POSTER #17

A Novel Guide for Controlled Bone Graft Placement in Sinus Lifting Procedures

Abdusalam E. Alrmali, Paolo Nava, Muhammad Saleh, Hom-Lay Wang

Department of Periodontics and Oral Medicine, University of Michigan School of Dentistry ,

Case presentation

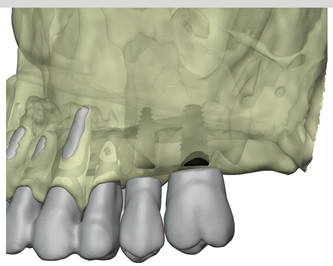
- A 59-year-old systemically healthy male with a history of missing maxillary posterior teeth (#14 and #15) presented with functional concerns and localized ridge deficiency.

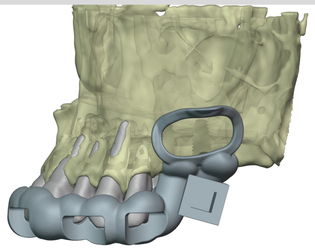
Clinical and radiographic examinations

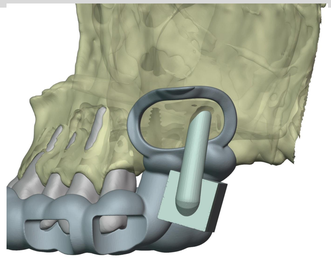
- Radiographic and clinical evaluations together confirmed a combined defect involving both the alveolar ridge and surrounding soft tissues corresponding to a Seibert Class III ridge deformity.

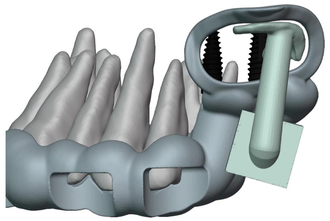
- Digital workflow for surgical precision
- Future implant sites integrated in planning
- Three-dimensional assessment completed
- Optimal window location determined
- Anatomical landmarks identified
- Surgical access trajectory planned

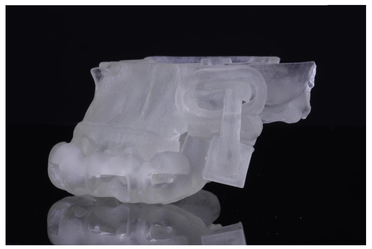
Surgical planning and preoperative ultrasound site evaluation

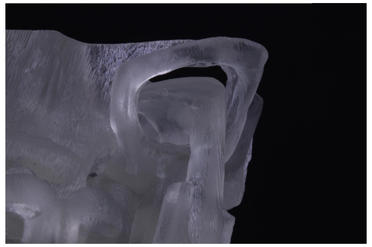


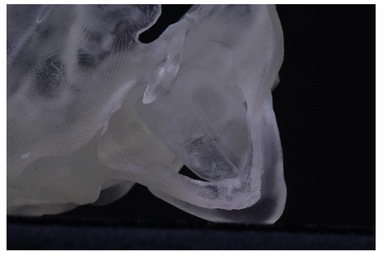


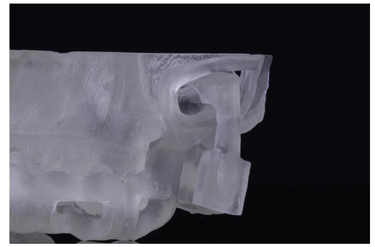


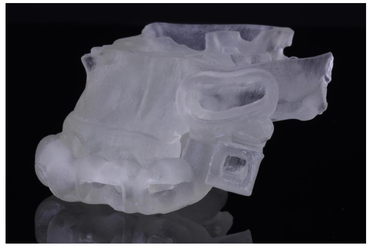












Digital workflow

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Surgical Steps

Surgery – A lateral window was prepared in the lateral wall of the maxillary sinus to gain access to the Schneiderian membrane.

