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THE APPLICATION OF LOW-COST, CLOSE-RANGE PHOTOGRAMMETRY IN DENTISTRY

Mohit Patel, D. Mettenburg, and F.A. Rueggeberg

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The Application of Low-Cost, Close-Range Photogrammetry in Dentistry

Presenter: Mohit Patel (Poster Presentation)

Authors: Mohit Patel[1], D. Mettenburg[2], and F.A. Rueggeberg[2]

Faculty Sponsor(s): F.A. Rueggeberg, DDS

Department Affiliation: [1]Biological Sciences, [2]Restorative Sciences

ABSTRACT

Currently, three-dimensional scanning is required by a number of procedures in dentistry: Orthodontics, Prosthodontics, Endodontics, Oral Surgery, and General Restorative Dentistry. Close-Range Photogrammetry is a technique that produces three-dimensional coordinates of points identified from multiple images of an object taken at different angles. This technique may provide a low-cost alternative to expensive intra-oral scanning systems and structured light-based 3D scanners. The objective of this proof-of-concept project was to evaluate the accuracy and precision of virtual 3D models created using a low cost 3D-printable, open source, 3D scanner (OpenScan) connected to an Adreno controller, Agisoft Metashape software, and a budget smartphone used as a camera. A 3D printed set of teeth were scanned using the system and were also manually measured for comparison. A layer of wax was applied to a region on the teeth on the model and a second scan was obtained. The volume of wax coating was calculated using software and compared to measurements taken by hand. The two values were found to be quite similar, proving these initial attempts at accurately scanning dental models were viable for further development.

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Correspondence: Mohit Patel, Augusta University, 1120 15th St. Augusta, GA 30912, mohpatel@augusta.edu