

# IMPACT OF COVID-19 ON DENTAL EDUCATION

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**Abstract:** COVID-19 (corona virus disease 2019) originated from Wuhan, china at the end of 2019 affected not only china but also spread all over the world and became a pandemic which was announced by WHO at march 2020. To prevent the spread of this corona virus disease many countries around the world announced Lockdown for several months. The people were asked to quarantine in their homes. All the Educational institutions like schools, colleges and universities are closed. It made a huge impact on health professionals and dental education. To avoid close contact between students, dental schools, colleges and laboratories were closed. so various virtual modes were undertaken to deliver Dental education in three different categories - lectures & problem based learning, laboratory training and clinical training. Although virtual modes of education had advantages, it has many disadvantages. The disease also has impact on dental research. In conclusion, though the pandemic caused more challenges to dental students and dental education, it paved a new way for Revolutionary modifications in dental education.

## 1. INTRODUCTION

The coronavirus disease 2019 (COVID19) which started as an epidemic at Wuhan, China, in December 2019 has become a major public health problem for China and many other countries across the world.<sup>1</sup> The World Health Organization (WHO) announced this outbreak as a public health emergency of international concern on January 30, 2020 <sup>2,3</sup> Further concerned by the alarming level of spread and severity the WHO announced the disease can be characterized as a pandemic on March 11,2020 <sup>4</sup>

The characteristics of dental settings, where close contact between human being are required for all the traditional learning process in dental institutions increases the risk of cross infection between dental practitioners and patients.<sup>3</sup> This has made many dental schools across the globe to be locked down, in order to minimize the spread of this coronavirus infection <sup>5</sup>. Universities across the globe have switched to the online mode of learning, as an effort to balance the wellbeing of students, faculty, and patients, and also to ensure the learning progress of students.<sup>5,6</sup> According to the European association of dental education 96% of clinical work was performed by the senior staff with a minimum 30% participation of postgraduate students and 11% of undergraduate students. The association also reported that 90% of schools used online pedagogical software tools, 72% used live or streamed videos, 65% organization of virtual meetings, 48% links to other online materials. For examinations and assessments, the lockdown has led 50% of dental schools to organize online examination, however, 72% have postponed evaluation of clinical competence.

Contrary to other careers, dentistry has a unique amalgamation of three elementary modules: theory (Lectures and Problem based Learning), laboratory, and clinical practice which requires face to face interactions between teachers, students, and patients in a dental school set up. It is this conventional triage that poses a great difficulty for dental universities to completely deliver education through online portals, unlike many other field. <sup>5,7</sup>

Table 1 – Various virtual modes adapted by universities across the world for delivering dental education during COVID -19 pandemic

Theory (Lectures and Problem Based Learning )	Laboratory training	Clinical training
<ul style="list-style-type: none"> <li>• Zoom® meeting</li> <li>• Google Classroom</li> <li>• Google meet</li> <li>• Google® educational tools</li> <li>• Skype®</li> <li>• Facebook®</li> <li>• Instagram®</li> <li>• YouTube®</li> <li>• WhatsApp®</li> <li>• Telegram®</li> <li>• LinkedIn®</li> <li>• Pinterest®</li> <li>• videoconference systems like Jitsi®, Microsoft Teams®, and WebEx®</li> </ul>	<ul style="list-style-type: none"> <li>• Virtual reality simulators by haptic technology</li> <li>• Augmented reality</li> <li>• Computer aided design/computer aided manufacturing (CAD/CAM) systems</li> </ul>	<ul style="list-style-type: none"> <li>• Tele dentistry</li> <li>• Recording live clinical procedures conducted by faculty and few postgraduate students with PPE</li> <li>• Virtual simulators and CAD/ CAM system</li> </ul>

#### Disadvantages of Virtual mode of education :

Although the virtual methods of education aids in continuous delivery of dental education during this pandemic situation it comes with certain disadvantages. Regmi et al in their recent systematic review have listed the barriers for virtual learning in health sciences as follows,

1. Poor motivation among the students caused by internal factors (e.g., poor engagement, high levels of anxiety and stress, lack of student's self-discipline) and external factors (course structure, poor pedagogical design, management policy, limited use of technology in education, lack of support)
2. Resource-intensive: time-, cost- and labour intensive approach of e-learning programs
3. Not suitability for all disciplines/contents: for contents <sup>7</sup>

Research proves the VR technology improves students' hand-eye coordination, fine motor skills and reflection skills especially in the very early stages of skill acquisition leading to a conservative preparation approach and better skill retention. However, they are expensive hence they are not available in all educational institutions, further they are not portable, and do not cover all areas of dentistry. <sup>8,9</sup>

