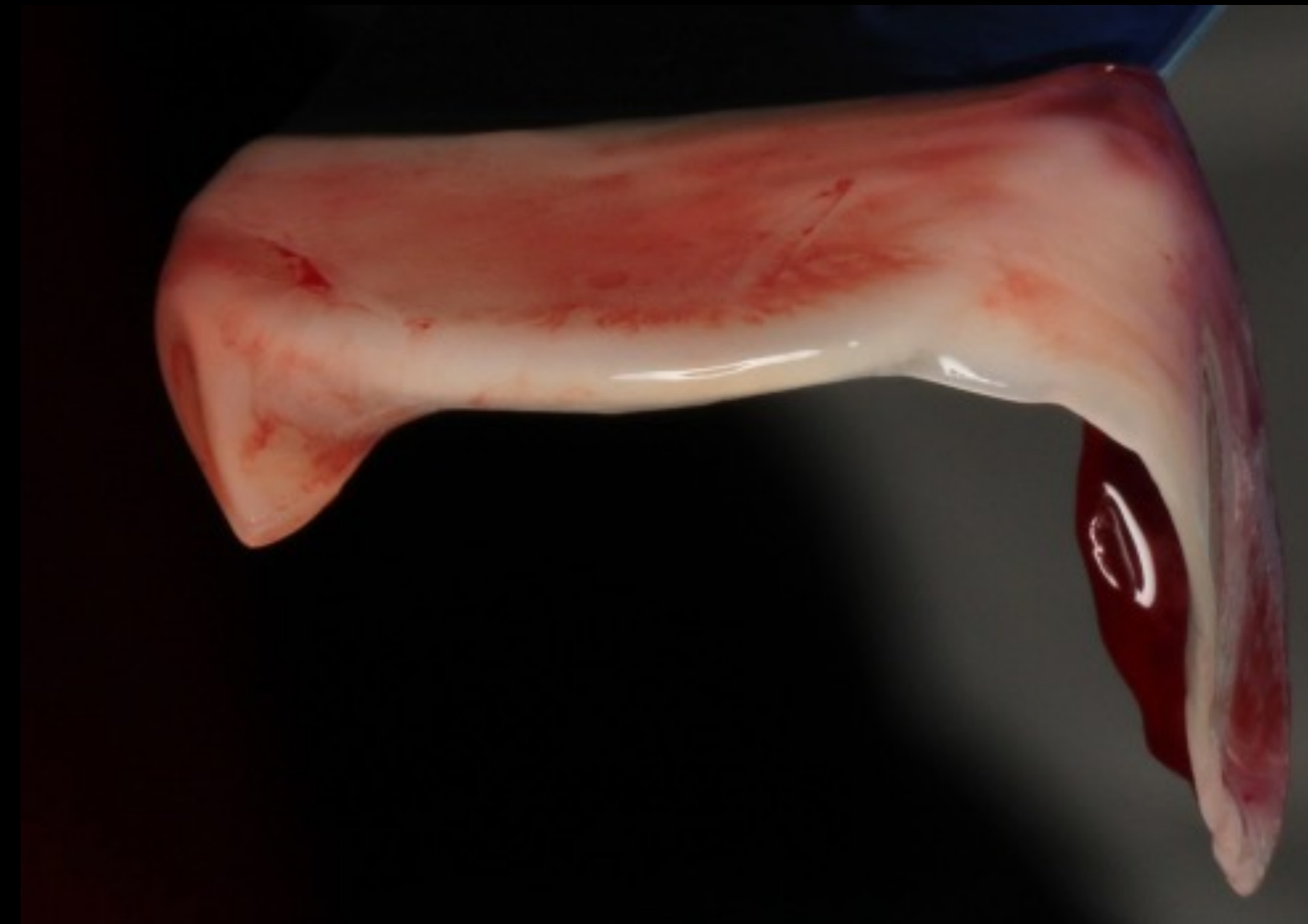
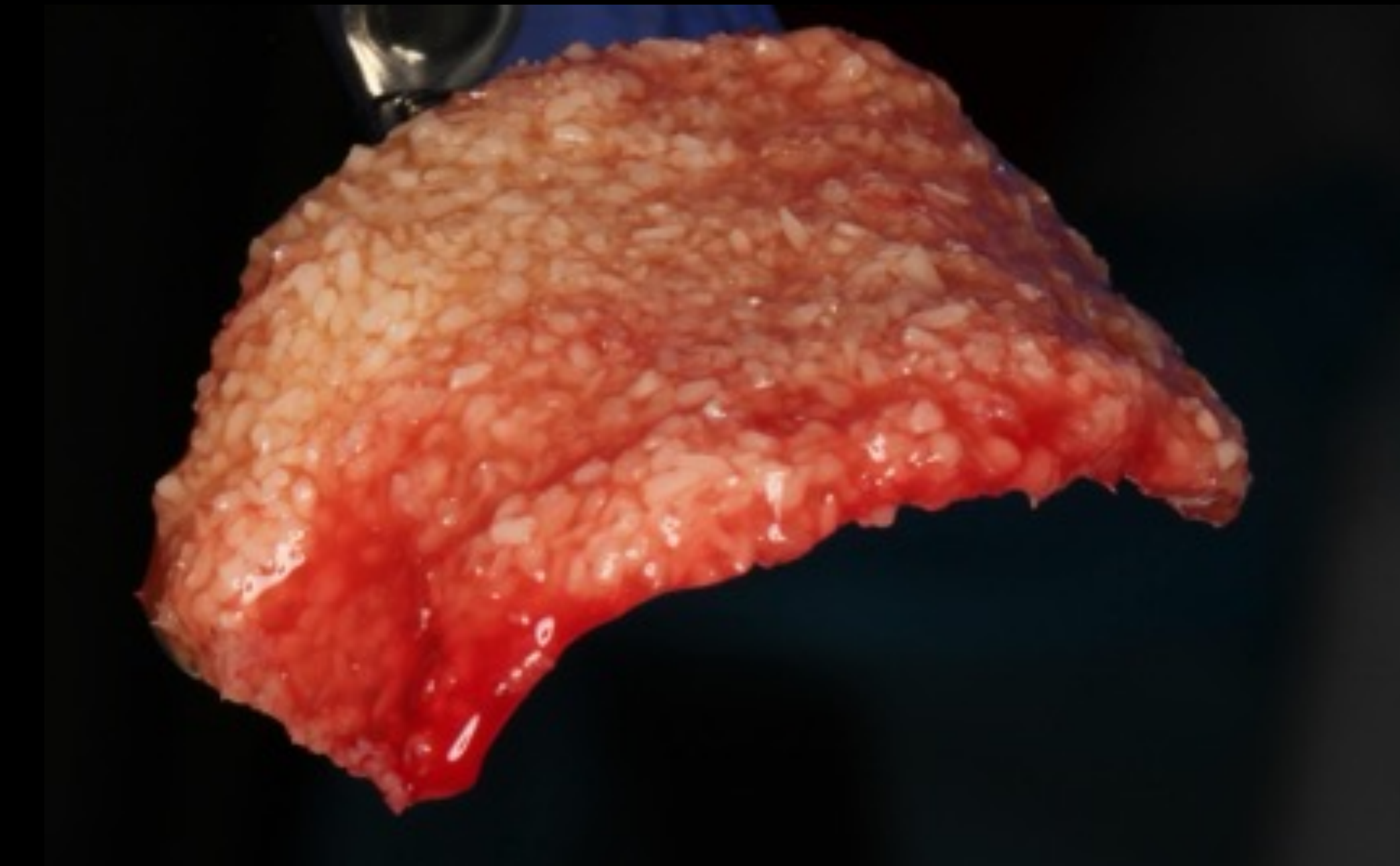


Management of Alveolar Ridge Deficiencies with Platelet Rich Fibrin (PRF)

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Introduction

Alveolar ridge deficiencies (ARD) are a common finding when evaluating patients for the placement of dental implants. Several reasons contribute to ARD including the position of teeth prior to extraction resulting in dehiscences/fenestrations of the buccal bone; traumatic extractions and removal of osseous lesions, amongst others. In many situations, the extent of the ARD necessitates a bone augmentation guided bone augmentation procedure to provide adequate bone volume for implant placement.¹ It has been demonstrated in multiple studies that platelet-rich fibrin (PRF) enhances wound healing by initiating stable clot formation and releasing growth factors throughout the inflammatory and proliferation phases.^{2,3,4} In this case series, we demonstrate the use of a combination of particulate allograft with platelet-rich fibrin (PRF) in guided bone regeneration to address ARDs.

A-PRF+ Protocol (Modified from Choukroun, 2017)

- Fast drawing + immediate centrifugation required (6 tubes, less than 90 sec)
- **A-PRF liquid** : 1300 rpm/ 5 min. After 5 min, the supernatant is still liquid.
 - Select the last two tubes drawn.
 - Aspirate the supernatant with a 2 mL syringe (penetrates into to the tube and avoids use of a needle with the syringe).
 - **Sticky bone** : the A-PRF liquid is applied to the bone graft in the bowl, mix till initial coagulation and let it sit until application.
- **A-PRF +** : 1300 rpm/ 8 min, spin the tubes for 3 more mins.
 - Remove the caps. Wait 5 minutes before clot removal for enhanced clot formation.
 - **PRF membrane** : Prepare membranes.

