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## Review Article

### Sustainable Development of Dentistry: Safeguarding the patient & professionals during Pandemics

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#### ABSTRACT:

Dentistry in this world has several historical evidences. It has started from stone age and transformed into robotics. Many forms and functions has changed in the dentistry either due to mankind or due to natural calamities. COVID-19 a Novel Corona Virus has reversed the growth trajectory of professional dentistry in the world. As the growth of Corona Virus is increasing, day to day scenario reveals the need of phenomenal changes in dentistry. Several guidelines have been issued by higher authorities of the world which felicitated dentists for safe practice. Government and Non-Government interventions help, support and stabilize the dental industry. This article elicits the transformation in Dentistry and provides an overview of the precautionary measures to be taken during dental procedures and role of government in developing a sustainable model for dental clinics in the country.

**Key words:** Government and Non-Government interventions, transformation in Dentistry, precautionary measures, Corona Virus, sustainable.

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#### INTRODUCTION:

The outbreak of coronavirus disease 2019 (COVID-19) in the area of Wuhan, China, has evolved rapidly into a public health crisis<sup>1</sup> and has spread exponentially to other parts of the world.<sup>2</sup> The novel coronavirus belongs to a family of single-stranded RNA viruses known as Coronaviridae<sup>3</sup>. This family of viruses are known to be zoonotic or transmitted from animals to humans. These include severe acute respiratory syndrome coronavirus (SARS-CoV), first identified in 2002, and the Middle East respiratory syndrome coronavirus (MERS-CoV), first identified in 2012.<sup>4</sup> There is strong evidence that this novel coronavirus has similarity to coronavirus

species found in bats and potentially pangolins, confirming the zoonotic nature of this new cross-species viral-mediated disease.<sup>5,6</sup> It has already infected more than 6.7million individuals with 393449 deaths(on 5<sup>th</sup> June 2020) and more than 3.26 million recoveries worldwide.<sup>(7)</sup>In India there are around 227273 cases, 4701 deaths and 109462 recovered cases.(5<sup>th</sup> June 2020).<sup>(8)</sup>Health care professionals are more at risk. Amongst the HCWs, dental professionals are particularly at high risk for nosocomial infection and can become potential carriers of the disease.

**Why dentistry a high risk:**

These risk can be attributed to the unique nature of dental interventions, which include aerosol generation, handling of sharp instrument, and proximity of the provider to the patient's oropharyngeal region. Numerous kind of dental equipment are used in the clinical practice in the form of hand pieces, air-water syringes and ultrasonic scalers which result in production of aerosol in substantial amount. So, the potential for the spread of infections from patient to dentist or dental assistant is high.<sup>(9)</sup> There is minimum of three different pathways for COVID-19 to be present in saliva: firstly COVID-19 in the lower and upper respiratory tract that can enter the oral cavity together with the liquid droplets frequently exchanged by these organs.<sup>(10, 11)</sup> Secondly, COVID-19 present in the blood can access the mouth via gingival crevicular fluid, an oral cavity-specific exudate that contains local proteins derived from extracellular matrix and serum-derived protein.<sup>(12)</sup> Finally, another way for COVID-19 to occur in the oral cavity is by major- and minor-salivary gland infection, with subsequent release of particles in saliva via salivary duct. 2019-nCoV transmission in dental settings occurs through four major routes:<sup>(13)</sup> (i) Direct exposure to respiratory secretions containing droplet, blood, saliva, or other patient materials; (ii) indirect contact with contaminated surfaces and/or instruments; (iii) inhalation of suspending airborne viruses; and (iv) mucosal (nasal, oral, and conjunctival).<sup>(7)</sup> Despite all the precautions taken, it is almost impossible to reduce droplet and aerosol production to zero during dental procedures.<sup>(14)</sup> In addition, if adequate precautions are not taken, the dental clinics can potentially expose patients to cross contamination and become a super spreading zone. As the understanding of this novel disease is evolving, dental practices should be better prepared to identify a possible COVID-19 infection, and refer patients with suspected, confirmed, or a history of COVID-19 infection to appropriate treatment centre. For an effective and efficient dental treatment face-to-face communication and contact is required. This needs a certain amount of preparedness from the dentist's point of view. This article provides an overview of the precautionary measures to be taken during dental procedures and role of government in developing a sustainable model for dental clinics in the country.

