

# W The Use of Virtual Reality for Dental Anatomy Education

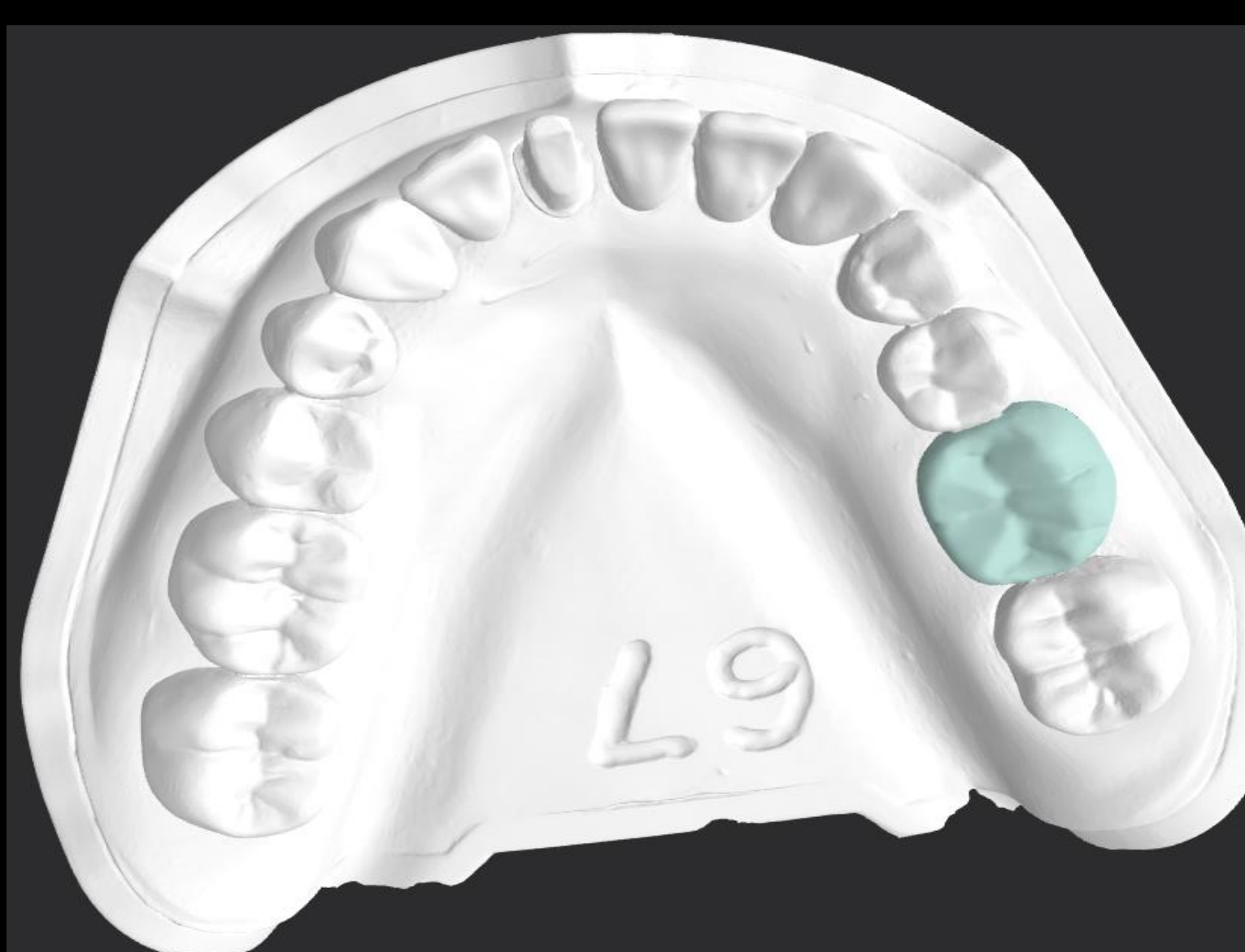
