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Perspective

Perspectives on the challenge and change of COVID-19 crisis on dental education

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A severe acute respiratory syndrome in human transmitted by SARS-CoV-2 has become a global pandemic which was originated in Wuhan, Hubei, China, at the end of 2019. Until now, clinical management of COVID-19 is mainly symptomatic treatment without an effective therapy. Although there are promising data on the development of an effective vaccine,¹ antiviral, antimalarial, and biological drugs are still administered in clinical trials. The correct use of personal protective equipment such as surgical masks and gowns with proper hand sterilization seems to be the best way for the prohibition of COVID-19 spreading.² This global public health crisis affects all walks of life. Dental education is also without any exception forced to face unprecedented challenges and changes of a return to normalcy. It is quite challenging for the changes in the ways of teaching, learning, and interaction between instructors and students. It also needs to rethink and adapt the entire curriculum and evaluation methods in a short period of time.

The COVID-19 pandemic has interrupted the face-to-face communication including teaching and educational activities worldwide. Social distancing was implemented against COVID-19 transmission. Therefore, fully-virtual courses or hybrid-teaching program were adapted in dental schools. Educational electronic platforms, video conferencing

networks, and social media are conducted into dental schools as an official alternative for non-classroom activities.^{3,4} Teachers also choose to upload pre-recorded lectures and supplemental materials to online learning platforms or apps before the lectures begin. From the COVID-19 lesson, we learned that the previous underestimated online e-learning infrastructure should be reconsidered for teacher–student interactions. The new pattern may become as the routine curriculum currently and even after the pandemic.

Simulation laboratory learning courses play an important infrastructure in preclinical dental education to facilitate the transition into the dental clinic for enhancing students' pre-clinical skill performances in many clinical dental procedures. Basically, manikins and physical typodonts are the typical equipments used in simulation laboratory. It is a real challenge that teaches these pre-clinical skills under social distancing and the restriction of gathering during the pandemic. Online simulation with dental training manikin is extremely difficult and almost impossible. Video demonstration of simulation could not replace the essential hand-on training simulation laboratory course. However, the recent incorporation of haptic virtual reality (VR) simulation technology brings the great opportunity for dental education supplemented distant learning. This innovative device could provide the real-time feedback between instructor and student. The haptic simulation environment can improve students' hand-eye co-ordination, fine motor skills, and reflection skills at the beginning of pre-clinical skill learning.⁵ Taken together, it could be the alternative

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to perform distance learning during the crisis situation. Perhaps the haptic VR device would become the new normal in the future.

The assessment of clinical competence and skill is also very important in competency-based dental education. Online case-based learning and virtual patient-based learning can provide the more relevant clinical scenario that could guide the student critical thinking for oral health assessment, inter-professional practice, and proper treatment planning. Objective structural clinical examination (OSCE) is a popular method used for evaluating student in an environment that mimics clinical situation. The online virtual OSCE by the use of video recording of the examination process for marking, calibration, and training purposes may replace the conventional 'live' OSCE.⁶ This newly developing examination system still has some limitations and needs to further evaluate the long-term outcome. Taken together, remotely delivering the case-based course materials, mimicking clinical experiences, and conducting skill examinations are the successful strategies for dental education during and post pandemic crisis.

However, distance learning cannot replace clinical practice with patients in acquiring abilities inherent to the dental training. Exception in Taiwan, most of the dental school clinics, teaching hospitals, and local dental clinics are shut down or just provide the emergency dental service in the beginning of COVID-19 outbreak.^{7,8} Emergency dental treatment becomes an important part of dental education. Redistribution of resources such as personal protective equipment, volume of facilities, and stock of consumables during and after the pandemic need to be carefully calibrated for the maintaining clinical training of dental students.⁹ Teledentistry, a subunit of telemedicine, seems the good method for dental education this time. It is a practical electronic consultation of dental care, education, or treatment to close the distance via the use of information technology such as video or telephone.¹⁰ This way allows patients screening and avoids direct face-to-face contact with any patient. Although, the outcome for dental education is still not sufficient for a long-term use. Teledentistry may be an adjunct component in the compromised dental education during the current pandemic.

In conclusion, COVID-19 crisis has greatly influenced global dental education including Taiwan, especially with regards to maintaining social distance leading to the challenge and change of both the teaching and learning methods. Therefore, teaching should be adapted to the new reality with the use of information technology to make

distance learning more remote learning. Online examinations may not be the ideal way to evaluate the students' skills only theoretically. It still has a lot of challenges and the dental educators need to solve in each stage of the COVID-19 pandemic. The model of dental education should be changed to provide a safe comprehensive clinical training such as hybrid teaching approaches and even direct patient care for dental students in a difficult dilemma.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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