In addition to these factors Bolanos et al reported that despite the accessibility to a virtual environment, the e-learning process is unequal, and university authorities must implement further improvising strategies as about 20 % students reported sharing their educational devices such as laptops and mobile phones with other people at home and about 4% reported

that the access to such devices was prioritized to other people who needed to be connected for work.<sup>7</sup>

#### Impact of COVID-19 on dental students

It has been noted that many students fear being affected by Covid-19<sup>10</sup>. Apart from this many students are worried about the delay in graduation and completion of the course as they had done a substantial amount of financial investment on their education.<sup>11</sup> In a survey conducted by Dziedzic A N majority of the students were worried about clinical patient's chairside activities, which has been significantly reduced and could not be substituted by remote training, like the telehealth formats used in medicine.<sup>12</sup> Similarly in a survey conducted by Susan Hattar et al 77% students expressed that they missed educational experiences, more than half of them felt less motivated in following e-learning programs and believed that online assessment is not a good method for evaluation. On the other hand, 67% of students thought that online group discussions have a positive value and preferred the same over theatre lectures. About 78.7% of the 5th year students stated that the quarantine increased their collaboration with their colleagues. However 87% of students, though their clinical training was the most affected and no virtual training could replace the face to face clinical training.

#### **Effect of COVID 19 pandemic on dental research**

In order to oblige to the mandatory government policies, many non-essential laboratory-based dental research projects and post-graduate student research projects, have been restricted.<sup>8</sup> This has directed, many dental researchers to adapt online means of conducting research such as online surveys and literature reviews. In a survey conducted by Dziedzic A et al participants reported that although they were worried about the reduction in research activities, mainly clinical research, they reported an overall 50% increase in writing and publishing articles during the lockdown.<sup>12</sup> Similarly Gambrani et al have reported 80% increase in publishing articles during the lockdown particularly for professors who otherwise used to spend two or more days in clinical training in dental hospitals.<sup>12</sup> Many funding agencies have called for research and development in the field of COVID-19, to encourage research on the same. This pandemic had opened new vistas for research in many imperative topics for research such as, Cross infection control, Dental Public Health issues in relation to COVID-19, Impacts of the pandemic on dental professionals, Role of dental professionals in management of COVID-19, Innovations in tele dentistry and online dental education, Interactions of human oral tissues with COVID-19 and Application of tissue engineered models of human oral and respiratory mucosa to develop rapid diagnostic kits and test various treatment modalities.<sup>8</sup>

Table 2 : Restricted services and recommendations followed during the COVID-19 pandemic

Australia	Brazil	America
<ul style="list-style-type: none"> <li>No routine dental treatment done.</li> <li>Dental treatments that mostly do not generate aerosols or aerosols produced have minimal saliva or blood due to rubber dam usage.</li> <li>Only the dental treatments that do not produce aerosols, or where treatments generating aerosols is limited to acute pain management</li> </ul> <p>Dental treatments should be treated :</p> <ul style="list-style-type: none"> <li>Extra oral swelling.</li> <li>Intra oral swelling.</li> <li>Emergency Trauma Cases.</li> <li>Fracture of mandible.</li> <li>Dental pain causing loss of sleep.</li> <li>ulcers persisting for more than 3 weeks.</li> </ul>	<ul style="list-style-type: none"> <li>Cleaning all the surfaces with 1% sodium hypochlorite or 70% alcohol.</li> <li>Distance between each dental chair must be more than 2 meters, with mechanical barriers between them.</li> <li>Pre-consultation with patients from telephone contact.</li> <li>Wearing PPE kit while treating all patients</li> <li>Use of high-power suction to reduce the spread of aerosols.</li> <li>Drying of the tooth with gauze or cotton.</li> <li>Avoiding the use of the air jet of triple syringe.</li> <li>use of extraoral radiographs, such as OPG or CT.</li> </ul>	<p>Patient care should be provided with no delay under any level of community transmission (CT).</p> <p><u>Large scale community transmission</u> : shift care to facilities less affected by COVID-19. consider deferring until CT decreases. Utilize telehealth if appropriate.</p> <p><u>moderate community transmission</u> : consider if the facility can provide patient care. work towards expanding in person care as needed with priority for at risk populations</p> <p><u>No community transmission</u> : resuming regular practice.</p>

## 2. CONCLUSION:

The COVID 19 pandemic has caused tremendous challenges to dental academicians and students across the globe, however it has paved a new pathway for revolutionary modifications in dental education, research protocols, tele-dentistry, and clinical trials with flexible approaches to solutions.<sup>10</sup> The current circumstances should be taken as a suitable moment for all the institutions to review their educational modalities, research practices, biosafety protocols, to prepare the future generation of dentists, to face a second wave of the COVID -19 disease and also future catastrophic events.<sup>11</sup>

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