An Internet-Based Surgical Simulator for Craniofacial Surgery

Roberto L. Flores, MD, Aaron Oliker, MS and Joseph G. McCarthy, MD

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Aaron Oliker has intellectual property rights to the simulator presented in this study,

Background: Craniofacial surgery remains a challenging field to learn and master. We present a freely-available internet-based multimedia simulator for craniofacial surgery designed as a resource of surgeons in craniofacial fellowship training.

Methods: Previously constructed digital animations of craniofacial surgery were upgraded in Maya 10 (Autodesk, San Rapheal, CA) in preparation for web-based simulation. These animations were exported into an internet cloud-based, surgical simulator produced by BioDigital Systems Inc. (New York, NY). High-definition intra-operative video recordings of all procedures were edited in Adobe Premiere CS5.5 (Adobe, San Jose, CA) and exported into the simulator with the addition of voiceover. Test questions were produced for each surgical module.

Results: The MyFace Craniofacial Simulator (www.myface3d.com) demonstrates nine craniofacial surgery procedures including: Lefort I, Bilateral Sagittal Split Osteotomy (BSSO), Vertical Ramus Osteotomy (VRO), Osseous Genioplasty, Lefort III, Frontal Orbital Advancement/Cranial Vault Remodeling, Lefort III Advancement, Lefort III Distraction, Monobloc Advancement and Monobloc Distraction. Through a customized digital interface the user can manipulate the 3D simulations in real-time including the ability to alter perspective, pace and order of the virtual operation. High-definition intra-operative video footage compliments the critical steps of each procedure demonstrated in the simulation. A voiceover and text guides the user through each tutorial. A test is included at the end of each simulation. As the simulator is internet-based, there is no need for specialized software or downloads and simulator upgrades are immediately available to all users. Access is zero cost and the tutorial can be viewed on a modern laptop or desktop computer with a current web-browser.

Conclusions: We present the first internet-based surgical simulator of craniofacial surgery. This freely available resource capitalizes on recent improvements in internet capability to produce an interactive virtual surgical environment for students and teachers of craniofacial surgery. This free simulator is designed as an educational resource for the next generation of craniofacial surgeons.

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