International Journal of Research in Health and Allied Sciences
Journal home page: www.ijrhas.com

Official Publication of "Society for Scientific Research and Studies" [Regd.]

ISSN: 2455-7803 Index Copernicus value [ICV] = 68.10;

# Review Article

## Coronavirus Disease 2019 (COVID 19): The Globalist!

Urmi Aggarwal[1], Renuka Thakur[2], Aakriti Nag[3], Bhavya Aggarwal[4], Renu Gupta[5]

[1,2,3]PG student , [5]Professor and Head, Dept of Prosthodontics, H.P. Govt Dental College, Shimla (H.P.);
[4]MBBS III year student, Govt Medical College, Amritsar (PB)

***ABSTRACT:***
Coronaviruses (CoVs), enveloped positive-sense RNA viruses, are characterized by club-like spikes that project from their surface, an unusually large RNA genome, and a unique replication strategy. Coronaviruses cause a variety of diseases in mammals and birds ranging from enteritis in cows and pigs and upper respiratory disease in chickens to potentially lethal human respiratory infections. Thoracic imaging is of great value in the diagnosis of COVID-19, monitoring of therapeutic efficacy, and patient discharge assessment. A high-resolution CT is highly preferable. Portable chest X-rays are helpful for critically ill patients who are immobile. Hence; in the present review, we aim to highlight some of the important aspects of COVID 19.
**Key words:** Corona virus, Global, Dental

Received: 12 April, 2020 Accepted: 24 April, 2020

**Corresponding author:** Dr. Urmi Aggarwal, PG student , Dept of Prosthodontics, H.P. Govt Dental College, Shimla (H.P.), India

**This article may be cited as:** Aggarwal U, Thakur R, Nag A, Aggarwal B, Gupta R. Coronavirus Disease 2019 (COVID 19): The Globalist!. Int J Res Health Allied Sci 2020; 6(3):9-13.

### INTRODUCTION

An emergent pneumonia outbreak originated in Wuhan City, in the late December 2019. The pneumonia infection has rapidly spread from Wuhan to most other provinces and other 24 countries. World Health Organization declared a public health emergency of international concern over this global pneumonia outbreak on 30th January 2020. (1) Since December 2019, multiple cases of novel coronavirus pneumonia (NCP) have been identified in Wuhan, Hubei. With the spread of the epidemic, such cases have also been found in other parts of China and other countries. (2) The World Health Organization announced that the outbreaks of the novel coronavirus have constituted a public health emergency of international concern. As of February 26, 2020, COVID-19 has been recognized in 34 countries, with a total of 80,239 laboratory-confirmed cases and 2,700 deaths. (5) Coronaviruses (CoVs), enveloped positive-sense RNA viruses, are characterized by club-like spikes that project from their surface, an unusually large RNA genome, and a unique replication strategy. Coronaviruses cause a variety of diseases in mammals and birds ranging from enteritis in cows and pigs and upper respiratory disease in chickens to potentially lethal human respiratory infections. (3) 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.(1) The novel coronaviruses belong to the β genus. They have envelopes, and the particles are round or oval, often polymorphic, with diameter being 60 to 140 nm. Their genetic characteristics are significantly different from SARS-CoV and MERS-CoV.(4)

**Suspect Case:**

A patient with acute respiratory illness {fever and at least one sign/symptom of respiratory disease (e.g., cough, shortness of breath)}, **AND** a history of travel to or residence in a country/area or territory reporting local transmission (See NCDC website for updated

list) of COVID-19 disease during the 14 days prior to symptom onset.(6, 7)

