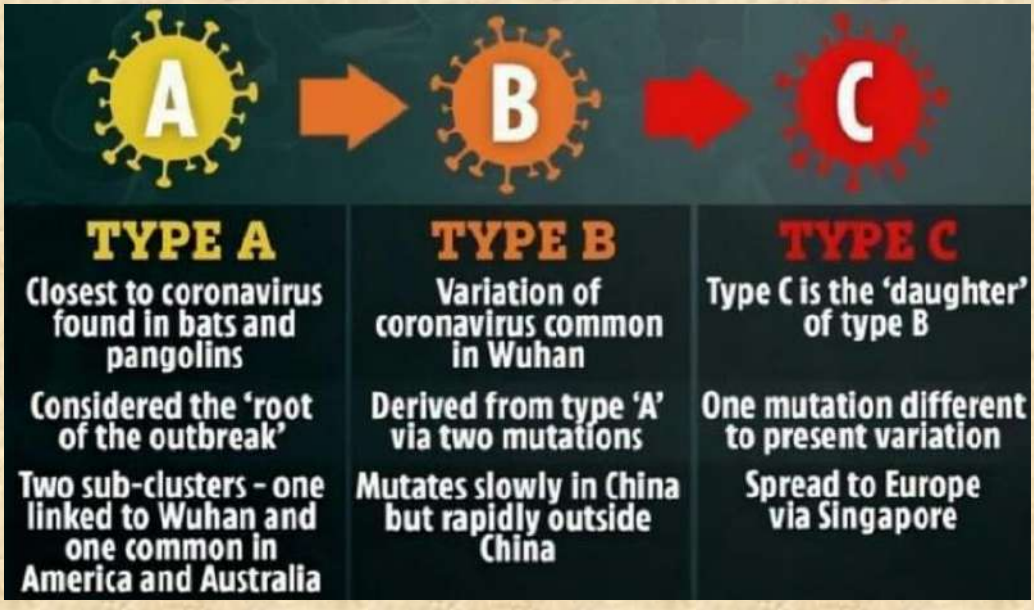
Dental practice after the COVID 19 war

The Novel Corona Virus

- Family- *Coronaviridae* (zoonotic- transmitted from animals to humans).
- Includes Severe Acute Respiratory syndrome coronavirus (SARS CoV, 2002) and Middle East Respiratory syndrome coronavirus (MERS-CoV, 2012).
- Strong evidence that novel coronavirus has a similarity to coronavirus species found in bats and pangolins.
- International Committee on Taxonomy of Viruses has given it the name SARS-CoV2and is popularly called the COVID19 [since, this published genome sequence has a close resemblance with the other beta-corona viruses such as SARS-CoV and MERS-CoV]
- Dental health professionals are at high risk category.
- The risks may be attributed to verbal interaction with patients and kin at close range and dental interventions.
- The procedures include aerosol generation, close proximity of operator to the patient and handling of sharps.
- Dental clinics and teaching institutions should be better prepared to identify a possible COVID19 infection.



Three strains of COVID-19

[Dailymail.co.uk]

History

31st December 2019	World health Organization (WHO) was informed of a cluster of 27 cases of pneumonia of unknown origin with 7 severe cases in Wuhan city, Hubei province of China → first reported to the China National Health Commission.
1st January 2020	Wuhan wet seafood market was shut down.
7th January 2020	Corona virus disease (COVID 19) was identified as the causative virus by Chinese authorities.
30th January 2020	World Health Organization (WHO) declared the rampant spread of SARS-CoV and its associated disease COVID 19 a public health emergency with a currently known mortality rate of 3.4%.
11th and 12th February 2020	WHO scientists on COVID19 met at WHO's Geneva head quarters to asses current level of knowledge about the new virus, agree on critical research questions and prioritize research to curtail the outbreak and prepare for future outbreak.

[WHO- WORLD HEALTH ORGANIZATION-Novel Coronavirus (2019-nCoV)]

Taxonomy

- Viruses are named based on their genetic structure to facilitate the development of diagnostic tests, vaccines and medications by International Committee on Taxonomy of Viruses (ICTV).
- ICTV announced (SARS-CoV-2) as the name of the new virus on 11 February 2020.
- WHO announced "COVID-19" as the name of this new disease on 1th February 2020.

Symptoms

Most common presentations

- Fever
- Dry cough
- Myalgia.

