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Guideline for dental office in the wake of novel corona virus-19: A summary of proposals

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Abstract
The novel corona virus-19 pandemic has presented an unprecedented challenge to human civilization, and clinical dental practice is one among the most affected sectors. As the virus spread via saliva and droplets, the risk of exposure for dental health care providers is the maximum, for the unique work pattern, like their proximity to patient's nasal and oral cavity, their handling with blood and saliva etc. In this discussion, we have tried to share our thoughts, and also we have compiled recommendation from different regulatory bodies and present an operational guideline for regular dental practice to ensure infection control during the pandemic.

Keywords: Novel corona virus-2019, covid-19, IPC, BMW, HCW, dental

1. Introduction
The corona virus disease-2019 was first noticed in Wuhan, China in December, 2019; and within months, it turned into a pandemic across the globe.
The virus, belonging to the family coronaviridae (order nidovirales, realm riboviria), is an enveloped one with positive sense single stranded RNA genome. The name 'corona' has been derived from Latin *corona* (meaning crown), and it refers to its characteristic appearance resembling 'solar corona'. This morphology is created by the spike glycoproteins on the surface of the virus that produce a fringe of club-shaped projection. The first corona virus was detected in 1930 as IBV (infectious bronchitis virus) affecting chicken. The human corona virus was discovered in 1940 causing common flu among humans.
The family of the virus has been known as zoonotic, i.e. transmitted among animals, from animal to human, and among humans; including SARS-CoV-1 (2002) and MERS-CoV (2012). This novel corona virus is much similar to the species found in bat and pangolins. The Chinese Center for Disease Control and Prevention officially declared it as the causative agent of COVID-19 on January 8, 2020. It was initially named as 2019-nCoV, and now it has been referred to as SARS CoV-2. Despite relatively moderate mortality, the covid-19 has literally locked down the human civilization, with surprisingly high transmissibility. Health care workers are often getting infected every day. As the virus spread via saliva and droplets, the risk for oral care providers is the maximum, for the unique work pattern, like their proximity to patient's nasal and oral cavity, their handling with blood and saliva etc.

1.1 Mode of spread [1].
The virus harbor in saliva, naso-lacrimal and pharyngeal secretion; and they spread by direct contact, fomites, droplet and aerosol.

1.2 Route of entry [1].
Oral cavity, Nasal cavity, Eyes, Cut/abraded skin.

2. Recommendation for oral health care providers in the awake of Novel Corona Virus-19
In the time of corona pandemic, as health care worker (HCW), it remains our duty to access

authentic source of information, not to panic but remain cautious, assure people and campaign awareness.
Postpone all non-emergency dental treatment till the curve of spread of covid gets flatten.

2.1 Rationale for temporary postponement of treatment [2].

1) It is now difficult to trace the asymptomatic careers.
2) To restrict public movement is the need for the hour.
3) Risk for aerosol production
4) Limited availability of PPE

2.2 Patient triage based upon emergency of dental care

However, the treatment for certain dental patients can be deferred till regular dental service resumes, but some cannot be awaited long indefinitely. Hence a severity of dental disease and the treatment need based triage is essential for the functioning of dental office. Here, a screening system, based upon 'Emergency Severity Index' (suggested by American Dental Association on March 18, 2020) [3] has been proposed below (Table 1), where patients have been divided in 3 category, like patients seeking elective, urgent and emergency care and managed accordingly.

Table 1: Severity of dental disease and treatment need based triage and management [3, 4, 5, 6].