**Laboratory Confirmed case:**
A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms. (7)

**ETIOLOGY:**
Appropriate specimens, collection methods and collection timing are important to improve detection sensitivity. Specimen types include: upper airway specimens (pharyngeal swabs, nasal swabs, nasopharyngeal secretions), lower airway specimens (sputum, airway secretions, bronchoalveolar lavage fluid), blood, feces, urine and conjunctival secretions. Sputum and other lower respiratory tract specimens have a high positive rate of nucleic acids and should be collected preferentially. (6) Specific antibodies are produced after SARS-CoV-2 infection. Serum antibody determination methods include colloidal gold immunochromatography, ELISA, chemiluminescence immunoassay, etc. Positive serum-specific IgM, or specific IgG antibody titer in the recovery phase ≥4 times higher than that in the acute phase, can be used as diagnostic criteria for suspected patients with negative nucleic acid detection. During follow-up monitoring, IgM is detectable 10 days after symptom onset and IgG is detectable 12 days after symptom onset. The viral load gradually decreases with the increase of serum antibody levels. (6)

**Updated definition of contact:**
A contact is a person that is involved in any of the following:

- Providing direct care without proper personal protective equipment (PPE) for COVID-19 patients
- Staying in the same close environment of a COVID-19 patient (including workplace, classroom, household, gatherings).
- Traveling together in close proximity (1 m) with a symptomatic person who later tested positive for COVID-19.(8-10)

**High Risk Contact:**

- Touched body fluids of the patient (Respiratory tract secretions, blood, vomit, saliva, urine, faeces)
- Had direct physical contact with the body of the patient including physical examination without PPE.
- Touched or cleaned the linens, clothes, or dishes of the patient.
- Lives in the same household as the patient.
- Anyone in close proximity (within 3 ft) of the confirmed case without precautions.
- Passenger in close proximity (within 3 ft) of a conveyance with a symptomatic person who later tested positive for COVID-19 for more than 6 hours.(11)

**Low Risk Contact:**

- Shared the same space (Same class for school/worked in same room/similar and not having a high risk exposure to confirmed or suspect case of COVID-19).
- Travelled in same environment (bus/train/flight/any mode of transit) but not having a high-risk exposure.(7)

**Clinical Classifications:**

1. Mild Cases: The clinical symptoms are mild and no pneumonia manifestations can be found in imaging.
2. Moderate Cases: Patients have symptoms such as fever and respiratory tract symptoms, etc. and pneumonia manifestations can be seen in imaging.
3. Severe Cases: Adults who meet any of the following criteria: respiratory rate ≥ 30 breaths/min; oxygen saturation ≤ 93% at a rest state; arterial partial pressure of oxygen (PaO2)/oxy- gen concentration (FiO2) ≤ 300 mmHg. Patients with > 50% lesions progression within 24 to 48 hours in lung imaging should be treated as severe cases.
4. Critical Cases: Meeting any of the following criteria: occurrence of respiratory failure requiring mechanical ventilation; presence of shock; other organ failure that requires monitoring and treatment in the ICU
   Critical cases are further divided into early, middle and late stages according to the oxygenation index and compliance of respiratory system.

● Early stage: 100 mmHg <oxygenation index ≤150 mmHg; compliance of respiratory system ≥30 mL / cmH2O; without organ failure other than the lungs. The patient has a great chance of recovery through active antiviral, anti-cytokine storm, and supportive treatment.

● Middle stage: 60 mmHg < oxygenation index ≤100 mmHg; 30 mL/cmH2O > compliance of respiratory system ≥15 mL/cmH2O; may be complicated by other mild or moderate dysfunction of other organs.

● Late stage: oxygenation index ≤ 60 mmHg; compliance of respiratory system <15 mL/cmH2O; diffuse consolidation of both lungs that requires the use of ECMO; or failure of other vital organs. The mortality risk is significantly increased. (6)

**PATHOPHYSIOLOGY:**
(1) ARDS
The primary pathology is ARDS, characterized by diffuse alveolar damage (e.g. including hyaline membranes). Pneumocytes with viral cytopathic effect

are seen, implying direct virus damage (rather than a purely hyper-inflammatory injury. (8)
(2) Cytokine storm
Emerging evidence suggests that some patients may respond to COVID-19 with an exuberant "cytokine storm" reaction (with features of bacterial sepsis or hemophagocytic lymphohistiocytosis .Clinical markers of this may include elevations of C-reactive protein and ferritin, which appear to track with disease severity and mortality.