Less common features

- Nausea
- Diarrhoea
- Reduced sense of smell (hyposmia)
- Abnormal taste sensation (dysguesia)
- Ground glass opacities on chest x ray

Fever	98.6%
Fatigue	69.6%
Dry Cough	59.4%
Anorexia	39.9%
Myalgia	34.8%
Dyspnea	31.2%
Sputum	26.8%
Sore throat	17.4%

Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China

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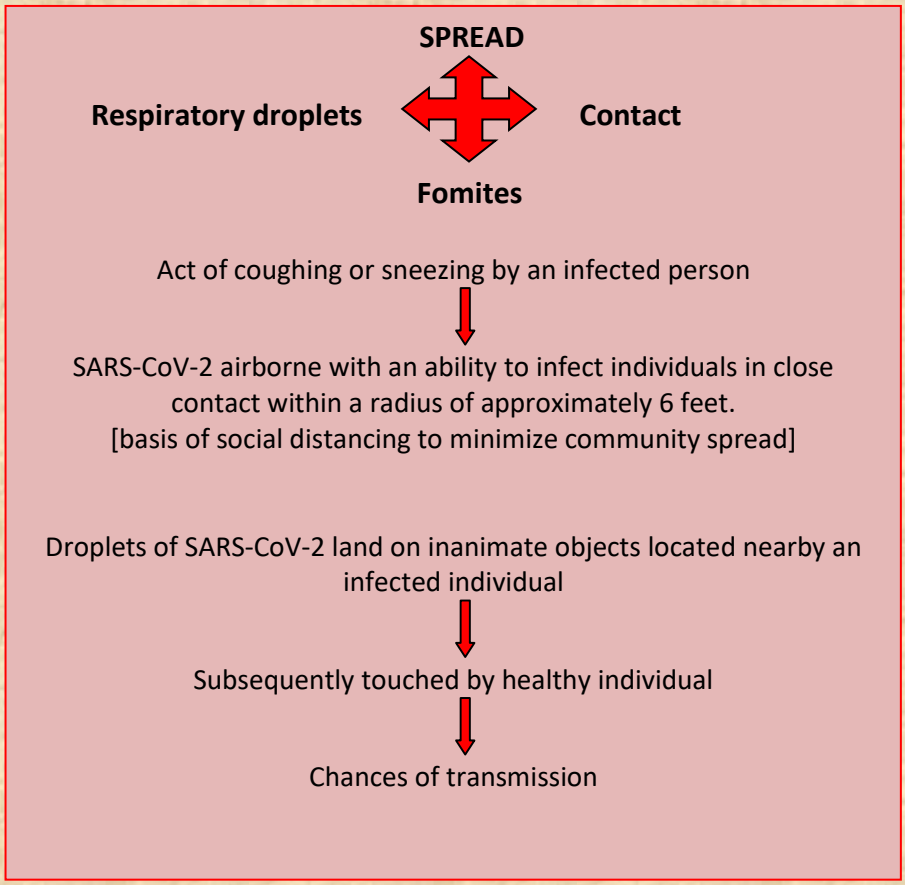
- 80 % patients have only mild symptoms resembling flu and seasonal allergies leading to an increased number of undiagnosed cases, asymptomatic cases acting as carriers
- Incubation period =0-24 days.
- Highly transmissible when patients are most symptomatic.
- Severe forms have a male predilection with a mean age of 56 years with pre-existing chronic illnesses such as cardiovascular disease or immunosuppression.
- The higher risk population manifests symptoms of pneumonia or respiratory distress syndrome.

CHALLENGES

- Unknown and evolving nature of the disease.
- Optimal management.
- Unknown virus origin and reservoir.
- Lack of knowledge on transmission possibilities and epidemiology.
- Development of safe and effective counter measures.
- When practicing in the absence of Airborne Precautions, the risk of SARS-CoV-2 transmission during aerosol generating dental procedures cannot be eliminated. Caring for patients requiring Airborne Precautions is not possible in most dental settings as they are not designed for or equipped to provide this standard of care. For example, most dental settings do not have airborne infection isolation rooms or single-patient rooms, do not have a respiratory protection program, and do not routinely stock N95 respirators.
- Dental health care personnel are in the *very high exposure risk* category.



- Thus disinfection of objects + frequent hand washing are essential to prevent spread
- (On an average a person touches the face 23 times per hour, 44% of the touching involves mucous membrane of mouth and /or nose)
- SARS-CoV-2 has also been found to be present in saliva and feces of affected patients.
- SARS-CoV-2 can bind to angiotensin converting enzyme 2 receptors that are highly concentrated in salivary glands.
- To summarize the potential routes of transmission are via aerosol, fomites, or fecal oral route that may contribute to nosocomial spread in dental clinics.