Surgery – Sinus elevation was performed through the lateral window using dedicated sinus elevators, achieving an intact Schneiderian membrane without perforation.

Surgery – The second component of the surgical guide was positioned to control graft placement and condensation, ensuring confinement of the material to the predetermined augmentation zone.

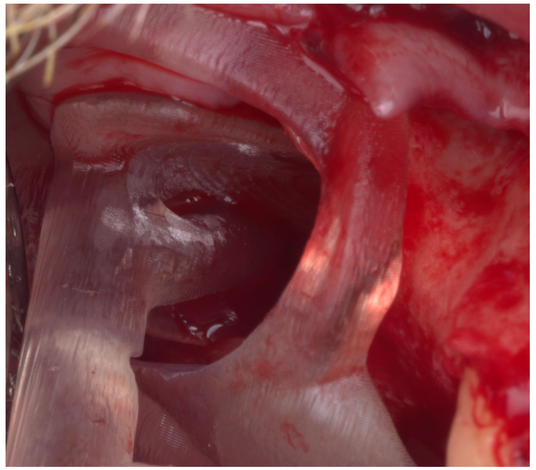
Surgery – Sinus graft layering protocol (from sinus floor upward):

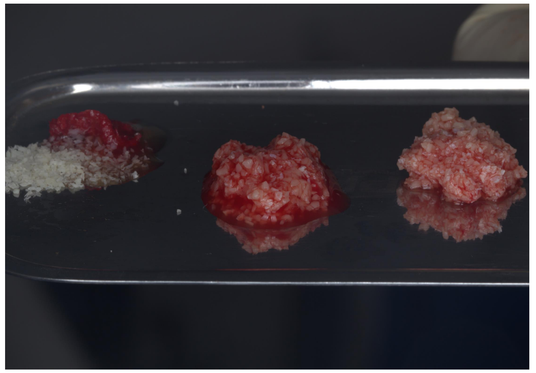
Basal layer: 50% autogenous bone + 50% cortical allograft, providing primary stability and osteogenic potential.

Middle layer: 50% cancellous allograft + 50% cortical allograft, enhancing graft volume and osteoconduction.

Apical layer: Deproteinized bovine bone mineral (Bio-Oss®), maintaining space and supporting long-term dimensional stability.

Surgery – All graft materials were preconditioned with autologous platelet-rich fibrin (PRF) obtained from the patient's blood prior to placement, to enhance handling characteristics and biological activity.





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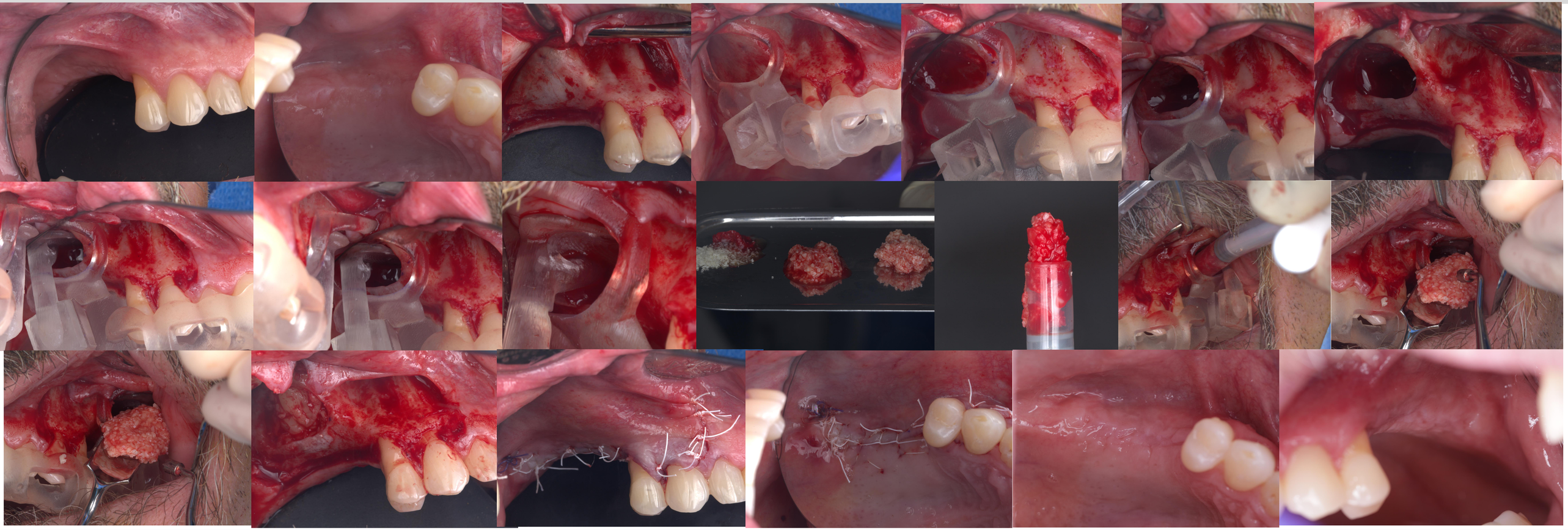
Surgical steps