Category of care needed	Clinical condition	Dental care
Emergency	1. Uncontrolled bleeding, 2. Diffuse extra-oral/ intra-oral septic swelling, interfering with airways. 3. Severe dental & oro-facial trauma	Patient must be attended for the emergency dental/ oral/ life-saving care.
Urgent	1. Severe pain of pulpal-periapical/ periodontal origin, not responding to medication 2. Acute abscess 3. Peri-coronal infection & trismus, 4. Post-extraction pain 5. Dental trauma/ fracture 6. Suture/ pack removal, post-surgical recall 7. Recurrent ulcers or red/ white patches 8. Recurrent trauma from sharp teeth, orthodontic appliances, denture etc. 9. Dental care necessary for performing urgent medical/surgical procedure	Pharmacological management with constant follow-up If condition worsens even after pharmacological management, patient should be attended and scheduled for urgent care. **It includes** 1. Extraction of non-restorable carious/ fractured tooth causing severe pain and recurrent peri-apical infection, highly mobile tooth, tooth/ root stump causing recurrent trauma, impacted tooth causing serious problem. 2. Access preparation with clinical micro-motor hand-piece/ chemo-mechanical means, change of intra-canal dressing of incomplete endodontic therapy 3. Abscess drainage 4. Temporary restoration, cementation of crown/ FPD 5. Correction of denture etc. 6. Suture/ surgical pack removal 7. Biopsy/ excision of growth 8. Selective grinding
Elective	1. Dental sensitivity 2. Bleeding gums 3. Loss of restoration/ prosthesis, 4. Incomplete endodontic therapy, where patient isn't reporting of pain/symptoms 5. Orthodontic therapy	Patient should be only tele-counseled and given appointment later, when routine service would resume.

2.3 Patients, who should be deferred from regular treatment, unless emergency [2]

Patients should be assessed for the risk of exposure for covid prior undertaking, preferably through tele-counselling before the appointment given, and again physically as patient arrives in dental clinic. Patients, belonging to the risk group, are following:

1. Patients with influenza-like illness (ILI) that includes cough and cold, fever and shortness of breath; or diarrhea; depending on degree of severity.
2. Patients with traveling history within 28 days in a corona affected country/ zone.
3. Patients with contact history with a corona sero-positive, or suspect within 28 days
4. History of hospitalization within 28 days
5. Patients belonging to hotspot zone
6. Tested corona sero-positive within 28 days.

A suspect is a person giving a traveling history, contact history with a covid patient or any suspect, or a health worker, or one belonging to a hotspot zone, or having h/o hospitalization, or showing some symptom; till tested negative.

2.4 Health care worker, who should avoid the contact with patients [2]

1. Dentists and paramedics, belonging to high risk group, like:
   - Elderly age (above 60 years)
   - Having co-morbidity (endocrinopathy, blood disorders, cardio-vascular diseases, chronic lungs diseases, chronic kidney diseases, chronic liver diseases, cancers, under immunosuppressive drugs etc.)
2. If they themselves are corona-sero-positive, or come under suspect category.

3. Recommendation for infection prevention & control (IPC) in dental practice

The awakening of Novel Corona Virus-19 has presented with a challenge for the clinical dental practice. The regular work-flow of a dental office has to undergo some modifications, those changes are aimed to protect the health care workers from the infection, as well as prevent the cross-infection

among the patients; so that the dental clinics never become the source of transmission of disease in the community.

A two-tiered approach is adopted as precaution for an infectious disease, like standard precautions and transmission based precautions[7]. As CoV-19 is seen to transmit through droplet, contact and air (for a short range), a combination of droplet, contact and airborne precaution, in addition to the standard one, is required.

Employment of PPE, hand hygiene, strict disinfection protocol, and environmental cleaning represent the fields of concern in this regards.

3.1 Hand hygiene guideline

Maintenance of hand hygiene becomes a regular practice since covid pandemic. This should be performed before and after each treatment session, before and after every PPE use, with soap and water (preferred), or alternatively with IPA based formulation.

Fig 1: Hand washing technique with soap and water [7].

Soap and water

Here, liquid soap is preferred over bar to avoid the risk of cross-infection. Soap solution is applied over the wet hands, and hand washing is carried out as shown in diagram (Figure 1). Rubbing should be maintained for 20 seconds minimum. This will be repeated if the hand isn't visibly clean. Soon after the wet hands should be wiped with paper towels, as wet hands/ surfaces catch microbes easily. A moisturizer solution is recommended for those with dry-skin.

When hands are visibly dirty and soiled with blood/ saliva/ etc. washing hands with soap and water is the only choice.