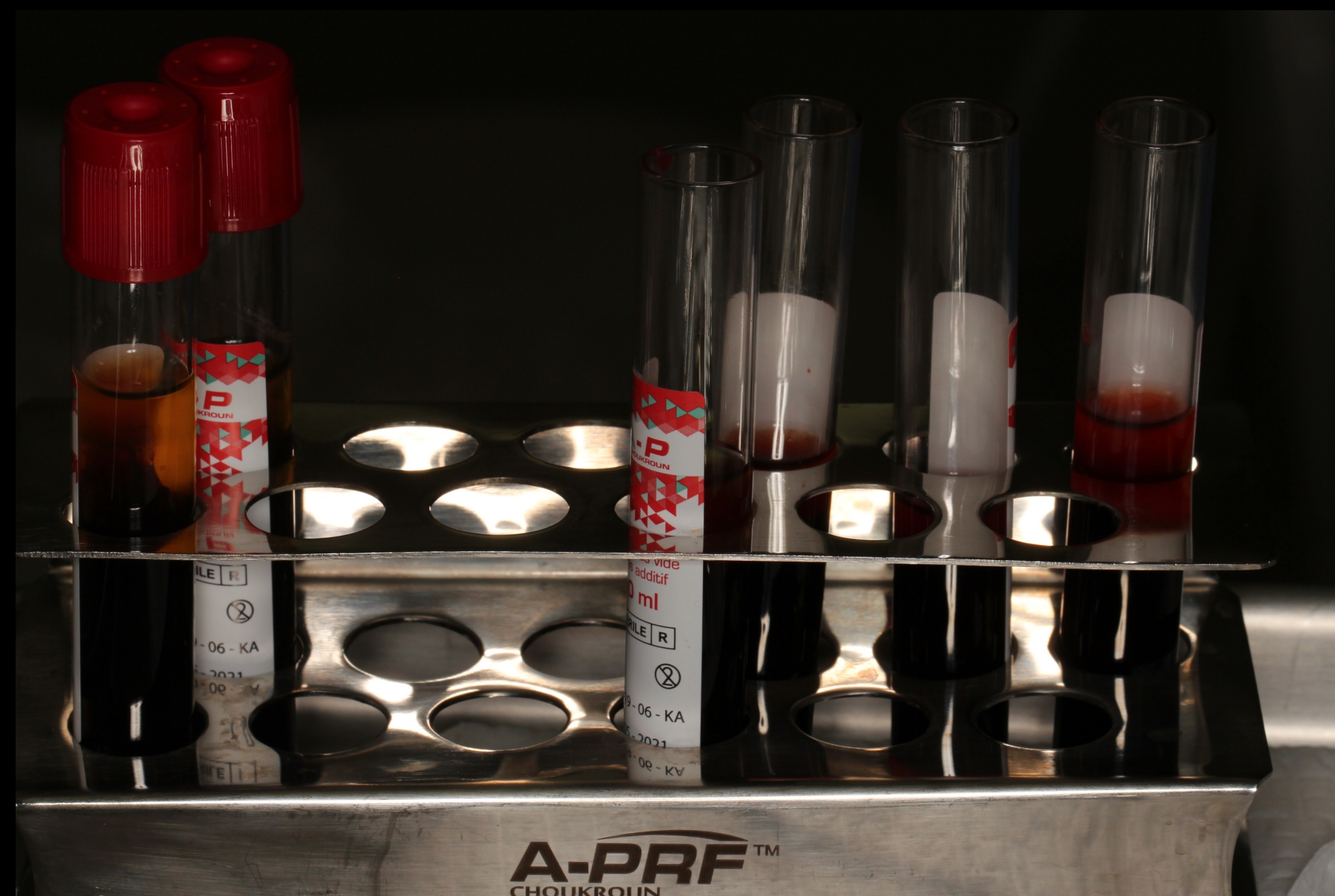
Material and Method

Three cases, including one buccally positioned maxillary central incisor extraction, one atrophic maxilla post-implant failure, and one severely resorbed mandibular ridge post-extraction were treated with particulate allograft, collagen membrane and the addition of PRF to regenerate sufficient alveolar bone dimensions for implant placement. A standard A-PRF+ protocol was applied for all the cases to obtain PRF membrane and sticky bone. Primary closure was achieved in all cases; non-disturbed healing period of four to six months were allowed.

Case 1: 19 yo African American female presented for anterior tooth (#9) extraction and ridge preservation; the extraction site was augmented with allograft sticky bone, long lasting collagen and PRF membrane, and then was temporized with the extracted crown.

Case 2: 56 yo Asian female patient lost implant #5, presented with significant buccal deficiency. Guided bone regeneration was performed on site #5 with allograft sticky bone, long lasting collagen and PRF membrane. Soft tissue healed well; no swelling or ecchymosis was reported. After four months of healing, adequate high-quality bone was observed at the re-entry, A 4.1 mm implant was placed and restored.

Case 3: 64 yo Hispanic male patient presented with a knife-edged, class IV atrophic mandibular ridge desiring placement of implants to support an overdenture. Guided bone regeneration was performed on the anterior region with allograft sticky bone, tacked down by long lasting collagen and PRF membrane. Soft tissue responded favorably during the six months of healing; adequate hard tissue was observed at the re-entry. Two 4.3 mm implants and cover screws were placed.



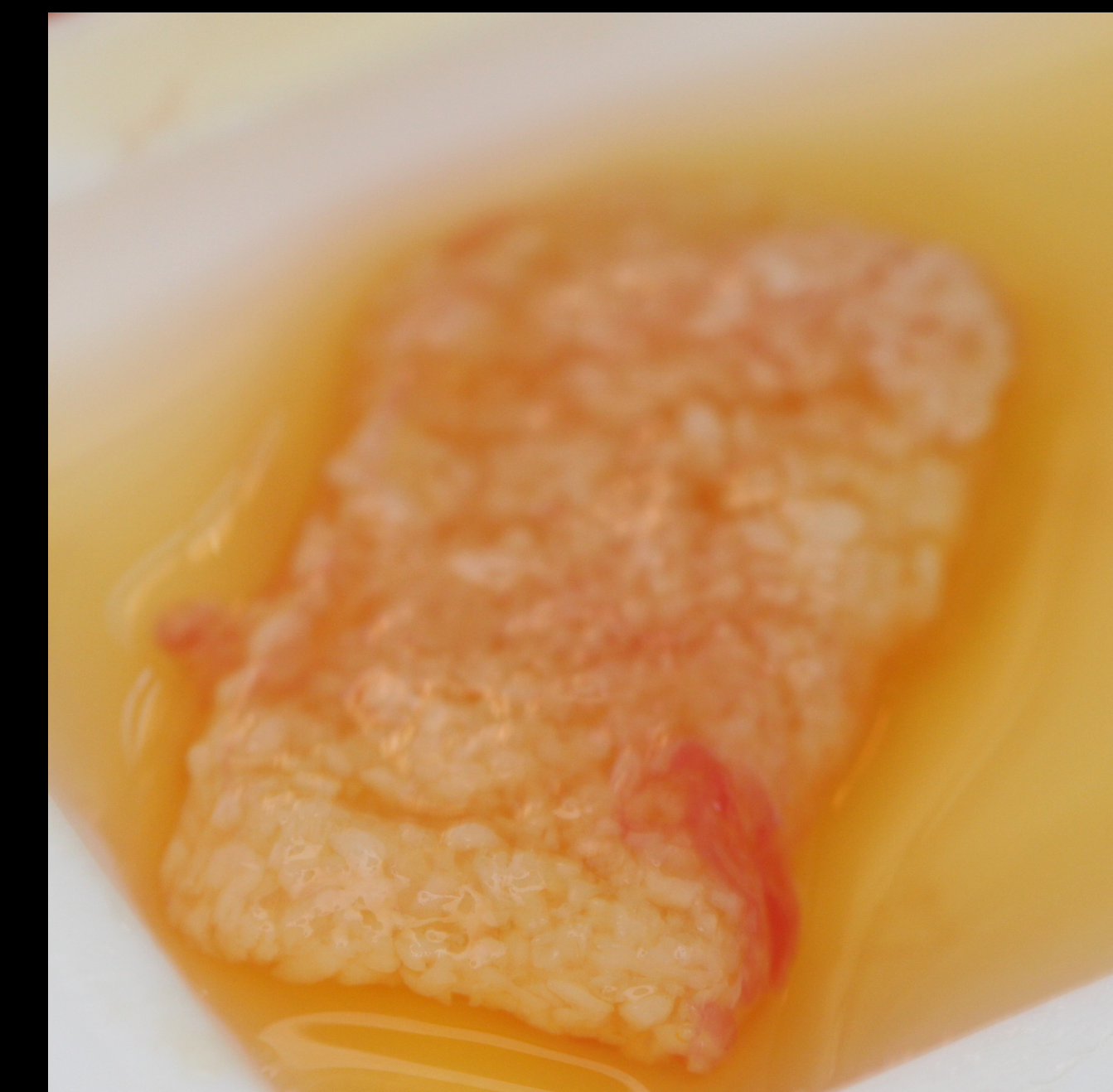
Blood Collection



PRF membrane processing



PRF Plug



Sticky Bone



PRF membrane

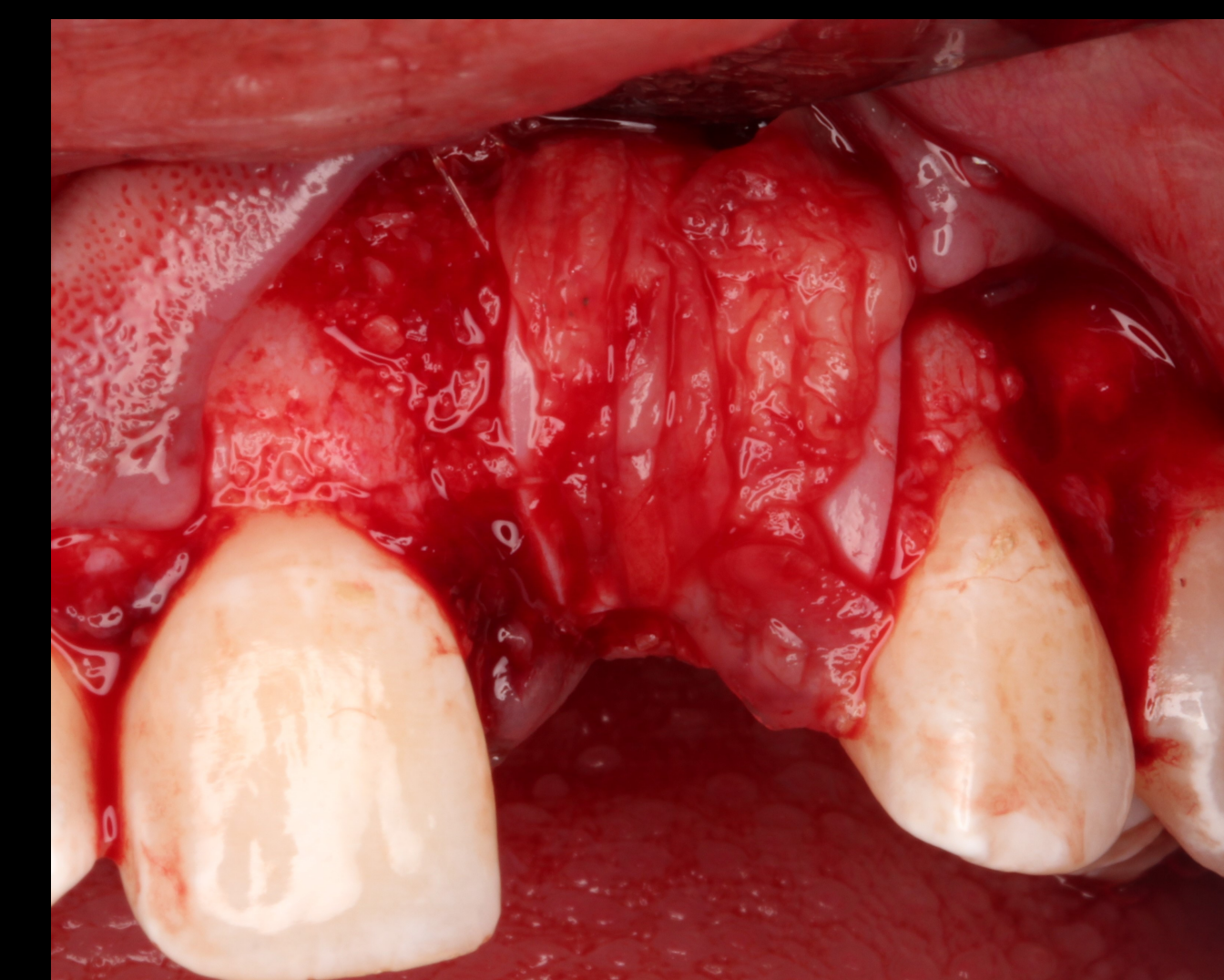
Case 1: Anterior Single Tooth Site Ridge Preservation



