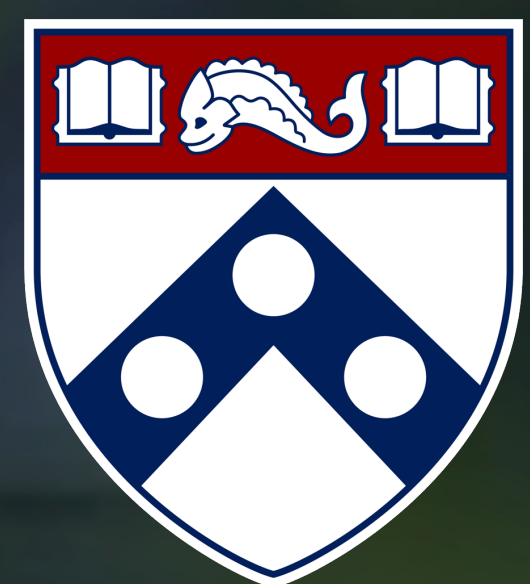


Implant Site Development by Ridge Preservation in the Anterior of Maxilla with a Buccal Wall Defect: A Case Report

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osseo2023.0800166

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Background

When extracting teeth with large buccal defects for subsequent implant placement, simultaneously performing ridge preservation is a favorable method to maintain bony structure and regenerate new bone. With the open membrane technique, soft tissue architecture is also preserved. The aim of studying this case is to prove that, by ridge preservation, an evident amount of bone can form in previously defected sites. Dimensional changes are analyzed by CBCT and are further substantiated clinically via re-entry during the implant placement.

Case Report

A 70-year-old female with a vertical root fracture of the left maxillary central incisor (#9) seeks implant therapy. Clinical and radiographic examinations deem #9 non-restorable, and a loss of buccal bone is seen on pre-operative CBCT images. After an uneventful extraction, the ridge was preserved by applying allograft bone graft and a d-PTFE membrane, followed by an intentional open-membrane wound closure. Post-operative CBCT was taken four months afterwards. Dimensional changes in bone were analyzed by superimposing pre- and post-operative CBCT segments. Implant position was planned, and an implant was placed with a surgical guide. Wound stability was achieved with a tension-free primary closure.

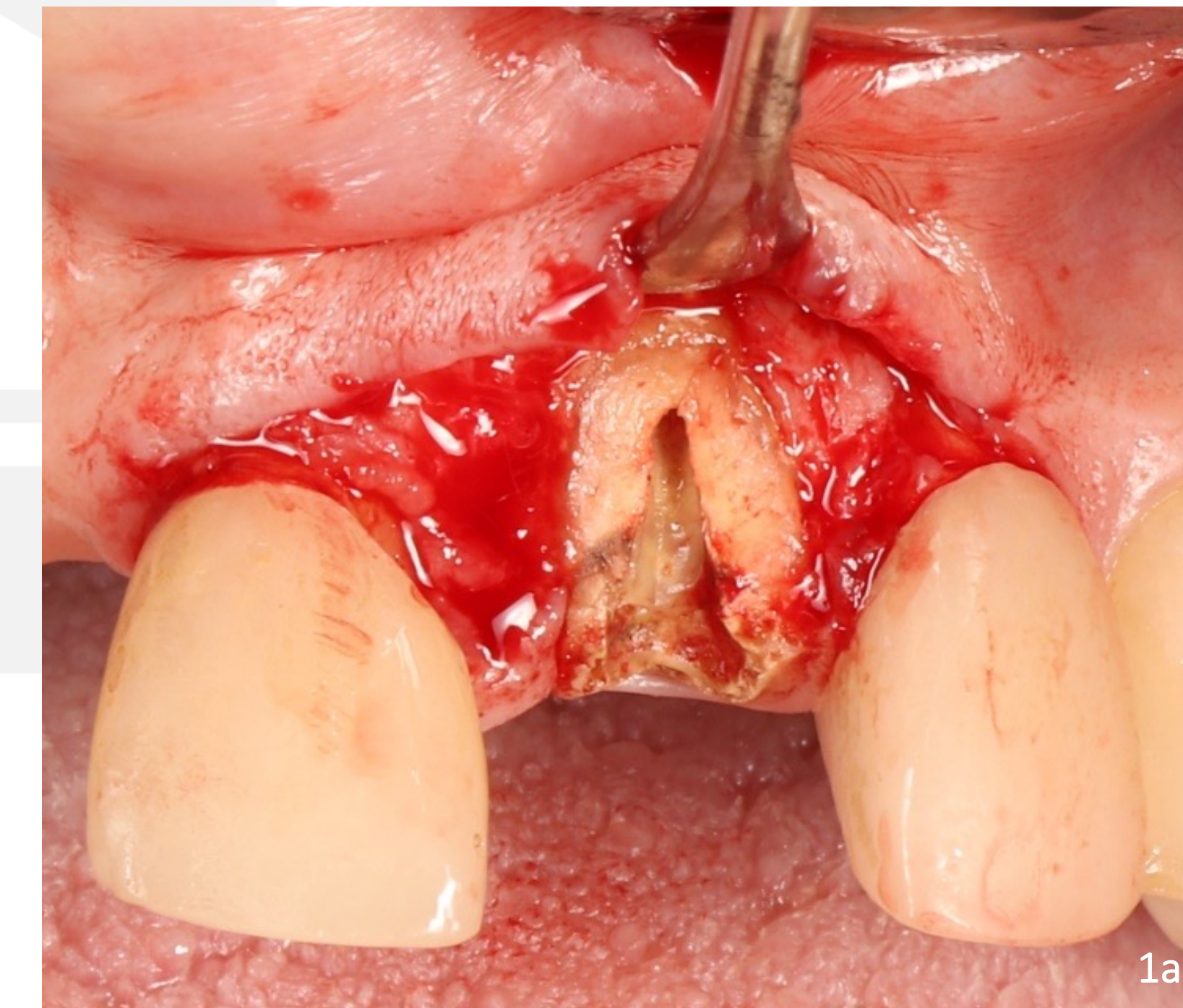


Figure 1a
Full thickness flap to expose the retained root with buccal wall defect

