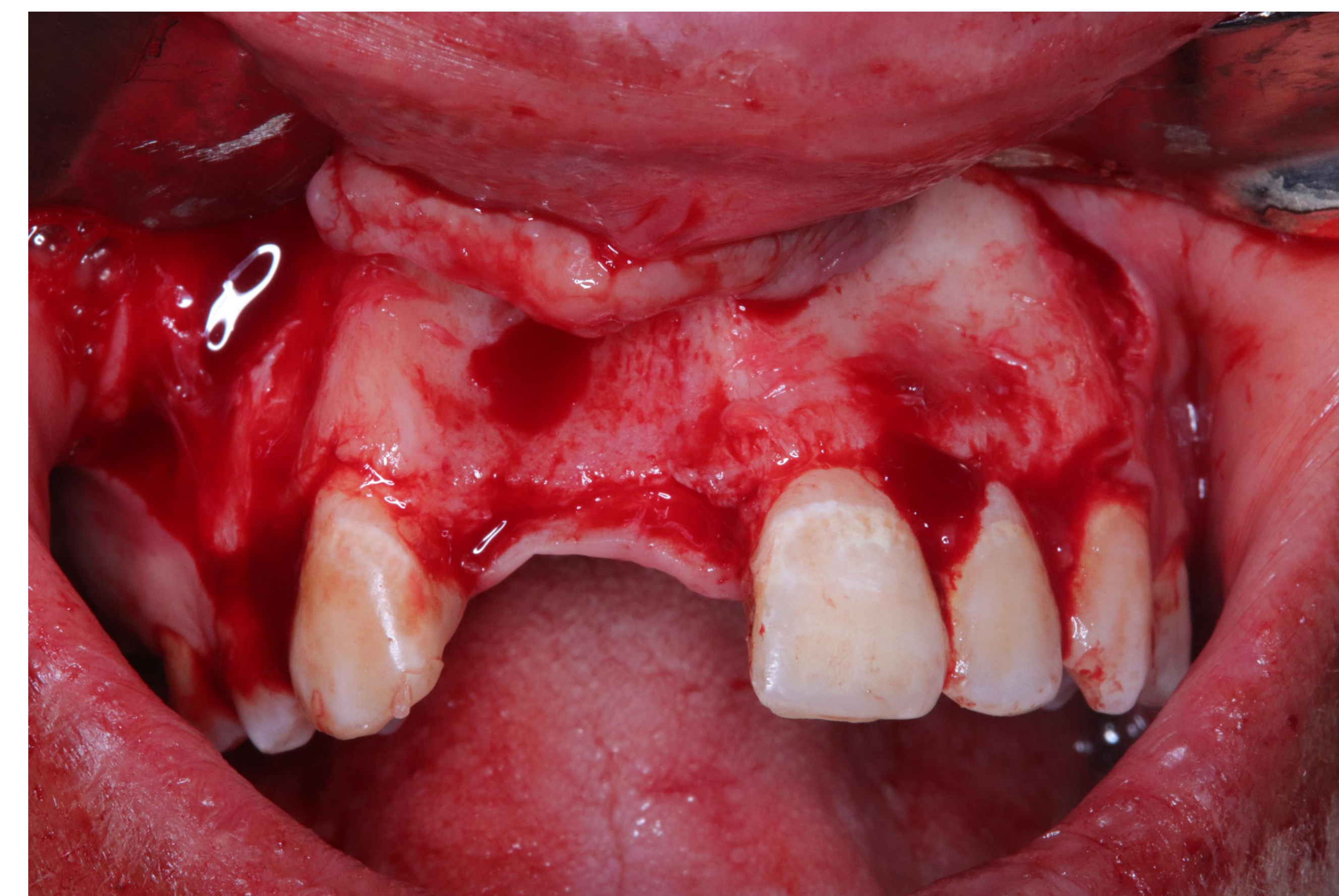


Computer Guided Autogenous Cortical Shell Technique: A Novel Protocol using Patient-Specific Tooth-Supported Harvesting and Positioning Guides

Abdulaziz Bagash, Mohammed Al-Dubai, Mohamed Sakr, Mohamed Mounir





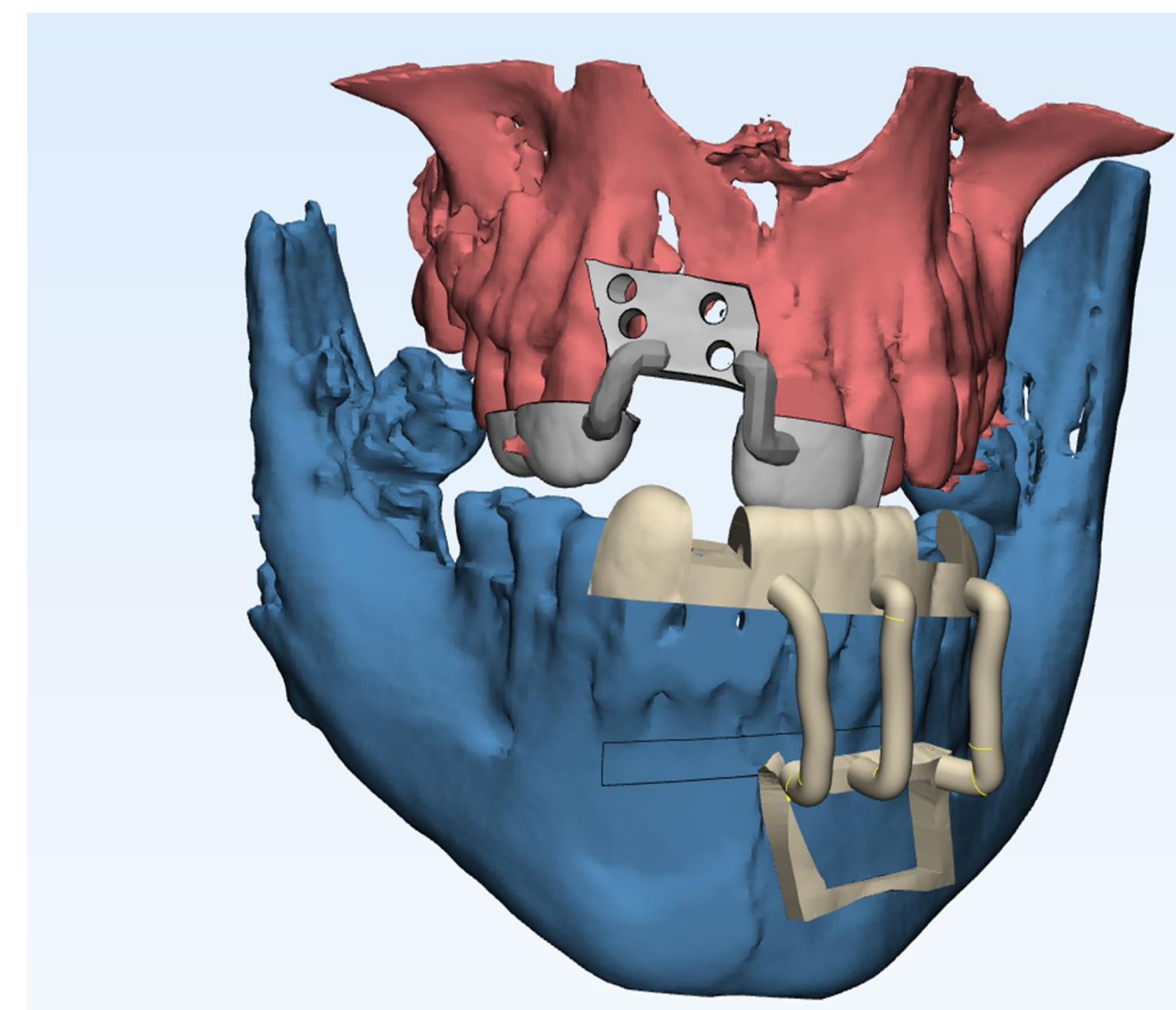
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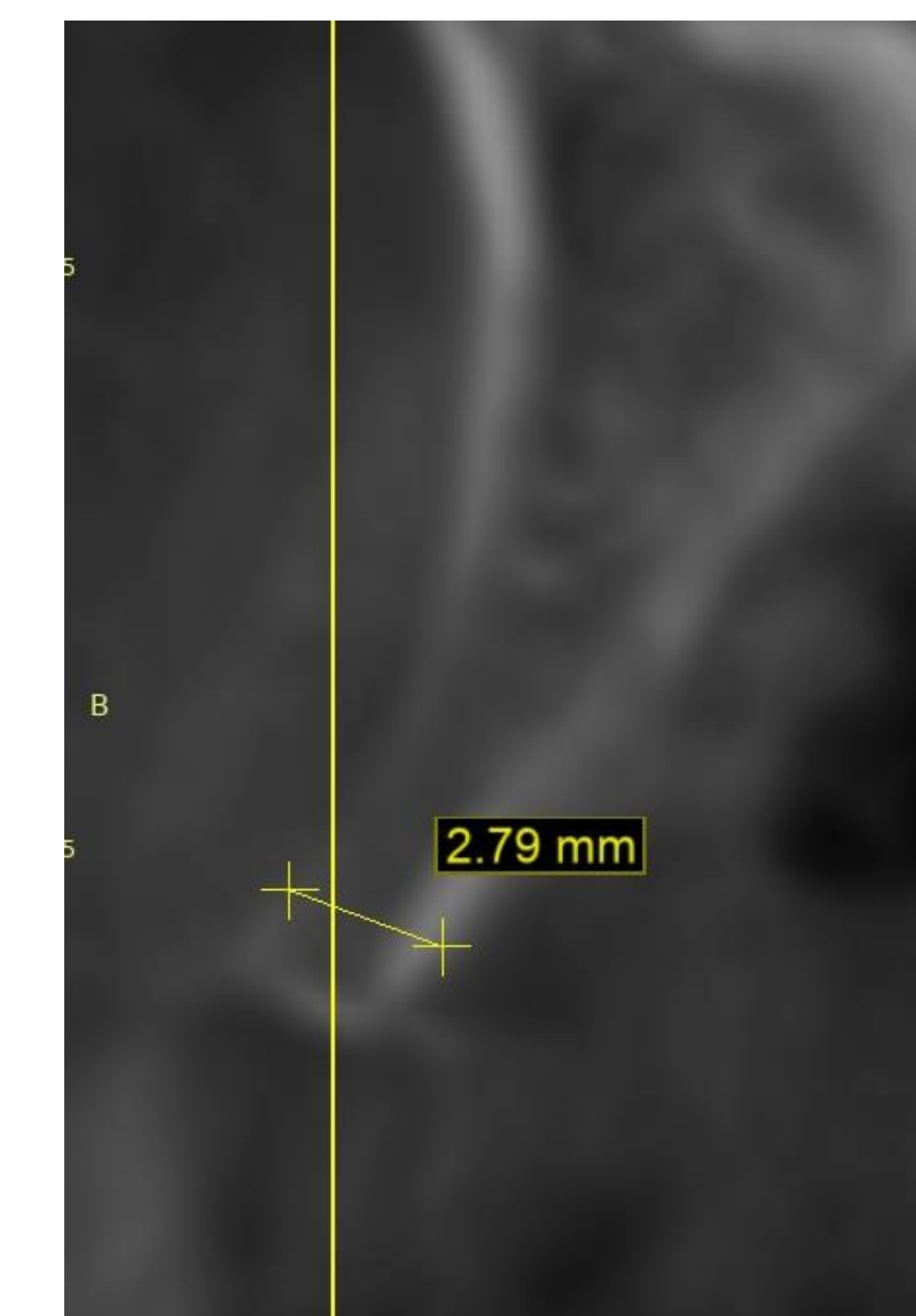