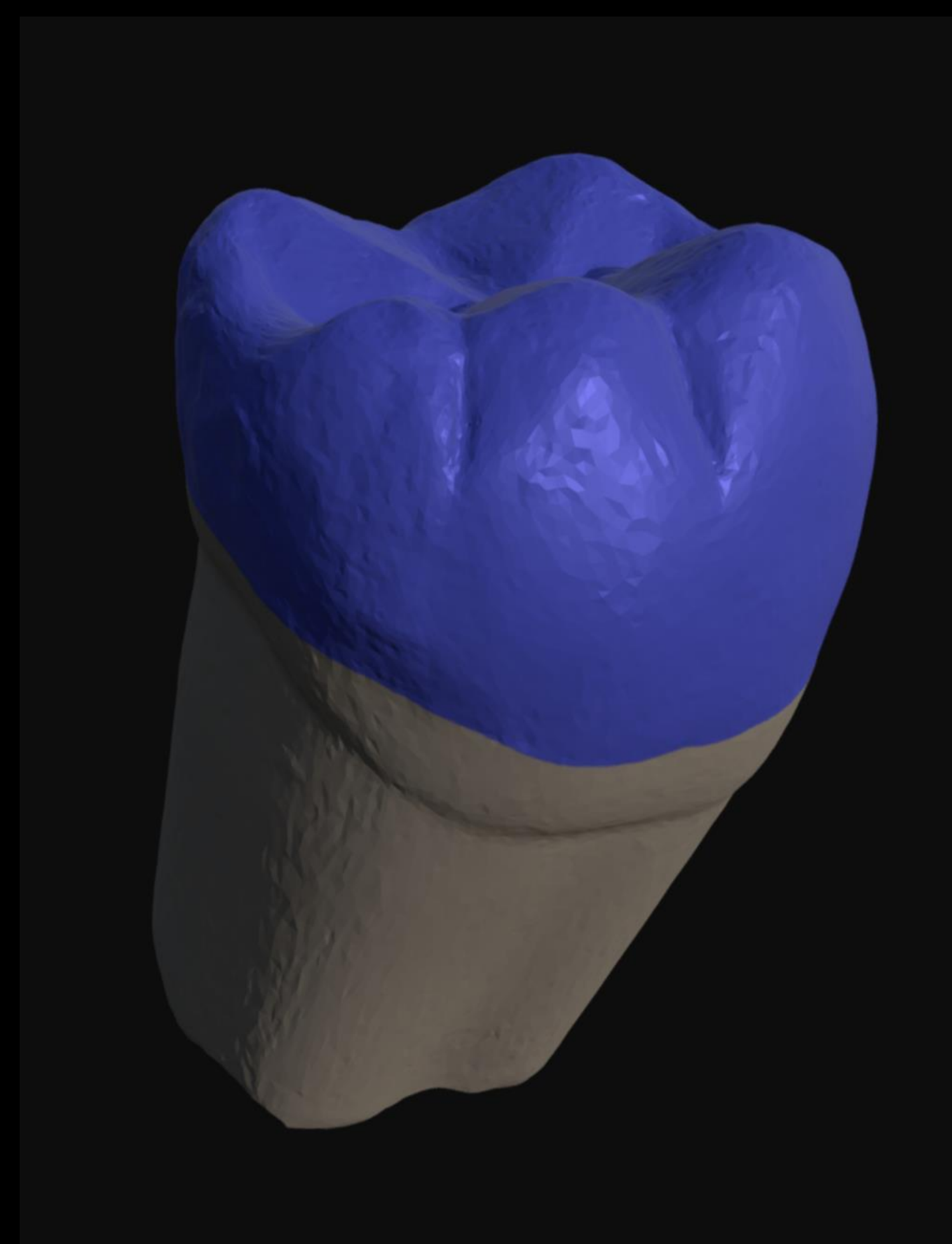
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## Objectives