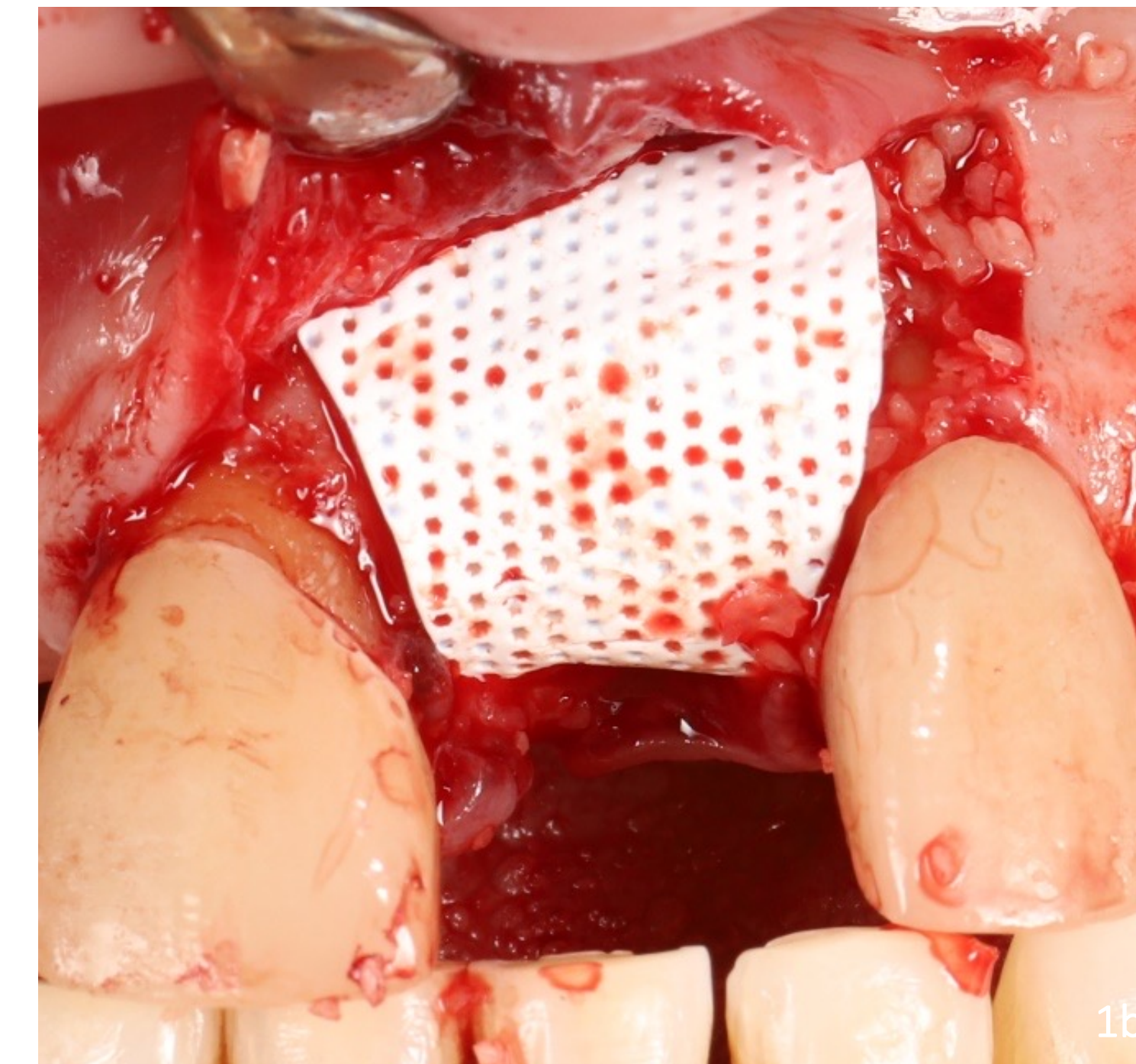


Figure 1b
d-PTFE membrane covering bone graft materials

