SALIVA – As A Diagnostic Tool For COVID 19 – A Review

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Abstract: SARS-COVID 19 [Severe acute respiratory syndrome Coronavirus -19] is a respiratory illness and affected the whole world [pandemic]. According to world health organization [WHO] COVID -19 has spread to 235 countries. All types of people including healthcare workers, symptomatic individuals, non health care peoples and mass screening is necessary for this type of global disease. WHO recommended nasopharyngeal [NP], and oropharyngeal [OP] swabs test for SARS-COVID 19 symptomatic patients through rRT -PCR [real time Reverse transcriptase - polymerase chain reaction] to confirm the diagnosis. Virus is present in saliva and testing of salivary specimen through rRT -PCR have more Advantage than NP and OP swab test. Salivary specimen is a non invasive diagnostic method. It minimizes the exposure of health care workers compared to other swab test. Infected patient saliva affects the dental health care providers during the treatment time. In this review article, we can see SALIVA - as a diagnostic tool for SARS-COVID 19 and what Precautions Dental health care providers should take before the treatment.

Keywords: SARS- COVID 19, Nasopharyngeal, Oropharyngeal, rRT - PCR, saliva
BACKGROUND OF THE DISEASE:
‘Co’ means for’ corona’ ‘VI’ means for ‘virus’ and ‘D’ for ‘Disease’. The disease was referred to as “2019 novel corona virus” or 2019-ncov. On 31st of December 2019 Wuhan health commission china identified a cluster of pneumonia cases with unknown etiology. On 1st January 2020, novel corona virus confirmed from the market place in wuhan city, symptoms such as fever, dyspnoea, drycough, diarrhoea and radiological findings are bilateral lung infiltration. 1 In Jan 9th 2020 novel coronavirus [ later named SARS – Cov 2 the virus causing COVID -19] is a causative agent for certain pneumonia cases2. On 11th march 2020 WHO declared COVID-19 a ‘GOLBAL DISEASE’.3

1. INTRODUCTION:
SALIVA is a hypotonic, exocrine, clinically informative biofluid secreted by salivary glands. 90% of the saliva is secreted by major salivary glands. saliva has numerous functions such as cleansing and protecting the oral cavity. Other functions are to improve the digestion and it has antimicrobial properties. serous and mucinous saliva is secreted everyday around 600 ml. It contains minerals, enzymes, electrolytes, buffers, enzyme inhibitors and salivary immunoglobulin’s [ig A], glycoprotein’s 4. Saliva is ideal for early diagnosis of diseases and it has numerous biological markers for certain diseases such as metabolic diseases, cardiovascular diseases, renal diseases, systemic malignancies, autoimmune diseases, infectious diseases, viral, bacterial and fungal infections also 6. Saliva is not only a safe tool for sars-cov-19 but it also gives clinical evaluation of the diseases. 7.

SAFE BIOLOGICAL TOOL : SALIVA
Corona virus disease [COVID- 19] is caused by SARS-cov-2 [severe acute respiratory syndrome corona virus -2] and it belongs to beta corona virus genus lineage B. Viruses are mostly detectable in the oral cavity. Oral cavity is the main gate for all infections including SARS – COVID -19. Infection migrating from nasopharynx or lower respiratory tract to the oral cavity. It plays a major role in COVID -19 pathogenesis. Because high expression of ACE receptors in the epithelial cells of the oral mucosa9. The expression of angiotensin - converting enzyme 2 [ACE2] is higher in salivary glands [minor] than lungs. It reveals salivary glands could be the potential reservoir for COVID -19. SARS – COV-2 entry in the saliva has 3 different pathways 1) lower and upper respiratory tract 2) From the blood into the GCF [gingival crevicular fluid]. 3) Infection of major and minor salivary glands11. Blood, pharyngeal swabs, anal swabs, saliva and urine shows the presence of virus in the COVID -19 positive patients. These are the various clinical specimens. WHO recommends nasopharyngeal [NP], oropharyngeal [OP] is the upper respiratory tract specimens for SARS-COV-2 RNA level through rRT-PCR [real time reverse transcriptase polymerase chain reaction]11. But this procedure, the risk of spreading infection from infected patients to health care workers is high. Sometimes it causes discomfort to the patient and it produces bleeding in thrombocytopenic patients. To avoid this difficulty some recent studies suggested that, SALIVA is a promising, diagnostic tool for to detect COVID -19. Because COVID -19 completely associated with human to human association and also saliva has higher consistent rate greater than 90% when compared to nasopharyngeal swabs.13
Collecting saliva is a non invasive, reliable method. For this method health care workers are not needed for taking the sample simply asking the patient to spit the saliva into the sterile bottle\textsuperscript{14}. After that viral RNA extract from infected patient saliva was a source for COVID-19 detection. In detection of SARS-COV-2 infection, rRT-PCR [real time Reverse transcriptase polymerase chain reaction] method is gold standard test\textsuperscript{15}.