Post-extraction defect #9



Sticky bone made by PRF liquid and
particulate allograft



Grafted site with sticky bone, collagen
membrane and layers of PRF membrane

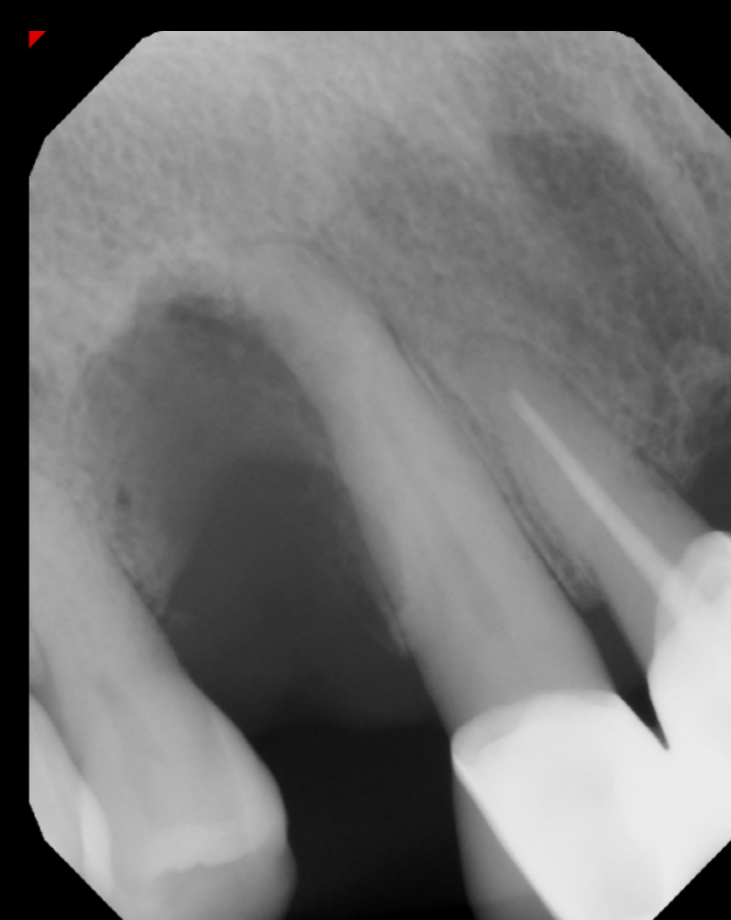


Immediate post-op with provisional made with the
extracted tooth crown **attached to the adjacent teeth**

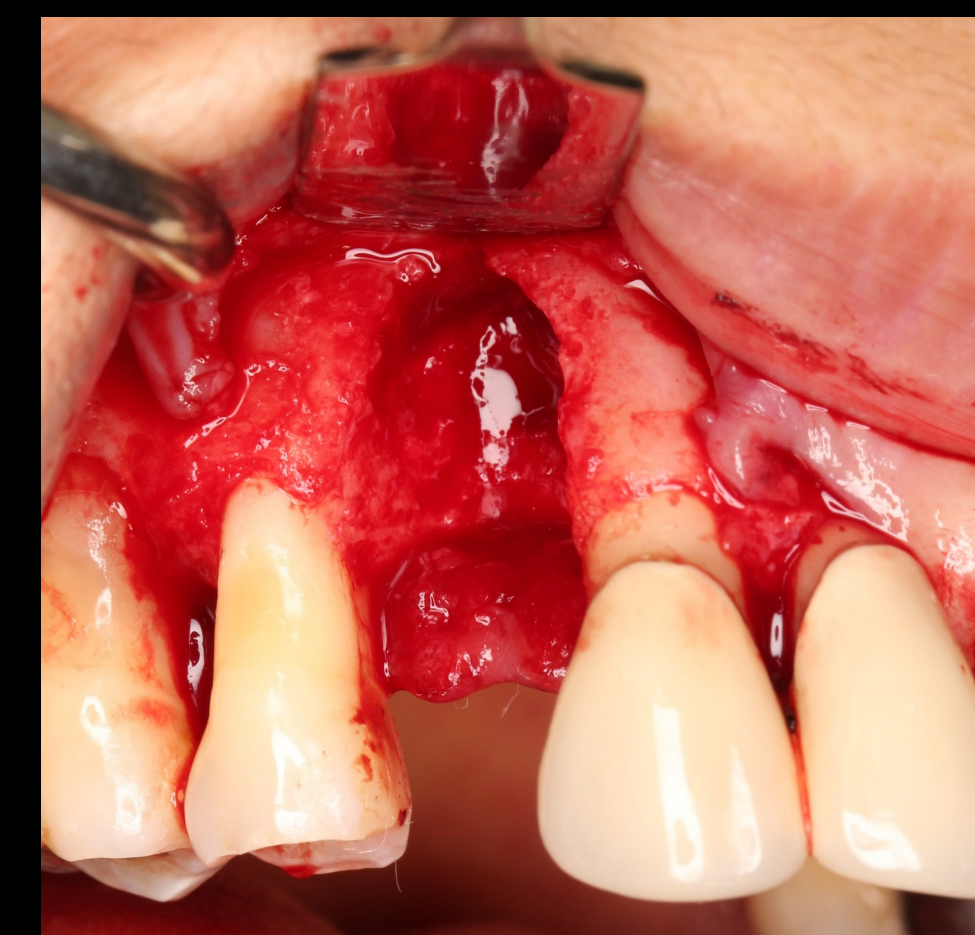
Case 2: Failed implant site GBR



Buccal deficiency #5



Pre-op radiograph



Defect exposed by full
thickness reflection



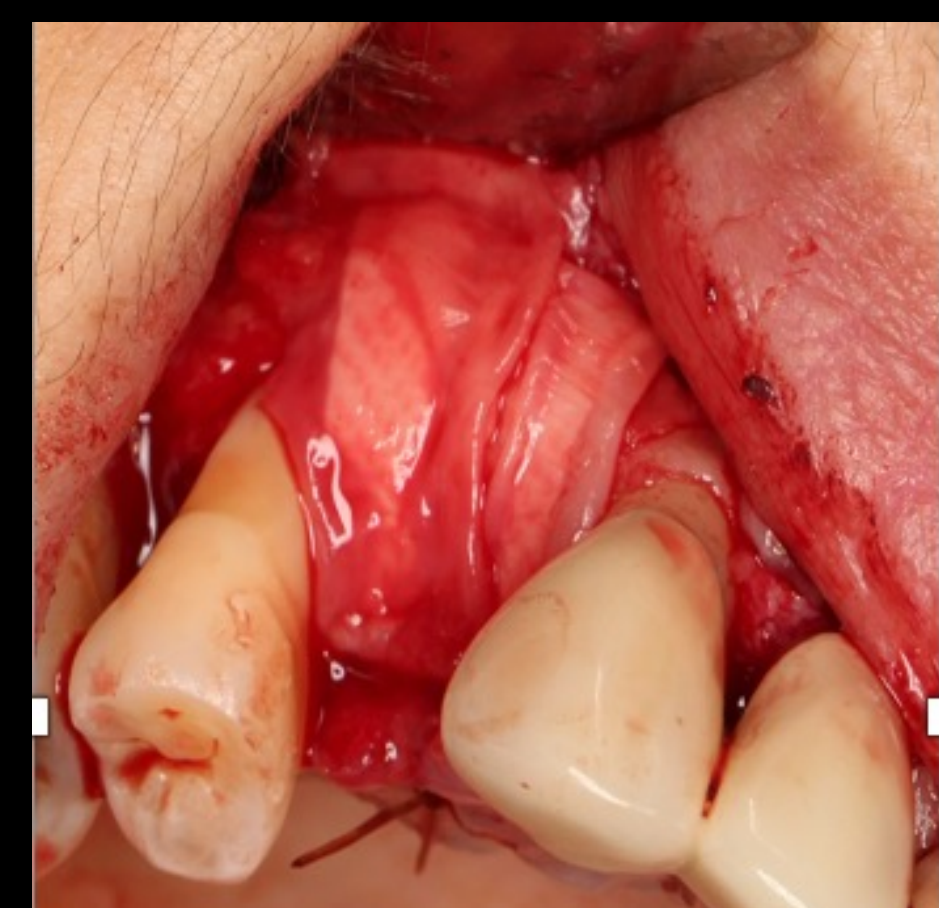
Sticky bone made mixing PRF
liquid and particulate allograft