INTRODUCTION

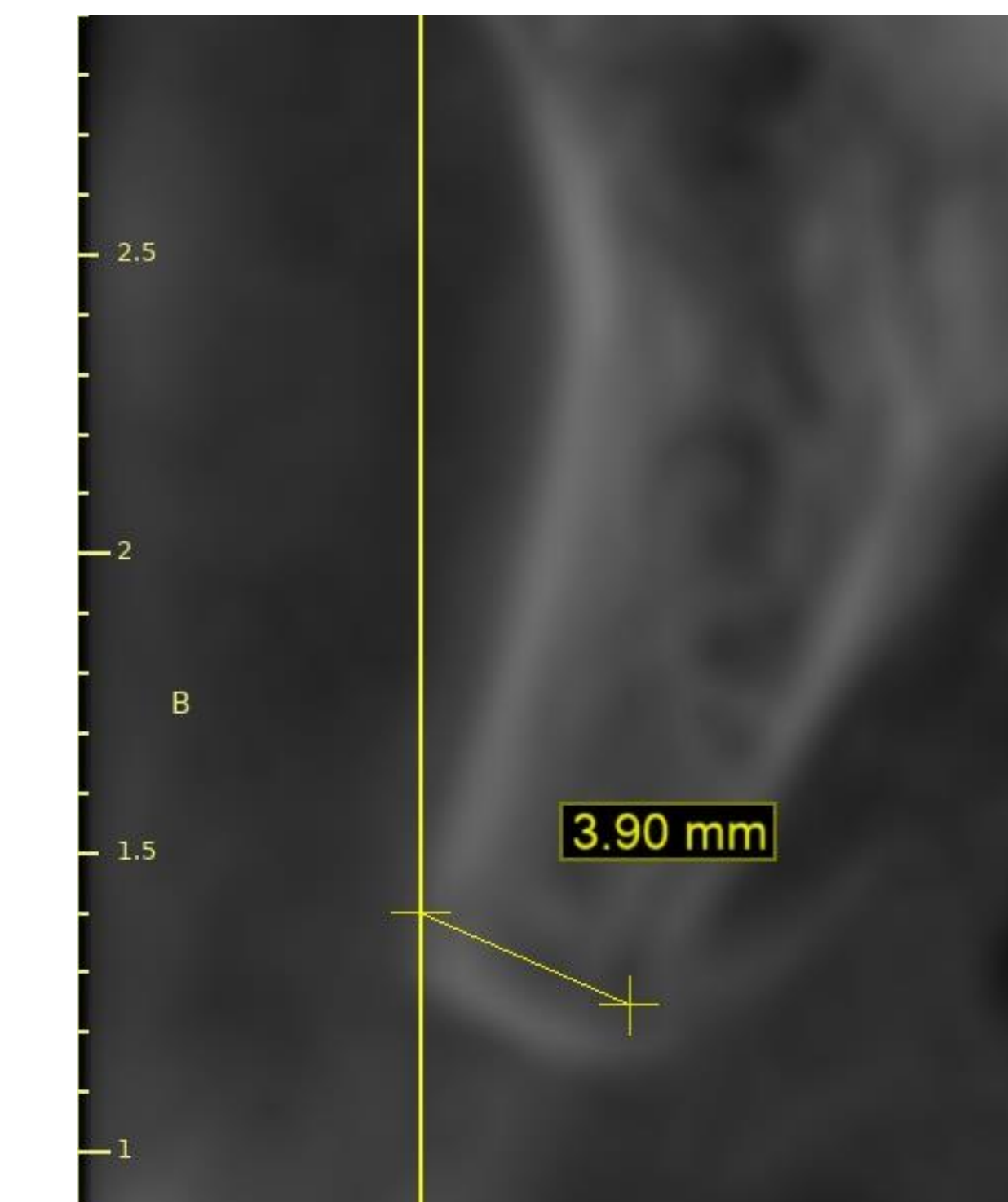
- Autogenous cortical shell harvesting and free-hand fixation at the optimal 3 dimensional position at the recipient site is a highly sensitive, time-consuming procedure that usually requires a well-trained surgeon.
- The aim of this case report is to describe a computer-guided mandibular block harvesting and fixation using patient-specific tooth supported surgical guides.