Salivary Glands- As Potential Reservoirs for Covid-19 Asymptomatic Infection

- Researchers have shown the role of oral mucosa in COVID-19 infection (Xu, Zhong et al, 2020).
- ACE2 is an important receptor for COVID-19. Liu et al. 2011, reported a study about SARS-CoV, where salivary gland epithelial cells were found infected with high expression of ACE2.
- The expression of ACE2 in minor salivary glands was higher than that in lungs, suggesting salivary glands could be potential target for COVID-19
- SARS-CoV RNA can be detected in saliva before lung lesions appear, explaining the presence of asymptomatic infections.
- The positive rate of COVID-19 in patients' saliva can reach 91.7%, saliva samples can cultivate live virus, suggesting transmission of COVID-19 by asymptomatic infections may originate from infected saliva.

Protocol for Management of Patients in Dental Clinic

- The practice of dentistry involves the use of rotary dental and surgical instruments such as handpieces or ultrasonic scalers and air-water syringes.
- These instruments create a visible spray that contains large particle droplets of water, saliva, blood, microorganisms, and other debris.
- This spatter travels only a short distance and settles out quickly, landing on the floor, nearby operatory surfaces, support staff, or the patient and remains for a variable period of time.

Clinic setting

- A designated area displaying respiratory hygiene and other clinic/hospital guidelines to receive patients, record temperature, body weight, blood pressure and pulse rate, detailed medical history including travel history and ailments in the last 6 months.
- Allowing only one accompanying person who has to document the travel and ailment history for the last six months indicating relationship with patient.
- Maintaining a distance of at least 3 feet in the first entry zone. In case this is not a possibility not more than two patients be present in the entry zone depending on the area available.
- Designated area outside for shoes and personal belongings (at their own risk).
- Availability of sanitizers (alcohol based hand rub >60%)at entry point be made mandatory.
- Use of masks for every visitor must be made mandatory.
- Designated trained employees/ staff in disinfection procedures with sensitization of contagious disease be deputed depending on clinic or institution.
- Employees to stay home if they have symptoms of respiratory infection if they develop symptoms while at work.
- Use of Personal Protective Equipment (PPE), where indicated.
- Fumigation of the clinic on a daily basis and/or use of overhead UV disinfection system.

Telescreening and triaging

- Identifying suspected or possible COVID 19 patients at the time of scheduling appointment. Use teleconferencing or teledentistry options to be explored as alternatives to in office care.

- Delayed scheduling of patients with common cold like symptoms if possible.

- The specific questions to be asked over phone or at the entry point in a clinic or institution should include exposure to person with known or suspected SARS-CoV-2 presentation, detailed travel history especially to an area of high COVID density and current symptoms of febrile respiratory illness like cough and fever.

- In the event of a positive response to any of the three specific questions, the patient should be advised self quarantine and consult primary care physician by phone or email or other suitable non-contact platforms.

- In such cases elective dental treatment should be deferred for at least two weeks.

Patient evaluation, cohorting and treatment

Services should be limited to emergency visits only during the period of the pandemic.

- Upon arrival at the working zone of the clinic, confirmation of detailed medical history, COVID 19 screening questionnaire.
- Sneeze and cough etiquette guidelines for dentists, personnel and persons visiting the dental clinic.
- In suspected or confirmed cases of COVID19 infections requiring urgent dental care for conditions such as pain and/ or swelling, pharmacological management in the form of antibioticsand/ or analgesics is an alternative. This approach will have two fold benefit: symptomatic relief and sufficient time for the dental surgeon to deliver dental care using appropriate measures to prevent spread of infection.
- The type of PPE used by the clinic / institute personnel will depend on the level of intervention and level of precaution required. The sequence for donning PPE is gown, mask/ respirator, face shields or goggles and gloves. The sequence for doffing PPE is gloves, goggles/face shield, gown, mask / respirator.
- Dentists should follow standard, contact and airborne precautions including appropriate use of PPE and hand hygiene.
- The same knowledge needs to be imparted to all personnel involved in patient care so that there is no breach in protocol. In case of institutions the students and trainees are to be included in the process of sensitization and implementing standard operating protocol/procedure (SOP considering each and every person in the clinic or institute may be potentially infective).
- Pre procedural mouth rinse with 0.2% povidone-iodine might reduce load of corona virus in the mouth. This should be a standard of care in every clinic and teaching institution. As an alternative 0.5-1% hydrogen peroxide mouth rinse may be advocated (non specific virucidal activity against corona virus).
- Use of disposable items with proper biomedical waste management protocol (including syringes, mouth mirrors blood pressure cuffs) is highly recommended.
- Extra oral radiography should be preferred over intra oral radiography to avoid cough or gag reflex. In case of use of intra oral radiography sensors need to be double barriered.
- Sodium hypo chlorite may be used in lower concentrations in endodontic practice to extend supplies without compromising treatment.
- Use of rubber dam should be made mandatory in clinics and teaching institutes for both graduates and post graduates.
- Disinfection of chair, light, instrument tray and rest of working area is mandatory after every procedure and so is limiting unnecessary contact of surfaces by every person involved in providing dental care.
- Limiting the use of aerosol generating devices like ultrasonics and high-speed handpieces whenever possible. Increased used of micromotor and chemomechanical caries removal agents. Increased use of hand instruments.
- Cleaning and sterilization of instruments is a serious task thus ultrasonic cleaners and B or N type autoclaves are advocated.
- Storage of instruments may be done for advocated time duration in a formalin chamber or UV chamber.
- Masks should be discarded every 4-6 hours or when damp or when touching by gloved or soiled hands. Gowns should be discarded. If heavily soiled with body fluids or punctured. Gloves should be discarded in between patients and hand hygiene practiced.