Fig 2: Hand hygiene technique with ABHR [7].

IPA based formulation

When washing hands with soap and water is difficult, hands are not visibly dirty and soiled with anything, alcohol based hand rub (containing minimum 70% IPA) can be used alternatively (Figure 2).

ABHR has potent anti-microbial action against gram positive and gram negative vegetative bacteria and enveloped-virus. It is not effective against spores, protozoan oocyte and non-enveloped virus.

Finger nail must be kept short, clean and smooth as a surgeons' general hygiene practice. Rings/ bracelets/ watches must be removed prior undertaking clinical job.

3.2 Personal Protective Equipment (PPE) guideline

PPE is not the protective shield for a clinician only, but it serves the same for clinical staffs, scavenging staffs, front-desk staffs and even patients also. The level of protection, and hence, the PPE demand varies with the risk profile and hence, the types of procedure. If standard PPE is not available, a dentist mustn't proceed with any dental treatment (nor even examination), irrespective of its urgency.

Components of PPE

- Gowns/ Aprons
- Gloves
- Face masks
- Goggles
- Face shields
- Head caps
- Shoe covers

1. Gowns/Aprons

It is mandatory to wear gown fully covering torso, at least knee-length, full sleeve, high neck, wrap around the back, and fastened at back, neck and wrist. It should be prepared of water resistant SITRA certified fabric with a thickness of 63-69 gsm; in absence, a disposable plastic apron can be worn over a non-fluid resistant one, though not recommended.

For examination purpose, a non-fluid resistant gown can be worn by HCWs. But a full-covering water resistant gown is required when a prolong contact with patient, or an aerosol production, or splashing of blood/ saliva is anticipated. Single use gowns are desired, as novel corona virus-19 is still a group 4 pathogen (i.e. pathogen causing serious human infection, but there is no established definitive treatment)[7], the disposable gowns must be used in extensive surgical procedure.

It should be discarded after every single use. For a limited availability, only the fluid impermeable one can be used over a session with spraying soap water or disinfectant (IPA) after every single patient.

Gown must be fastened snugly, yet comfortably, at back, neck and wrist. While removing, it is peeled away turning the contaminated outside towards in, and rolled and dumped as per protocol.

2. Gloves
Nitrile/vinyl/surgical grade latex gloves, preferably powder-free, minimum 280 mm long and 8 mils thick, partly covering the arm (i.e. extending beyond the wrist), snuggly fitting, are required. If possible, two pair of gloves of different colors should be used, so that an accidental tears of outer one could easily be addressed. Gloves are strictly subjected to single use. A clean, non-sterile gloves can be used for examination purpose, but a pre-packed sterile gloves is mandatory for aseptic procedures; and the sanitary staffs must be given with heavy utility gloves.
While wearing, it is our recommendation, if the gloves is extended over the gown cuffs, and end 1/2 inch is kept reverted out so that, while removing, it can be held there and pulled away, without touching the inner surface of the gloves, as well as the gown cuffs.

3. Face masks
A single use N-95/ FFP2 respirator, with minimum fluid resistance 80 mm Hg pressure and filtration efficacy 95% above 0.3 micron, having comfortable breathability, without an expiratory valve, is preferred. It can be combined with a triple layer surgical mask externally, if subjected to 6-12 hours of extended use.
While wearing, the N-95 mask, held in cupped palm of hand, is placed over mouth, the nose piece is adjusted over bridge, first the lower elastic band and then the upper one is secured, and the respirator is tested. The mask should collapse and inflate on inhale and exhale respectively. It is removed by holding at the elastic strings only.

4. Goggles
It has to protect eyes all around, with flexible frame and elastic band, having zero power and clear visibility. Goggles must be well fitting, yet comfortable, light weight, fog resistant. It is reusable after necessary disinfection. Personal spectacles are not a suitable alternative for this.

5. Face shields
It is used in combination with face mask and goggles. A face shield is a must to procure for any aerosol-high work, like dentistry.

6. Head cap
Head cap/ hood covering hairs, part of forehead, ears and back of neck is also essential for dental office. It should be made of the fabric similar to gown.