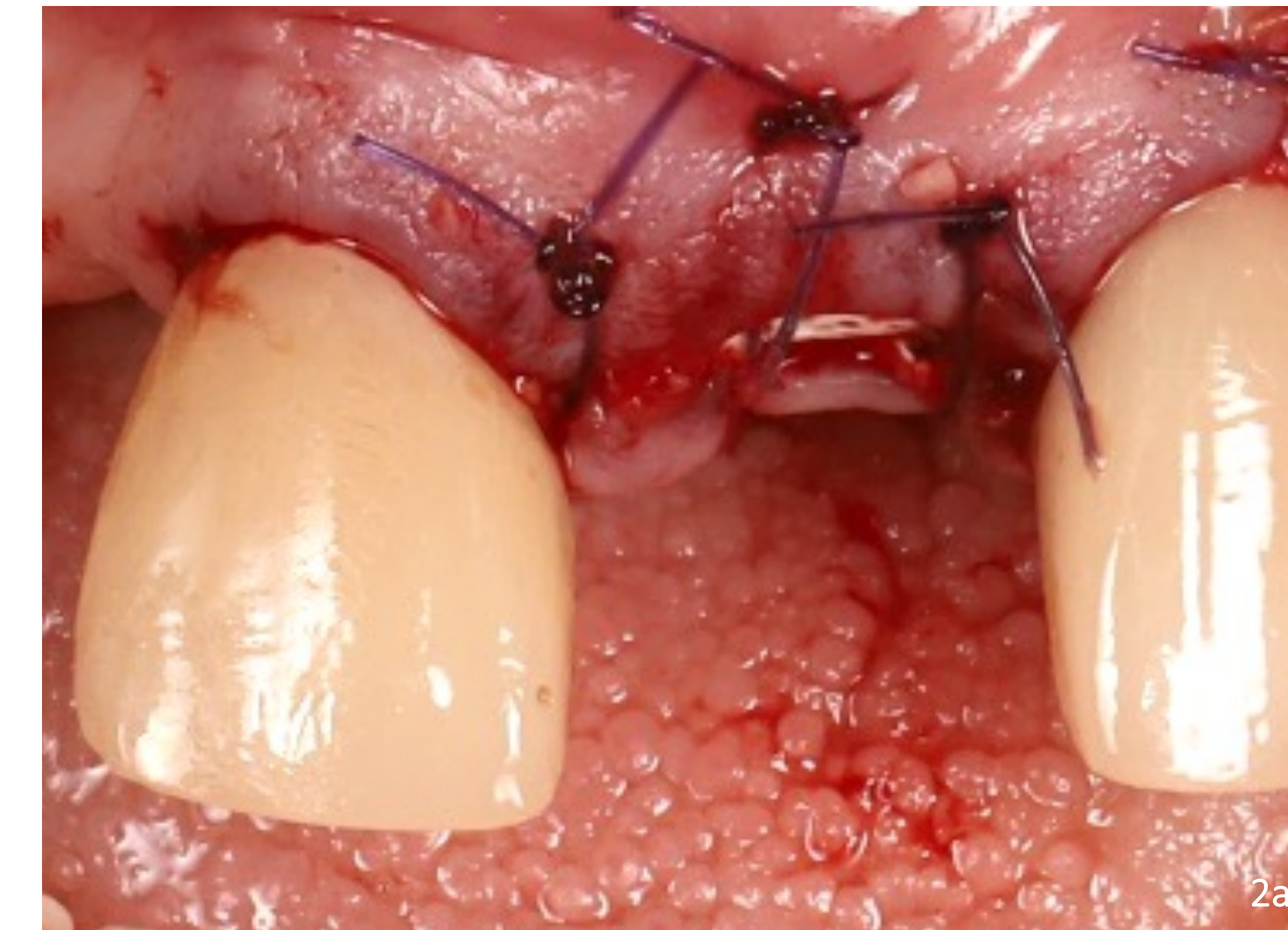


Figure 2a
The operation site on the surgery day



Figure 2b
The operation site 