Emergency

- If emergency dental care is medically necessary for a patient who has, or is suspected of having COVID-19, Airborne Precautions (an isolation room with negative pressure relative to the surrounding area and use of an N95 filtering disposable respirator for persons entering the room) should be followed.
- The spray also might contain certain aerosols. Surgical masks protect mucous membranes of the mouth and nose from droplet spatter, but they do not provide complete protection against inhalation of airborne infectious agents.
- There are currently no data available to assess the risk of SARS-CoV-2 transmission during dental practice or to determine whether dental health care professionals are adequately protected when providing dental treatment using Standard Precautions.
- Dental treatment should be provided in a hospital or other facility that can treat the patient using the appropriate precautions.
- If the patient is afebrile (temperature < 100.4˚F) and otherwise without symptoms consistent with COVID-19, then emergency dental care may be provided using appropriate engineering controls, work practices, and infection control practices.

Key concepts and take home message

- Awareness posters on transmissible infections especially COVID19 mentioning source of information at the bottom.
- Establishment of SOP maintaining standard precautions including waste disposal.
- Sensitization and staff training suiting individual clinics.
- Modification of clinic reception area to screen patients before they reach operatory.
- Teaching institutes can have the same before patients are referred to various departments.
- Natural and mechanical ventilation of the operatory.
- Dental settings have unique characteristics that warrant additional infection control considerations.
- Postponing elective procedures, surgeries, and non-urgent dental visits.
- Proactive communication to both staff and patients stating the need for them to stay at home if sick.
- Knowing the steps (referral of patient to appropriate facility) to take if a patient with COVID-19 symptoms enters the clinic/ teaching institution.

Summary

- SARS-CoV-2, the virus that causes COVID-19, which spreads primarily through respiratory droplets. However, the contribution of aerosols, or droplet nuclei, to close proximity transmission is currently uncertain.
- Airborne transmission from person-to-person over long distances is unlikely.
- The virus has been shown to survive in aerosols for hours and on surfaces for days.
- There are also indications that patients may be able to spread the virus while pre-symptomatic or asymptomatic.
- Increased use of disposable PPE might result in unprecedented environmental pollution hence disposal needs to be considered well in advance.

Notes

Standard Precautions are the minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where health care is delivered. These practices are designed to both protect dental health care personnel and prevent from spreading infections among patients. Standard Precautions include —

- Hand hygiene.
- Use of personal protective equipment (e.g., gloves, masks, eyewear, gown).
- Respiratory hygiene / cough etiquette.
- Sharps safety (engineering and work practice controls).
- Safe injection practices (i.e., aseptic technique for parenteral medications).
- Sterile instruments and devices with clean and disinfected environmental surfaces (cleaning, disinfection, sterilization, floor mopping).

Personal Protective Equipment

- It is a special equipment to create a barrier between operator and germs.
- This barrier reduces the chance of touching, being exposed to, and spreading germs.
- Personal protective equipment (PPE) helps prevent the spread of germs in the clinic/hospital. This can protect people and health care workers from infections.
- All hospital staff, patients, and visitors should use PPE when there will be contact with blood or other bodily fluids.

Types of PPE

- Masks(cover mouth and nose).
- Masks with see-through plastic eye shield.
- A surgical mask (3 ply).
- A special respiratory mask (respirator e.g. N 95 respirator) forms a tight seal around nose and mouth.
- During dental procedure including examination of patient wearing N95 respirator is highly recommended. To prolong the life of N95 respirator a surgical mask may be worn over it which is changed between every patient.
- Eye protection includes face shields and goggles. These protect the mucous membranes in eyes from blood and other bodily fluids. If these fluids make contact with the eyes, germs in the fluid can enter the body through the mucous membranes.
- Clothing includes gowns, aprons, head covering, and shoe covers.
- These are often used during procedures.
- Choosing the right PPE
- Autoclavable full sleeve surgical gowns or disposable surgical gowns are recommended for dental procedures.