7. Shoe-covers
A water-resistant shoe-cover, covering the entire shoes and reaching above the ankle, completes the essential safety gears for a HCW.

Table 2: Standard PPE requirement in dental clinic [9].

HCW	Assigned job	Risk profile	PPE
Dentist	Examination, Short procedure-not generating any aerosol (impression, finishing/ polishing of restoration/ prosthesis extra-orally, brief orthodontic treatment, suture/ surgical pack removal)	Moderate	Normal gown/apron Surgical gloves N-95 mask Goggles Head-cap Shoe-covers
	Any procedure with prolong contact with patients (more than 15 minutes), or generating aerosol	High	Fluid resistant full gown Surgical gloves N-95 mask face-shield Head-cap Shoe-covers
clinical staff	Chair-side clinical assistance	Moderate/ high	Same as the operating dental surgeon
Sanitary staff	Environmental cleaning, disinfecting the patient care equipment, disposing the biomedical waste, housekeeping	Moderate	Normal gown Heavy utility gloves N-95 mask Goggles Head-cap Shoe-covers
Reception staff	Thermal screening, triage, providing masks, supervising hand hygiene, Paper work, interacting with patients	Moderate	Examination gloves N-95 mask Head-cap Shoe-covers
Walking in patients/ patients/ attendance	Nil	Low	Triple layer surgical mask Head-cap Shoe-covers

Separate places for donning and doffing PPE, with wash basin having long handled tap and storage cupboard and contactless beans are desired. Discarded PPEs should be disposed as per protocol as mishandled PPE increases the chance of infection.

Sequence of donning
Inner gloves*--- Gown--- face mask**--- goggles--- head cap--- face shield--- shoe-covers--- outer pair of gloves

Sequence of doffing
Outer pair of gloves--- gown—face shield---head cap--- goggles--- face mask**--- shoe-covers--- inner gloves* *if not used, then start from/ end at next/ prior item **if N95 is to reuse, then put a 3-ply surgical mask on this; and while removing, dispose the outer mask only.
*** Hand hygiene must be performed before donning and after doffing the PPE.

Fig 3: Donning procedure of PPE

Fig 4: Doffing procedure of PPE

3.3 Sterilization/ disinfection guideline

The idea is to follow the standard protocol for sterilization/ disinfection, and should be followed stringently under strict surveillance. The procedure for sterilization/ disinfection of different items, used in dental clinic, is depicted below (Table 3).

Table 3: Asepsis/ disinfection protocol in dental clinic [7, 8].

Patient care equipment Category	Patient care equipment Example	procedure for sterilization & disinfection
Critical patient care equipment [those are used to cut the soft tissue and bone and extensively come in contact with blood]	Endodontic files, periodontal curette, extraction/ surgical instruments.	Autoclave. Burs and endodontic files are disposed after single use, if possible.
Semi-critical patient care equipment [those coming in contact with mucous membrane or non-intact skin]	Diagnostic set, plastic filling instruments, impression trays.	Autoclave/ high level disinfection for heat sensitive ones with 2% glutaraldehyde for 15 minutes/ 3% hypochlorite for 10 minutes/ conc. soap solution for 20 minutes.
Non-critical patient care equipment [those only contact intact skin, and those	X-ray tube, endodontic motor (except hand-piece), scaler machine	Cleaning thoroughly. Covering the surfaces of heat-sensitive items with FDA-cleared polythene barrier is a better alternative.

frequently touched by clinician]	(except hand-piece), light cure unit, face-bow.	In addition, cleaning with EPA registered hospital disinfectant with intermediate level (tuberculocidal claim) is desired.