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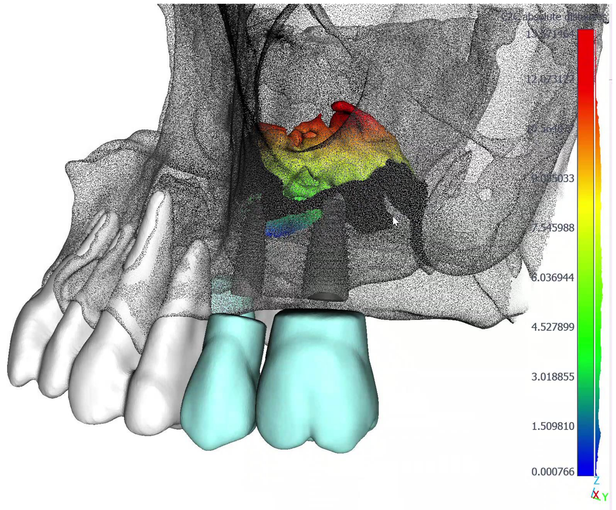
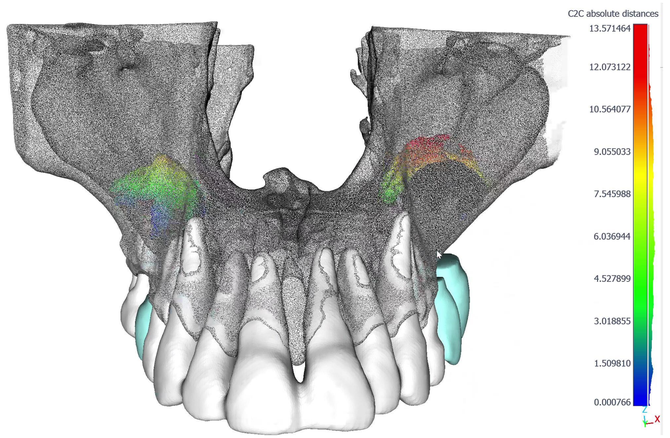
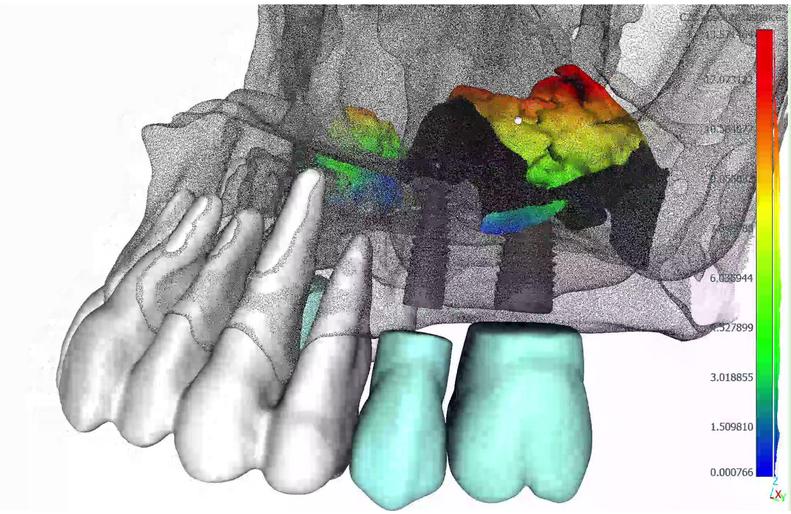
Follow up