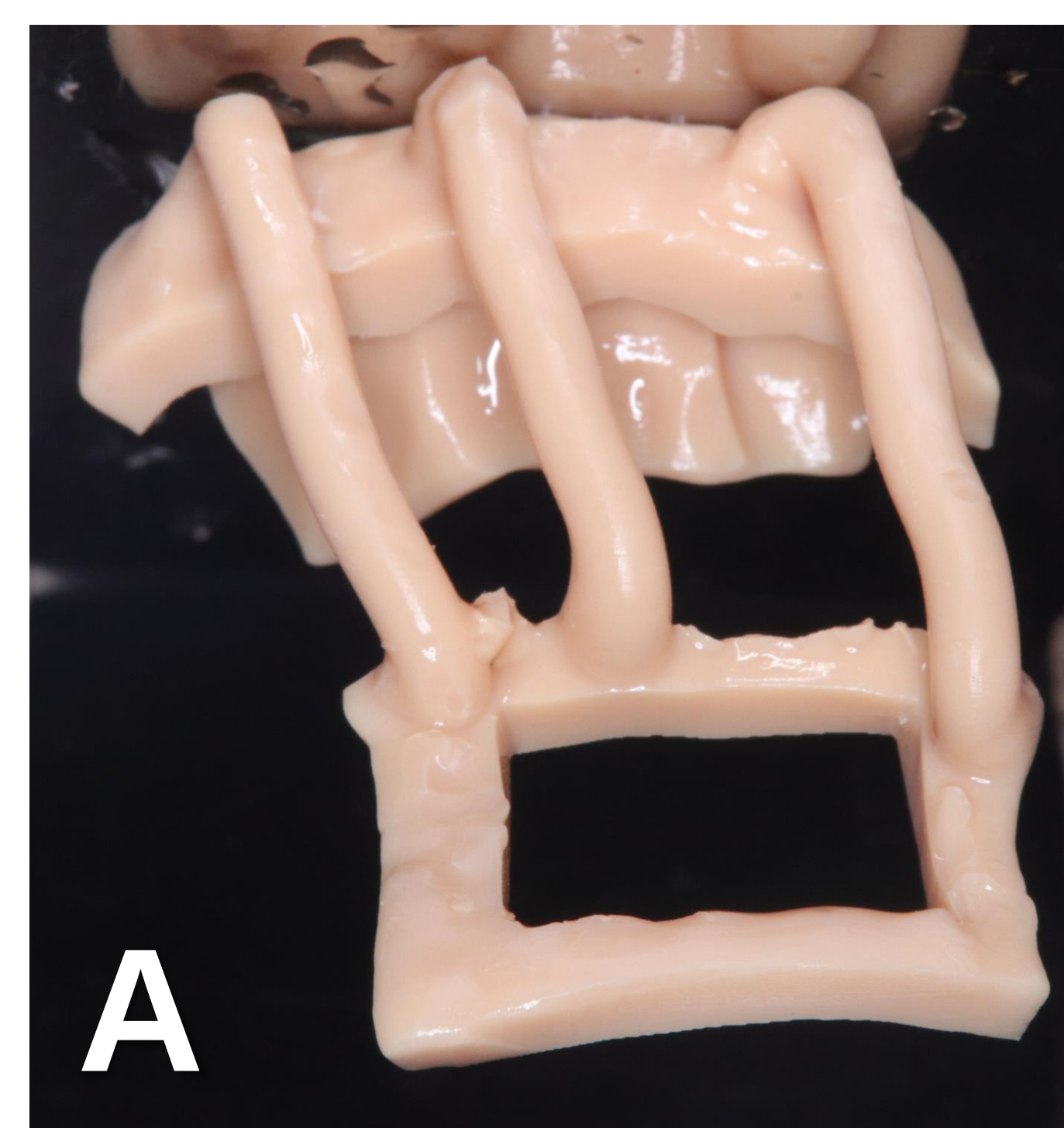
Virtual 3D design of tooth supported patient specific harvesting and positioning guides



Cross sectional view of pre-operative width of alveolar ridge at the site of maxillary right lateral incisor



Cross sectional view of pre-operative width of alveolar ridge at the site of maxillary right central incisor



Clinical view of patient specific guides (A) Bone block harvesting guide, and (B) Bone Block positioning guide



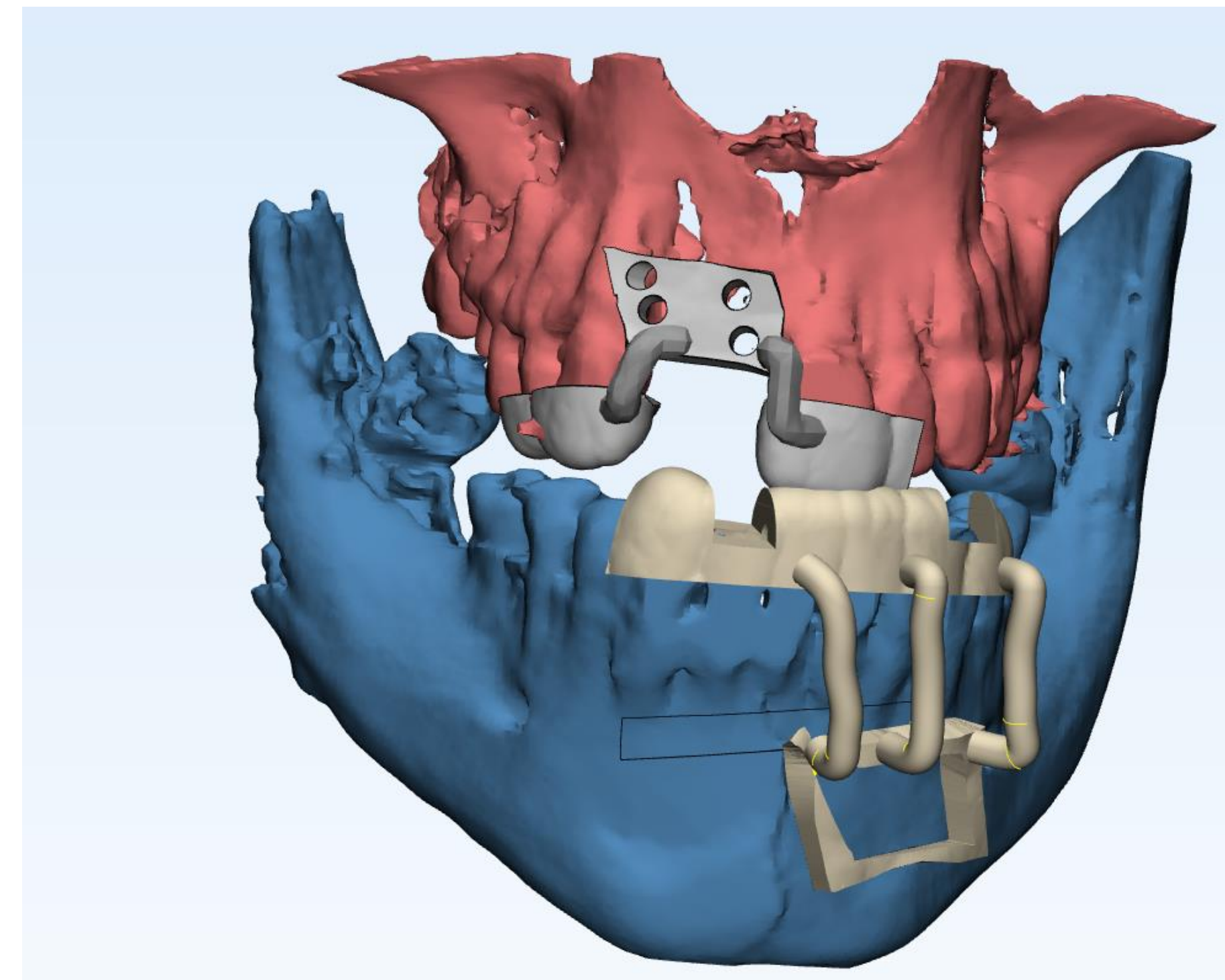
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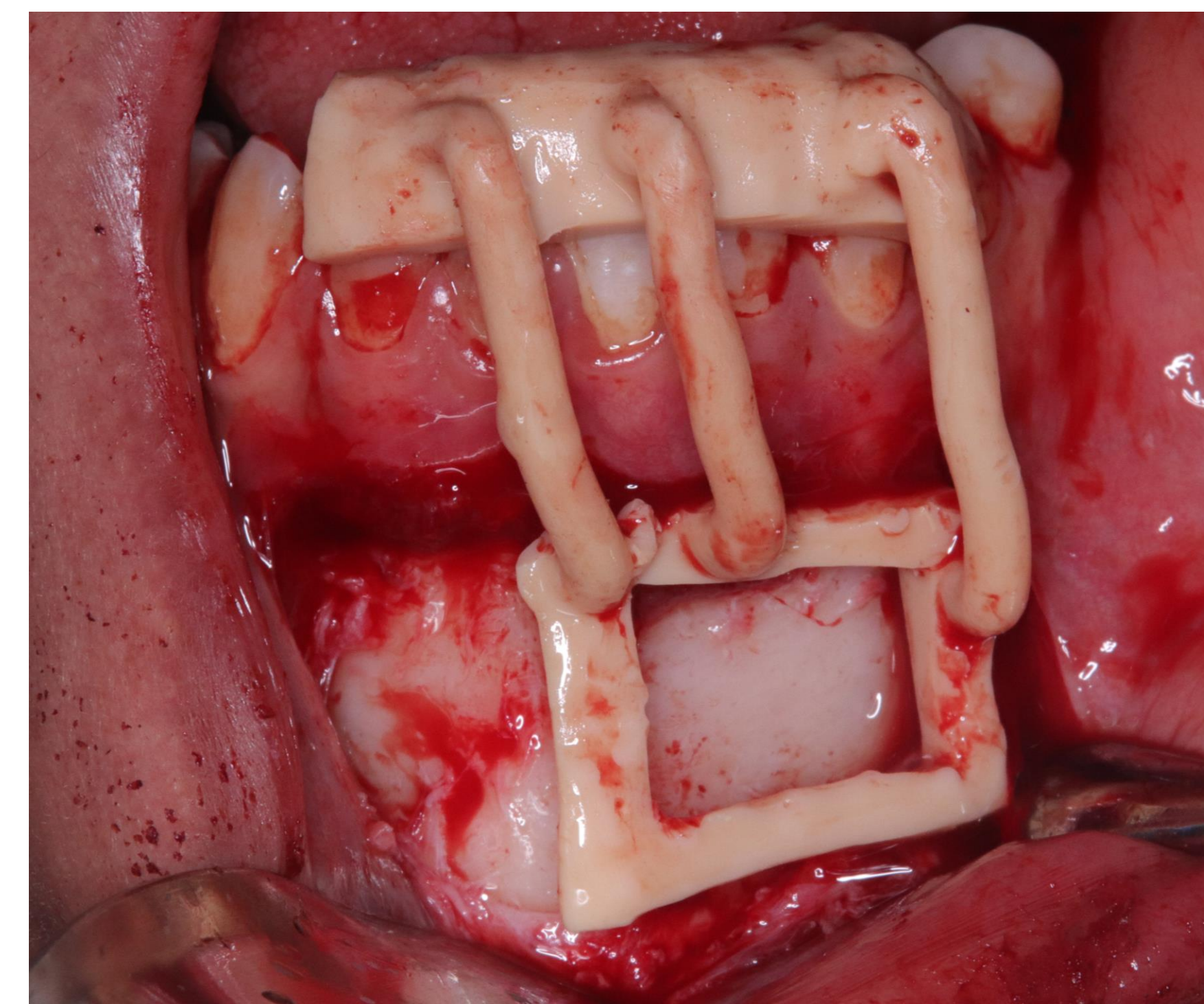