PRF Membrane



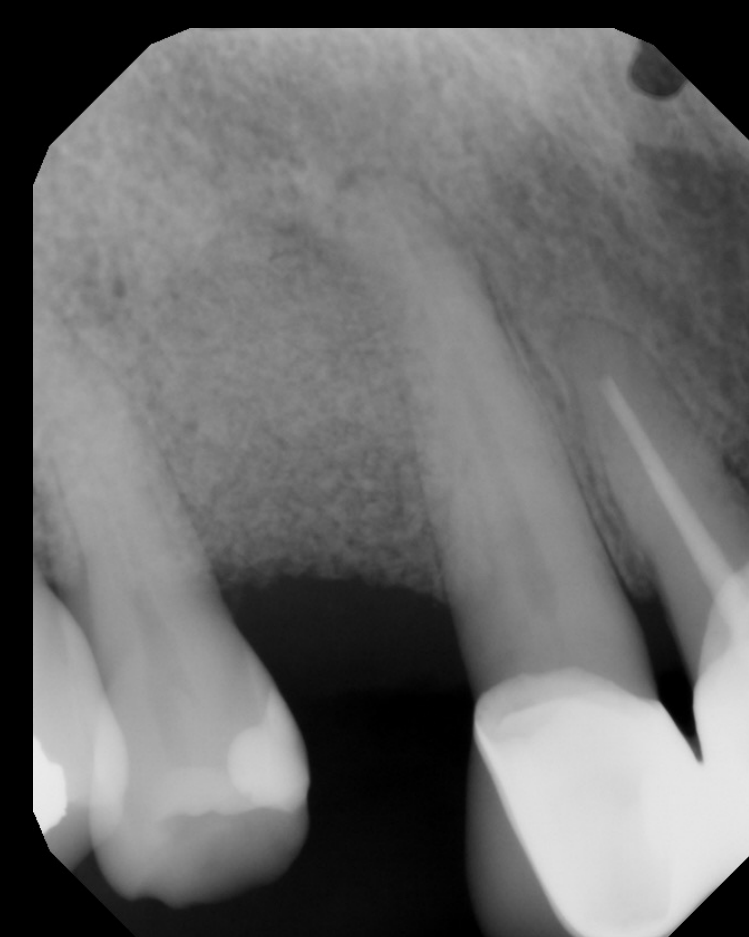
Grafted site with sticky bone



Suture-stabilized collagen membrane
covered with PRF membrane



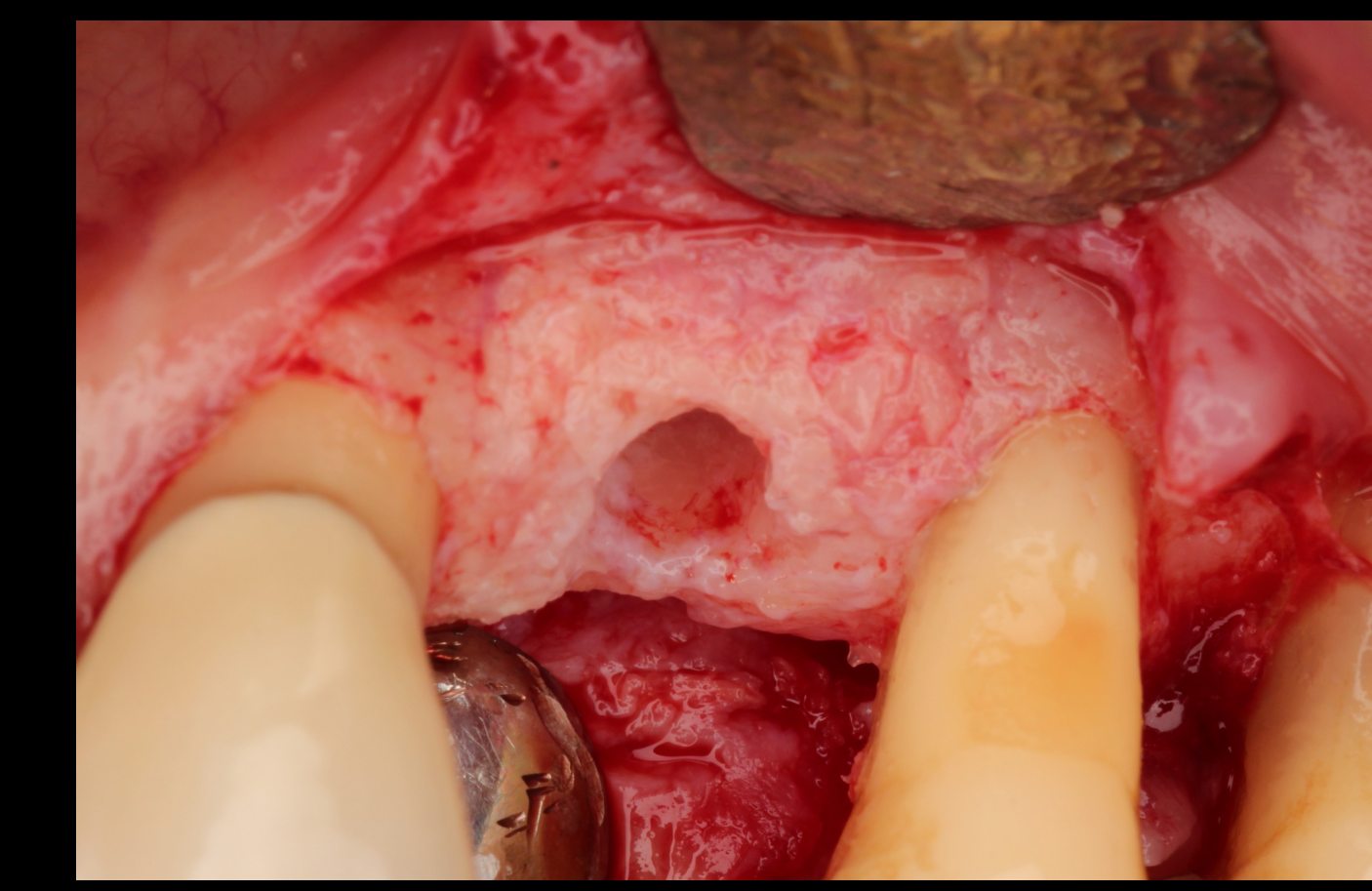
Four-month post-op healing



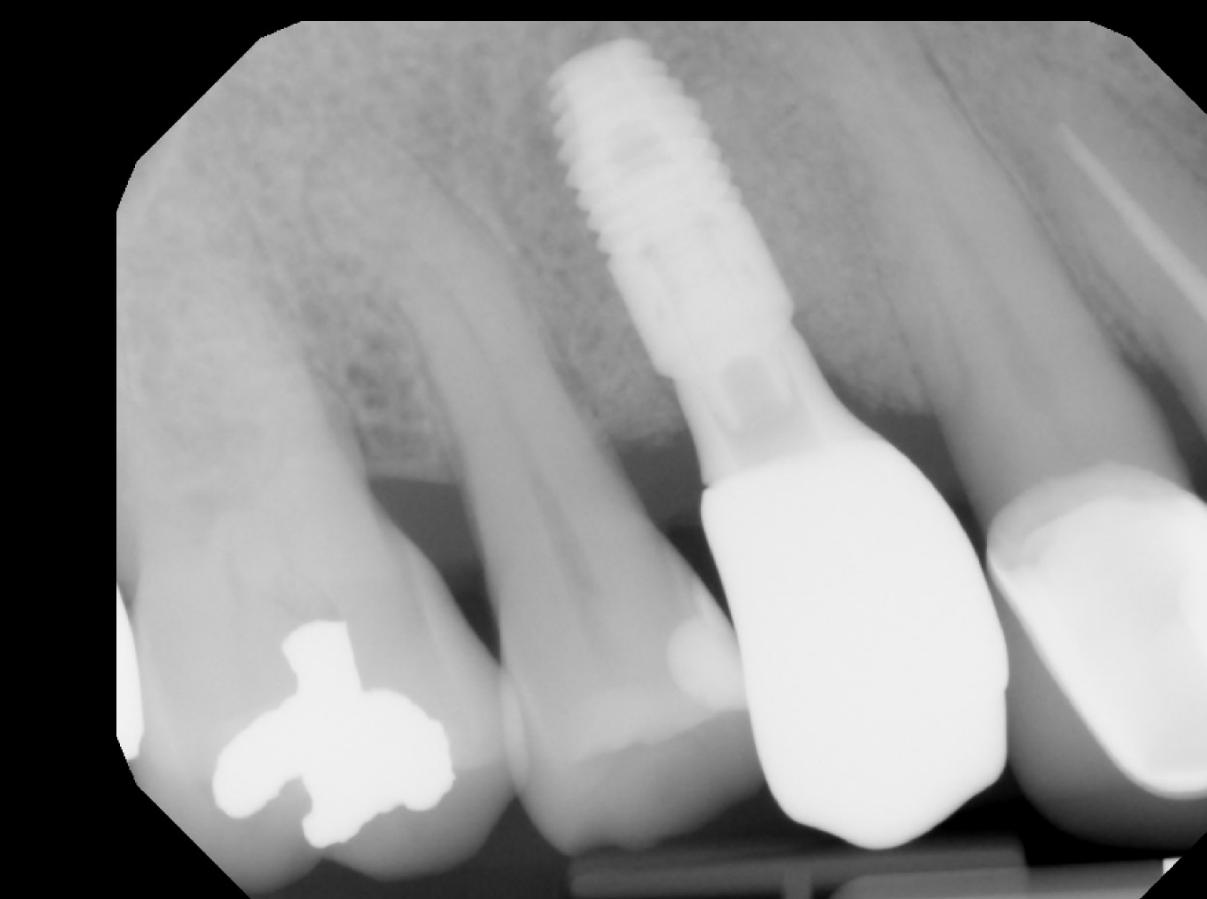
Post-op radiograph



Regenerated bone at re-entry

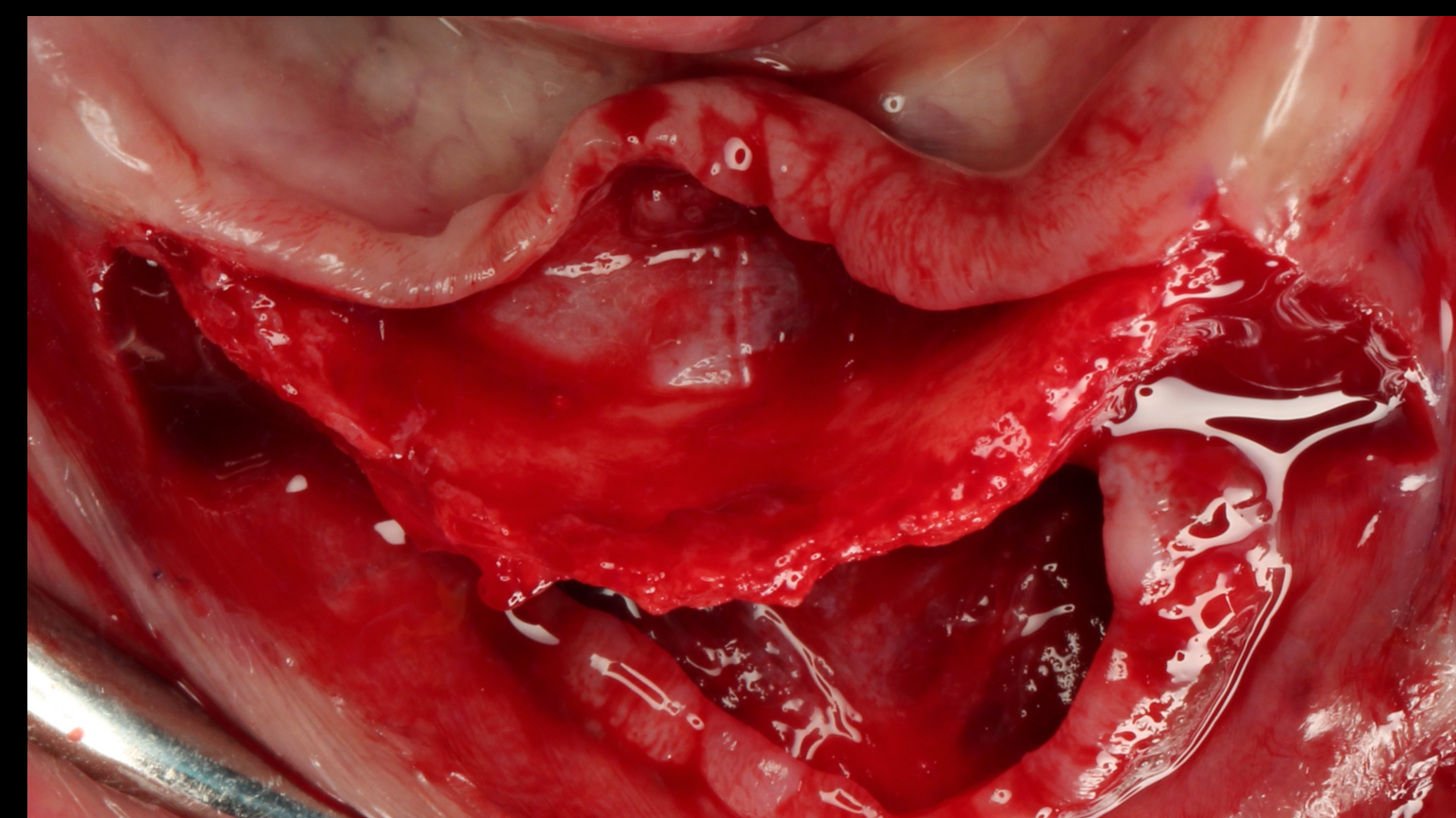