Respirator

A respirator is a personal protective device that is worn on the face, covers at least the nose and mouth, and is used to reduce the wearer's risk of inhaling hazardous airborne particles (including dust particles and infectious agents), gases, or vapors. Respirators are certified by the CDC/NIOSH, including those intended for use in healthcare.

Respirator use must be in the context of a complete respiratory protection program in accordance with OSHA Respiratory Protection standard. Healthcare Providers should be medically cleared and fit tested if using respirators with tight-fitting facepieces (e.g., a NIOSH-approved N95 respirator) and trained in the proper use of respirators, safe removal and disposal, and medical contraindications to respirator use.

Infection Control Considerations

- Use of the highest level of personal protective equipment (PPE) available.
- If available, wear gloves, a gown, eye protection (i.e., goggles or a disposable/reusable face shield that covers the front and sides of the face), and an N95 or higher-level respirator during emergency dental care for patients without COVID-19.
- Disposable respirators should be removed and discarded after exiting the patient's room or care area.
- Reusable eye protection must be cleaned and disinfected according to manufacturer's reprocessing instructions prior to re-use. Disposable eye protection should be discarded after use.
- Change gown if it becomes soiled. Remove and discard the gown in a dedicated container for waste or linen before leaving the patient room or care area. Disposable gowns should be discarded after use.
- If a respirator is not available, use a combination of a surgical mask and a full-face shield.
- Surgical masks should be removed and discarded after exiting the patient's room or care area.
- Change surgical masks during patient treatment if the mask becomes wet.
- If the minimally acceptable combination of a surgical mask and a full-face shield is not available, do not perform any emergency dental care. Refer the patient to a clinician who has the appropriate PPE.

Engineering Controls and Work Practices

- Avoid aerosol generating procedures whenever possible.
- Avoid the use of dental handpieces and the air-water syringe.
- Use of ultrasonic scalers is not recommended during this time.
- Prioritize minimally invasive/atraumatic restorative techniques (hand instruments only).
- If aerosol-generating procedures are necessary for emergency care, use four-handed dentistry, high evacuation suction and dental dams to minimize droplet spatter and aerosols.
- Setting up of AIIR(airborne infection isolation room) should be considered.
- Extraoral suction devices may be evaluated for the claimed efficacy.

Disinfection of Operatory and Waste Management

- General areas – clean and mop using isopropyl alcohol and commercially available 1% sodium hypochlorite including desks, chairs, waiting area, door handles, knobs and counter tops. Use of disposable cloth is recommended for the same.
- Use of 0.01% sodium hypochlorite to clean dental unit water channels and suction units.
- Disposable plastic spittoon covers may be used.
- Waste disposal should be in accordance with Biomedical Waste Management and Handling Rules 2016.

Dental Treatment Conditions

EMERGENCY

- Uncontrolled bleeding.
- Diffuse intra oral or extra oral swelling, which may obstruct airway.
- Severe traumatic injury like road traffic accident.

Approach: Attend immediately with full PPE.

URGENT

- Symptomatic irreversible pulpitis.
- Acute apical abscess.
- Pain from pericoronitis.
- Post operative complaints.
- Sharp object stuck in the soft tissues or wedged between teeth which patient is unable to remove.
- Sharp cuspal edges or fractured teeth/ carious degenerated teeth causing trauma to soft tissues.
- Trauma resulting in enamel fracture.
- Mobile teeth disturbing normal mastication.
- Mouth ulcers.
- Trauma from orthodontic appliances.
- Apical periodontitis.

Approach: Pharmacological management if possible and reschedule for physical appointment at a latter date. If that will not offer relief, physical appointment as emergency care with full support PPE for operator and support staff.

ELECTIVE

- Loss of restoration
- Need for restoration
- Generalized sensitivity
- Previously planned elective procedures like orthodontic treatment
- Asymptomatic ongoing but not yet completed non surgical endodontic treatment
- Prosthetic procedures
- Cosmetic dental procedures

Approach: Tele counsel and schedule when regular dental procedures start.

All dental clinics, hospitals and teaching institutions need to comply with the SOP prepared by the organizations in the same line for societal management.

References

1. CDC- Centers for Disease Control and Prevention
2. WHO- World Health Organization
3. JOE- Journal of Endodontics
4. DCI- Dental Council of India
5. IDA- Indian Dental Association