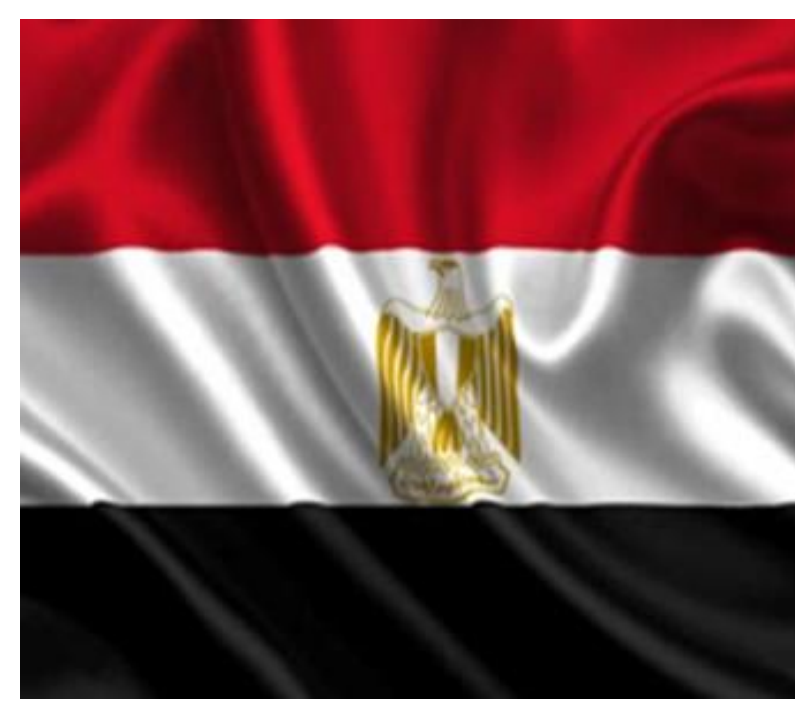
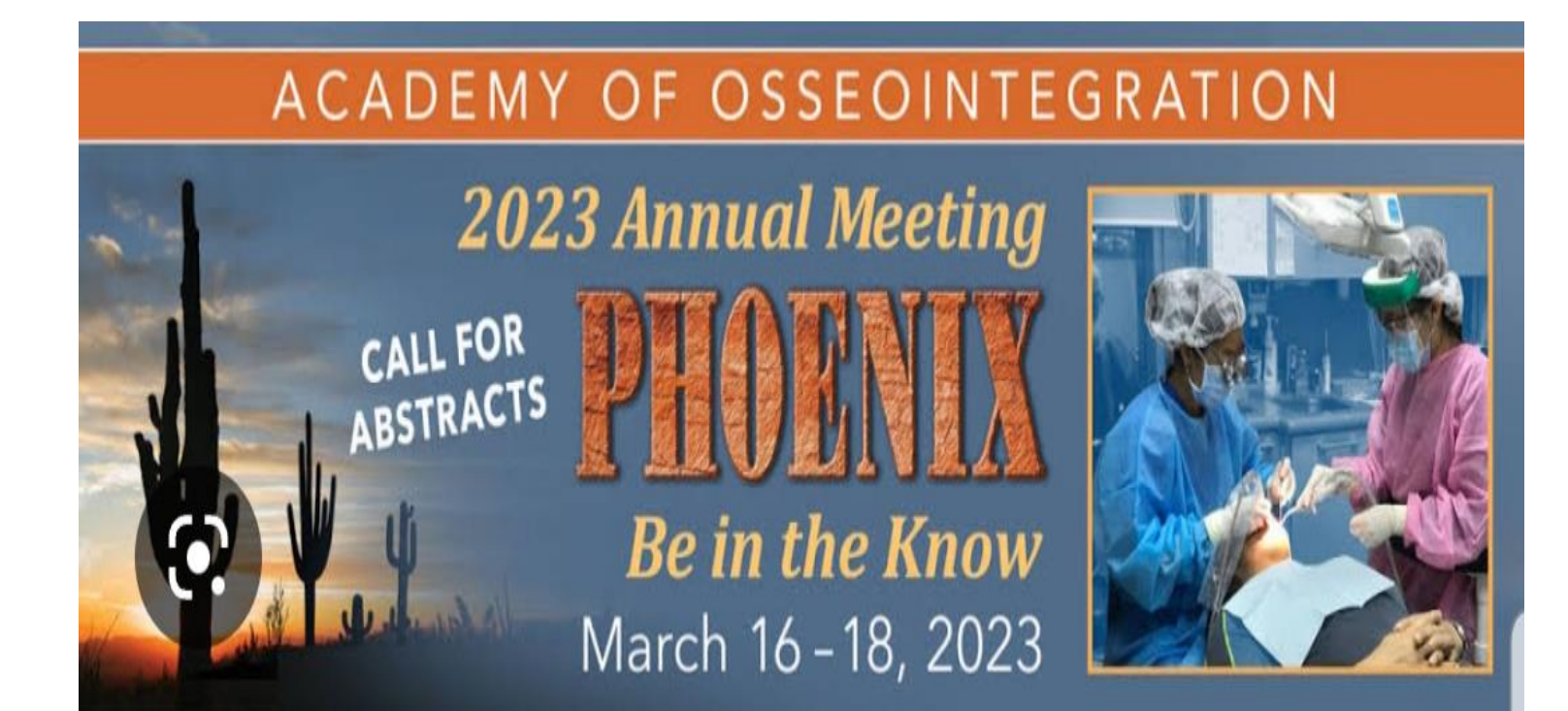




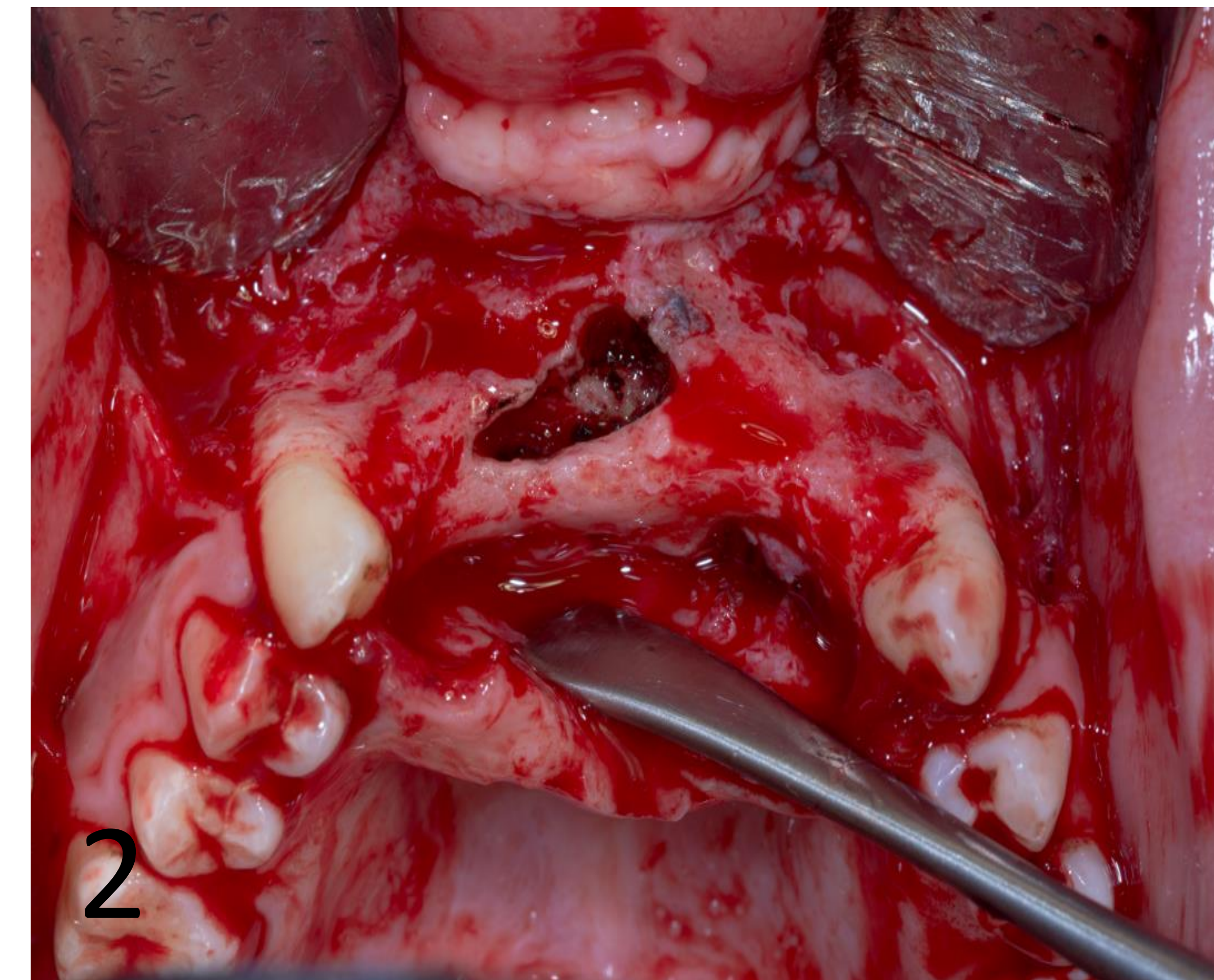
Assessment of Bone Quality Using Buccal And Palatal Cortical Autogenous Shells Harvested From Different Donor Sites For Horizontal Maxillary Alveolar ridge Augmentation: A Histomorphometric Study