6 Months Buccal – Bone quantity and quality were assessed after 4 months of healing using 3D radiographic and clinical measurements to verify the accuracy of the guided reconstruction at the future implant sites.

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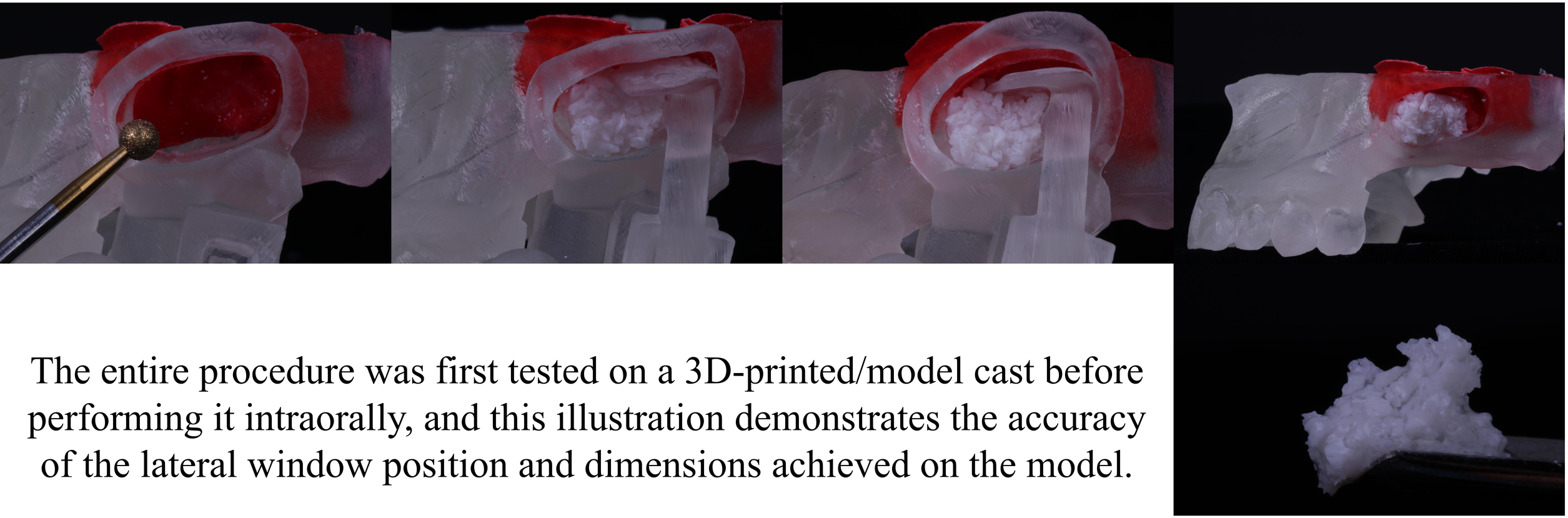
Tested Model



The entire procedure was first tested on a 3D-printed/model cast before performing it intraorally, and this illustration demonstrates the accuracy of the lateral window position and dimensions achieved on the model.