4 months post-operatively

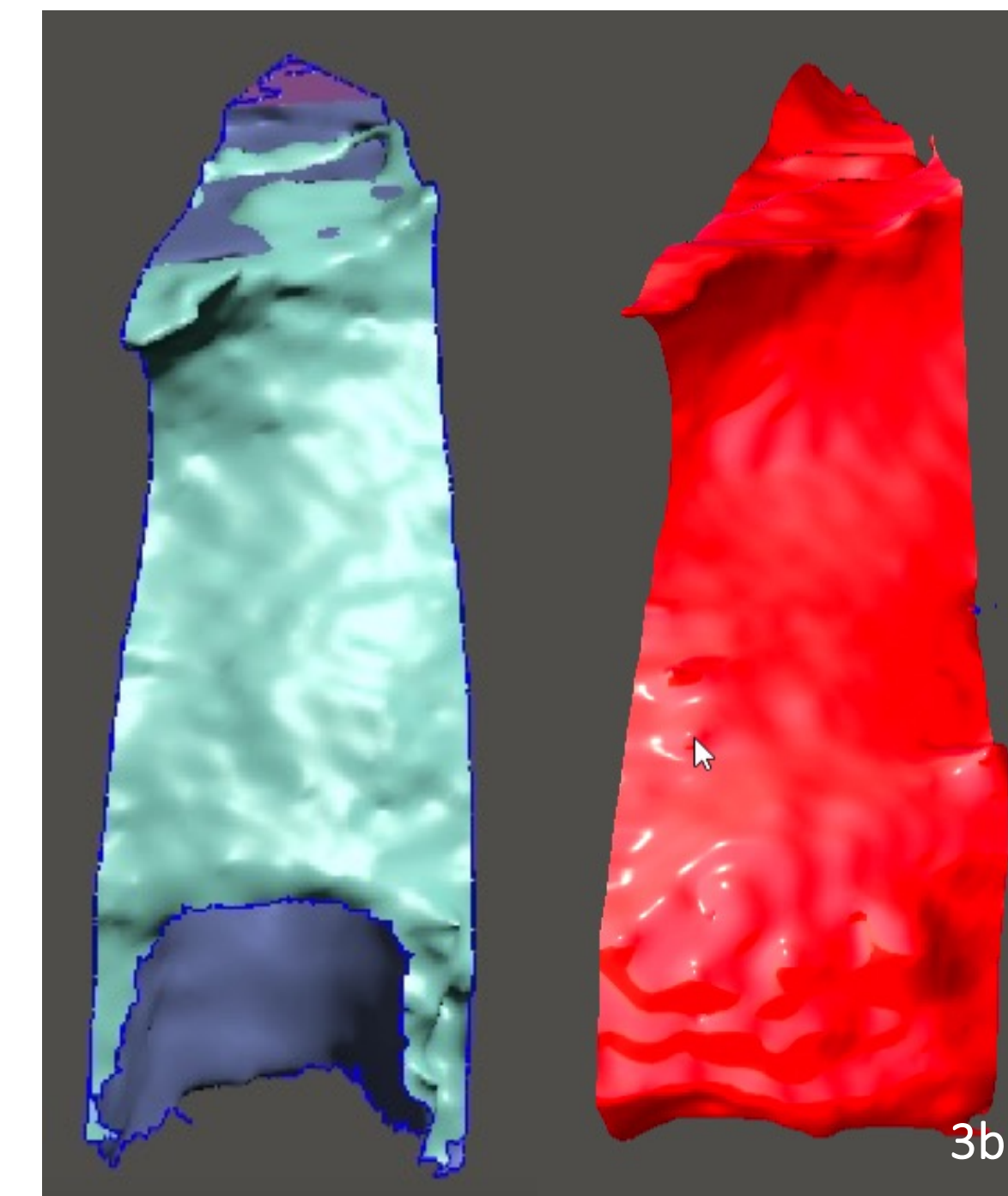
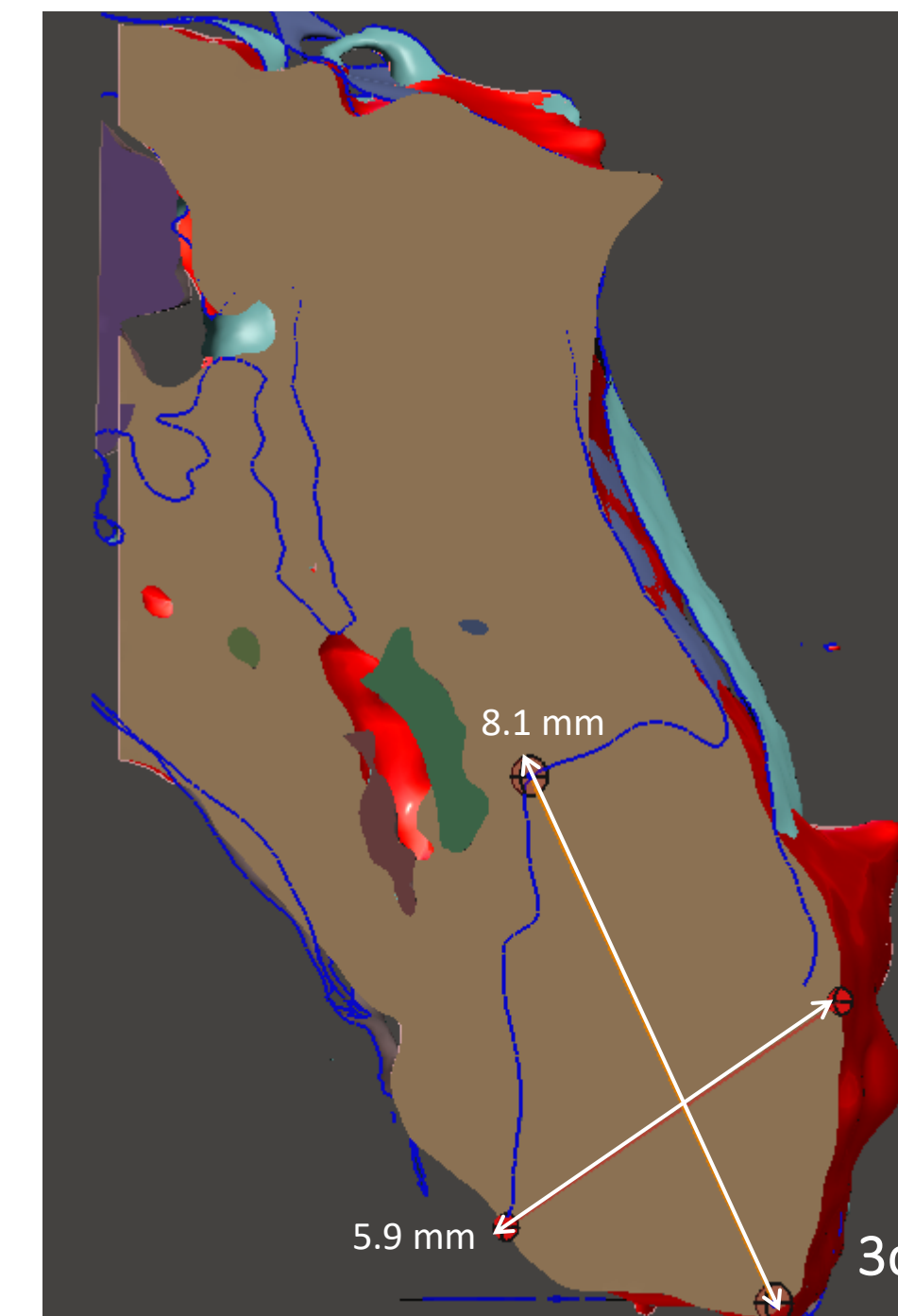