METHODS

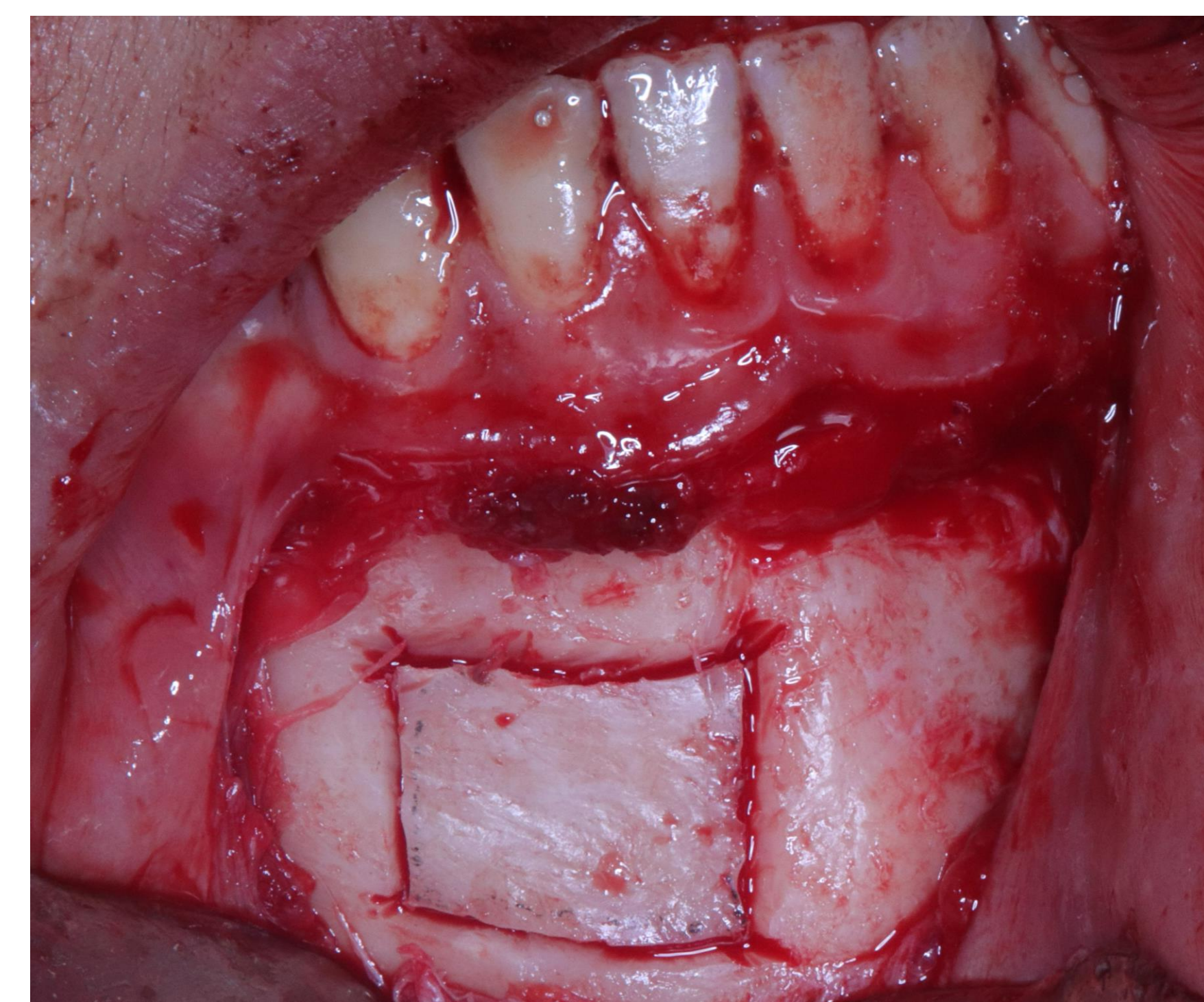
- A partially edentulous patient with two missing maxillary anterior with post traumatic horizontal defect, was selected for onlay block grafting from the mandibular symphysis.
- The size of maxillary ridge deficiency and the block needed for augmentation was measured on a Cone Beam CT scan of the patient using a computer software (Mimics, Materialise, Belgium).
- The proposed site and dimension of the cortical shell from was planned using a CAD software (3matic, Materialise, Belgium) to design a tooth-supported surgical guide with an extended arms and an opened window to define the osteotomy lines for the cutting disk while keeping a safe distance from the underlying anatomical structures.