Sequence

Washing in running tap water/ ultra-sonic cleaner -> chemical treatment/ autoclave/ both -> ultra-violet ray cabinet

Most overlooked items in these regards are hand-piece and bur, which often miss required sterilization in our daily practice! A number of hand-pieces should be kept ready for use, and after using one, it should be scrubbed with disinfectant/ conc. soap solution, and then autoclaved in sealed pouch. For a micro-motor/ air-motor hand-piece, one with ceramic bearing is desired, as it is resistant to heat and moisture. For air-rotor hand-piece, one with anti-retraction system is preferred, as it restricts the back flow of fluids. Otherwise, after finishing the job, povidone iodine/ hydrogen peroxide/ chlorhexidine is added to the water reservoir, and the hand-piece is allowed to run on, so that the fluid comes out from within. Same protocol should be employed for laboratory hand-piece too. An ultrasonic scaler with detachable hand-piece must be used, that can be autoclaved.

Another overlooked field is impression and cast. Impressions must be disinfected before pouring, with 1% hypochlorite soln. (alginate/ compound), 2% glutaraldehyde (ZOE paste/ rubber based).

Almost all modern electronic dental gadgets are heat and moisture sensitive, and hence those are not fit for aforesaid treatment, e.g. endodontic motor (switch panel), ultrasonic scaler (switch panel), light cure unit, RVG sensors. These devices should be used with disposable plastic covers (RVG sensors, light curing gun); or should be avoided from touching with contaminated gloves of clinician. Instead, the assisting staff, whose gloves have not been contaminated yet, should be instructed for operating those (e.g. switch panel of endodontic motor, ultra sonic scaler); or these should be replaced by autoclavable alternatives (e.g. an electrical guttapercha cone cutter should be replaced by a heated ball burnisher). Whenever the article comes in contact with blood or saliva, it should be scrubbed with alcohol wipes.

The dentist must restrict himself/ herself from touching things/ surfaces beyond working field and the clinical assistant should be trained for catering necessary instruments and materials, like dispensing composites, or providing pfi.

3.4 Environmental safety guideline

3.4.1 Positioning of patients

Social distancing must be followed strictly everywhere. In the waiting, the patients must be seated keeping a distance of 3 feet among themselves. If space doesn't permit, they should be requested to wait outside the clinic until the space is created. In this regards, a smart telephonic appointment planning and strict maintenance of the schedule are required. In the operatory, for multiple dental chair, a minimum of 6 feet distance among chairs must be maintained. Wherever not possible, patients should not be taken together at a time.

3.4.2 Environmental cleaning

Dental office must be cleaned thoroughly, especially after aerosol generation. Here a cleaning and disinfection policy for dental care settings has been presented in Table 4-a.

Table 4-a: Cleaning and disinfection protocol for dental clinic [7].

Settings	Items	Procedures	Frequency
Patient care area	Floor	Wet mopping with 3-bucket technique - one with plain water, one with detergent solution and one with disinfectant (0.5% hypochlorite solution) and damp cloth piece in following order: detergent- water-disinfectant.	After every session/ whenever gets soiled
	Celling, wall, doors and windows	Moist dusting with a micro-fiber duster and soap solution, sweeping in overlapping lines.	Daily once/ whenever gets soiled
	High-touch/ clinical surfaces	Very frequently touched items and clinical surfaces within 3 feet distance from dental chair must be cleaned with hot water, detergent and hospital grade disinfectant solution (1% hypochlorite solution) If any surface are not feet for wet mopping, that should be covered prior.	After every patient
	Non-touch/ non-critical surfaces	Thorough washing/ moist dusting with scrubber and warm soap solution, as the item demands.	Weekly once/ whenever gets soiled
Patient holding area	Floor	Wet moping with 3-bucket technique as mentioned earlier. No use of broom is recommended	Daily once/ whenever gets soiled
	High-touch surfaces/ toilets	Cleaned with hot water, detergent, 1% hypochlorite solution.	Daily once

Here a frequency based cleaning schedule has been attempted to present in Table 4-b.

Table 4-b: Standard frequency for cleaning in dental care settings [8].

Frequency of cleaning	Items
After every patient	Dental chair (chair arms, light handles, working tray, control panel, hand-piece and other attachments, spittoon, saliva ejector), devices that were used (light cure unit etc.), x-ray machine, trolleys/ delivery units
After every session	Storage cabinet doors, floor, drainage points, wash basins, spittoon and suction machine (as per manufacturers manual)
Weekly once	Each and every washable surface (doors and windows and their handle), AC vents, fans etc.