**INFECTION CONTROL AND MANAGEMENT:**

SARS-CoV-2 can stay on surfaces for a few hours or up to several days, depending on the type of surface, the temperature, or the humidity of the environment.<sup>(14)</sup> This strengthens the need for good hand hygiene and the importance of thorough disinfection of all surfaces within the dental clinic. The most endorsed guidelines indicate that dentist should evade the scheduling of any

patient and only such vital dental diseases can be considered during the COVID-19 outbreak. This action will drastically limit the interpersonal contact, the waiting time of patients in dental cabinet and, in general, the conditions disposing patient to be infected. Before starting treatment a thorough history regarding the patients health status especially in the last 7 days is warranted including a temperature check and about the risk of having been in contact with other infected person.<sup>(15)</sup> In Clinical management patients and their accompanying persons are provided with medical masks. Temperature measurement is done once they enter hospital. Aerosol-generating procedures, such as the use of a 3-way syringe should be minimised. Extraoral dental radiographies, such as panoramic radiography and cone beam CT are appropriate alternatives during the outbreak. The 4-handed dentistry is helpful for controlling infection. The use of saliva ejectors and aerosol suction devices can reduce the production of droplets and aerosols.<sup>(16)</sup>

**DENTAL PROCEDURES AND PROTECTION:**

Aerosol generating procedures specifically need all the protective measures. Pre-procedural mouthwash for 30 seconds supervised ; with either Hydrogen peroxide 1% (dilute 3% to 1%), Chlorhexidine 0.2%, Povidine iodine mouthrinse (0.2%).<sup>(17)</sup> Use of appropriate PPE, use of single patient treatment room (where possible) , work with an assistant and use four handed dentistry, use rubber dam (or Isolate if available), swab teeth and tissues, use high volume evacuation. remove all unnecessary equipments, instruments, materials and objects from the treatment room and ensure remaining surfaces in the room are clear from clutter. PPE must be worn when the treatment room is in service. PPE includes gloves, fluid resistant masks, protective eyewear, outer protective clothing and enclosed footwear.<sup>(18)</sup> Wear all the above as per manufacturer's instruction. A face shield is the best alternative to protective eyewear. When donning and removing personal protective equipment use sequencing that minimizes the spread of contamination. Outer protective clothing must be worn above clothes or scrubs. If soiled it should be removed and compulsorily disposed every post treatment. Wear enclosed footwear that will protect your feet against injury from sharp objects. Only essential staff should be present. Hand hygiene is an important phenomena which as per WHO should be performed before touching a patient, before aseptic procedure, after body fluid exposure, after touching a patient and patient surroundings. Alcohol based hand rub should be used as per guidelines.

## GENERAL CONSIDERATION

1. Classify patients into emergency and non-emergency dental care and plan well before initiating any dental procedures along with scheduling of patients is very essential; hence avoid interaction of vulnerable patients (medically compromised or elderly patients) with general patients.
2. Primary care dental triage should focus on the provision of the three A's: a. Advice; b. Analgesia; c. Antimicrobials (where appropriate).
3. Dentist and support staff should wash their hand thoroughly with soap and water and follow up with alcohol based hand sanitizers before and after every patient screening or interaction. Surgical scrubbing of hands is recommended.
4. Patients should be scrubbed with Iso Propyl alcohol extra orally prior to any dental procedure.
5. Fumigation of clinics periodically is advised.
6. Clean and disinfect public areas frequently, including door handles, chairs and bathroom.
7. All dental clinics should display health awareness posters regarding COVID-19, Hand and Respiratory hygiene at prominent locations of the clinical area.
8. Dental Clinics should have adequate ventilation, as it can reduce the risk of infection through dilution and removal of infectious particles through air exchange. Improved ventilation in clinics is essential in preventing transmission of airborne infections.
9. Dental Team member should change from personal clothing to scrubs and vice versa before entering and returning home. Upon arriving home, dentist and dental staff should take off shoes, remove and wash clothing separately and immediately shower prior to any contact with family member.
10. All patient details and records should be maintained properly and if need arises should be shared with local health authorities or administration. Be aware of the local health authority protocol or testing laboratories and report any patient with relevant history for further necessary medical care.
11. If possible, use directional airflow, such as from fans, to ensure that air moves through staff work areas before patient treatment areas – not the reverse. A qualified industrial hygienist, ventilation engineer, or other professionals can help ensure that ventilation removes, rather than create, workplace hazards.