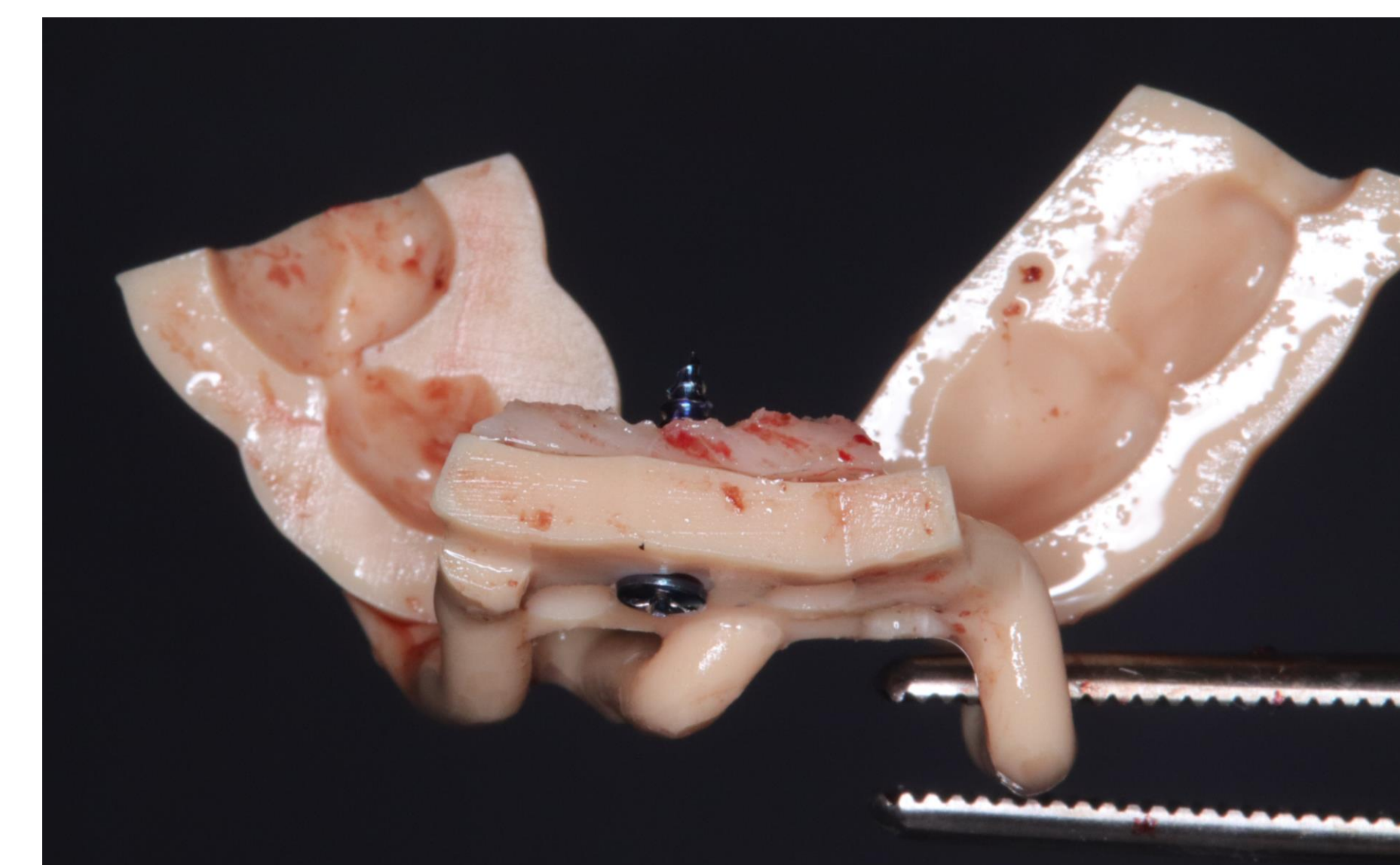
A



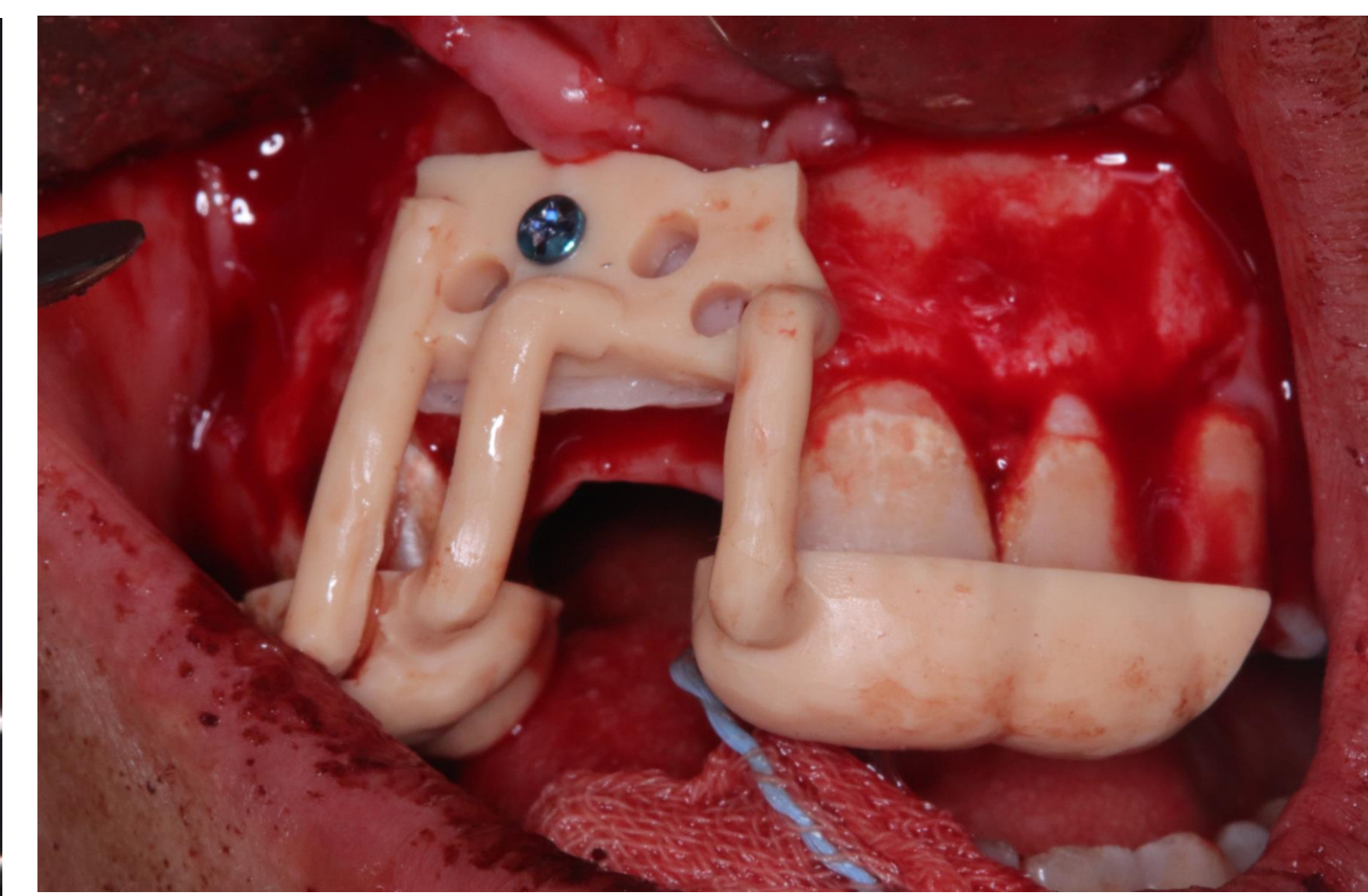
B



C



D



E



F

(A) virtual 3D design of tooth supported patient specific harvesting and positioning guides (facial view), (B) Tooth supported patient-specific harvesting guide fixed in place, (C) Outline of bone block to be harvested, (D) Bone block fixed to the fitting surface of positioning guide (occlusal view), (E) Bone block positioning guide fixed in patient's mouth (anterior view), and (F) (occlusal view)



