

Dental Clinic Setup In The Post Covid Era- The New Normal

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ABSTRACT:

Corona viruses are group of viruses that causes respiratory syndromes such as Middle East Respiratory Syndrome(MERS) or Severe Acute Respiratory Syndrome(SARS).The newly discovered coronaviruses knowns as the SARS-COV 2 have caused a severe respiratory distress resulting in a disease called covid-19.It has been declared as a global pandemic by the World Health Organisation.Since the transmission of viruses can occur through either droplet or aerosol contamination or contact with the surfaces contaminated by the infected persons all the health care professionals are potentially at risk and the amount of risk being higher for the Dental Health Care Professionals(DHCP) since they are the ones who are frequently dealing with aerosols..Hence this article aims at reviewing the health care and standard operation protocols to be followed in the post covid era.

INTRODUCTION:

Coronaviruses are a large family of viruses which can cause illness in animals as well as humanbeings. Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) are the severe diseases which are being caused by the corona viruses. The most recently discovered coronavirus is found to cause the coronavirus disease called the COVID-19. This corona virus were fisrt found due to the outbreak which has occurred in Wuhan, China, in December 2019. COVID-19 is now evolved as a pandemic which has been affecting many countries globally¹

Jobs At High Risk For Corona Viruses:

Surveys has been so far conducted by the New York times magazine(fig 1) as well as the The Alberta Federation of Labour regarding the jobs which are at highest risk for the corona virus pandemic.The results shows that among about hundred jobs analysed the Dentists are found to be at the highest risk who are being topped in the list (fig 1).Dentists are found to be potentially at risk because of the aerosol generating procedures that are commonly being done in the dental clinics.To know the exact mechanism it is must to know the entry and replication as well as transmission of SARS-COV2.

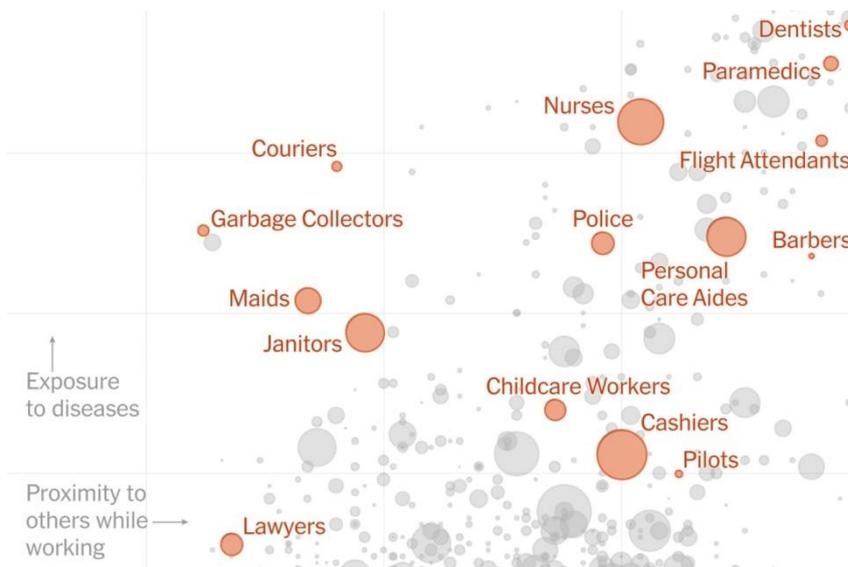


Fig :1 Pc:THE NEWYORK TIMES

Sars-Cov2 Virus And Its Entry And Replication :

The SARS-related coronaviruses are covered by spike proteins. They contain a variable receptor-binding domain. SARS-CoV-2 has surface viral proteins, namely, spike glycoprotein (S), which mediates interaction with cell surface receptor ACE2. Entry of coronaviruses into host target cells depends on the binding of spike glycoprotein to the cellular receptor and priming of S protein by host cell proteases. Like SARS-CoV, SARS-CoV-2 uses the ACE2 receptor for internalization. Similar to SARS-CoV, the extrapulmonary spread of SARS-CoV-2 may be seen due to the widespread tissue expression of the ACE2 receptor. SARS-CoV-2 enters body by Binding of spike protein to the ACE2 receptor which results in release of viral RNA into host cytoplasm which generates replicase polyproteins. Through interaction of viral RNA and protein at endoplasmic reticulum (ER) and Golgi complex the assembly of virions occur. These virions get subsequently released out of the cells through vesicles².