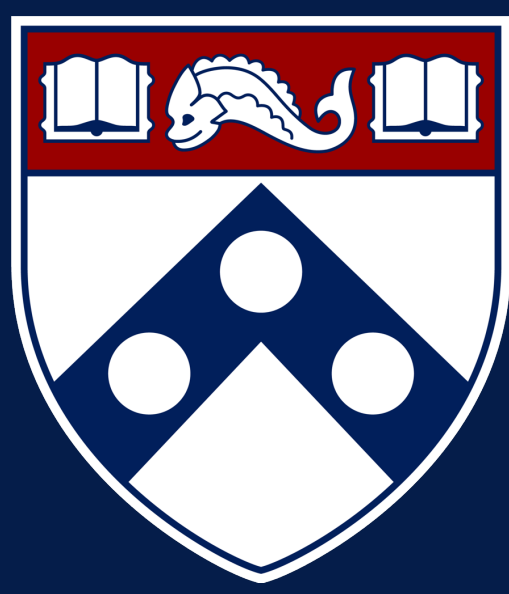
Figure 3a to 3c
3a) Pre-operative CBCT of tooth #9
3b) 3D segments of pre-operative (Left) and post-operative (Right) CBCT images
3c) Linear measurement of dimensional changes after superimposing two segments



Figure 4a
Frontal view of the surgical site on the day of implant placement



Figure 4b
Incisal view of the surgical site on the day of implant placement



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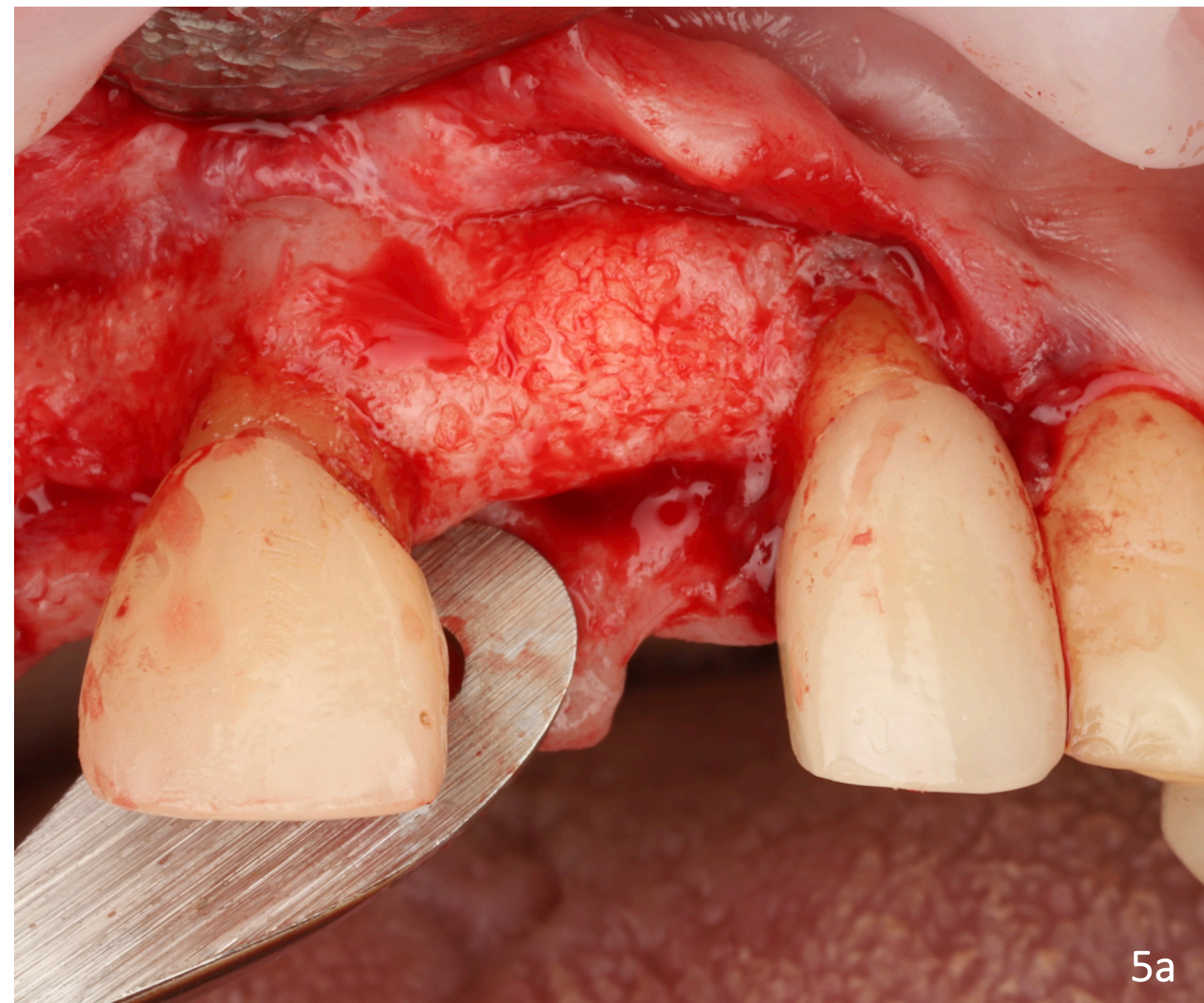


Figure 5a
Full thickness flap for implant placement. Bone quality and quantity were evaluated