- Virtual Reality (VR) is becoming an essential part of modern, contemporary education. Especially in dentistry, VR is also being utilized in various ways: improving hand-eye coordination in pre-clinical, desensitizing patients with dental anxiety, and facilitating visualization of head and neck anatomy. This educational research survey looked to measure and compare the usefulness of VR learning to traditional educational modalities.

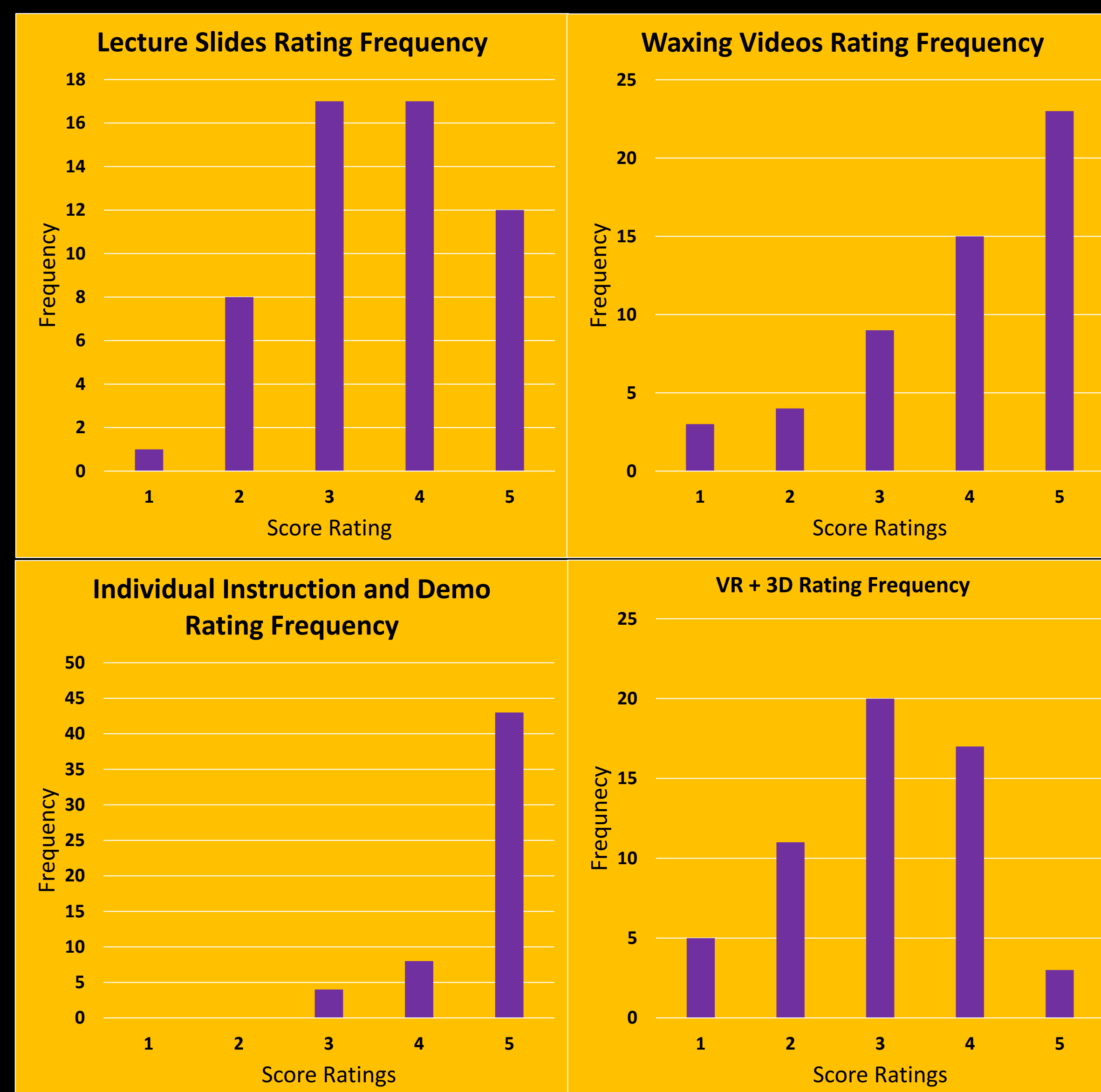


## Methods

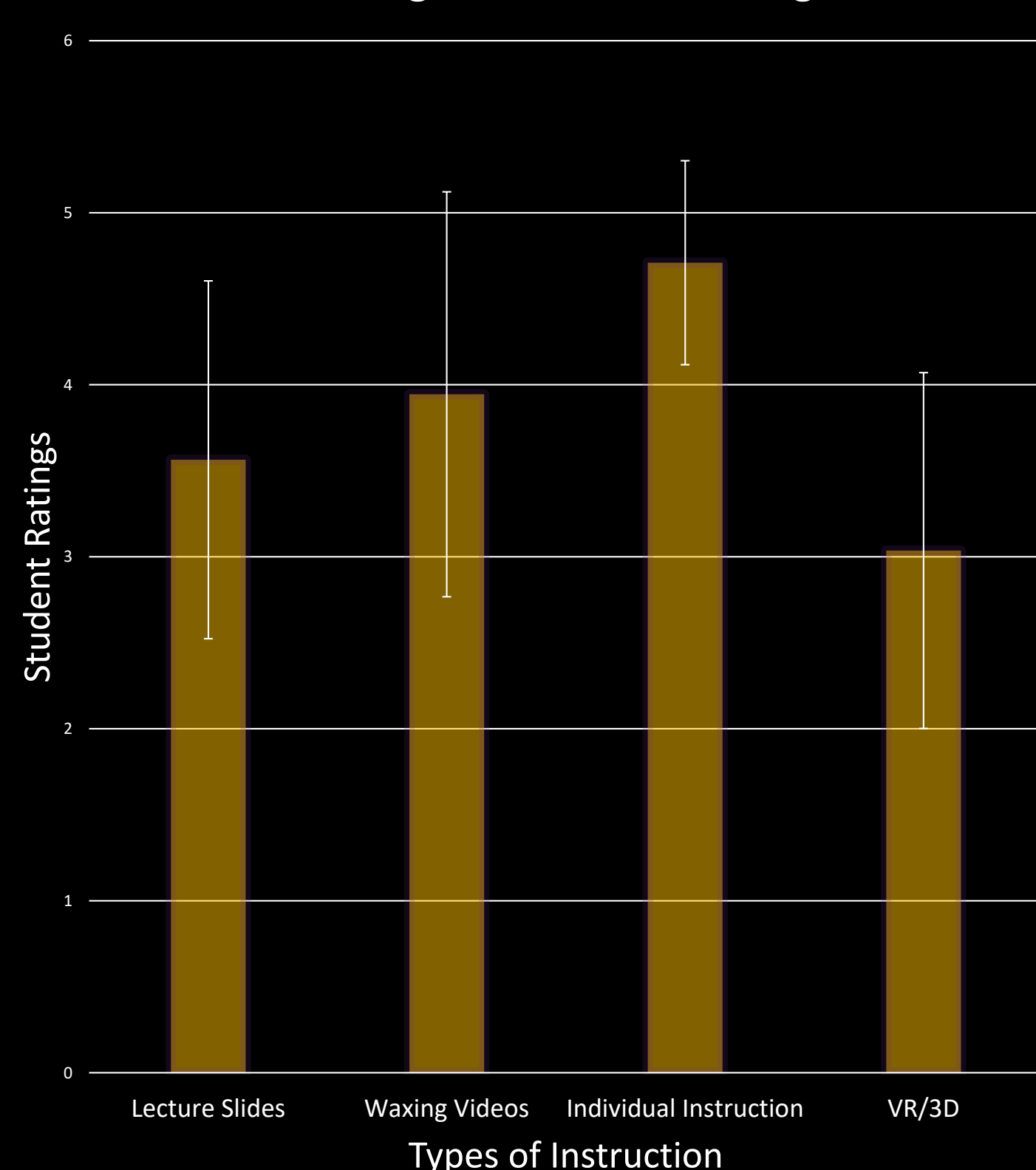
- The current first year dental students (n=55) in the dental anatomy course experienced four phases with distinct educational modalities on how to wax teeth. In the 1st phase, students were shown a video on tooth waxing. In the 2nd phase, students were given a short presentation with step-by-step instructions. In the 3rd phase, students were given personalized tutoring as well as a live demo of the waxing procedure. In the 4th phase, students have experienced 3D models under VR of the waxing procedure on the HTC Vive through a software called VR Model Viewer (Steam). The VR images were obtained from 3D model image scans (Trios3, 3Shape) made from wax ups (Thowax, Yeti Dentalprodukte GmbH Engen Germany) on a dentoform (Frasaco). After the last phase, educational research survey was used to collect data on usefulness of these different modalities of education.

## Results

- One tailed T-Tests (equal variance) were performed to evaluate the difference in means in ratings between VR and other teaching modalities. P-value of evaluating the difference between "Waxing Video vs VR" shows 2.15E-5. P-value of evaluating the difference between "Waxing Lectures vs VR" shows 4.54E-3. P-value of evaluating the difference between "Individual Waxing Instructions vs VR" shows 3.63E-18. Null hypothesis is that there is no difference between the means in ratings. In all three scenarios, the T-test showed a rejection of the null hypothesis, indicating that there is a statistically significant differences between the mean ratings of the teaching methods to VR.



Average Student Ratings (0-5) of Various Teaching Methods of Waxing



## Conclusions

- Our pilot study did not show an overwhelming advantage of using Virtual Reality for teaching dental anatomy over other traditional teaching modalities. The limitation of this study is that we did not incorporate VR into regular curriculum, while other modalities are used everyday by students for learning and assisting in education. VR may be more suitable for teaching fine motor skills and hand-eye coordination, but unfortunately not beneficial in serving as a replacement in teaching dental anatomy effectively. The future of this project is that we will attempt to repeat with real-time digital waxing through VR environment and Optical Coherence Tomography imaging to compare against traditional modalities.

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