**STAGES:**
There seem to be different stages of illness that patients may move through.

(1) **Replicative stage** – Viral replication occurs over a period of several days. An innate immune response occurs, but this response fails to contain the virus. Relatively mild symptoms may occur due to direct viral cytopathic effect and innate immune responses.

(2) **Adaptive immunity stage** – An adaptive immune response eventually kicks into gear. This leads to falling titers of virus. However, it may also increase levels of inflammatory cytokines and lead to tissue damage – causing clinical deterioration.(8)

**TRANSMISSION:**

**LARGE DROPLET TRANSMISSION**

- COVID-19 transmission can occur via large droplet transmission (with a risk limited to ~6 feet from the patient)

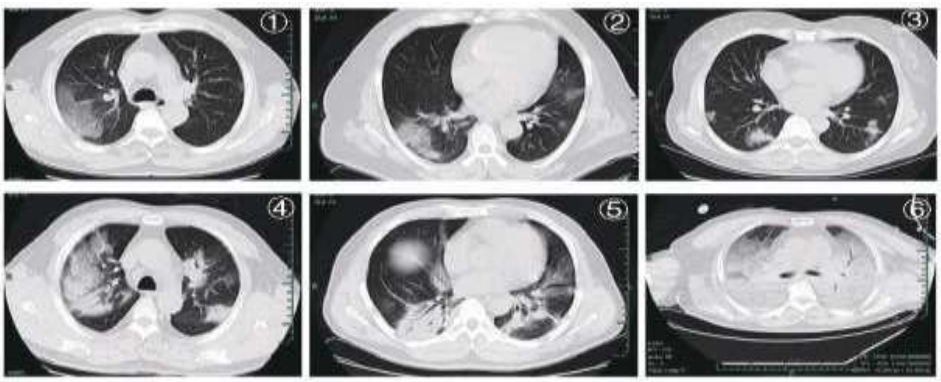
**AIRBORNE TRANSMISSION**

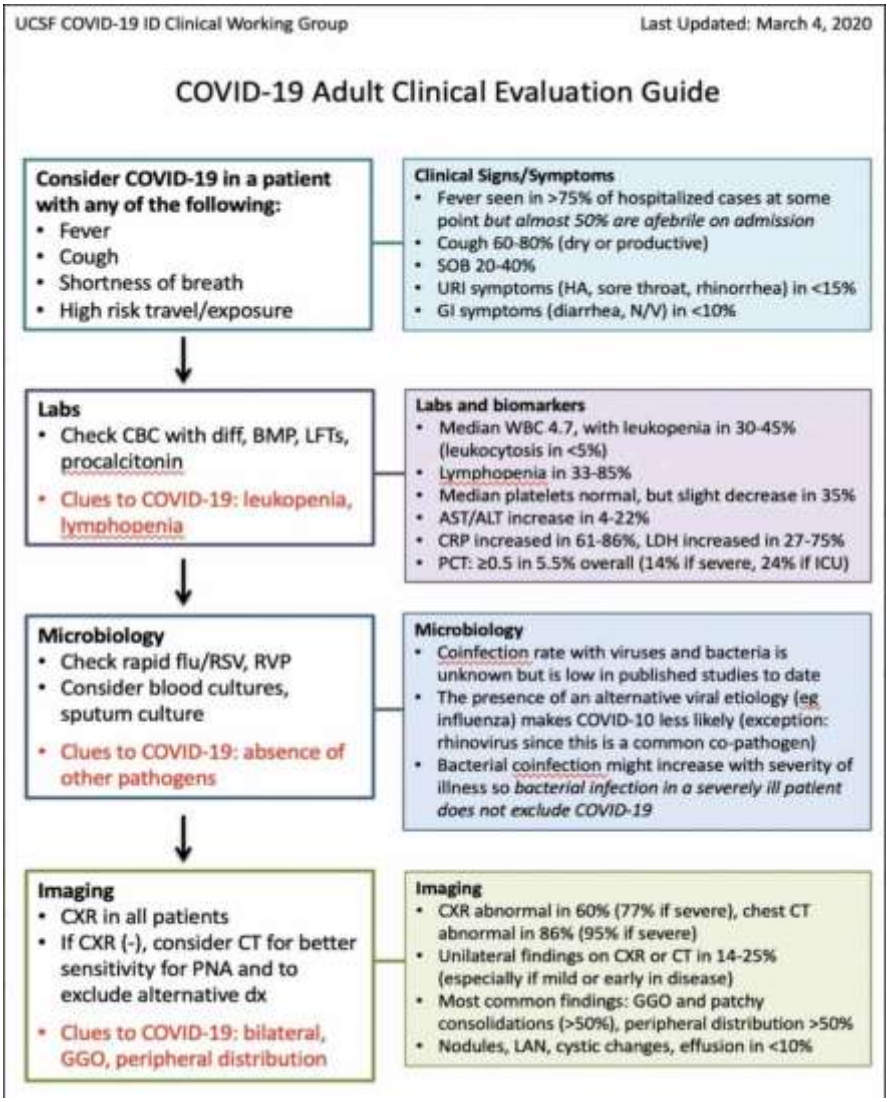
- It's controversial whether COVID19 can be transmitted via an airborne route (small particles which remain aloft in the air for longer periods of time). Airborne transmission would imply the need for N95 masks ("FFP2" in Europe), rather than surgical masks.
- Using airborne precautions for all patients who are definitely or potentially infected with COVID19 will likely result in rapid depletion of N95 masks. This will leave healthcare providers unprotected when they actually need these masks for aerosol-generating procedures.
- In the context of a pandemic, the Canadian and WHO guidelines may be more sensible in countries with finite resources (i.e. most locales). However, infection control is ultimately local, so be sure to follow your hospital's guidance regarding this.