Figure 5b
Implant placement with the aid of a surgical guide

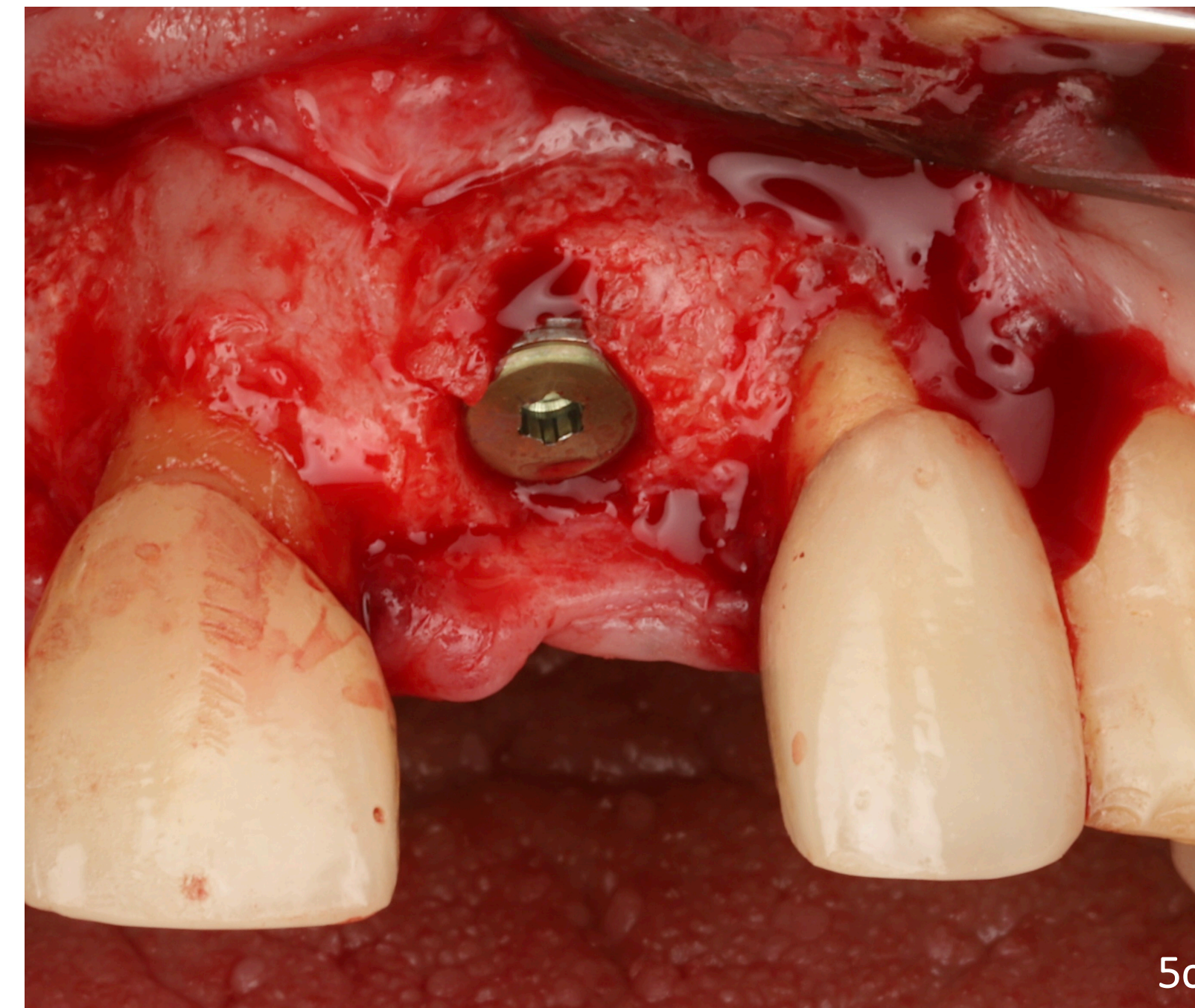


Figure 5c
Implant placement of tooth #9

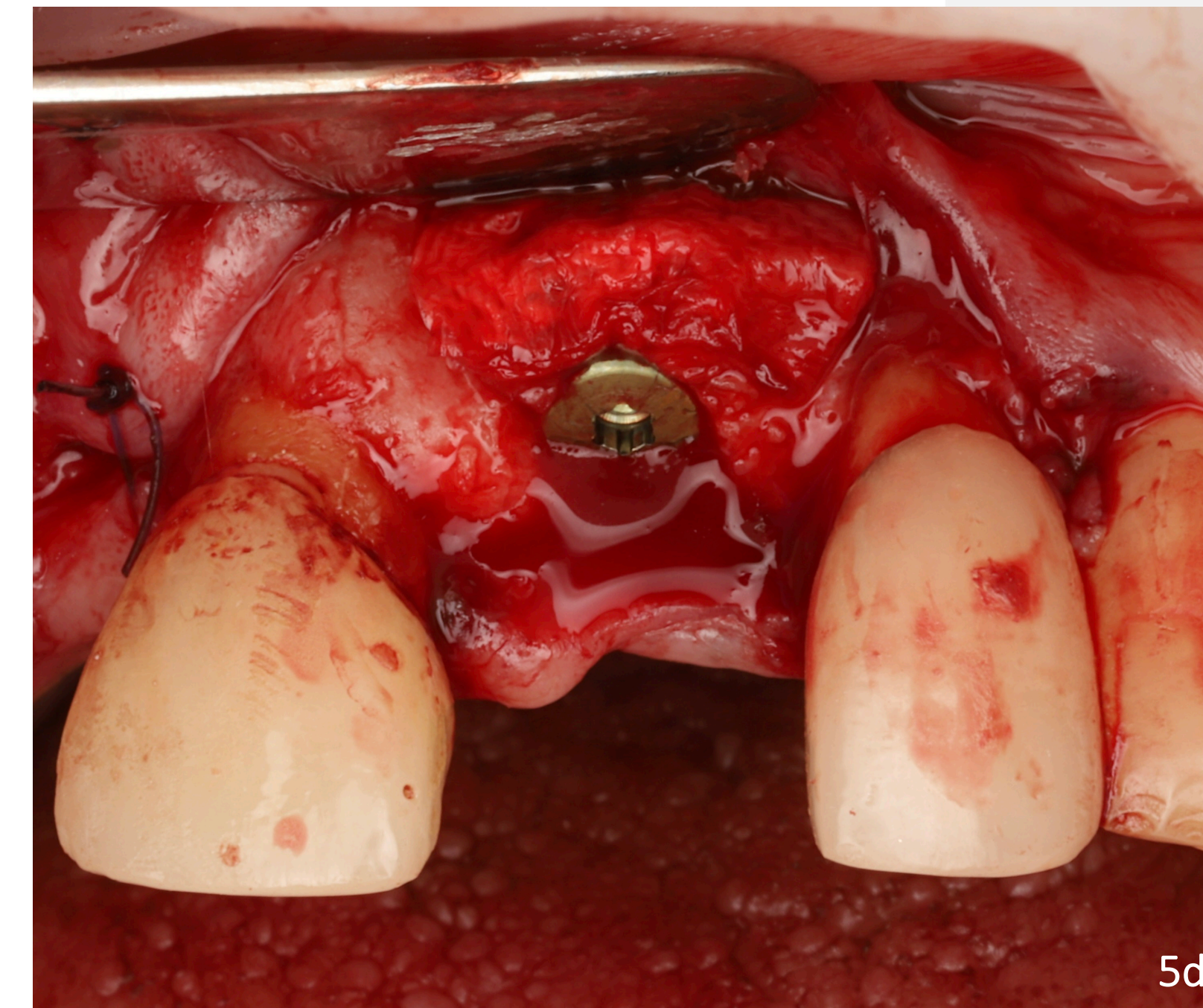


Figure 5d
Collagen membrane covering buccal aspect of tooth #9

Results

Four months after ridge preservation, uneventful keratinized epithelialization was seen, and the mucogingival junction was kept at the original position. Radiographic outcomes were evaluated by superimposing the pre- and post-operative CBCT images. The facial-palatal and coronal-apical growth of the grafting site are 5.9 and 8.1 mm, respectively, measured from the mid cross section of the superimposed segments. The regenerated alveolar ridge was clinically observed through the re-entry of the surgical site. Implant with 4.3 x 11.5 mm was placed with favorable torque. Buccal side of the implant was covered with a crosslinked, multi-layered collagen scaffold.

