

Up To Which Extent Dentists Are Ready To Confront COVID 19 – What They Should know?(Updating Knowledge)

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Abstract: Novel corona virus 2019 (COVID 19) become emerging public health emergency condition and it has created a panic condition in many countries. It becomes more important in the quarantine period of the epidemic outbreak to updating our knowledge for the purpose of epidemic protection.

Dentists have been closed during the epidemic, a large number of emergency patients still go to the dental clinics and hospitals for treatment. Medical students and dentists are mandatory to update their knowledge about any epidemic infection to be aware about the precaution and the managements. We have summarized the possible transmission routes of 2019-nCoV in dentistry. The purpose of this document is to provide clear and actionable guidance for safe operations for the dentists to be able to facing the COVID 19 with updating knowledge and information.

Key words: Coronavirus - COVID 19 – Virus infection – aerosol infection-Dentists

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I. Introduction

World Health Organization declared a public health emergency of international concern over global pneumonia outbreak on 30th January 2020.

The rapidly increasing number of cases and evidence of human-to-human viral transmission is originated in Wuhan City. In the late December 2019, the pneumonia infection has rapidly spread from Wuhan to most other provinces and countries around the world⁽¹⁾.

Chinese researchers have quickly isolated the new virus from the patient and sequenced its genome. The infectious agent of this viral pneumonia happening in Wuhan was finally identified as a novel coronavirus (2019-nCoV), the seventh member of the family of coronaviruses that infect humans⁽²⁾.

This disease was referred as 2019 novel coronavirus (2019-nCoV), severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and Corona virus disease 2019 (COVID-19). This virus is a new virus linked to the same family of viruses as Severe Acute Respiratory Syndrome (SARS) but it was more contagious than SARS-CoV and Middle East respiratory syndrome coronavirus (MERS-CoV)⁽³⁾.

Novel corona virus 2019 become emerging public health emergency condition and it has created a panic condition in many countries. Most of the countries are locked down and applied quarantine to prevent further spread of this virus. It becomes more important in the quarantine period of the epidemic outbreak to updating our knowledge for the purpose of epidemic protection.

COVID-19 is a new disease that is distinct from other SARS, MERS and influenza. Although coronavirus and influenza infections may present with similar symptoms, but COVID-19 is different with respect to community spread and severity.

Every day we are still learning about COVID-19 and how it affects people. 2019-nCoV can bind to the human angiotensin converting enzyme 2 (ACE2), the same host receptor for SARS CoV. 2019-nCoV can bind to the ACE2 receptor from the cells from human, bat, civet cat, and pig, but it cannot bind to the cells without ACE2⁽⁴⁾.

The high affinity between ACE2 and 2019-nCoV S protein also suggested that the population with higher expression of ACE2 might be more susceptible to 2019-nCoV⁽⁵⁾.

The typical clinical symptoms of the patients who suffered from the novel viral pneumonia were fever, cough, and myalgia or fatigue with abnormal chest CT, and the less common symptoms were sputum production, headache, hemoptysis, and diarrhea^(6,7). This new infectious agent is more likely to affect older males to cause severe respiratory diseases⁽⁸⁾.

THE POSSIBLE TRANSMISSION ROUTES OF 2019-NCOV

Dentistry have been closed during the epidemic, a large number of emergency patients still go to the dental clinics and hospitals for treatment. It is mandatory for medical members , medical students and dentists to have knowledge and awareness about diagnosis, precaution and the managements of any epidemic infection ⁽⁹⁾.

Studies have suggested that 2019-nCoV may be airborne through droplets aerosols ⁽¹⁰⁾.The common transmission routes of novel coronavirus include direct transmission (cough, sneeze, and droplet inhalation transmission) and contact transmission (contact with oral, nasal, and eye mucous membranes)⁽¹¹⁾. The transmission of 2019-nCoV is not limited to the respiratory tract , and that eye exposure may provide an effective way for the virus to enter the body ⁽¹²⁾.

The asymptomatic incubation period for individuals infected with 2019-nCoV has been reported to be 1–14 days, and it was confirmed that those without symptoms can spread the virus⁽¹²⁾.To et al. reported that live viruses were present in the saliva of infected individuals by viral culture method⁽¹³⁾.