**CONTACT TRANSMISSION ( FOMITE -FACE)**
This mode of transmission has a tendency to get overlooked, but it may be incredibly important. This is how it works:

I. Someone with coronavirus coughs, emitting large droplets containing the virus. Droplets settle on surfaces in the room, creating a thin lm of coronavirus. The virus may be shed in nasal secretions as well, which could be transmitted to the environment.
II. The virus persists on fomites in the environment. Human coronaviruses can survive on surfaces for up to about a week. It's unknown how long COVID-19 can survive in the environment, but it might be even longer (some animal coronaviruses can survive for weeks!).
III. Someone else touches the contaminated the surface hours or days later, transferring the virus to their hands.
IV. If the hands touch a mucous membrane (eyes, nose, or mouth), this may transmit the infection. (8)

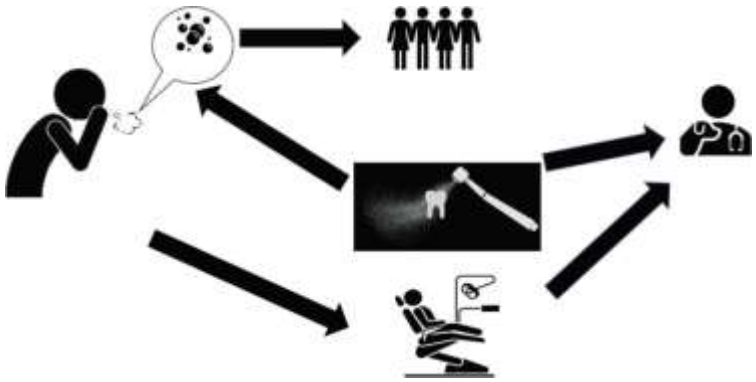
**DIAGNOSIS AND MANAGEMENT:**
Thoracic imaging is of great value in the diagnosis of COVID-19, monitoring of therapeutic efficacy, and patient discharge assessment. A high-resolution CT is highly preferable. Portable chest X-rays are helpful for critically ill patients who are immobile. CT for baseline evaluation of patients with COVID-19 is usually performed on the day of admission, or if ideal therapeutic efficacy is not reached, it can be re-performed after 2 to 3 days. If symptoms are stable or improved after treatment, the chest CT scan can be reviewed after 5 to 7 days. Daily routine portable chest X-rays are recommended for critically ill patients. (7)