Distribution Of Ace Receptors In The Body:

ACE2 receptors are present in higher levels in the intestinal tract, kidney, gallbladder, heart, and testis³. The ACE2 are also expressed in the oral cavity, where it is highly enriched in epithelial cells. Moreover, among different oral sites, ACE2 expression was higher in tongue than buccal and gingival tissues, which indicates that the mucosa of oral cavity may be a potentially high risk route of 2019-nCov infection⁴

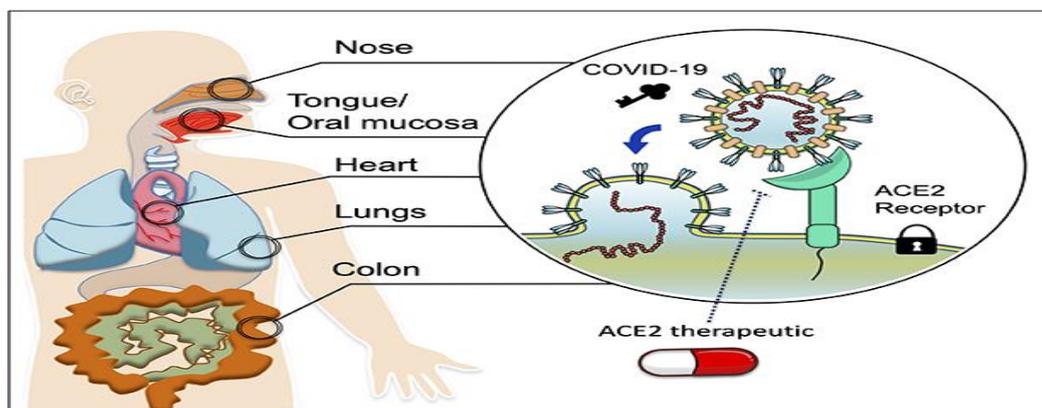


Fig:2 Pc: Xu H, Zhong L, Deng J, Peng J, Dan H, Zeng X, Li T, Chen Q. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. International journal of oral science. 2020 Feb 24;12(1):1-5.

Transmission Of Corona Virus:

There are three modes of transmission of corona viruses symptomatic transmission, asymptomatic transmission and the pre-symptomatic transmission. symptomatic transmission is the transmission from a person while they are experiencing symptoms. studies provide evidence that COVID -19 is primarily transmitted from symptomatic people to others who are in 1.close contact through Respiratory Droplets,2.by direct contact with infected persons or by 3.contact with contaminated objects and surfaces. Time between exposure to virus and symptom onset - During this period, also known as the “pre- symptomatic” period, some infected persons can be contagious. Therefore, transmission from a pre -symptomatic case can occur before symptom onset. Aymptomatic is the transmission of virus from a person, who does not develop symptoms. The modes of transmission for covid 19 are given in fig:3