### Concerns and Implications for Patient Care

DCI's advisory released on 16th April 2020, dentists must strictly follow all protocols to decontaminate, disinfect and sterilize at the clinics as prescribed,

enabling to treat a maximum of only 3 or 4 patients a day. Dentist and assistant will now need to mandatorily use PPE suit, goggle, face shield, N95 FFP3 mask, surgical gloves and shoe cover, single use chair cover etc., and more for all procedures.

1. With this, already exorbitant treatment costs will at least double, if not more.
2. Informal checks suggest that nearly 80% of dental clinics at present don't follow the most basic sterilization protocols.
3. If some of these practitioners choose to compromise on the quality of PPE used or sanitation maintained in their clinics, the resulting impact to societal health will be catastrophic.
4. Apart from the huge monetary investments required to continue safe dental practice, there is also the equally important issue of proper training and process management in following these protocols to ensure minimal risk to patients and dentists alike.
5. The advisory also recommends only emergency dental services in the near future, further impacting the financial plight of dentist.
6. When the lockdown measures do ease up finally, given the overall uncertainty in the economy, people will tend to put off any elective dental procedures as they are not covered under health insurance schemes, despite repeated appeals by dentists in the last decade.

### Ways the government can address the malady affecting the dental industry today.

1. Inject fiscal support for the fledgling industry over the next two years: This could be on subsidized provision of quality PPE, sanitization, equipment, material, and reduction on import duty levied on expensive dental equipment to ensure dentist maintain adequate hygiene standards and aseptic protocols necessary for safe practicing.
2. What would also help is perhaps an easing of taxes for the industry for the next two years, interest-free loans and top-ups.
3. Equally important, there is a need for a government led business insurance plan for dentists and their practicing staff, protecting them for losses and health concerns arising as a result of exposure to the viral strain or other pandemics.
4. In parallel, we must bring dental treatment under insurance coverage for the general public.
5. Combined with this, the government must also actively look into setting up ancillary industries that can cater to the requirements of the healthcare industry, boosting employment locally and reducing our dependence on medical

imports.

6. Move away from a compartmentalized approach to oral health: Dentistry has long been the forgotten, poor cousin amongst healthcare practitioners and consequently, in public perception as well. However oral health is the window to general health – many medical conditions that can be diagnosed through an examination of the oral cavity. <sup>(19)</sup> Regular preventive oral checkups can reduce both the risk of diseases and the cost of oral treatment which can otherwise be very expensive. The government should ensure, every government hospital and oral primary healthcare center across the country has a dedicated healthcare department – this will also provide employment to the thousands of dental graduates in the country who can train to pick up expertise and practical knowledge on the field that is currently lacking.
7. Encourage public – private partnership: Dentistry and the medical field in general are lacking innovation and a healthy competitive spirit at the graduate level. There is a pressing need for privatization and globalization of dentistry and medicine, which will bring in a healthy dose of aggressiveness, agility and exposure to cutting-edge technology and the latest research – opening up opportunities and access to knowledge - all ultimately benefiting the practitioners, the industry and patient care. The government must encourage private partnership within the country and with reputed universities abroad. They can well counter any perceived reduction in quality of education by formulating appropriate guidelines to be strictly enforced by regulatory bodies that govern these alliances.
8. Periodic assessment and mandatory skills upgradation : The dental industry must have an active regulatory authority that periodically assesses all dental clinics across various parameters including expertise and exposure to the latest in dental practices and hygienic practicing conditions. This could be implemented through a mandatory skills upgradation program that is linked to license renewal for dentists every two years, after a thorough assessment.

#### Conclusion:

Scrutiny of dental professionalism is closely evitable specifically the safety issues putting proper evidence based dentistry into practice & will be the best start in this uncertain environment as the road to recovery will be painful and prolonged.. But this health emergency won't be the last one. We must be better prepared for what is likely to come next and equip the dental

faternity and industry to overcome the next hurdle. The above measures will not only help us produce dentists and medical professionals who are competent and confident in tackling health issues in the new decade, they will also bring in much needed investment and revenue injection into healthcare. This in turn will increase employment in allied fields including dental technician, assistant, lab specialist, etc. It will also provide an impetus to ancillary manufacturing industries that will further generate employment and revenue in the country, nudging us back onto the growth trajectory of being a leading dental and healthcare destination.

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