For blood spillage, 1% hypochlorite solution is recommended with a minimum contact time of 5 minutes. The mop must be washed with hot water-soap solution and disinfected by 1% hypochlorite solution and laundered; and should be changed

regularly. Removal of every clutter that cannot be cleaned and disinfected, from practice is recommended, like magazines, show-pieces etc. The dental office should be decontaminated by fogger/ fumigator, ultra-violet light at regular basis.

Aerial disinfection

CDC guideline (2008) has mentioned for the importance of fumigation/ fogging in health care facility. Fumigation using formaldehyde/ peroxide/ chlorite/ ethylene oxide must be performed at the end of a working day, or at least weekly once. Alternatively, ULV/ cold fogging with QAC (like D125/ D256) can be employed in between the patients.

Ultra-violet light

UVC light with wave-length 254 nm has been reported to have potent anti-microbial activity. Irradiation with 30W tube (wall/ celling mount, or standing) from opposite sides for 3-5 minutes is recommended for dental care settings.

3.4.3 Air-flow circulation

Airborne infection occurs through droplet nuclei below 5 micron and novel corona virus is 0.8-1.2 micron in average. Hence covid-19 cam transmit through air during aerosol generating procedure. Ventilation reduces the risk of infection by dilution and removal of infectious particle via air exchange. Hence improved ventilation is essential for health care facilities like dental clinic.

In our country, majority of the dental clinics pose natural ventilation (where air enters or leaves the room through openings like doors and winos). Unrestricted and fixed opening on both opposite walls, with a surface area of at least 20% of floor, provides the best natural ventilation.

Mechanical ventilation (which employs fans to drive the airflow in room) can be fully controlled, in combination with air cooling/ heating and purification. It also includes 'mixed mode ventilation, where exhaust and supply fans are added to natural ventilation.

It should be remembered that implication of split AC with closed doors and windows completely lack the air exchange. Hence during the pandemic, AC must be avoided in the operatory, at least during aerosol generation; otherwise it must be combined with sufficient air purifying system.

Air exchange rate

Minimum air exchange rate, estimated to reduce the risk of infection below 5% in a closed setting is shown below (Table 5).

Table 5: Required air-flow in dental clinic [7].

Settings	Minimum Air Changes Per Hour (ACH)	Minimum hourly average rate of ventilation (liter/ second/ patient)
Waiting room	>6	40
Operatory room	>12	80-100

Directional control of airflow

The direction of airflow of dental clinic should be between the patient and dentist, instead of 'across' patient and dentist, as shown below (Figure 5).

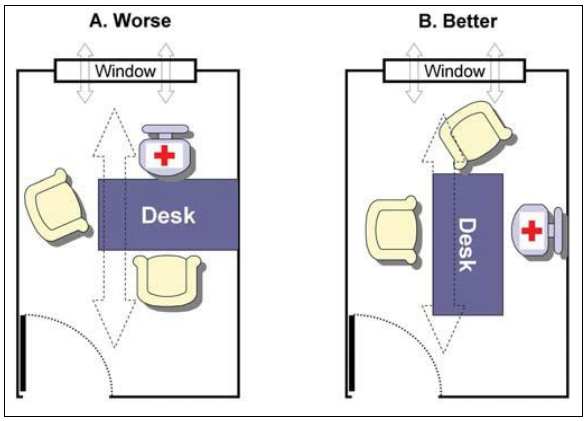

Fig 5: Sitting arrangement in naturally ventilated room [7].

Filtration

A true-HEPA (high efficiency particulate air) membrane filter provides 99.97% filtration of 1 micron sized particle. Ionizer, in combination with HEPA are claimed to have germicidal property, though not established.

Heating, ventilation and air-conditioning system (HVAC) controls the infectious particles of air by air flow and pressure control and filtration. The central air conditioning uses 3 types of filtrations (1) coarse for large particle size, (2) micro-filter for particle size above 5 micron and (3) HEPA for small particle size up to o.3 micron.