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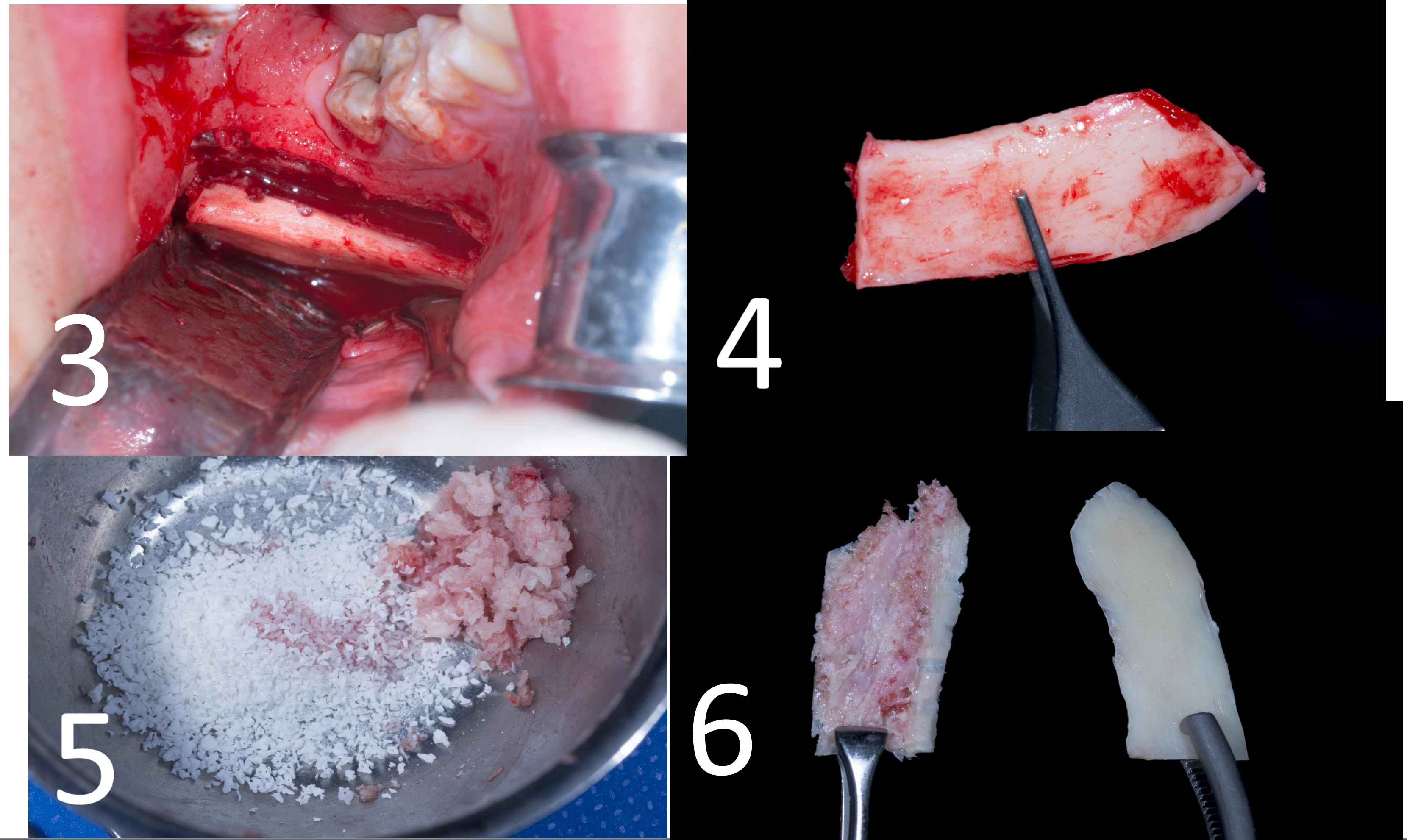
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Introduction: There are Different causes of maxillary alveolar ridge atrophy such as trauma, infection and bone pathology .treatment always requires multiple surgeries with prolonged time ,cost and donor