients, with the implementation of virtual exams and consultation models carving its presence into our "new normal". Hence, every effort should be made to interview the patient either by telephone or text monitoring system or video conference before the visit.^[3]

The multifold advantages of using teledentistry are reduced overhead costs, coordinated consultations with patients and specialists, maximizes time for both dentists and patients, allowing a streamlined workflow, and is also beneficial for treatment planning and expanding the options of treatment phasing in complicated cases.

2.2 Infection control strategies

2.2.1 Pediatric Dentists and Dental auxiliaries

All the staff should be trained to strictly adhere to the infection prevention and control guidelines issued by respective national health organizations and governments.

PPE donning and doffing should be done in designated rooms having washbasin and bio-medical waste bins.^[4]

Latex gloves involve the development of micro-perforations which becomes significant after 60 min of usage, inducing an increase in the biological risk.^[5] Therefore, using two pairs of gloves simultaneously reduces the passage of blood through micro-perforations considerably.

For dental auxiliaries, it is recommended to wear thick domestic red gloves while washing tools, blue ones while boxing them and yellow ones while sanitizing.^[6]

(Table I) Practising post-Covid needs utilisation of PPE

- Hand Hygiene

"Two before and three after" technique- emphasises washing hands

Before: examining the patient, dental procedures

After: direct contact with the patient, touching the environment without previous disinfection, touching the patient's oral mucosa and skin, or coming into contact with saliva and oral fluids.^[7]

Alcohol-containing agents are preferable for hand wash. Coldwater must be used when washing hands because repeated use of hot water can cause dermatitis.^[8]

- Other precautions- Vaccinations

Hepatitis B- to increase personal protection,^[9] if already vaccinated, should monitor levels of immunity against HBV over time and take booster shots.^[10]

Other vaccinations: flu, mumps (live-virus), measles (live-virus), rubella (live-virus), and varicella-zoster (live-virus).^[8] Rubella vaccine is strongly recommended for female dental professionals who have pregnancy uncertainty.^[11]

The influenza vaccine is useful for dental health professionals as they are at increased risk for respiratory droplet infections.^[8]



Fig 1 & 2: Colourfully painted patient waiting areas.



Fig 3 & 4: Colourful operative area with dental chairs placed in distance/barriers.

COVID-19 vaccine is available. In high-risk cases, Rapid antigen tests should be done in dental practices before starting dental treatment, as a patient without symptom is not necessarily a healthy patient.



Fig 5: Colourful dental chair.



Fig 6: Snoezelen Environment.



Fig 7: Customised PPE.



Fig 8: Essix retainer.

2.2.2 Dental set-up

Toys, storybooks were earlier used to manage children. With newer infection control strategies, certain changes to be made are removing play items and magazines from the waiting area as a part of infection control strategies. In order to compensate for this, it is necessary to make the clinic colourful because colour is an integral part of the process of conveying messages, meanings and in the ability to identify necessary objects or warning signal.^[12] To summarise the changes to be made:

Entrance:

- Electronic doors or Entrance door should be kept open for proper ventilation.

Reception Area:

- Protective barrier at the reception area.
- Limit paperwork, use APP for consent form, prescription, details/records of the patient and for payments.

Waiting Area:

- Should meet hospital standards for infection control and air turnover. ^[1]
- Signs to prevent patients from walking through wrong areas.
- Display oral, hand, respiratory hygiene posters.
- Remove toys, magazines, books, have colourful painted walls (Fig. 1, 2).

Operative area:

- No ceiling fans, encourage use of wall mounted fans, etc for unidirectional flow of air.

DOCTOR PATIENT → EXTERNAL
ENVIRONMENT/FILTERS

- Cover switches, mouse, computer keyboards, and anything else that may be more difficult to clean with disposable film.
- Well ventilated cabins with HEPA Filters/UV-C irradiation light lamp, Exhaust fans.
- No external visible pipes on the walls and ceilings.

Table 1: Modulation of safety protocols for dental treatment procedures according to occupational risk in pre-COVID and post-COVID era.