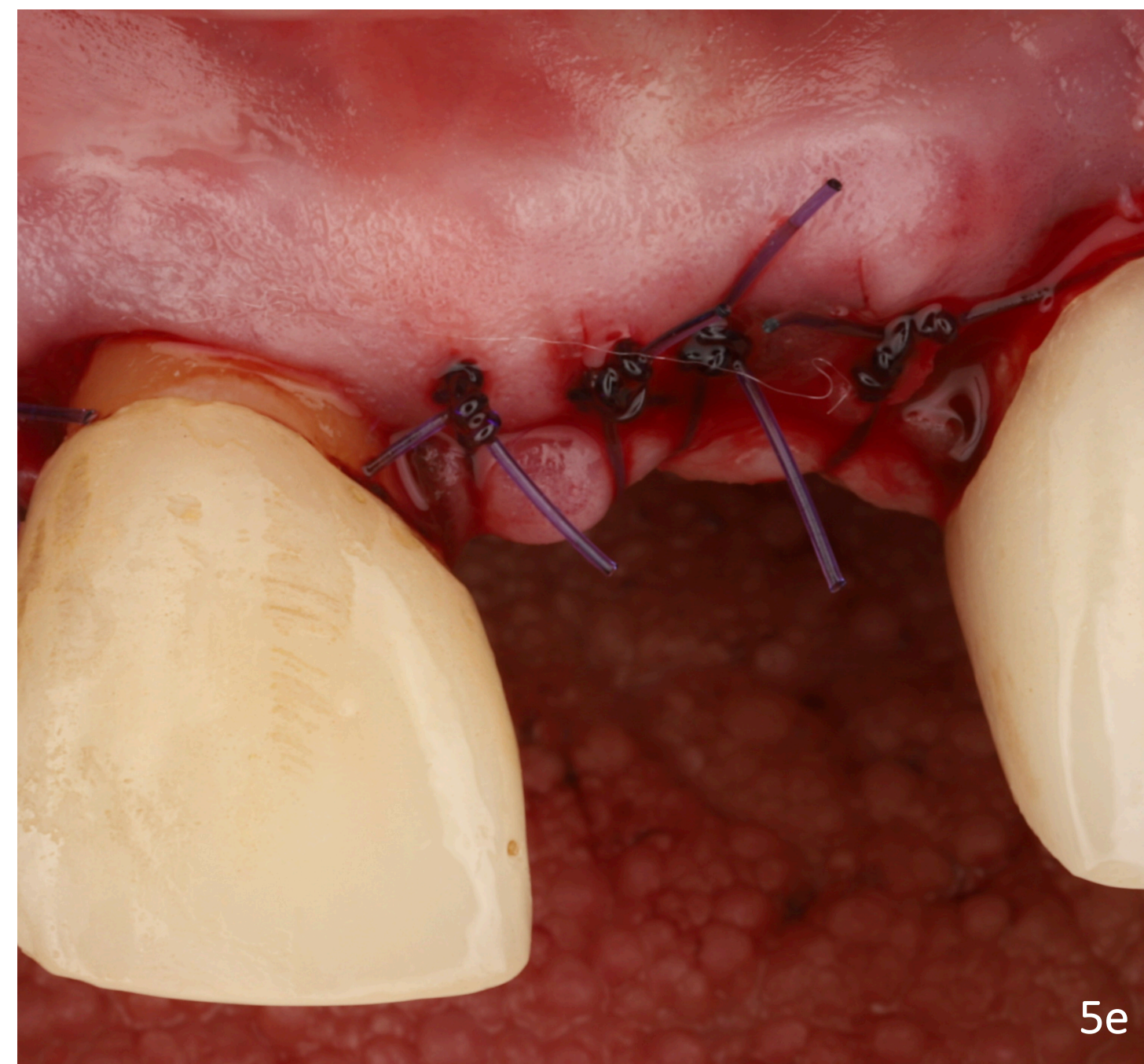


Figure 5e
Wound closure with simple interrupted sutures



Figure 5f
Incisal view of wound closure

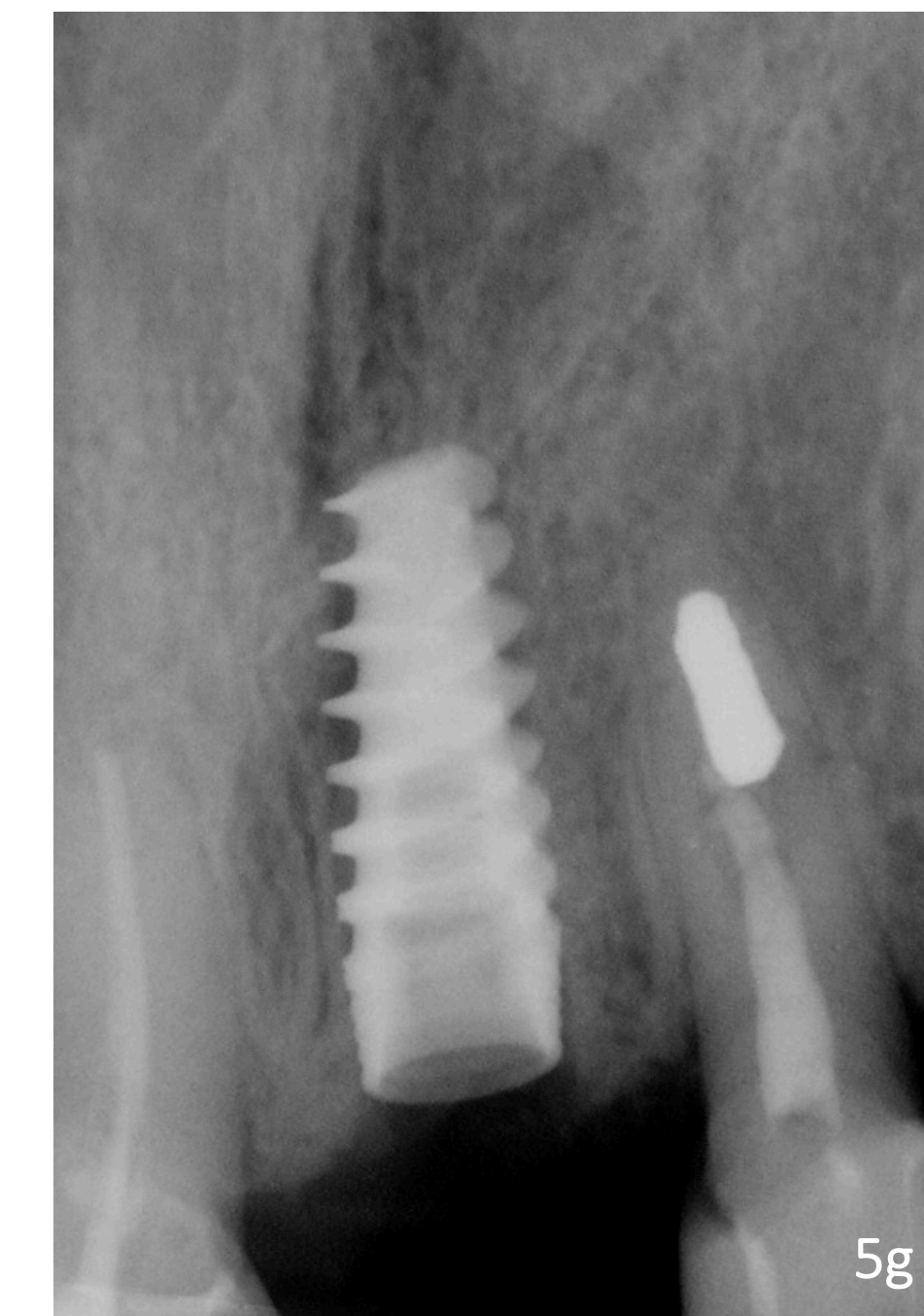


Figure 5g
Post-operative periapical radiograph of tooth #9



Figure 6a
Frontal view of the operation site 2 weeks post-operatively



Figure 6b
Incisal view of the operation site 2 weeks post-operatively

Conclusions

Ridge preservation using the open membrane technique can successfully maintain and regenerate hard tissue, which is favorable for future implant placement. Application of digital analysis of CBCT images enables anatomic structures to be precisely calculated. Implant surgery can be prudently planned based on the accurate information provided by the radiographic data. In an extraction socket with an apparent buccal wall defect, the ridge preservation technique has been proved in this case to be an efficient way to regenerate bone for implant placement.



References