Osteotomy for #5 implant

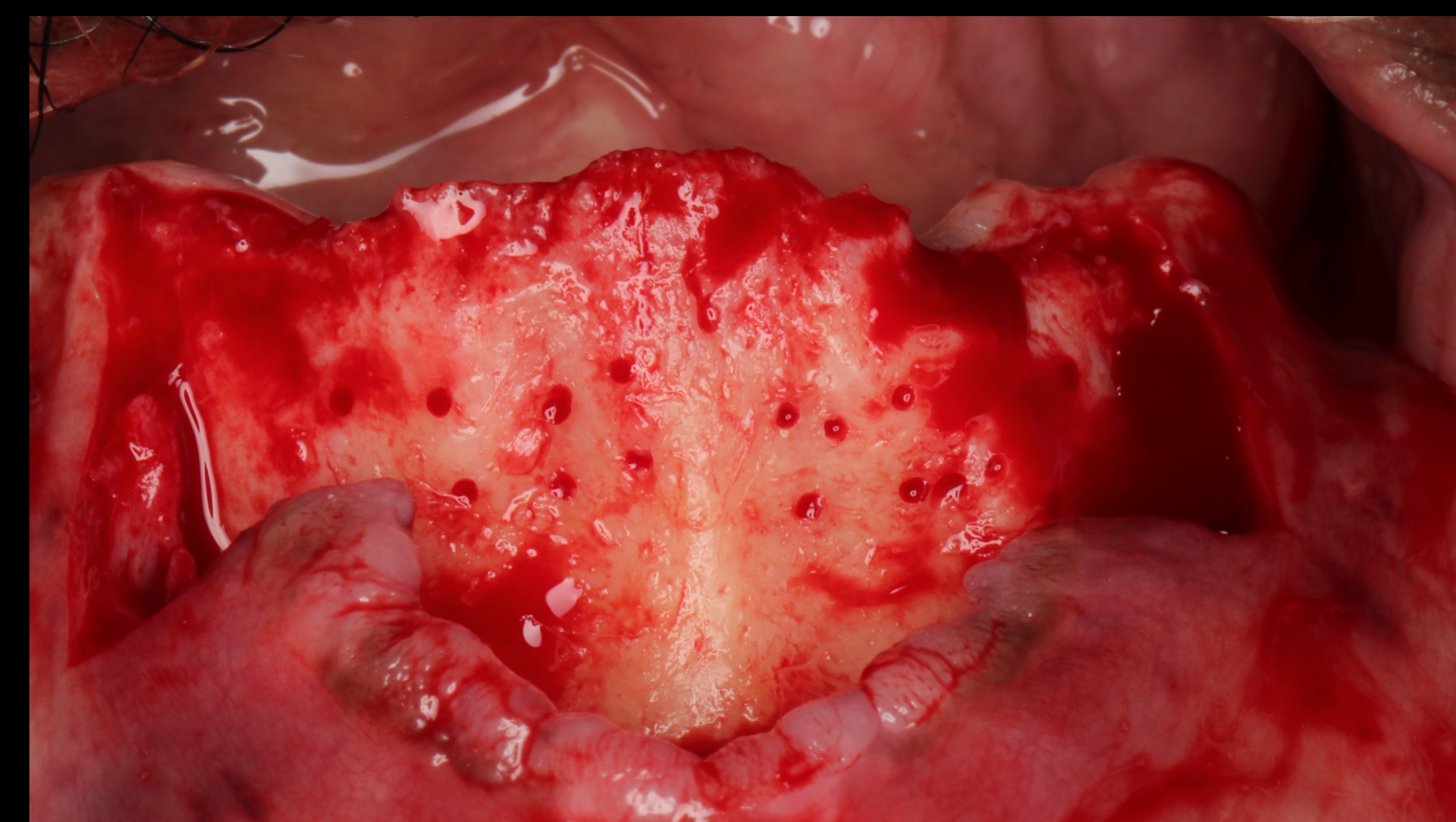


Implant placed and restored

Case 3: Edentulous Mandibular GBR



Knife-edged, class IV atrophic mandibular ridge



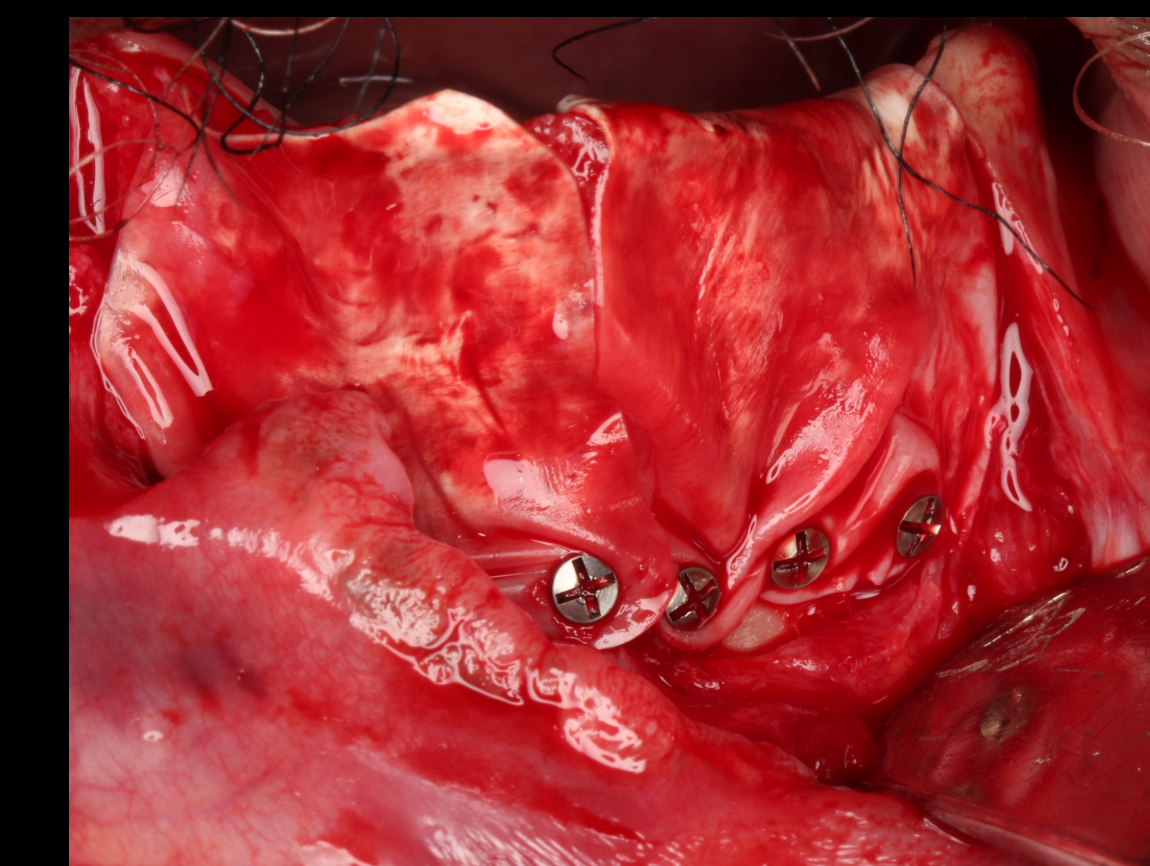
Buccal decortication



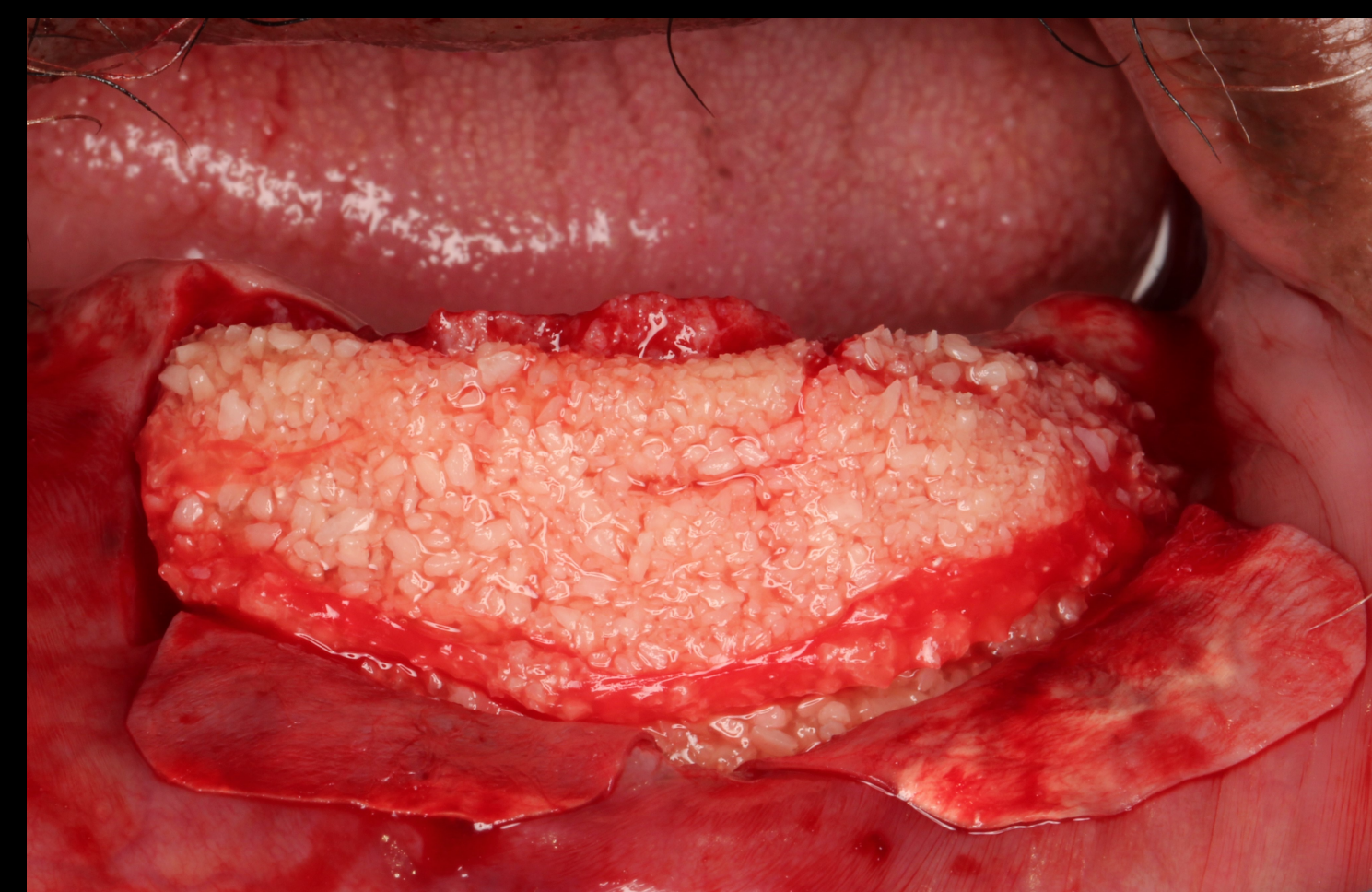
Sticky bone made with PRF liquid
and particulate allograft