	Pre-COVID	Post-COVID
Dental procedures safety protocols	- Disposable headgear - Surgical mask - Surgical gown - Disposable latex gloves	- Disposable headgear - Disposable/sterilizable visor to remove immediately - Powered air purifying respirator (PAPR) / FFP3 - Disposable protective suit - Double disposable latex gloves - Shoe covers

Table 2: Instrument disinfection procedures [15]

Item	Recommended method	Alternative method
Steel and Tungsten-carbide burs	Use metallic brush and detergent to clean, rinse, dry and dry heat	Use metallic brush and detergent to clean, rinse, dry and immerse in 2% glutaraldehyde for 10 h, rinse
Dental mirrors	Use detergent and water to clean, autoclave and store in covered pack or container	
Extraction Forceps	Use detergent and water to clean, autoclave and store in covered pack or container	
Composite carriers	Wipe with 70% ethyl alcohol	
- Handpieces - Air motor for slow speed handpieces	Flush for 30 s, clean with detergent and water, oil, and autoclave	Flush for 30 s, clean with detergent and water, oil, surrounding the handpiece by a gauze pad soaked in 2% glutaraldehyde for 10 min and rinse with water
Impressions-Alginate (plastic trays)	Rinse, spray with 0.1% sodium hypochlorite and put in closed container for 10 min	
Zinc-oxide eugenol paste	Rinse, spray with 0.1% sodium hypochlorite and put in closed container for 10 min	
Alginate (metallic trays)	Rinse, spray with 2% glutaraldehyde and put in closed container for 10 min.	
Rubber base	Rinse, immerse in 2% glutaraldehyde for 10 min and rinse	
Instrument trays, Orthodontic bands and pliers, Polishing stones, Rubber dam clamps, Saliva ejectors (metallic)	Use detergent and water to clean and autoclave	
Endodontic armamentarium, Ultrasonic scaler tips and inserts	Use detergent and water to clean, autoclave and store in covered pack	

Stainless steel instruments, Surgical instruments	or container	Dry heat
Rubber dam forceps	Clean and autoclave	Clean and immerse in 2% glutaraldehyde for 10 min rinse
Suction tube adaptors	Wipe with 70% alcohol after each use. Autoclave weekly	

Table 3: Biological caries management techniques.

Biological Management Technique	Caries	Cavitated/ Non-cavitated lesion	Primary/ Permanent tooth	Symptomatic/ Asymptomatic Tooth	Proximal/ Occlusal lesion
Fluoride varnish		Non-cavitated	Primary and permanent	Asymptomatic	Proximal
Resin infiltration		Non-cavitated	Primary and permanent	Asymptomatic	Proximal
Sealant		Non-cavitated	Primary and permanent	Asymptomatic	Occlusal
SDF		Cavitated	Primary and permanent	Asymptomatic	Occlusal and proximal
SMART					
Hall PMC		Cavitated and non-cavitated	Primary	Asymptomatic	Occlusal and proximal
		Cavitated	Permanent		
ART		Cavitated	Primary and permanent	Asymptomatic	Occlusal and proximal
ITR		Cavitated	Primary	Asymptomatic	Occlusal and proximal
ITR/diagnostic				Symptomatic (reversible pulpitis symptoms)	
IPC		Cavitated	Primary and permanent	Symptomatic (reversible pulpitis symptoms)	Occlusal and proximal

Atraumatic or alternative restorative technique (ART), interim therapeutic restorations (ITR) indirect pulp capping (IPC), the Hall technique (HT); Silver Diamine Fluoride (SDF) Silver modified ART (SMART) (Slayton et al. 2018; Urquhart et al. 2019; Al Halabi et al. 2018; Tedesco et al. 2017; AAPD, 2017a, b; Hussein et al. 2020; Seifo et al. 2018).

Table 4: Summarizes – before Covid (BC) vs After Covid (AC).

BC	AC
Traditional Dental care	Value-based dental care
Treating dental disease after it occurs	Prevention-focused and minimally invasive oral health care
Dentistry is a siloed profession	Medical-Dental integration and referrals
Electronic dental records are used to store information and billing	Electronic health records focused on linking quality to care
Strenuous consultation procedure	Accessible dental guidance through tele dentistry-APP
Fee-for service model	Outcome-based fee model
	Financial security-dental practice under MSME

- Use of false removable ceiling plasters, which interfere with cleaning should be avoided.
- Separate chambers for consultation and followed by cabins for Aerosol, non-aerosol control procedures.
- Dental chairs placed in distance/barriers in between (Fig. 3, 4).
- Colourful walls.

