ADVANCING THROUGH INNOVATION

Delivering hands-on pre-clinical orthodontic education in the remote age

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1 | PROBLEM

With the coronavirus disease 2019 (COVID-19) pandemic causing dissolution of traditional in-person instruction, education has become remote in an exceedingly short timeframe. For pre-clinical laboratory courses, this presented challenges in providing a comparable hands-on experience.

This article describes a 10-week combined lecture and pre-clinical dental student laboratory course that applies introductory orthodontic education to clinical simulations. Due to the pandemic, both the lecture and laboratory components were moved fully online.

2 | SOLUTION

Didactic content remained intact, with lectures being pre-recorded and posted in advance of each class session. To encourage group discussion, a live videoconferencing session was hosted weekly with the course chair. A polling feature (Zoom Video Communications, Inc.) was used, which allowed students to apply lecture information to simulated test questions; the group would then review the concepts, giving them weekly opportunities to assess comprehension.

The laboratory component was also transitioned to fully remote instruction and was led by residents. Four of the sessions were held in small groups via the same aforementioned videoconferencing platform to simulate the resident-led bench group experience. This involved review of case records, where students performed diagnosis and treatment planning. Space analysis was performed with 1:1 photocopied prints of the stone models. For lateral cephalograms, students could print them or directly trace them on their touchscreen devices. Measurements could be done manually with a protractor or digitally via software. In lieu of a wax typodont to practice bracket positioning, a free 3D software with purchased 3D model was used to simulate digital bracket placement. Weekly attendance and projects were uploaded to a course cloud folder for review. The final exam was also given electronically.

3 | RESULTS

Access to pre-recorded lectures and low-stakes assessment of comprehension through videoconference polling was well received by students. Increased exposure to real-life case presentations to demonstrate biomechanics and clear aligners to introduce basic removable appliance concepts was also a popular laboratory modification due to the broad clinical applicability. These sessions took the place of wire bending and retainer fabrication, which may be less relevant to students who pursue a career path other than orthodontics. Wire exercises could still be taught remotely, although students would need access to the materials in advance, which was not possible during this transition.

Approval of the small group remote labs depended on the individual students’ experiences with their resident; this could be improved with more teaching experiences for the residents and incentivizing preparedness for leading their sessions. Size scaling of the patient records could be standardized by providing printed packets in advance of the course. With more time to secure individual licenses,
the digital bracket placement could be performed by every student; due to limitations in licenses, the students had to work as a large group.

The innovations on behalf of the course chair, dental students, and orthodontic residents at the UCLA School of Dentistry helped make this course a success. In the future, a hybrid course is anticipated; with modifications to remote delivery, the laboratory experience could be further optimized to enhance this hands-on component.

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DISCLAIMERS
None.

CONFLICTS OF INTEREST
The authors have no conflicts of interest to disclose.

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