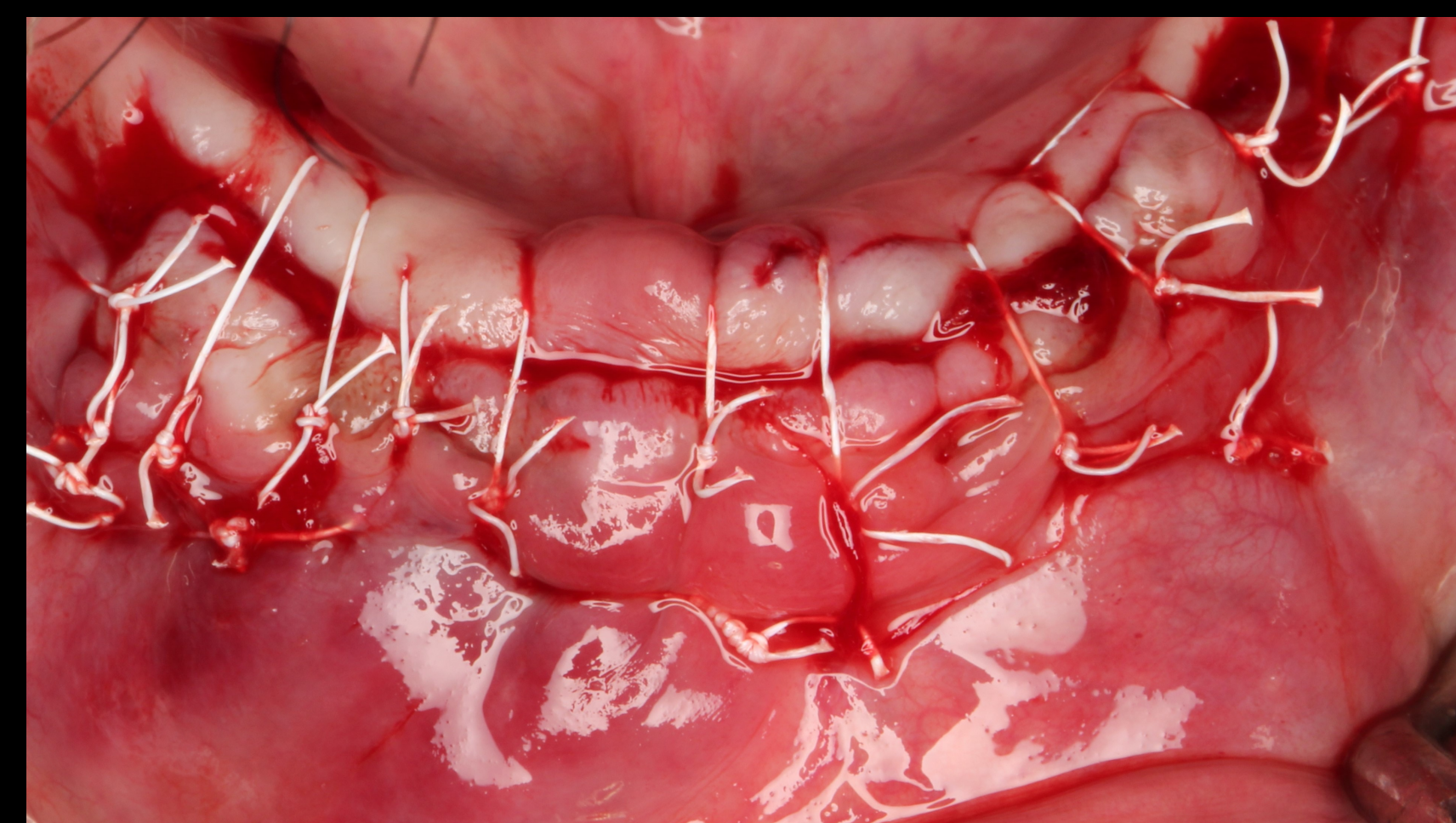
PRF Membrane



Collagen membrane tacked down
at the apical region



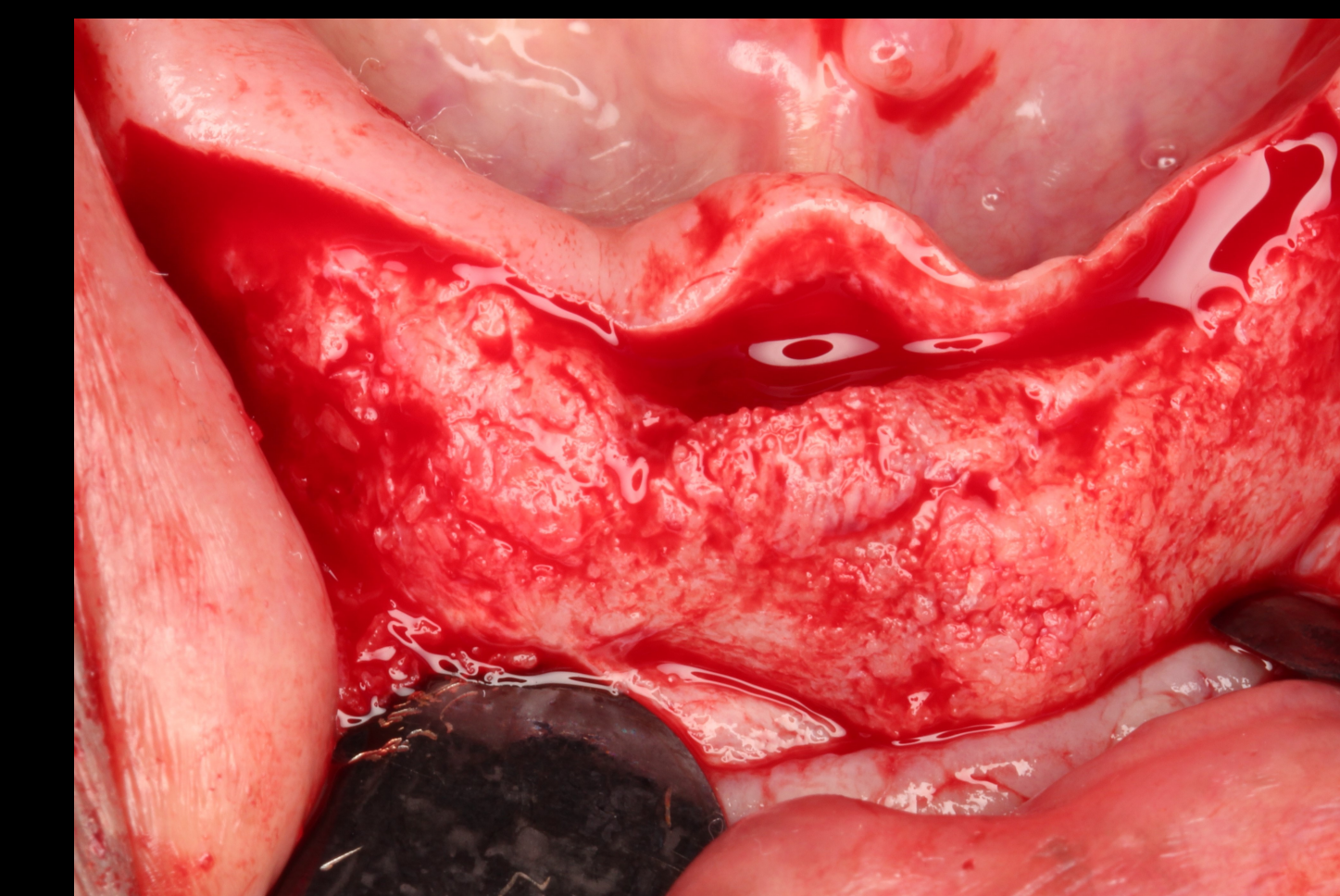
Sticky bone placed at the site



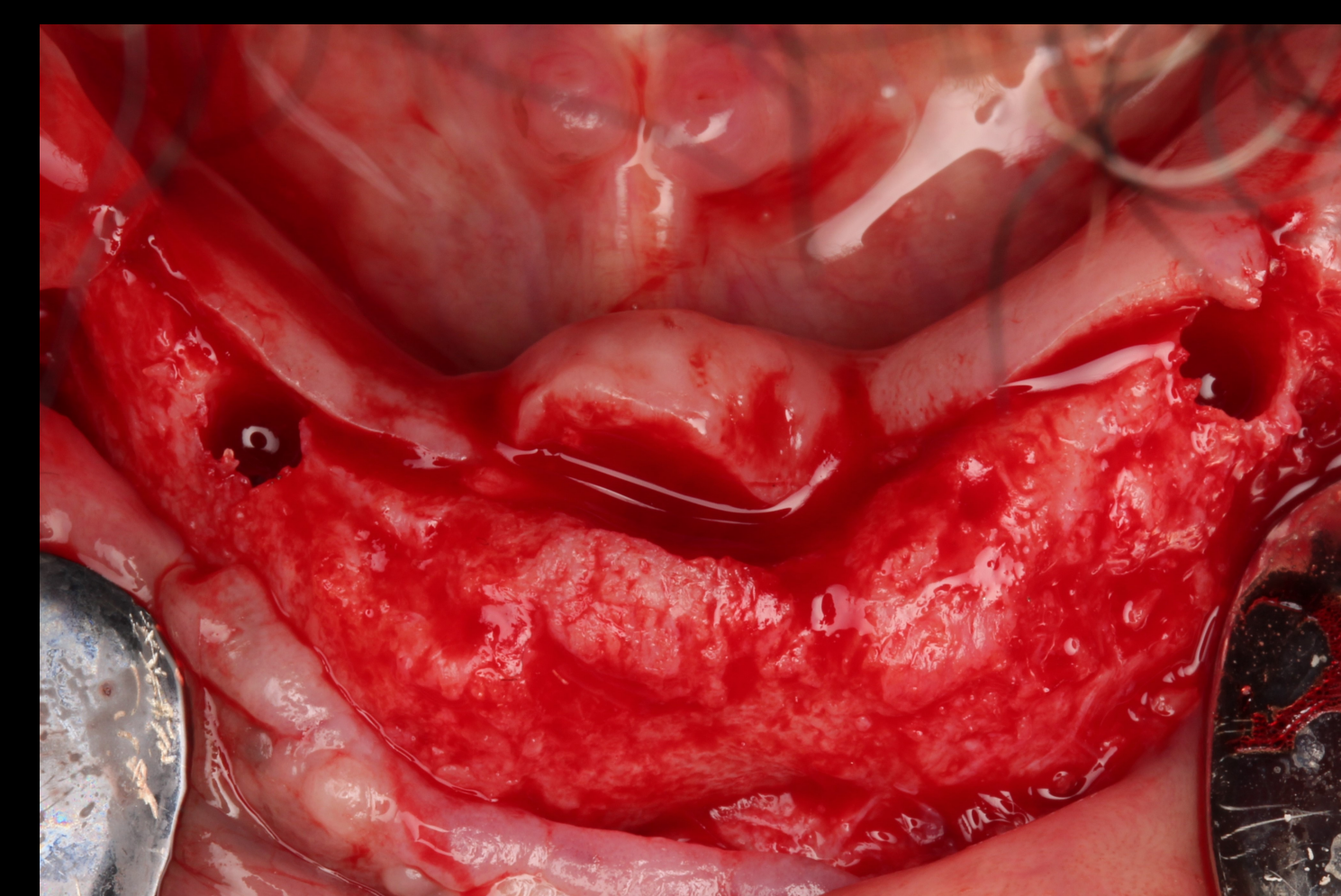
Primary wound closure



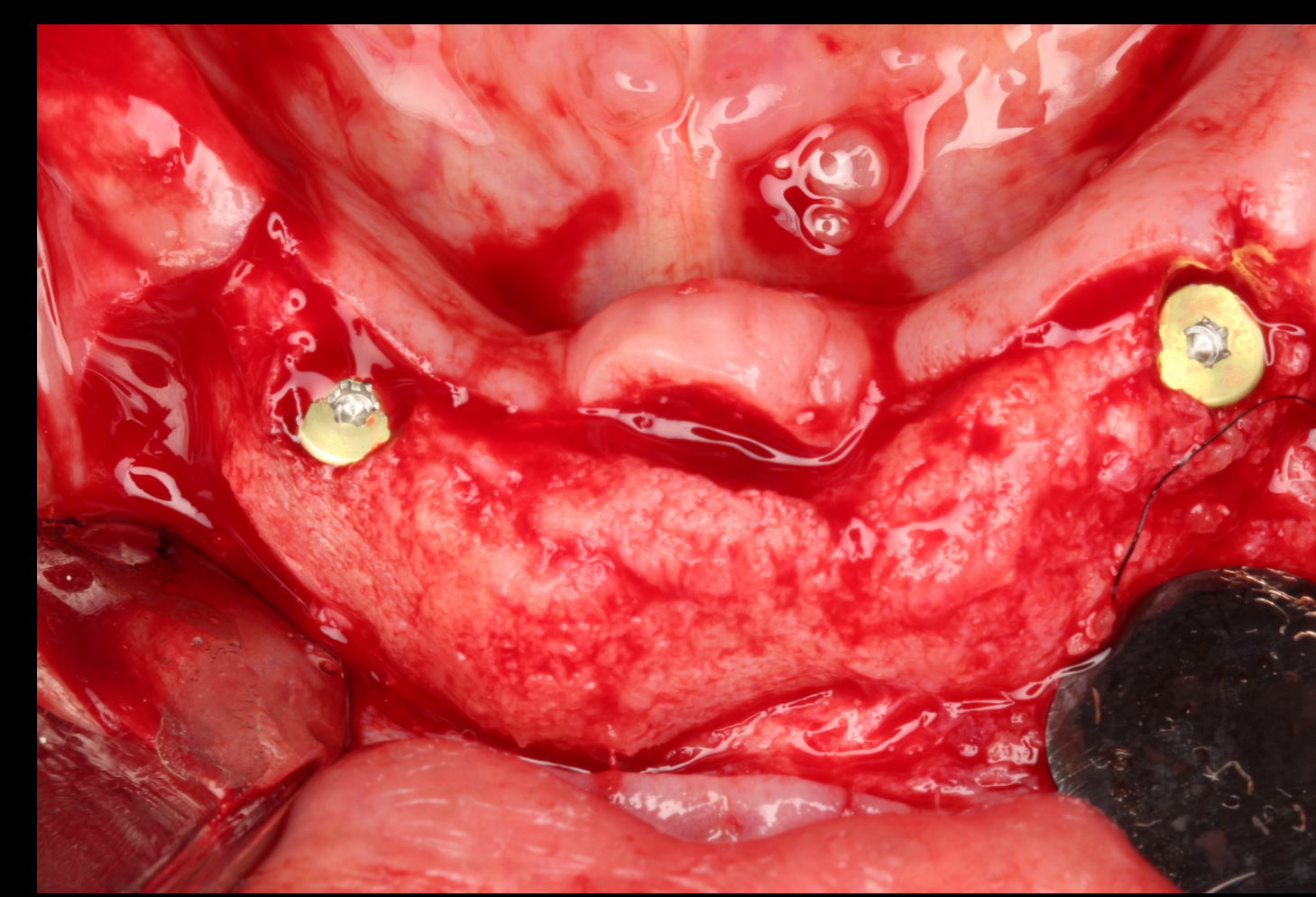
Six months post-op healing



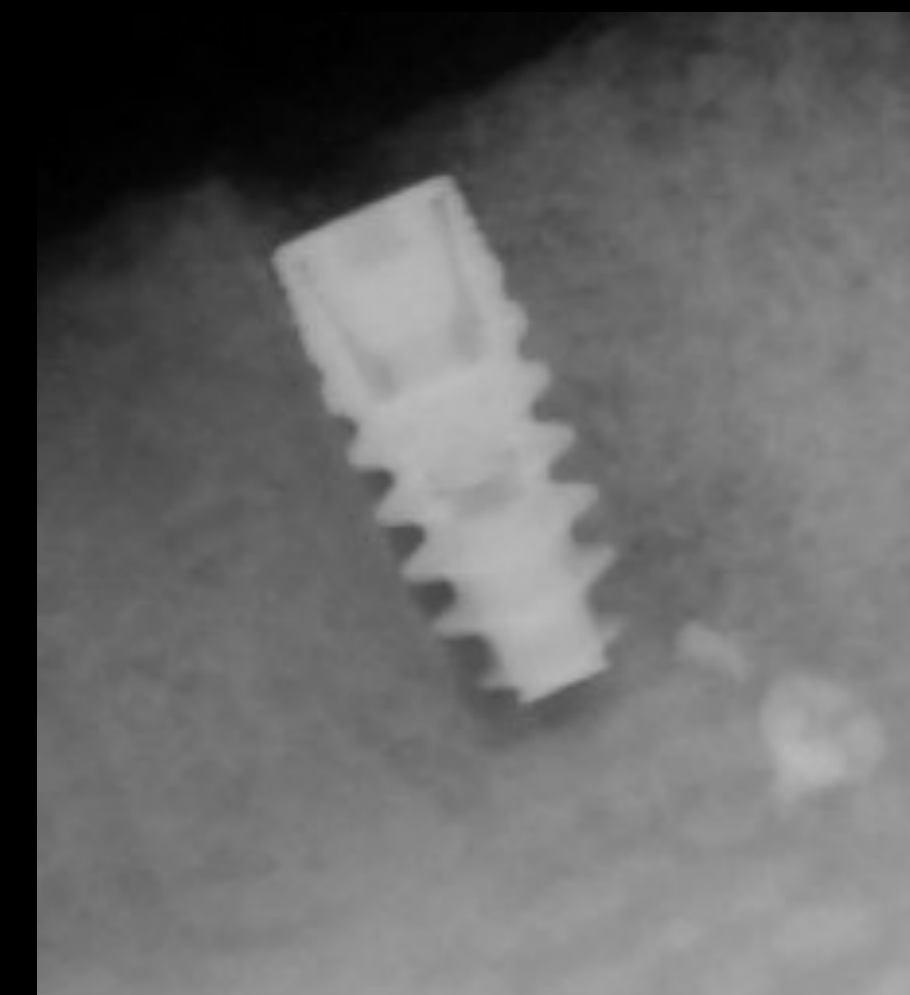
Regenerated bone at re-entry



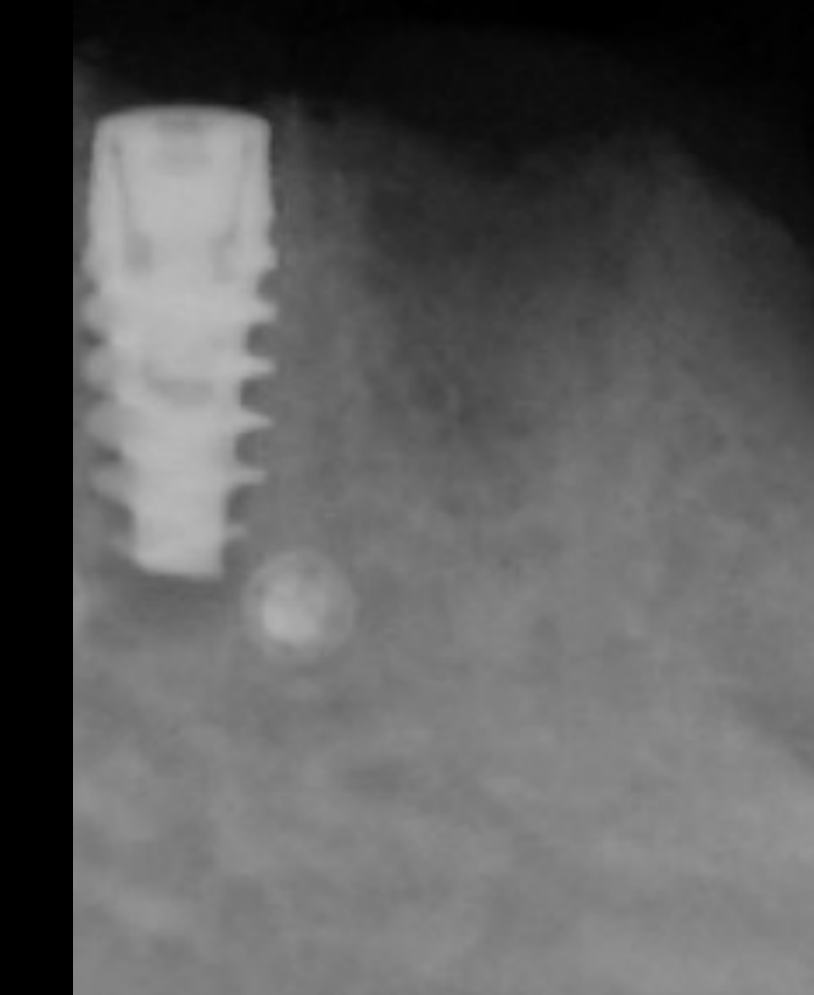
Osteotomies for #22 and #27 implants



Placement of implants at site #'s
22 and 27



#22 post-op radiograph



#27 post-op radiograph

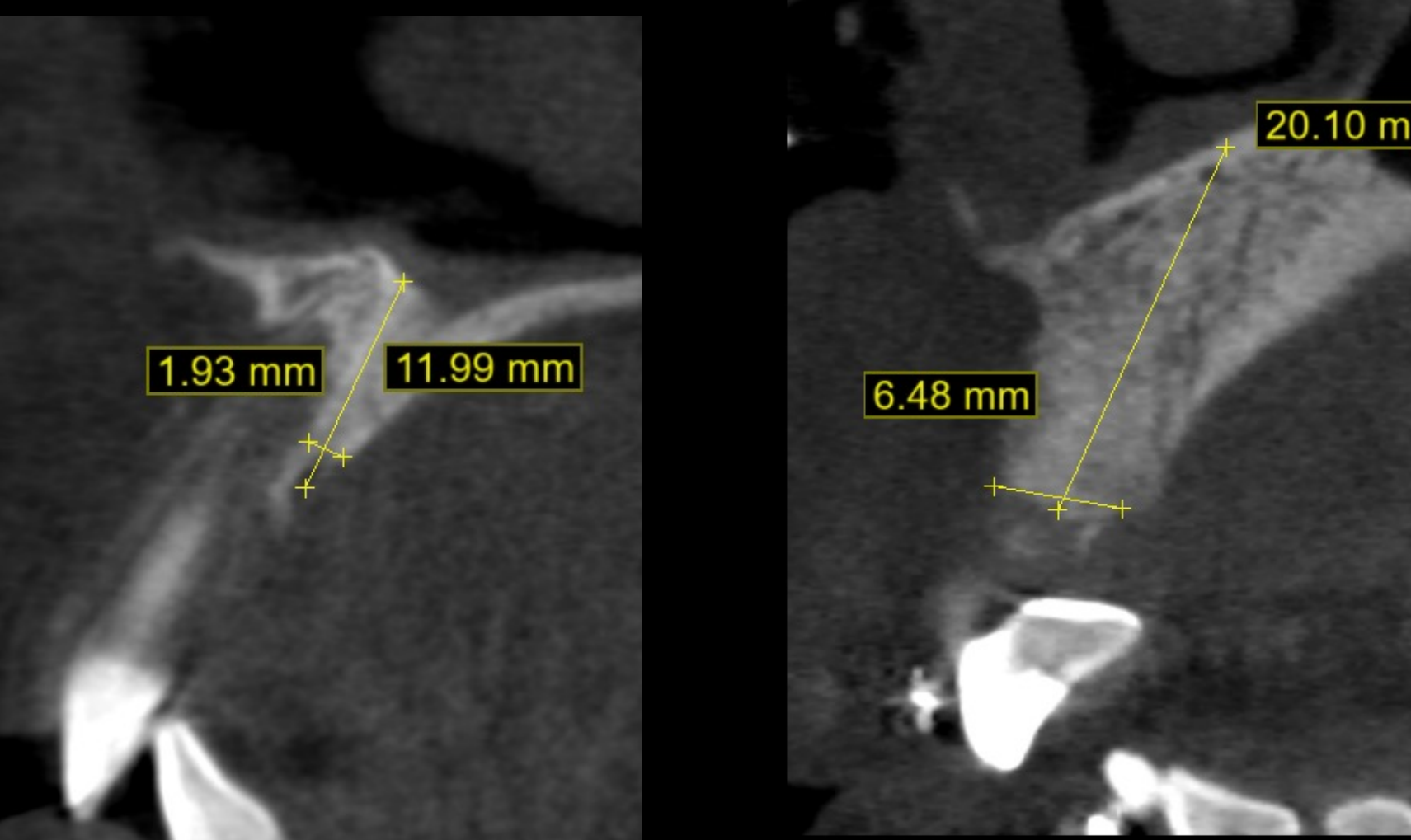


One month post-implant healing