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METHODS

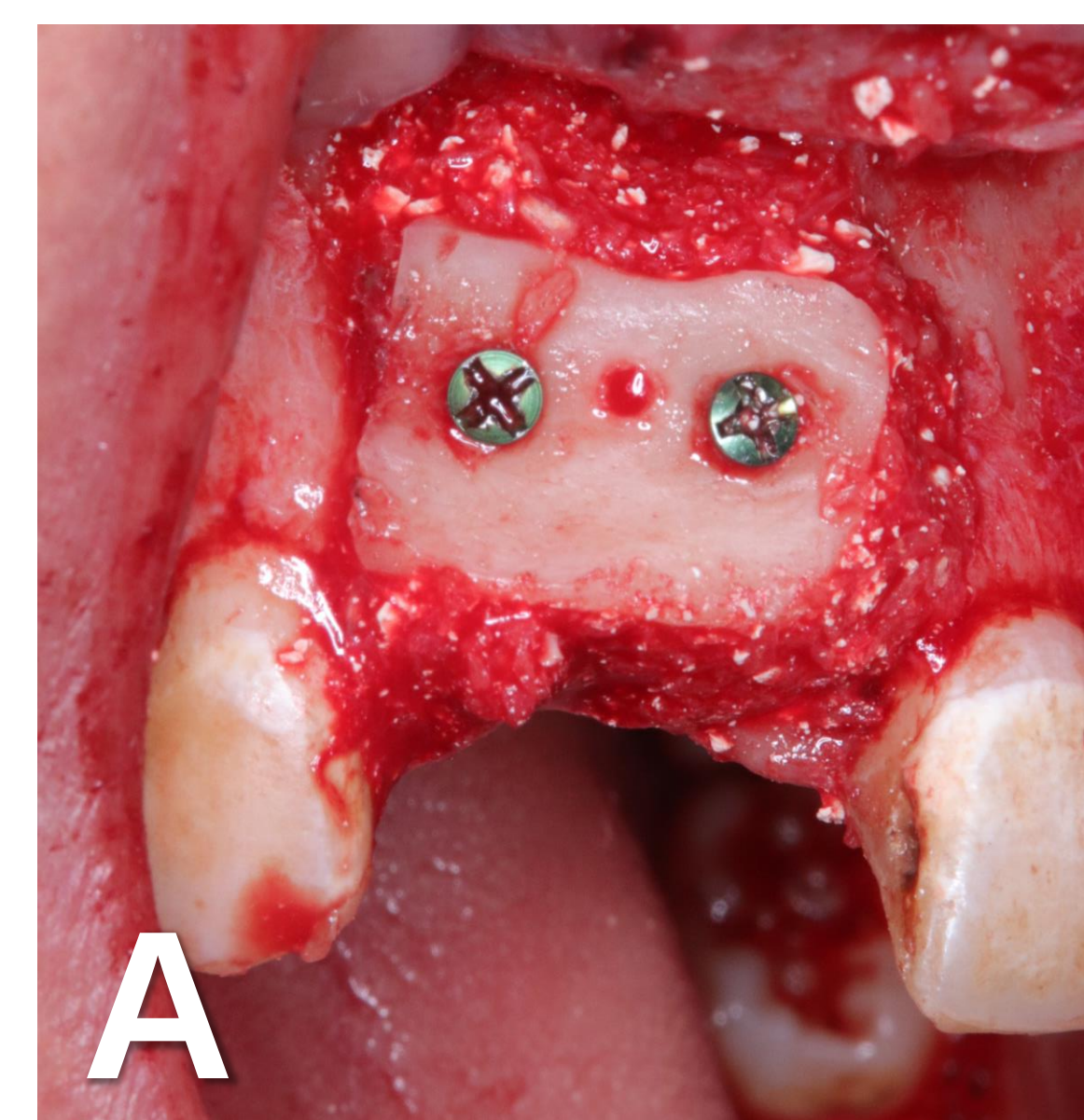
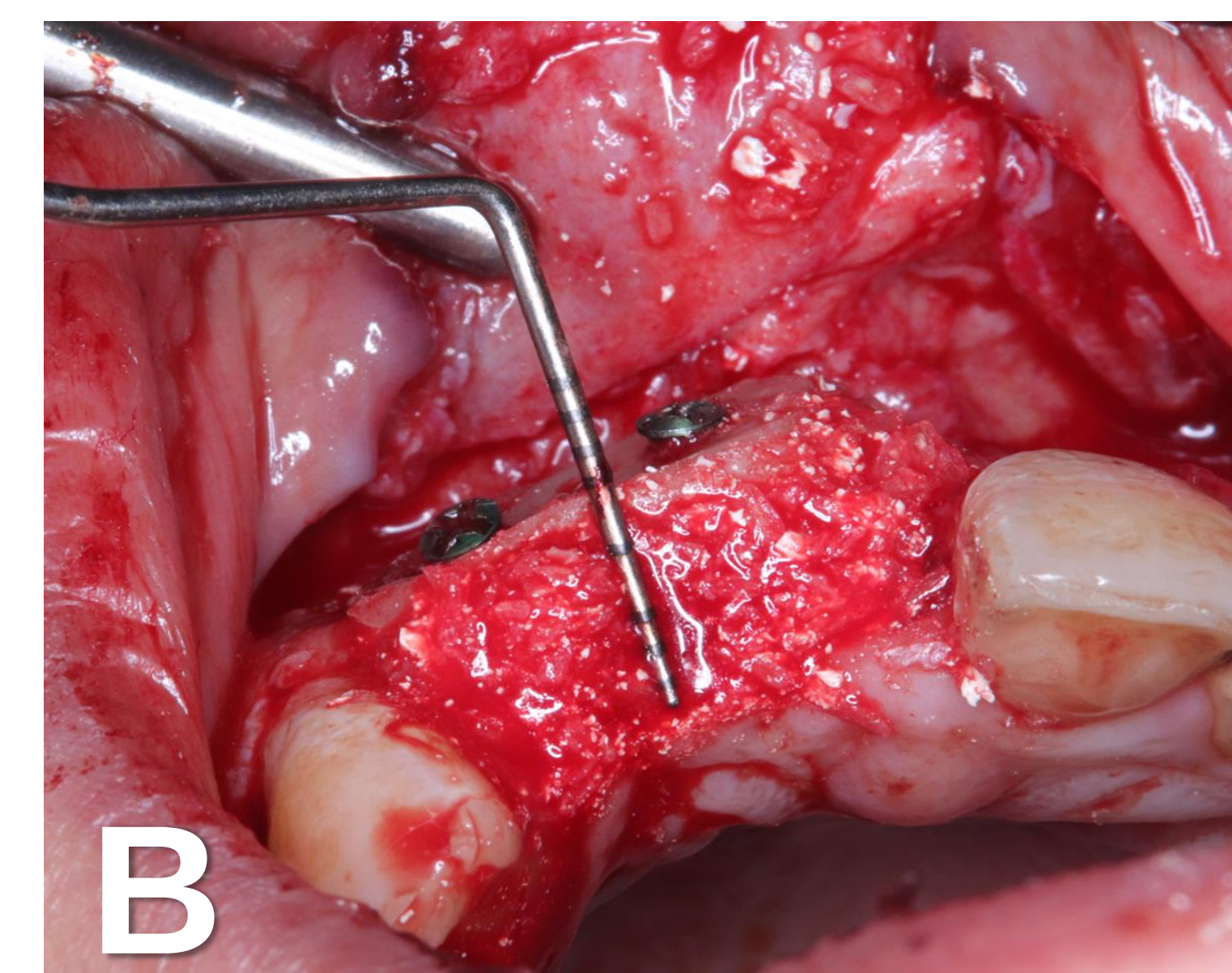
• The fixation guide was planned on the same CAD software, and is supported on the adjacent maxillary teeth. The harvested block was fixed to the guide for fixation using a 1.5 mm mono cortical screw, then the block was screwed to the ridge while still being fixed to the guide. The guide was then removed and the resulting interpositional gap was filled with an equal mixture of allograft and xenograft.