site morbidity. Several bony reconstructive procedures have been proposed to augment severely atrophic maxilla Cortical shell- block autogenous bone grafting is a technique that could be used to reconstruct deficient ridges The aim of the study is To compare the quantity and quality of bone gained using autografts as an onlay shells harvested from three different donor sites for horizontally deficient maxillary ridges.



Figures 1,2: severely atrophied anterior maxilla

Methods: 12 Patients were included with atrophic maxilla with residual bone thickness ranging from 1 to 3mm. 4 Chin, 4 rami and 4 iliac cortical shells were harvested, each graft was sagittally splitted into 2 parts using carbide discs for all patients, and each block was fixed with mini screws one for the buccal side of the ridge and the other on the palatal side. The inter positional gaps between the native ridge and both cortical shells was filled with particulate mix of xeno and auto particulate grafts. Immediate post operative and 6 months CBCT were taken to assess the developed thickness radio graphically. core biopsies were retrieved from the implant sites and Histomorphometric bone area percent were assessed from all the operated sites.



Case 1: fig3-6 ramal block harvesting then autogenous particulate bone mixed with xenograft (1:1). Then block splitted using micro discs

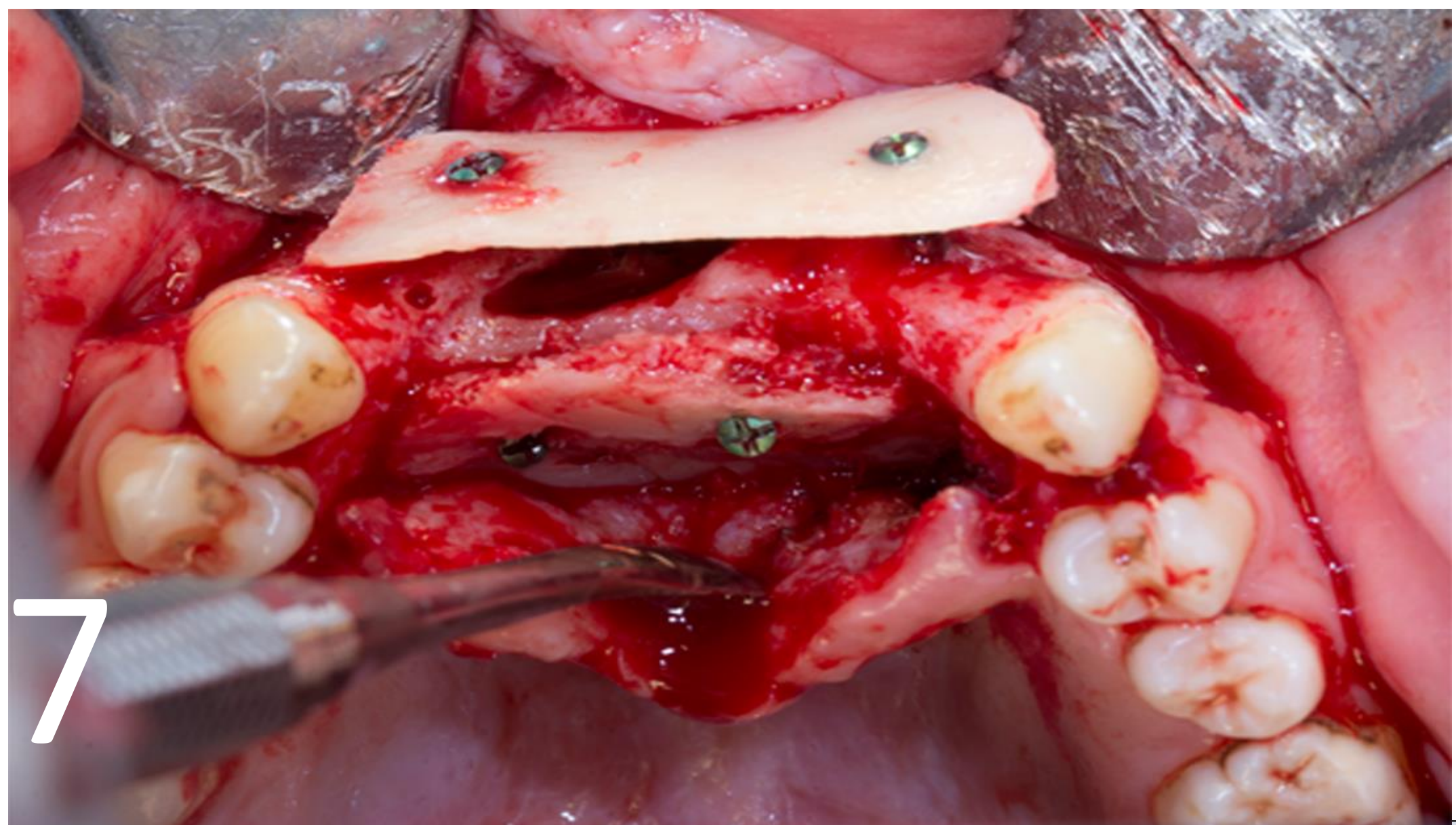
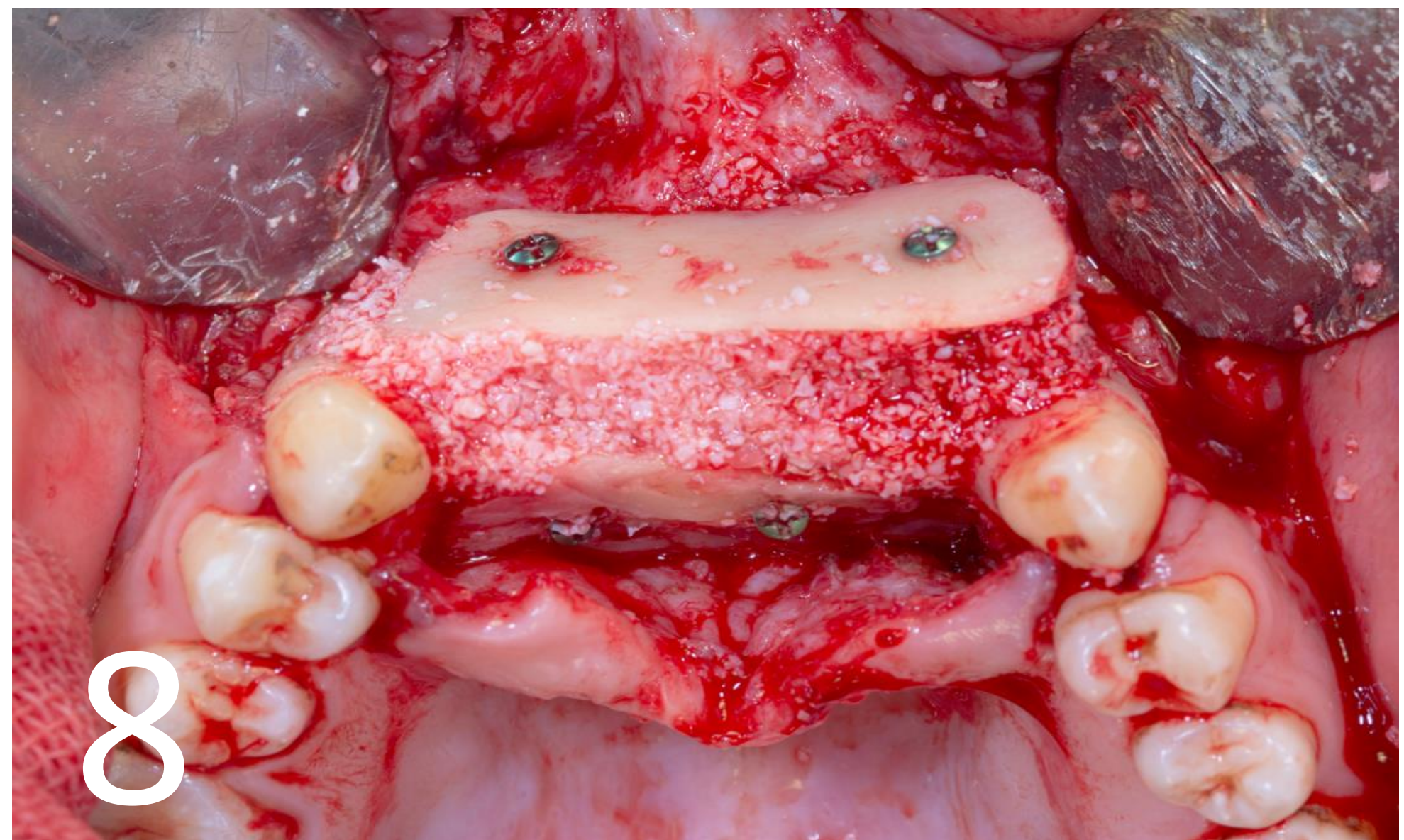


Fig 7,8: buccal and palatal cortical shell fixation each with 2 mini screws with interpositional mix of particulate graft

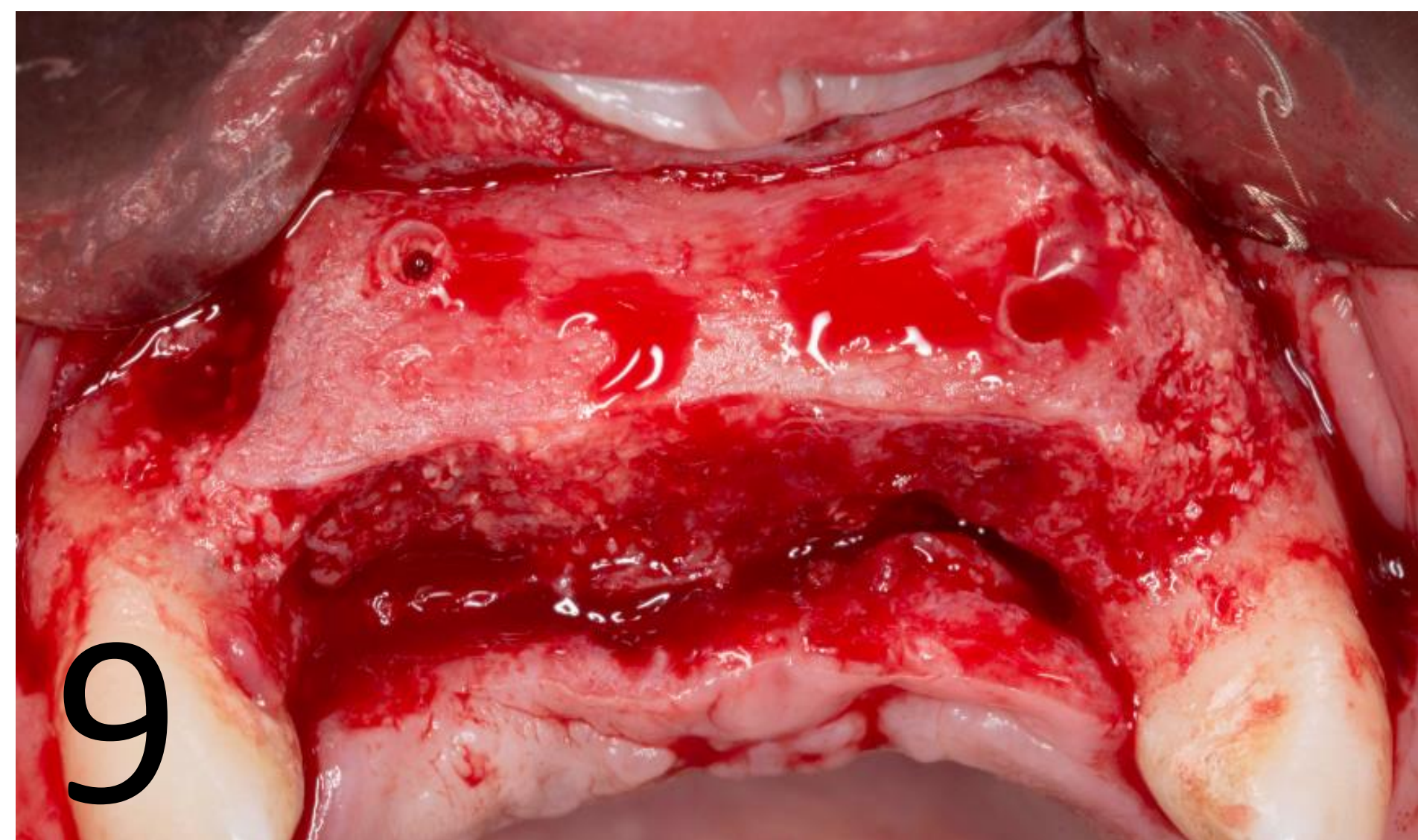
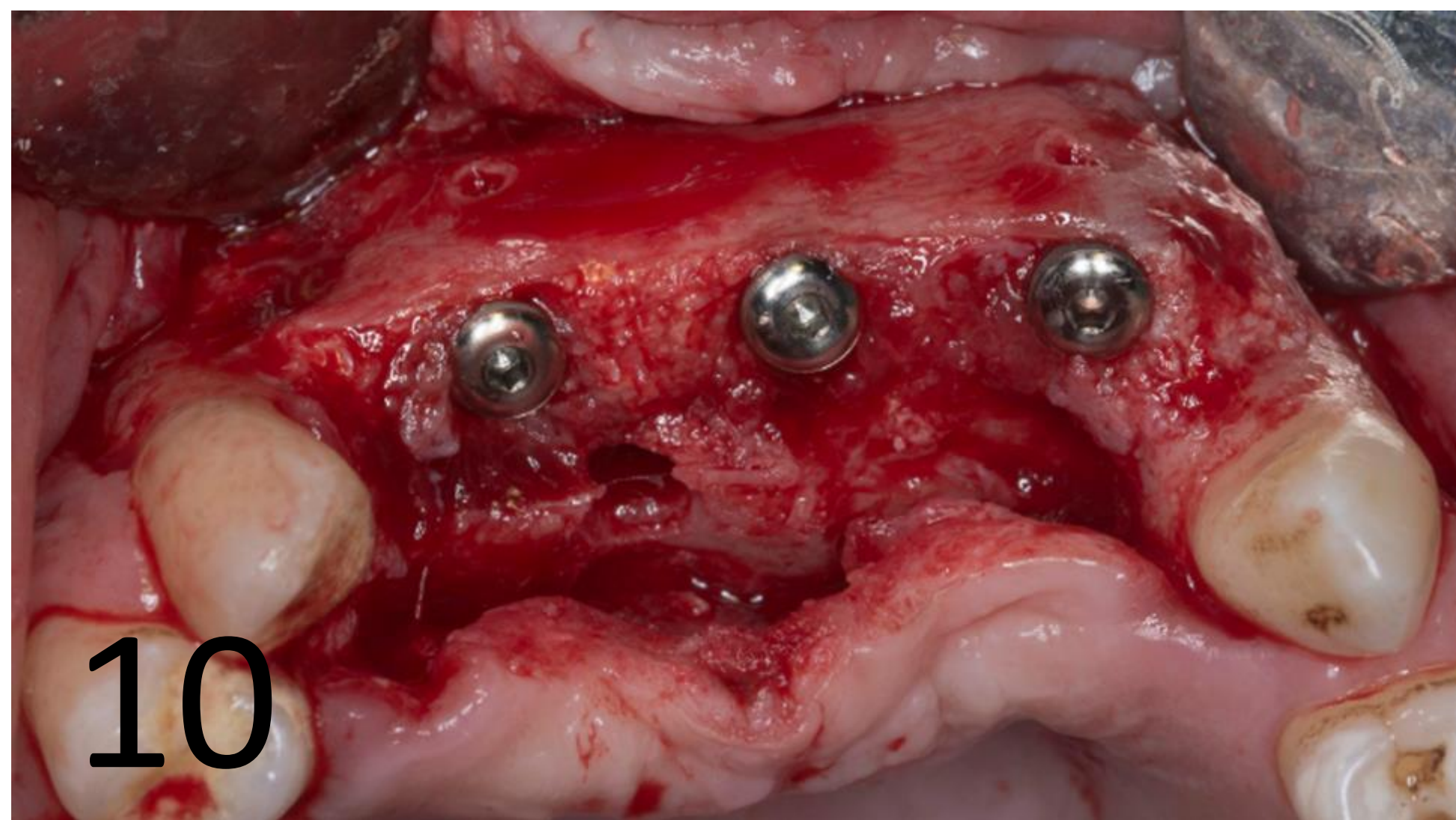