Results

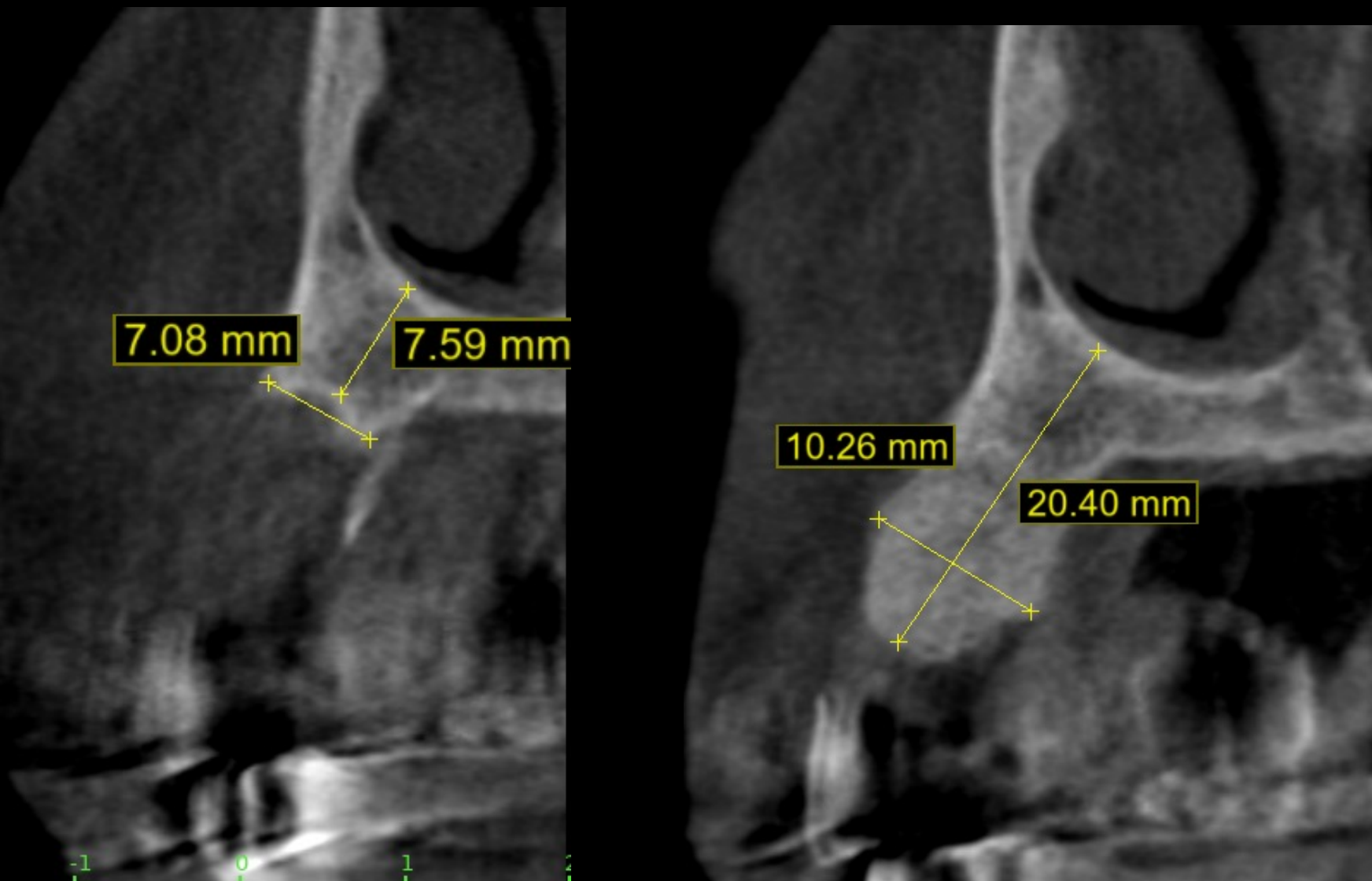
In addition to the improved handling properties of sticky bone compared to particulate bone alone, these treated sites showed superior soft and hard tissue healing. Adequate bone regeneration was observed in CBCT and confirmed clinically at the time of implant placement. Soft tissue healing was excellent and the patients reported minimal post-surgical edema and pain.

Case 1: Anterior Single Tooth Site Ridge Preservation



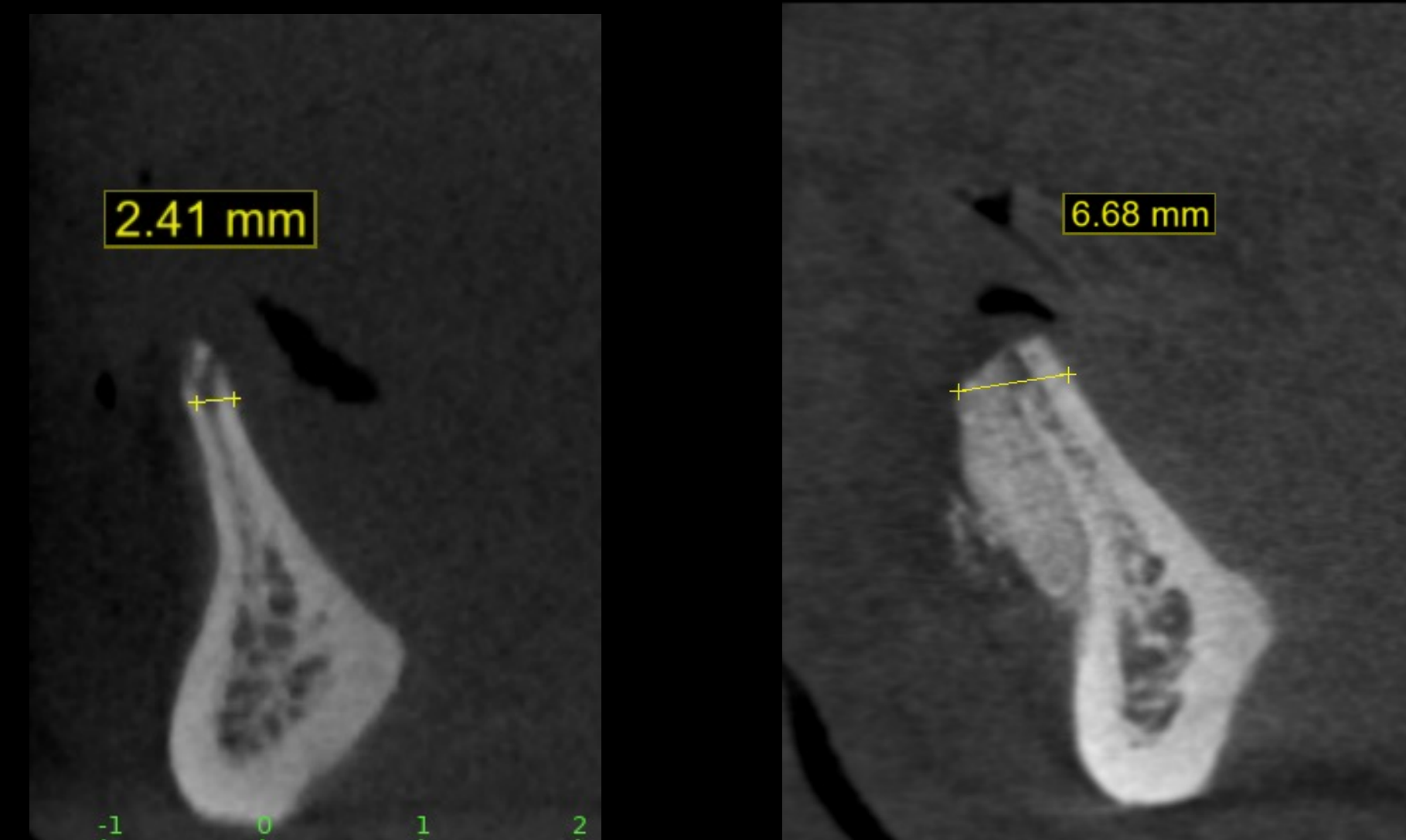
Pre op CT slice Post op CT slice

Case 2: Failed implant site GBR



Pre op CT slice Post op CT slice

Case 3 Edentulous Mandibular GBR



Pre op CT slice Post op CT slice

Summary of CT Measurements

Case	Horizontal Augmentation (mm)	Vertical Augmentation (mm)
1	5.82	11.68
2	10.64	12.15
3	5.53	N/A
Valladão et.al 2000	5.9 ± 2.4	5.6 ± 2.6

Conclusions

Within the limitations of this study, the addition of PRF in guided bone regeneration showed clinical benefits and improved surgery outcomes. In GBR, PRF liquid and membrane clinically enhanced the handling of bone particles with sticky bone and soft tissue management; the application of biologics also reduced post-operative ecchymosis and maintenance of incision line closure.

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