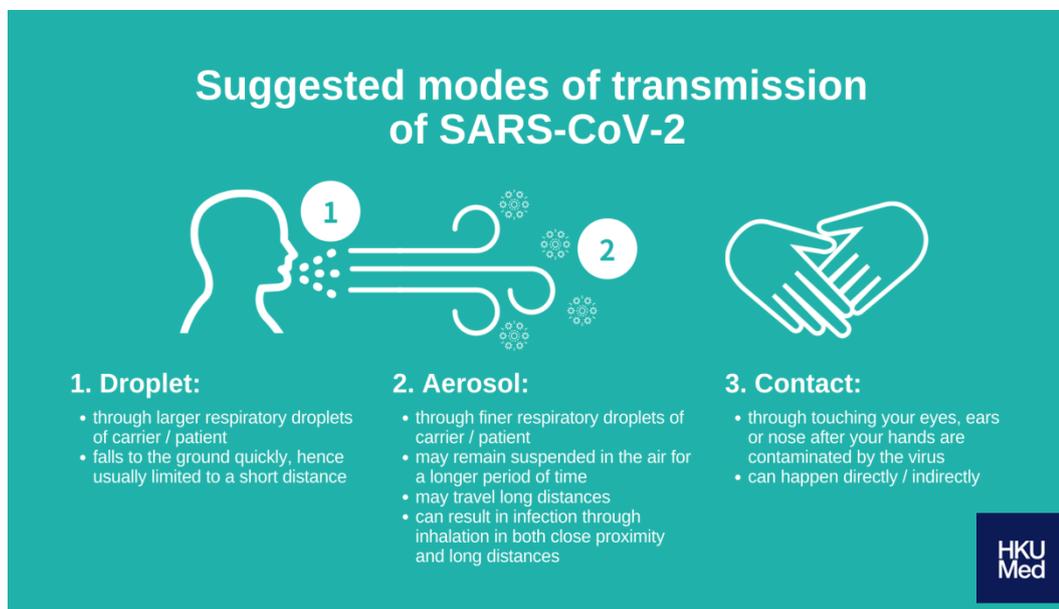


Fig:3Pc: HKUMed on COVID-19 -Debunking the Aerosol Transmission Myth

As it is in the picture there are several modes for transmission of the corona virus which includes droplet spread ,aerosols contamination or the contact with the contaminated surfaces.Here for dentitsts the aerosol (<math><5\mu\text{m}</math>) contamination and the respiratory(>math>>5\mu\text{m}</math>)droplet spread pays a major role in transmitting the virus because the size of the droplets also plays a major role as the time taken for droplets to settle down also has a role because it takes 41 hours for a droplet of size 0.5 μm to settle down similar to which 1 μm takes 12 hours,10 μm - 8.2 minutes and 100 μm - 5.8 seconds.Since the droplets can stay in air for a longer period of time it is necessary to have certain protocols which must be practiced before starting any dental procedure⁵.

Guidance For Dental Settings In The Post Covid Era:

A standard operation protocol has been given by the Centers For Disease Control And Prevention to be followed in the dental clinics in the post covid era. CDC recommends the use of additional infection prevention and control practices which should be applied to all the patients visiting the clinic, not just those with suspected or confirmed SARS-CoV-2 infection.Primarily the infection

control protocols should be applied to the dental professionals and the coworkers so that they'll be disease free .

Protocol For Health Care Professionals:

Monitor and manage the dental health care professionals by implementing sick leave policies for them, regularly monitor them for fever and symptoms of covid-19. remind them to stay home if they are ill. if they are suspected with covid-19 ask them not to come to work. And notify their primary healthcare provider to determine whether medical evaluation is necessary or not. Assisting professionals are also recommended to follow the universal source control measures. DHCP who will perform the environmental cleaning and disinfection are requested to wear gloves and other ppe to prevent the occupational exposure to infectious agents and hazardous chemicals .commercially available non medical gloves can also be used for the housekeeping procedures .chemical- and puncture-resistant utility gloves tend to offer more protection than patient examination gloves when using hazardous chemicals^{6,8}.

The Standard Operation Protocols:

Implementing proper operation protocols include implementation of teledentistry and triage protocols which includes contacting all patients prior to dental treatment. While doing that telephone screen all patients for symptoms of covid19 are done. If the patients report for symptoms of covid-19, it is best to avoid non-emergent dental care procedures. If possible, try to delay dental care until the patient has ended isolation or quarantine. And also advise patients to wear a cloth face covering or facemask when entering the facility. This is followed by screening and triaging everyone entering the dental healthcare facility for signs and symptoms of covid-19 which is done by posting visual alerts at the entrance and in strategic places and also provide alcohol-based hand rub (abhr) with at least 60% alcohol. It is better to remove the frequently touched objects from waiting room which cannot be regularly cleaned and disinfected and must screen everyone entering the dental healthcare facility for fever and symptoms consistent with covid-19 by actively taking their temperature. Fever is either measured as temperature $\geq 100.0^{\circ}\text{f}$ or subjective fever. Also document the absence of symptoms consistent with covid-19. other things include implementation of universal source control measures such as advising the patients to use facemasks . Because of the potential for asymptomatic and pre-symptomatic transmission, source control measures are recommended for everyone entering in a healthcare facility, even if they do not have signs and symptoms of covid-19 finally encourage physical distancing by maintaining 6 feet between people to prevent sars-cov-2 transmission. Try scheduling appointments in such a way to minimize the number of people in the waiting room⁶.

Administrative Controls And Work Practices:

DHCP is asked to limit clinical care to only one patient at a time, whenever possible. Set up operatories are set up in a way so that only the clean or sterile supplies and instruments needed for the dental procedure are readily accessible. All other supplies and instruments are placed in covered storage, and away from potential contamination. Any supplies and equipment which are exposed but not used are considered to be contaminated and should be disposed of or reprocessed properly after completion of the procedure⁶.

