A MIRRORING VIRTUAL REALITY ENVIRONMENT USING MOBILE HEAD MOUNTED DISPLAY FOR VISUALIZATION OF PATIENT-SPECIFIC ANATOMY

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Background: In recent years, low-cost head-mounted displays have been widespread in a wide range of fields. In medicine, this technology has been proved to be effective in teaching human anatomy and surgical training. Aims: Using open source software, we developed a workflow to transfer 3D patient-specific organ models to an interactive and portable mirroring Virtual Reality Environment (VRE). Methods: 3D models were created with 3D Slicer from DICOM cross-sectional radiological images and then adjusted in Blender. Expert radiologists validated 3D models. Lastly, a loadable package for smartphones was created using Unity 3D. Our VRE was submitted to: morphologists (n=11), trainee surgeons (n=15) and expert surgeons (n=7). They tried our VRE and then filled in an original six items questionnaire, which covered: 1) ease of use, 2) anatomy comprehension compared to radiological images, 3) usefulness in explaining anatomical variations and 4) surgical procedures, 5) preoperative planning, 6) occurrence of gastrointestinal/neurological disorders. Participants rated each item using a 5-point Likert scale, where higher ratings indicated more positive appreciation. We also mirrored VRE content in a tablet and/or computer controlled by a tutor, thereby enhancing group interaction and discussion through an active learning process. Statistical analysis was performed using one-way ANOVA followed by post-hoc test. Results: For each item, all participantsrated positively our VRE. Only anatomy comprehension was statistically different between the 3 groups (morphologists gave highest score). Conclusions: Our VRE coupled with mirroring app is an innovative and practical technology to visualize 3D patient-specific models with great educational and clinical potentials.