RESULTS

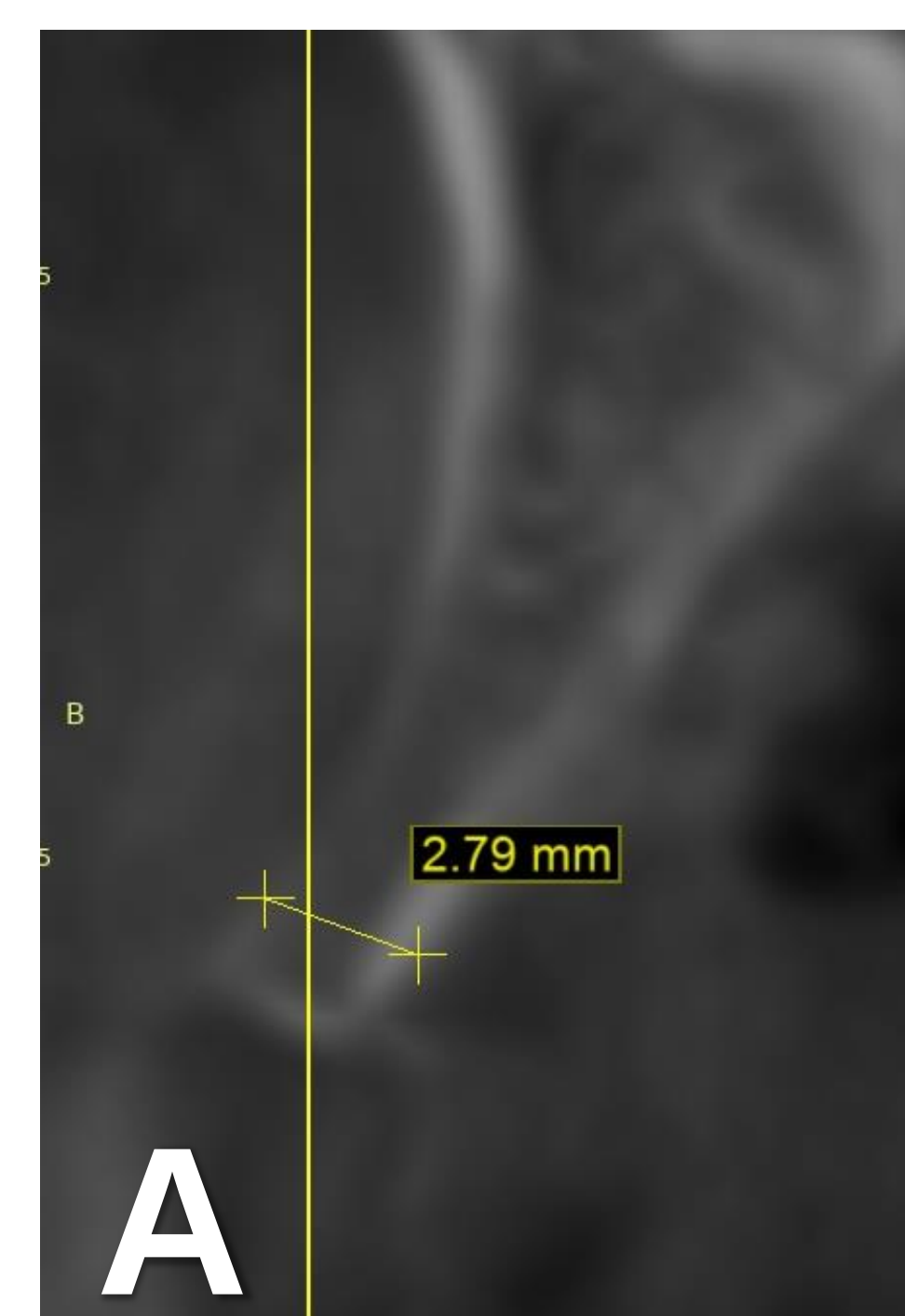
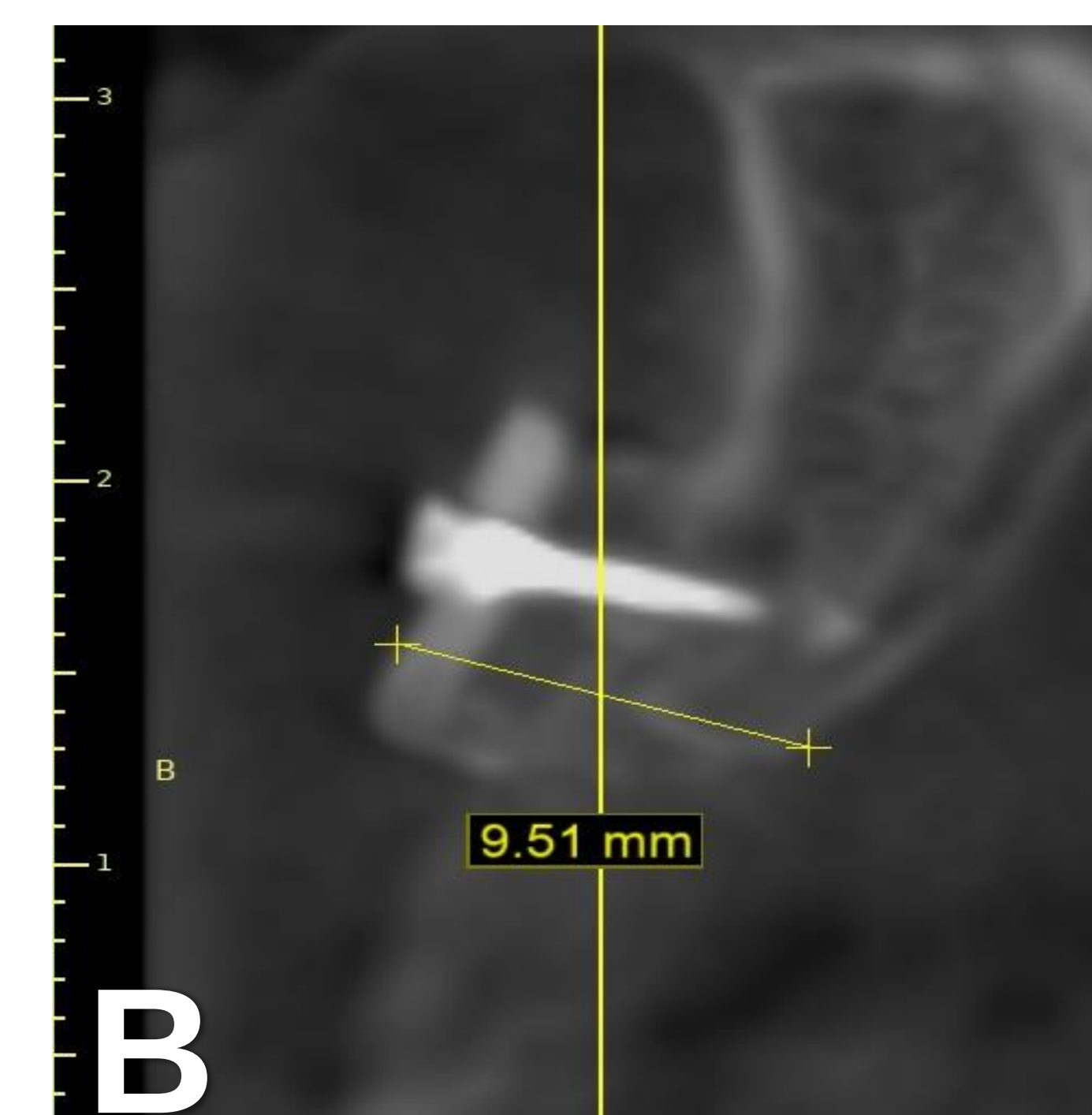
• The average horizontal bone gain was 5.13 mm.