Implement Universal Use Of Personal Protective Equipment (Ppe):

BEFORE ENTERING A PATIENT ROOM OR CARE AREA: There are few steps which are to be followed in donning of the PPE KIT which are STEP 1: Performance of hand hygiene ,wash your hands with soap and water for at least 20 seconds or use a hand sanitizer. STEP 2: Put on a clean gown or protective clothing that covers personal clothing and skin (e.g., forearms) likely to become soiled with blood, saliva, or other potentially infectious materials. Gowns and protective clothing should be changed if they become soiled. STEP 3: Put on a surgical mask or respirator. Mask ties should be secured on the crown of the head (top tie) and the base of the neck (bottom tie). If mask has loops, hook them appropriately around your ears. Respirator straps should be placed on the crown of the head

(top strap) and the base of the neck (bottom strap). Perform a user seal check each time you put on the respirator. STEP 4: Put on shoe covers. STEP 5: Put on eye protection (goggles or a face shield that covers the front and sides of the face). Protective eyewear (e.g., safety glasses, trauma glasses) with gaps between glasses and the face likely do not protect eyes from all splashes and sprays. Personal eyeglasses and contact lenses are NOT considered adequate eye protection. STEP 6: Put on clean non-sterile gloves for examination. Gloves should be changed if they become torn or heavily contaminated. Put on sterile gloves for surgery⁶.

IN PATIENT AREA: Avoid aerosol generating procedures by avoiding the use of dental handpieces, air/water syringe, and ultrasonic scalers. Prioritize the use of minimally invasive/ atraumatic restorative techniques. If aerosol generating procedures are to be used for dental care, it is best to use four-handed dentistry, high evacuation suction and dental dams to minimize droplet spatter and aerosols. The number of dhcp to be present during the procedure should also be limited. Before performing the procedure it is necessary to do pre-procedural mouth rinses (ppmr) ppmrs with any antimicrobial product such as chlorhexidine gluconate, essential oils, povidone-iodine or cetylpyridinium chloride, since they reduce the level of oral microbes in aerosols and spatter generated during the dental procedures⁹.

AFTER COMPLETION OF DENTAL CARE: the doffing of PPE should be done in the following order: Remove gloves, Remove gown or protective clothing and discard the gown in a dedicated container for waste or linen. Discard the disposable gowns after each use or Launder the cloth gowns or protective clothing after each use which are reusable. Exit the patient room and then perform hand hygiene as done earlier then Remove the eye protection while removing do not touch the front of the eye protection. Then Remove and discard surgical mask or the respirator by avoiding touching the front of the respirator or mask⁶.

Equipment Considerations:

Autoclaves and instrument cleaning and all done by routine cleaning. Test the sterilizers using a biological indicator with a matching control. Air compressors, vacuum and suction lines, and radiography equipment, high-tech equipment, amalgam separators, and other dental equipment are properly cleaned.

Optimize The Use Of Engineering Controls :

It is also necessary to maintain proper ventilation systems by Limiting the use of the demand-controlled ventilation also the use of a portable high-efficiency particulate air (HEPA) air filtration unit while the patient is undergoing, and immediately following, an aerosol generating procedure also Consider the use of upper-room ultraviolet germicidal irradiation (UVGI) as an adjunct air cleaning rates. Routine cleaning and disinfection of the patient care areas should also be followed. The Clinical contact surfaces-light handles, switches, dental radiograph equipment, dental chairside computers, reusable containers of dental materials, drawer handles, faucet handles, countertops, pens, telephones, and doorknobs, and Housekeeping surface such as Floors should also be cleaned regularly, and spills should be cleaned up promptly. Blood spills on the clinical contact or the housekeeping surfaces should be managed quickly to reduce the risk of contact by patients as well as the DHCP. The action of scrubbing with detergents and surfactants and rinsing with water is found to remove substantial numbers of microorganism. 1:100 dilution of sodium hypochlorite is found as an inexpensive and effective disinfecting agent¹⁰.

CONCLUSION:

ALBERT EINSTEIN has once said that "IN THE MIDDLE OF A DIFFICULTY LIES AN OPPURTUNITY". Thus since we are being stuck with a global pandemic, we have no other choice than intelligently using the STANDARD OPERATION PROTOCOLS to protect ourselves as well as our patients from this pandemic.

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