**ADVANTAGES OF COLLECTING SALIVARY SAMPLES:** \textsuperscript{16}
- Economical, without breaking the skin procedure when compare to other swab technique.
- Doesn’t need health care professionals or other qualified persons or any other special instruments.
- We can take the sample at any place [Home, medical center].
- Saliva sample cannot clot; multiple numbers of times can be obtained easily.
- No cross contamination

**PRECAUTIONS:**
Infected COVID – 19 patients saliva which may contain live viruses and there is possibility of transmission of viruses from person to person\textsuperscript{17}. Salivary droplets and nasal discharge is a main resource of spreading infection if we stand less than 2 meters\textsuperscript{18}. As health care workers especially dental professionals who are all dealing with saliva can take precautionary measures before taking up the patient. Careful history, health status, contact and residence history may be helpful to find out the patient present condition.

Patient reached into dental clinic entrance

- Check body temperature

- If it is less than $37.3^0 \text{C}$
- Higher than $37.3^0 \text{C}$

- Ask the patient previous history [contact, residence history, start the COVID-19 treatment present health status of the patient]
- refer to medical hospital and start the COVID-19 treatment present health status according to patient medical status.

- Asymptomatic patients/ carriers
- Reschedule the appointment, advice self quarantine for 14 days.

- Nothing relevant history regarding COVID-19
- Avoid elective procedures and will do emergency procedures alone.
After this basic investigations, every dentist should wear a PPE (personal protective equipment), protective eye wear, disposable masks, gloves, face shield and disposable apron to avoid the risk of COVID-19. It is strictly recommended for all dental health care clinics and hospitals. There are 3 levels of protective measures are recommended:

Primary       disposable working caps, mask, Standard protection for all staffs] whitecoat, face shield and latex Gloves

Secondary   disposable doctor cap, disposable [advanced protection for doctor] surgical mask, gloves, face shield

Tertiary [strengthened protection when patient suspected from COVID-19] But suspected COVID-19 patients not able to treat in the dental clinic.

PRECAUTIONS DURING THE TREATMENT:

- According to national health commission, every patient who visited dental clinic should gargle their mouth with mouth rinses before start the treatment
- Use disposable things is mandatory to prevent cross infection
- To minimize the aerosol infection we can use rubber dam for non-surgical procedures.
- High speed dental instruments/3 way syringes should be avoided
- COVID-19 suspected patients must be treated in separate rooms that is airborne infection isolation rooms [AIIRs].
- Disinfection should be done every time

2. CONCLUSION:
Saliva is considered as a non-negligible, diagnostic tool for COVID-19 by rRT-PCR analysis. Salivary sample is simple to collect by patient itself. It can eliminate special equipments and qualified persons to collect the sample. saliva is appropriate biofluid for detection of COVID-19 caused by SARS-COV-2 when compared to Oro – or – Nasopharyngeal swab technique. As we saw previously, salivary droplets and nasal discharge are the major source of spreading infection from human to human. As dental health care providers we need to know about COVID-19 and required to put barrier – protection equipment to protect ourselves and the society.

3. References:


