Virtual Surgical Planning for Implant Supported Auricular Prosthetics: Three Scanning Techniques


ABSTRACT
The purpose of this poster is to determine the most efficient and accurate method for auricular scanning in implant-supported auricular prosthetics. Implant-supported auricular prosthetics are ideally suited for virtual surgical planning. Most patients have an intact contralateral ear that may be used to digitally model the missing ear due to cancer, trauma, or congenital defect. Imaging data may be acquired by a variety of 3-dimensional data acquisition methods. Once data is captured from the intact ear, it can be copied, mirrored, and placed in the appropriate position for virtual implant planning and surgical guide design.

WORKFLOW
At IUSD, the Department of Orthodontics collaborates with the Department of Prosthodontics to help scan maxillofacial prosthetic patients. Scanners include CareStream intra-oral scanner, desktop laser scanner from Ortholnsight, and 3dMD Face extra-oral photogrammetry. The School of Informatics Media Arts and Sciences converts DICOM/scanner data then designs virtual prostheses and surgical guides. The School of Mechanical Engineering fabricates prototypes on stereolithographic 3D printers.

SCANNING TECHNOLOGY
Chairside Scanning: CareStream CS3500 Intraoral Scanner
Laser Scanning: Ortholnsight 3D from Motion View Software
Facial Scanning: 3DMD Face Photogrammetric System

SURGICAL PLANNING
3D Slicer
Geomegic Design X
ZBrush Pixologic
Form 2 SLA Printer / PreForm FormLabs

CONCLUSIONS
Based on this exploration, photogrammetric facial scanning with 3DMD Face offers the best patient and clinician experience, adequate anatomic data acquisition, and acceptable digital modeling for virtual prosthetic design and surgical guides. It is no longer necessary to capture the contralateral ear using traditional impression techniques. A fully digital workflow provides accurate, anatomically-correct virtual modeling and auricular restoration.

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