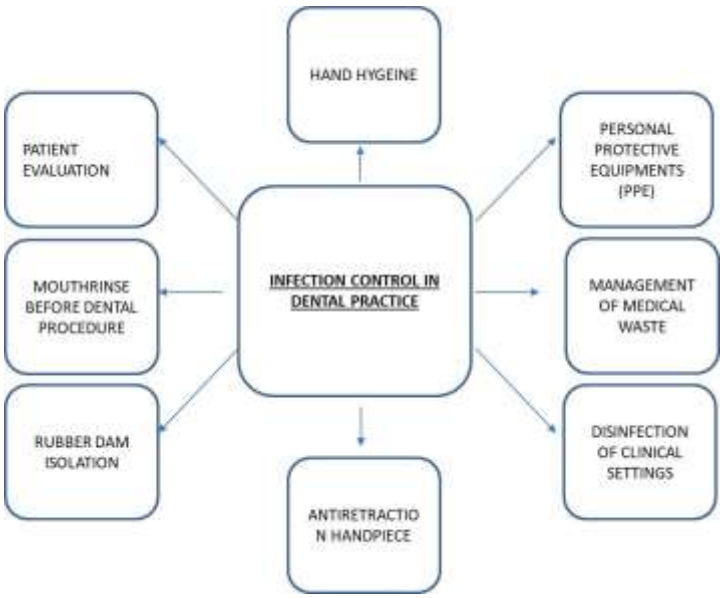

**DENTAL IMPLICATIONS**

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 infection due to the specificity of its procedures, which involves face-to-face communication or **direct transmission** (cough, sneeze, and droplet inhalation transmission) and contact transmission (contact with oral, nasal, and eye mucous membranes). (12) Dental patients who cough, sneeze, or receive dental treatment including the use of a high-speed handpiece or ultrasonic instruments make their secretions, saliva, or blood aerosolize to the surroundings. Dental apparatus could be contaminated with various pathogenic microorganisms after use or become exposed to a contaminated clinic environment. Thereafter, infections can occur through the puncture of sharp instruments or direct contact between mucous membranes and contaminated hands.(4)



Up to now, there has been no consensus on the provision of dental services during the epidemic of COVID-19. On the basis of our experience and relevant guidelines and research, dentists should take strict personal protection measures and avoid or minimize operations that can produce droplets or aerosols. The 4-handed technique is beneficial for controlling infection. The use of saliva ejectors with low or high volume can reduce the production of droplets and aerosols. (4)

**INFECTION CONTROL IN DENTAL PRACTICE**




**REFERENCES:**


1. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B : Transmission routes of 209-nCoV and controls in dental practice,Int. J. Oral Sci.(2020)12:9.
2. National health commission and state administration of traditional Chinese medicine :Diagnosis and treatment protocol for novel coronavirus pneumonia, March 3,2020.
3. Fehr AR, Perlman S: Coronavirus : An overview of their replication and pathogenesis,Methods in molecular biology, Vol. 1282.
4. Meng L, Hua F, Bian Z :Coronavirus disease 2019 (COVID-19): Emerging and future challenges for dental and oral medicine, J. Dent. Res. 00(0).
5. Liang T : Handbook of COVID-19 Prevention and Treatment.
6. National Center for disease control Directorate General of health services MoHFW, GOI, New Delhi: The updated case definitions and contact categorisation.
7. Farkas J :The internet book of critical care, COVID-19 EMcrit Project, 11 march 2020.
8. World health organisation: Considerations for quarantine of indivisuals in the context of contaminant for coronavirus disease (COVID -19), 29 February 2020.
9. World Health Organisation : Clinical management of deVere acute respiratory infection (SARI) when COVID-19 disease is suspected. 13 March 2020.
10. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD: How will country- based mitigation measures influence the course of the COVID-19 epidemic.
11. Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, Tao Q, Sun Z, Xia L: Correlation of chest CT and RT-PCR testing in coronavirus disease 2019 (COVID-19) in china : A report pf 1014 cases.
12. IDA: Indian dental association's preventive guidelines for dental professionals on the coronavirus threat.