CONCLUSION

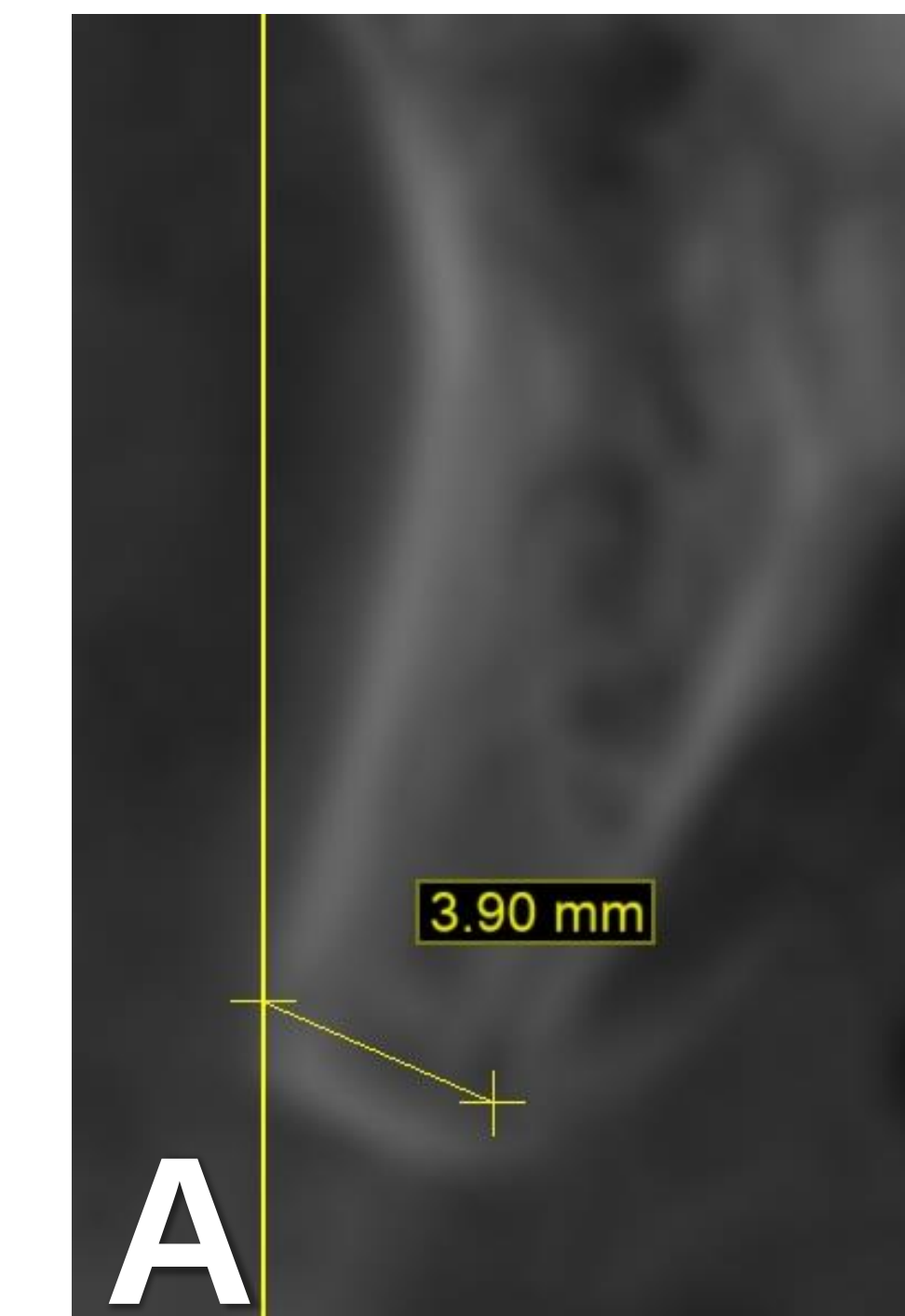
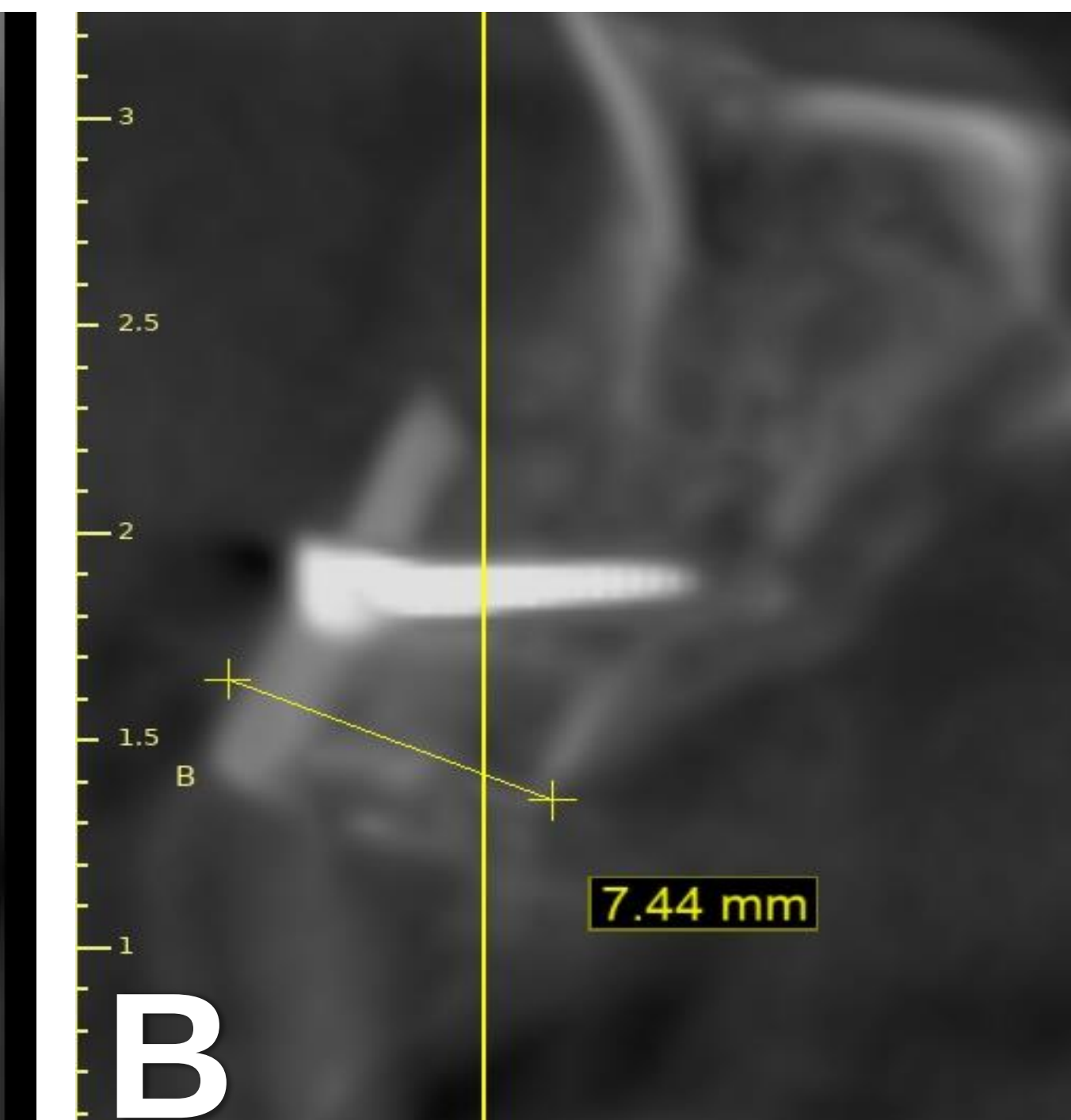
• This concept of computer-guided block harvesting and fixation enables the dental surgeons to minimize the risks of damage to sensitive structures, saves time, as well as ensures the optimal 3D placement of the harvested onlay bone block.



(A) Bone block fixed in place (facial view), (B) Bone block fixed in place (occlusal view), (C) Flap closure



Cross sectional view at the site of maxillary right lateral incisor (A) pre-operative width of alveolar ridge, (B) post-operative width of alveolar ridge.



Cross sectional view at the site of maxillary right central incisor (A) pre-operative width of alveolar ridge, (B) post-operative width of alveolar ridge.