Dental patients and professionals can be exposed to pathogenic microorganisms, including viruses and bacteria that infect the oral cavity and respiratory tract. Dental care settings invariably carry the risk of 2019-nCoV infection due to the specificity of its procedures, which involves face-to-face communication with patients, and frequent exposure to saliva, blood, and other body fluids, and the handling of sharp instruments. The pathogenic microorganisms can be transmitted in dental settings through inhalation of airborne microorganisms that can remain suspended in the air for long periods. Infections could be present through any of these conditions involved in an infected individual in dental clinics.

In addition to the infected patient's cough and breathing, dental devices such as high-speed dental handpiece uses high-speed air to drive the turbine to rotate at high speed and work with running water. When dental devices work in the patient's oral cavity, a large amount of aerosol and droplets mixed with the patient's saliva or even blood will be generated. Particles of droplets and aerosols are small enough to stay airborne for an extended period before they settle on environmental surfaces or enter the respiratory tract.

A dental professional's frequent direct or indirect contact with human fluids, patient materials, and contaminated dental instruments or environmental surfaces makes a possible route to the spread of viruses.

Effective infection control strategies are needed to prevent the spread of 2019-nCoV through these contact routines. Human coronaviruses (HCoV) can persist on surfaces like metal, glass, or plastic for up to a couple of days.

Therefore, contaminated surfaces that are frequently contacted in healthcare settings are a potential source of coronavirus transmission. Dental practices derived droplets and aerosols from infected patients, which likely contaminate the whole surface in dental offices.

SUMMARY OF INSTRUCTION RECOMENDED FOR DEALING WITH 2019-NCOV IN DENTAL CLINIC ⁽¹⁴⁾.

EVALUATION OF PATIENTS

Dental professionals should be familiar with how 2019-nCoV is spread, how to identify patients with 2019-nCoV infection, and what extra-protective measures should be adopted during the practice, in order to prevent the transmission of 2019-nCoV.

Dental professional should be able to identify the patient with suspected 2019-nCoV infection, and should not treat the infected patient in the dental clinic. The body temperature of the patient should be measured in the first place.

A questionnaire should be used to screen patients with potential infection of 2019-nCoV before they could be led to the dental chair-side. This questionnaire concerns all previous travel within the last month to any suspected area that isa source of infection. If yes for any question it is advice do not interfere with any dental treatment even it is emergency and refer the patient to the hospital.

INFECTION CONTROLS FOR DENTAL PRACTICE

- Appropriate hand hygiene (before patient examination, before dental procedure after touching the patient, after touching the surroundings and equipment without disinfection) .
- Since airborne droplet transmission of infection is considered as the main route of spread, particularly in dental clinics and hospitals ,dental professionals should be taken more caution for to avoid touching their own eyes, mouth, and nose.
- Barrier-protection equipment, including protective eyewear, masks, gloves, caps, face shields, and protective outwear, is strongly recommended for all healthcare givers in the clinic/hospital . Wearing disposable working cap, disposable surgical mask, and working clothes (white coat), using protective goggles or face shield, and disposable latex gloves or nitrile gloves if necessary.
- Since 2019-nCoV is vulnerable to oxidation, preprocedural mouthrinse containing oxidative agents such as 1% hydrogen peroxide or 0.2% povidone is recommended, for the purpose of reducing the salivary load of oral

microbes, including potential 2019-nCoV carriage. A preprocedural mouthrinse would be most useful in cases when rubber dam cannot be used.

-The use of rubber dams can significantly minimize the production of saliva- and blood-contaminated aerosol or spatter . It has been reported that the use of rubber dam could significantly reduce airborne particles in ~3-foot diameter of the operational field by 70%.

- Anti-retraction dental handpiece with specially designed anti-retractive valves or other anti-reflux designs are strongly recommended as an extra preventive measure for crossinfection.

-Public areas and appliances should also be frequently cleaned and disinfected, including door handles, chairs, and desks. The elevator should be disinfected regularly.

-The medical wasteshould be pretreated, cleaned, sterilized, and properly stored in accordance with the protocol ofdisinfection and sterilization of dental instrument .

Double-layer yellow color medical waste package bags and “gooseneck” ligation should be used.

