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Developing technical skills utilizing a remote operating kit

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1 | PROBLEM

The clinical component of dental school is a pivotal time during the dental school curriculum as it involves direct patient care and more advanced hands-on clinical experiences. The COVID-19 pandemic has greatly affected dental education by reducing the amount of clinical experiences important for the development of hands-on skills. For most dental schools, didactic courses have transitioned to remote learning,[1] which has made it more difficult to achieve objectives of a clinical curriculum. Online clinical-teaching and case discussions benefit critical thinking,[2] but the development of hands-on dental experiences to improve clinical and fine motor skills are still a significant problem.

2 | SOLUTION

A Remote Operating Kit (ROK) was developed to allow third-year dental students to practice hands-on exercises remotely from the dental school. Each kit consisted of teeth for the student's typodont (Columbia R861), diamond bur kit, and a Bien Air electric hand piece controlled by the Optima controller (Figure 1). What turned out to be the most impactful component of the ROK was an iPad and ring light (Figure 2) for video recording.

The students prepared typodont teeth for 4 all-ceramic restorations: zirconia crowns, lithium disilicate crowns, lithium disilicate onlays, and endo-crowns. The students used the iPad with ring light to record a video of each preparation with views from the occlusal in the path of draw, buccal, lingual, and the typodont in maximum intercuspation.

FIGURE 1 Remote Operating Kit: Columbia R861 typodont, Bien Air electric hand piece with Optima controller, diamond bur kit, iPad, carrying case

The Virtual Clinic Rotation consisted of small groups of 6 students with a faculty facilitator and a time allotment of 8 hours/week for 4 weeks. Small group synchronous sessions were held with their faculty facilitator over Zoom for ≈ 2½ hours/week. During these synchronous sessions, each student shared their recorded video of a preparation. The ability for the student to video record their tooth preparation allowed for real-time feedback from faculty even though they were working remotely. The remaining time was used for individual remote practice of the hands-on exercises.

3 | RESULTS

A precourse survey was conducted with 42 students. Seventy-four percent of the respondents felt the remote-interactive concept was a good idea. The schedule provided

FIGURE 2 iPad and ring light set up with typodont for video recording

sufficient faculty availability for questions (90%) and feedback (87%). All four of the typodont exercises were strongly considered a benefit to expanding their clinical skills.

Obstacles to this Virtual Remote Clinic rotation have included an abundance of dust/debris from the cutting of typodont teeth without suction and variations in video quality for accurate assessment.

Despite these minor challenges of working away from an equipped preclinical space, the response to this remote way of learning has been positive. During the feedback sessions all students learned from the evaluation of their own work and were able to compare their preparations with other students' preparations supporting both individual and group learning.

Developing manual dexterity and fine motor skills is essential during clinical dental education and simulations are one of the safest ways to practice these skills without direct patient interactions.[3] A virtual clinic utilizing ROKs is an innovative educational process for the teaching of hands-on dental technical skills while allowing real-time faculty feedback that supported peer and group learning experiences that do not require the use of dedicated preclinical facilities.

CONFLICT OF INTEREST

None

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