Airborne precaution room

The aerosol generating procedures should be performed in an airborne precaution room. It must meet the following requirements:

1. Minimum airflow rate of 12 ACH.
2. Directional control of airflow.

For naturally ventilated airborne precaution room, air must flow from the room to the outside environment.

For mechanically ventilated airborne precaution room, a negative pressure (air pressure of the operatory is less than outside) must be maintained with following requirements:

1. Clean to dirty airflow.
2. An exhaust to outside, or HEPA/HVAC if air is re-circulated.
3. A negative air pressure differential of minimum 2.5 Pa.
4. An airflow differential of minimum 125 CFM/ 210-215 CMH. (CFM= cubic feet per minute, CMH= cubic meter per hour)
5. A sealing of the room allowing 0.5 Sq. ft leakage.

As an example, for 2000 cubic feet space, about 400 CFM/ 680 CMH fresh air flow is required for maintaining 12 ACH air exchange rate. So an air purifying machine with equivalent CADR (clean air delivery rate) would be required. Alternatively exhaust fan with 9 inch diameter and 1400 rpm produces 425 CFM;

3.4.4 Bio-medical waste

As per Bio-medical Waste Management Rules 2016 & its Amendments, BMW generated during screening, treatment, management etc. from health care facility should be segregated and disposed, as shown in Table 6.

Table 6: Bio-medical waste management protocol in dental clinic [7].

Category of Waste	Color coding	Final Disposal
Human tissue (like extracted tooth, excised growth)	Yellow	Incineration (deep burial for remote/ rural area)
Soiled wastes, like cotton/dressings, contaminated with blood/	Non-chlorinated plastic	Incineration

saliva (excluding blood bags), sutures	bag/ packaging	In absence of the facility, autoclaving/ microwaving/ hydrowaving and shredding. Treated wastes is send for energy recovery.
PPE like face mask, gown, cap etc. (those made up of fiber material or others except those made up of disposable plastics), linen Floor washing, housekeeping, sanitary & disinfecting mops		Non-chlorinated chemical disinfection and subsequent incineration
Impression & casts, ceramic/acrylic items		Incineration
Latex Gloves (even if contaminated with blood/ saliva) Disposable plastic (those used as barrier, syringe without needle)	RED Non-chlorinated plastic bag/ packaging	Autoclaved and shredding. Treated waste is send for energy recovery/ recycling
Broken/ intact glassware's, medicines vials/ ampoules (except those contaminated with cytotoxic waste)	BLUE Puncture proof, leak proof container with blue marking	Disinfection (soaking with detergent/ disinfectant) or autoclaving, shredding, then recycling
Metallic sharp wastes like needles, scalpels, blades, syringe with fixed needles Metallic restoration/prosthesis, orthodontic brackets	WHITE Puncture proof, leak proof, tamper proof container	Autoclaved, shredding followed by encapsulation

4. Clinical management guideline

The entire treatment plan should be focused on minimizing the aerosol production. In addition, care must be taken on maintaining required physical distance among/ with the patients in waiting, prior screening for the symptoms, preventing cross-infection among patients, protecting himself/ herself from infection. The dentist must provide his/ her sub-ordinates with safety training. Finally, a professional must not hesitate to inform the concerned authority, if encountered with a covid suspect, and every person in contact (dentist/ office staffs/ other patients) should be informed and asked for medical consultation.

4.1 Appointment planning

1. Prior appointment is utterly desired. Unnecessary visits should not be indulged.
2. Verbal screening (for history of exposure and symptoms) on telephone.
3. At least a gap of 15 minutes must be maintained in between the appointments.
4. Patient is asked to come alone, if possible; otherwise to bring maximum one person accompanying.

4.2 Protocol for undertaking a patient

When patients arrive at dental office, they first step into reception (waiting room) and then they are taken to operatory (working room).