Changing room:

- There must be bins for the collection and subsequent disinfection of the non-disposable PPE.
- Special containers for the collection of waste (disposable PPEs, etc.).

Material sterilizing room and Resting room:

- Sensor taps, elbow-handles, paper towels should be used.

EQUIPMENTS:

- Sedation- Disposable Nitrous oxide tubes and masks.
- Isolation/suction- Isolite system.
- Instrument: Anti-retraction handpieces with anti-retractive valves,^[13] disposable hand instruments, laser.

2.2.3 Sterilization and Disinfection

- Antibacterial disinfectant rub and alcohol-based sanitiser at the entrance.
- Surface disinfection:
 - Wet mopping is unidirectional with warm water and detergent or hospital disinfectant (e.g. 1:50 dilution of 5.25-6.15% Sodium hypochlorite).^[14]
 - Start at the least contaminated area and proceed to the most contaminated one; start at the top and move downwards; start inside and move outwards.^[6]
- Clean dental chairs (0.5% sodium hypochlorite), spittoon filters, air & water pipelines (0.01% of sodium hypochlorite),^[14] Ac filters; Regularly check and drain the compressor cylinder till the gauge is zero.

- Clinical environment- (Table II) presents Instrument disinfection procedures (Table modified from DH ICCo. Guidelines on Infection Control in Dental Clinics 1993)^[15]

Other disinfectants: 0.2% Peracetic acid; Active oxygen- 3% Hydrogen peroxide, Ozone; 0.2% Benzalkonium chloride.^[16]

- Colour changing autoclavable pouches.
- Impression sterilization- Prioritise digital dental impressions.^[16]
- Tubing of high-volume aspirators and saliva ejectors regularly flushed with water and disinfectant (0.1% sodium hypochlorite).
- Defogging of the operating area between appointments
- Delicate Electronic equipment – wiped with alcohol-based rub/spirit (60-90% alcohol) swab before each patient contact.

2.2.4 Waste management

The waste resulting from the treatment must be safely disposed of in double-layer yellow-coloured medical waste package bags with "gooseneck" seal.^[17] Dental office waste must be regularly transported to the temporary storage facility.

2.3 Classifying dental procedures

Classifying dental procedures, according to:

1. The likelihood of contagion by one or more infective agents (via saliva, blood, droplets, or aerosol) into WET or DRY Appointment

(OR)

2. Risk assessment

Colour code:

Red: Emergency care- a priority for urgent treatment owing to their dental/ medical/ social/ behavioural needs.

Yellow: Urgent care- experiencing moderate dental impacts and had already received at least one course of antibiotics. Advice or interventions were

actioned for this group, with follow-up phone calls to review their condition. If necessary, then offered a hospital appointment (for local anaesthesia, inhalation sedation or GA as appropriate).

Green: Scheduled/Elective care- the patient was reportedly symptom-free or was experiencing mild symptoms.

2.4 Clinical Recommendations

• Behaviour Management

The most important technique which can address the fear and anxiety of both child and parent in the post-Covid era is appropriate and skilful behaviour management.

Pre-appointment:

-Instructions to watch videos of doctors wearing PPE in the APP and play online dentist games

- Pre-appointment Questionnaire (PAQ)/Letter- which helps in pre-appointment interaction with kids, thus helping in facilitating positive dental attitude in the first visit and addressing fear of unknown, knowing likes and dislikes of the child beforehand.

In-Office:

Usually, Pediatric dentists use face, eyes, voice-over, Tell-show-do (TSD) and Modelling techniques in managing kids. But in the post-Covid era, face and eyes will be covered with face shields, TSD and Modelling cannot be possible. A child is already frightened by the appearance of doctors in PPE or scrubs. Increasing voice tone may, even more, make the child uncooperative. Hence, the techniques to be followed in the post-Covid era are:

- Dental Clinic- Colourful walls and dental chairs (Fig. 5), soothing music, Snoezelen environment (Fig. 6).^[18]
- Dentist appearance- Doctor's Name and photo on PPE or customized PPE (Fig. 7)^[19]
- *Parent and child -*

Message clarity, PAQ, Motivational Interviewing, Coping techniques

- *Child -*

TLC (Tender Loving Care), Tell-Play-Do, Empathy, Child-centred approach, Active listening, Multisensory communication, Magic trick, Memory restructuring strategy, Euphemism.^[18]

- Preventive Dentistry
 - Dental caries needs to be best managed by prevention ^[20]
 - Caries risk assessment at child's first dental visit.
 - Dietary modifications (low cariogenic tooth-friendly diet).
 - Brushing daily for appropriate management of biofilm.
 - Using biological atraumatic non-invasive or minimally invasive treatment alternatives (Table III). ^[21]
 - Holistic orthodontics- Focuses on balanced jaw and anterior facial development using natural forces such as tongue pressure, masticatory forces and proper breathing.