Now a day with the status of quarantine in the most of countries , dentists should be concern only for the emergency cases for non-infected patients (infected patients should treated in hospital) and according to the specialty we classified the emergency as the following table 1:

Table 1	specialty	Emergency Procedure type
	Restorative	Moderate and severe caries with pain or needed to RCT
		Tooth fracture with pain
	Endodontic	Active infection or cellulitis with needed to RCT
	Oral surgery	Active infection or cellulitis with needed to release the problem
		Partial impaction in active pain
	Periodontic	Severe periodontitis in patient with risk factor (Diabetes cardiac---etc)
	Pediatric	Moderate and severe caries with pain

IN the circumstances of Pandemic of the COVID 19,the dentists are not able to apply theinstruction recommended for dealing with COVID 19 in dental clinic.It is urgent to refer the patients to the hospital were the protocol of protection is more applicable.

All patients should be suspected as COVID 19 infection and must be tested for infection with the COVID-19 virus using a molecular test.

Polymerase chain reaction (PCR) is a technique that is used to amplify trace amounts of DNA (and in some instances, RNA) located in or on almost any liquid or surface where DNA strands may be deposited. RT-PCR is a PCR test that is designed to detect and measure RNA. RT-PCR differs from conventional PCR by first taking RNA and converting the RNA strand into a DNA strand⁽¹⁵⁾.

Currently virus nucleic acid PCR test has become the standard method for diagnosis of SARS-CoV2 infection.The tests have some inconvenient and are complicated in operation⁽¹⁵⁾:

- 1- It generally take on average over 2 to 3 hours to generate results.
- 2- The PCR tests require certified laboratories, expensive equipment and trained technicians to operate.
- 3- To process the test required cold chain is mandatory
- 4- There are some numbers of false negatives for RT-PCR of COVID-19.

In 17 March 19, 2020 the latest FDA Guidance Allows Distribution of SARS-CoV-2 Serology Tests for Diagnostic Use.The new test was developed by different laboratories around the world can detect IgM and IgG antibodies simultaneously against SARS-CoV-2 virus in human blood within 15 minutes(detect patients at different infection stages)⁽²⁴⁾. The overall testing sensitivity was 88.66% and specificity was 90.63%. theses test can be hold by samples from fingerstick blood,serum and plasma of venous blood⁽¹⁶⁻¹⁷⁾.

Furthermore, detection of IgM antibodies tends to indicate a recent exposure to SARS-CoV-2, whereas detection of COVID-19 IgG antibodies indicates virus exposure some time ago.

The results indicated great detection of IgM-IgG. It can be used for the rapid screening of SARS-CoV-2 carriers, symptomatic or asymptomatic. it was reported that asymptomatic carriers could spread SARS-CoV-2 virus⁽¹⁶⁻¹⁸⁾.

The new test could be use for hospitals, clinics, and test laboratories.The test can also be effectively deployed in businesses, schools, airports, seaports and train stations, etc.,

A total of three detection lines are on the stip. The control (C) line appears when sample has flowed through the cartridge. Fig 1



Certainly, this test cannot confirm virus presence 100%, only provide evidence of recent infection, but it provides an important immunological evidence for physicians to make the correct diagnosis along with other tests(PCR and RT-PCR).table 2

PCR	IgM	IgG	Clinical significance
+	-	-	Patient may be in the period of Infection (incubation)
+	+	-	Patient may be in early stage of infection
+	+	+	Patient is in active stage of infection
+	-	+	Patient may be in recurrent stage of infection
-	+	-	Patient may be in early stage in infection and PCR
-	-	+	Patient may be had past infection and has recovered
-	+	+	Patient may in the recovery stage of an infection and PCR result false-negative

It is essential to confronting the coronavirus disease (COVID-19) to understand basic information about the disease including its symptoms, complications, how it is transmitted, diagnosis tests and how to prevent transmission by applying the recommendations for dental practice⁽¹⁹⁻²⁰⁾. Having information and facts about COVID-19 will reduce the fears and anxieties around the disease.

By applying the diagnosis test of COVID 19 before any medical treatment, dentists can approach the patients for emergency treatment only and maximum of protection requirements must be applied.

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