Protocol for waiting room:

1. Maximum one attendant should be allowed for every patient.
2. There must be sufficient space between 2 persons while waiting (physical distancing).
3. Patient must put on a cloth/ surgical mask, on entering the clinic; and then sanitize the hands with soap water, or IPA based suitable hand rub, provided by the clinic.
4. Thermal screening, relevant history, and consent for covid.*

Protocol for working space

1. Relevant history is re-taken
2. Patients, undertaken for treatment, must be cladded with apron (at least knee-length, full sleeve, high neck), head cap, goggles.

4.3 Clinical protocol

Pre-procedural protocol

1. If possible, separate set-up and separate entity for high-aerosol producing, moderate aerosol producing and non-aerosol producing procedures.
2. If not possible, aerosol-free procedure are appointed early; aerosol producing procedure are appointed at later hours of clinic.
3. Prioritize the application of hand/ manual instruments and single visit treatment plan.
4. If two patients are attended at a time, there must be a gap of 6 feet between two chairs.

Per-procedural protocol

1. Patient is asked to use 0.2% chlorhexidine/ 1% povidone iodine/ 1% hydrogen peroxide solution for 60 seconds, before starting approaching for any procedure.
2. The skin of the face (extra orally) also must be scrubbed thoroughly.
3. Povidone Iodine should be added with the water in reservoir of dental chair.
4. Application of rubber dam is the need of the hour
5. 4 handed dentistry with high volume suction.
6. Extra-oral suction is desired
7. Clinical contra-angle micro-motor hand-piece with external irrigation, or ELECTRICAL HANDPIECE is preferred
8. Practice of chemo-mechanical preparation of cavity, ART should be encouraged.
9. Extra oral radiography is desired, if feasible
10. All procedure should be performed at arm's length

4.4 Protocol for leaving the patient

Protocol for leaving the working room

1. After completing procedure, patients must take off the PPE, and sanitize hands before leaving.
2. E-prescription should be popularized.
3. Cleaning and disinfection of operatory, as discussed earlier.

Protocol for leaving the waiting room

1. Patient must be asked strictly to report if he/ she develops any symptom within 14 days.

2. Patient must sanitize hands, and asked to scrub the cloth and take bath, on returning home.
3. Non-contact, e-payment is encouraged.

5 Recommended workflow for a dental care setting

1. Patient arrives at clinic

- Restricted entry
- Put on shoe-covers
- Thermal screening
- Provide mask
- Hand hygiene
- History & consent

2. Patient undertaken for check-up (meanwhile dentist and clinical staffs are prepared with PPE)

- Retake relevant history
- Provide PPE
- Povidone Iodine rinse
- Check-up

3. Patient undertaken for procedure (meanwhile dentist and clinical staffs are prepared with PPE) in addition to step [3]

- Extra-orally Povidone Iodine scrub
- Procedure

4. Check-up/ procedure done, patient leaving working space

- Doffing PPE (under guidance)
- Sanitize hands
- Cleaning/ disinfection process begins with preparation for next patient

5. Patient leaving reception space

- Instruct to report immediately, if develops any symptom within 14 days of dental visit
- Take off shoe-covers, put on shoes, sanitize hand
- E-payment encouraged

A dentist is advised prior to perform this protocol as mock drill in his/her settings with the support staffs in the absence of patients, to check for the feasibility and equip and modify itself accordingly.

6. Conclusion

The novel corona virus-19 pandemic has presented an unprecedented challenge to human civilization, and clinical dental practice is one among the most affected sectors. It should be kept in mind that, until the vaccine comes, the virus is not going to leave us, and we have to live with the virus. As there is no effective specific anti-viral drug till date, prevention remains the only measure, we have to consider every patient as a covid one and do the needful. We must remember, this isn't a sprint, this is rather a marathon, and hence, we have to focus on a long-term occupational strategy, instead of repetitive short-term crisis response.

In this discussion, we have tried to share our thoughts, and also we have compiled recommendation from different regulatory bodies (like Indian Dental Association, Indian Prosthodontic Society, Indian Endodontic Society, Dental Council of India etc.) and present an operational guideline for regular dental practice. As far our knowledge is really limited, and no protocol is time tasted, it is required to upgrade timely with newer research.

7. References

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