The goals of Holistic Orthodontics are:

- Nasal breathing
- Competent lips
- Tongue on the palate at rest
- Tooth in the neutral zone
- No movement of facial muscles on swallowing
- Balanced jaws
- Optimal facial development
- Long term stability
- AGP (Aerosol Generating Procedures)
 - Extraoral wiping of the face with betadine/isopropyl alcohol.
 - Protection from saliva (infectious load): Use of rubber dam and pre-procedural mouth rinse with 0.5-1% Hydrogen peroxide or 0.2% povidone-iodine by the patient is recommended ^[22] Isolite system.

- Four-handed dentistry with high volume suction for aerosols should be implemented along with regular suction.^[7]
- Chair position: Working in 10 or 11 o'clock position is recommended. To avoid splatter, the eight o'clock position should be avoided

AGP's can be made safe by use of a few alternative techniques like:

- **Chemo mechanical caries removal (CMCR)**- Carisolv, Caridex, Papacarie, Biosolv, etc

Kochhar et al. in 2011^[23] reported that least pain was associated with the Papacarie caries excavation method. Singh et al. in 2011^[24] reported that Papacarie exhibited a high patient comfort level when compared to other methods. Therefore, Papacarie can be used for efficient caries removal in children.

- **Laser**- Future gold standard in pediatric dentistry ^[25]

Can be used for:

- ✓ caries prevention
- ✓ early diagnosis
- ✓ cavity restoration
- ✓ management of traumatized teeth
- ✓ minor oral surgical procedure
- ✓ pulp therapies
- **Lesion Sterilization Tissue Repair (LSTR)** can be taken up as an alternative to pulp therapies in uncooperative patients
- Single visit treatment- Space maintainer
- Preformed bands can be used.
- Chairside fabricated glass fibre reinforced space maintainer.
- 3D printed space maintainer.

- Tooth modified Essix retainer as a space maintainer ^[26] (Fig. 8) in avulsion and extraction cases.

2.4 "outcome-based fee model"

This gives flexibility to the patient for paying fee in post-Covid era, with an uninterrupted treatment.

2.5 Online Training

Community-level educative awareness interventional programmes can be conducted using recorded videos to guide teachers, students, special schools regarding oral health measures, trauma management, diet modifications stressing more on prevention-centred strategies.

3.0 Decoding stress-post Covid times

It is necessary for health care professionals to have a sound body and mind for a balanced career and personal life. Therefore, by practising stress decoders such as aerobics, yoga, surya namaskars, trigger point exercises, chair side stretching's and use of saddle stools, dental loupes and with proper positions for better ergonomic posture in work place ensures well being of good quality of health of practitioners.

Financial concerns: As Dental practices have been granted with MSME (Micro, Small & Medium enterprises) by Government of India, practitioners shall benefit with this especially in post Covid times for redesigning their dental clinics and for investing in right equipment and instruments for a productive and a hygienic practice.

4.0 SUMMARY (Table IV)

CONCLUSION

Though COVID-19 pandemic has presented a challenge to dental practitioners, it has also paved the way in bringing a paradigm shift in the concept of Pediatric dental practice which focuses on prevention-patient-centred care (PPCC), through inter professional collaborative practices enhancing and strengthening the scope of pediatric dentistry.

PPCC

1. *Pediatric dentist- oral physician*: Oral cavity-mirror of systemic health.
2. *Personalized care plans*: Diet counselling, fluoride applications, caries risk assessment.
3. *Focus on wellness and disease prevention*: First dental visit, well baby visit.
4. *Support and resources for self/home care*.
5. *Accessible care*.
6. *Comprehensive preventive dental care*: Biological caries management, holistic orthodontics.

7. Collaborated care:

Community-

Primary health care centres, schools, orphanages, special schools.

Medical-

General physician, Pediatricians, Gynaecologists, Nutritionist.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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