Fig 9,10: second stage surgery 6 months postop. And dental implant placement

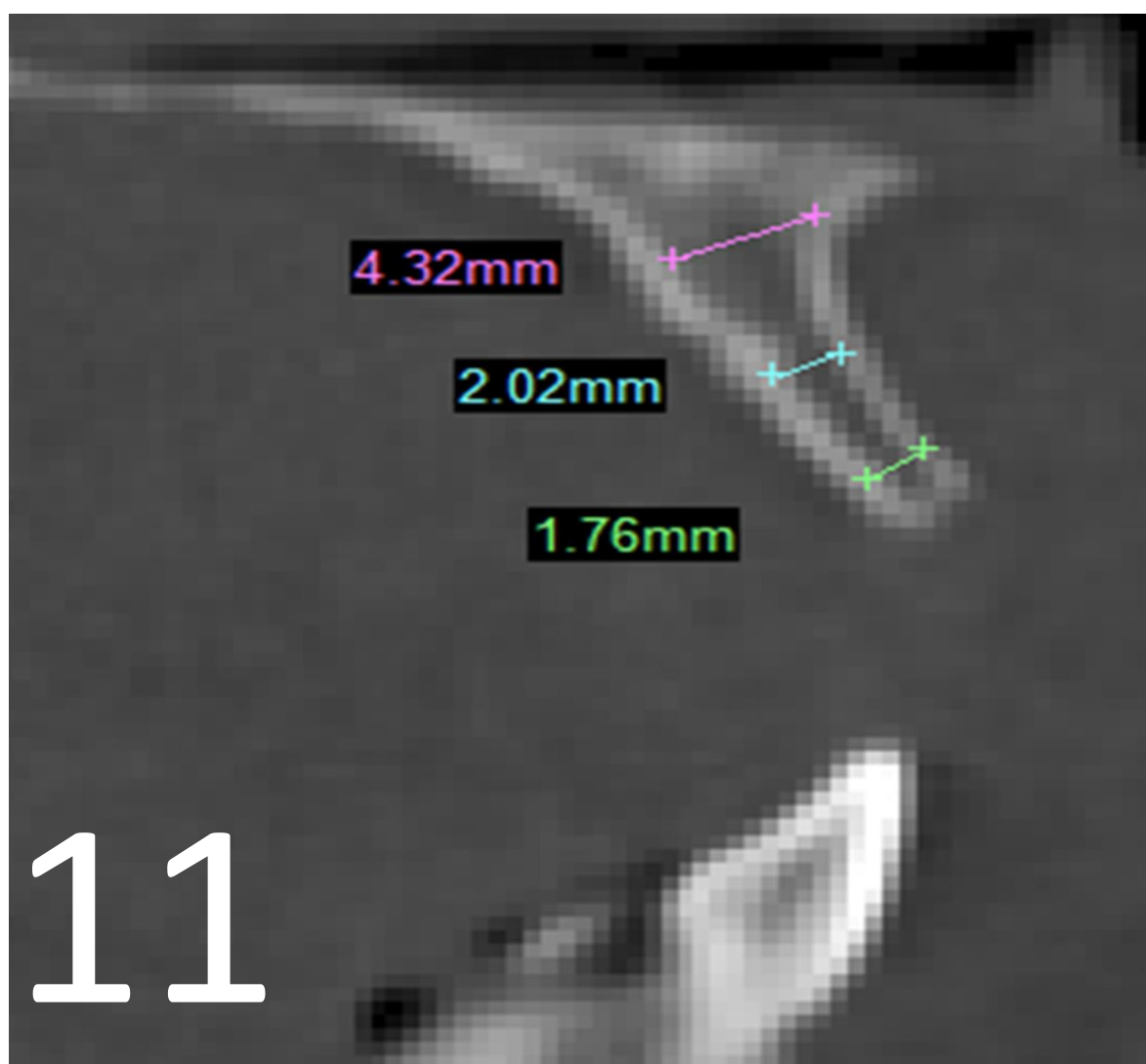
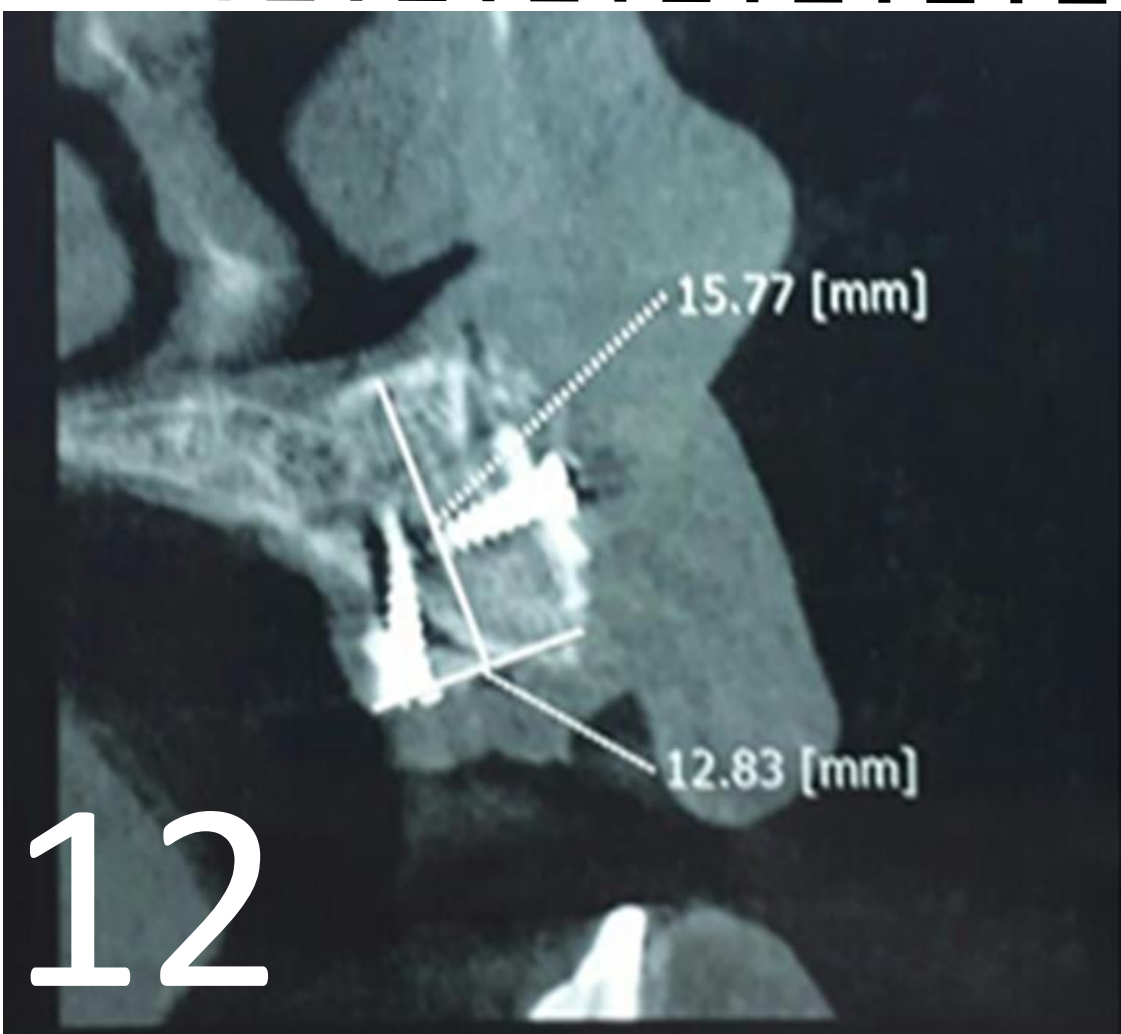


Fig 11,12: cross sectional views of a CBCT (pre and postop)

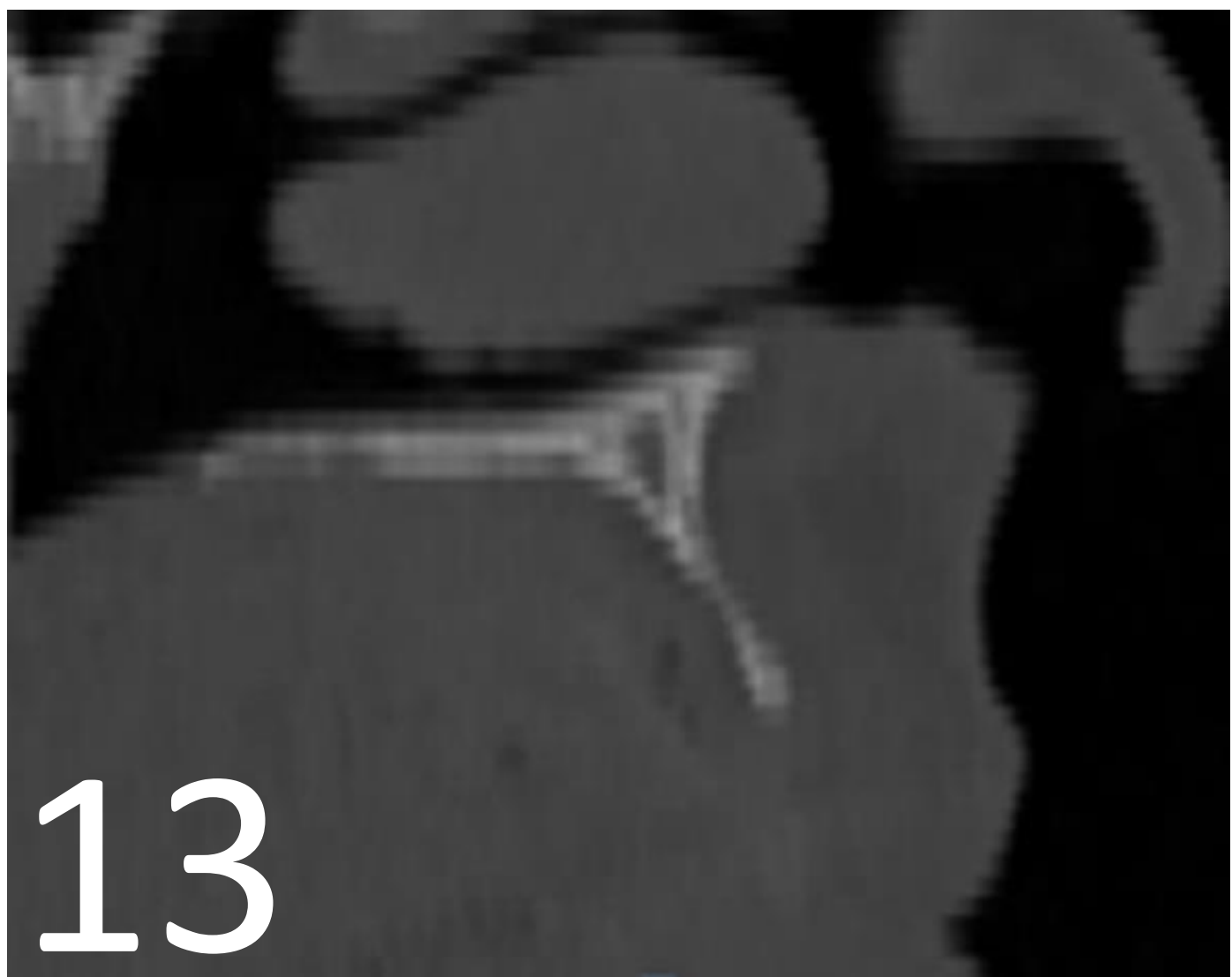
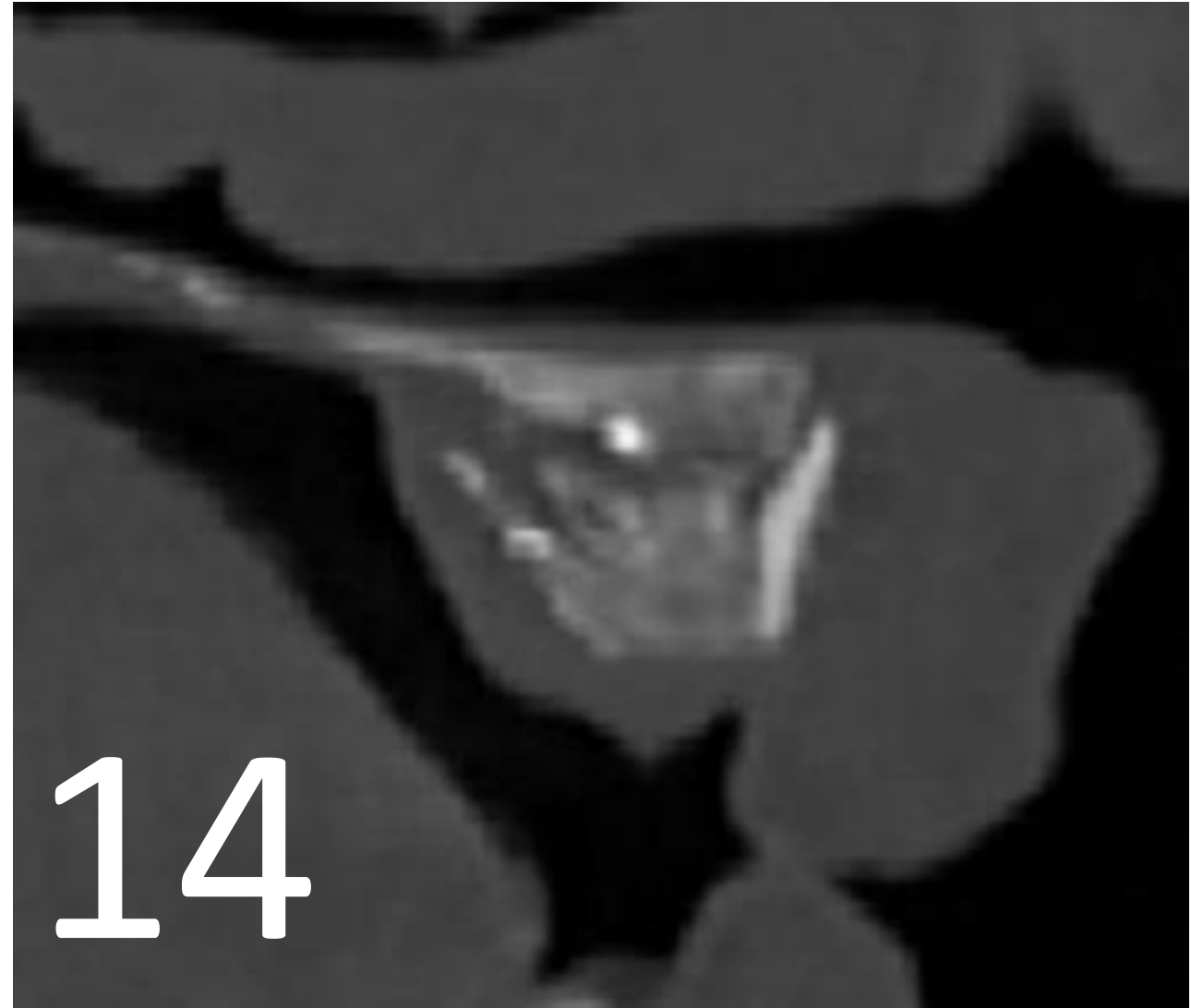


Fig 13,14 : cross sectional views of a CBCT (pre and postop)

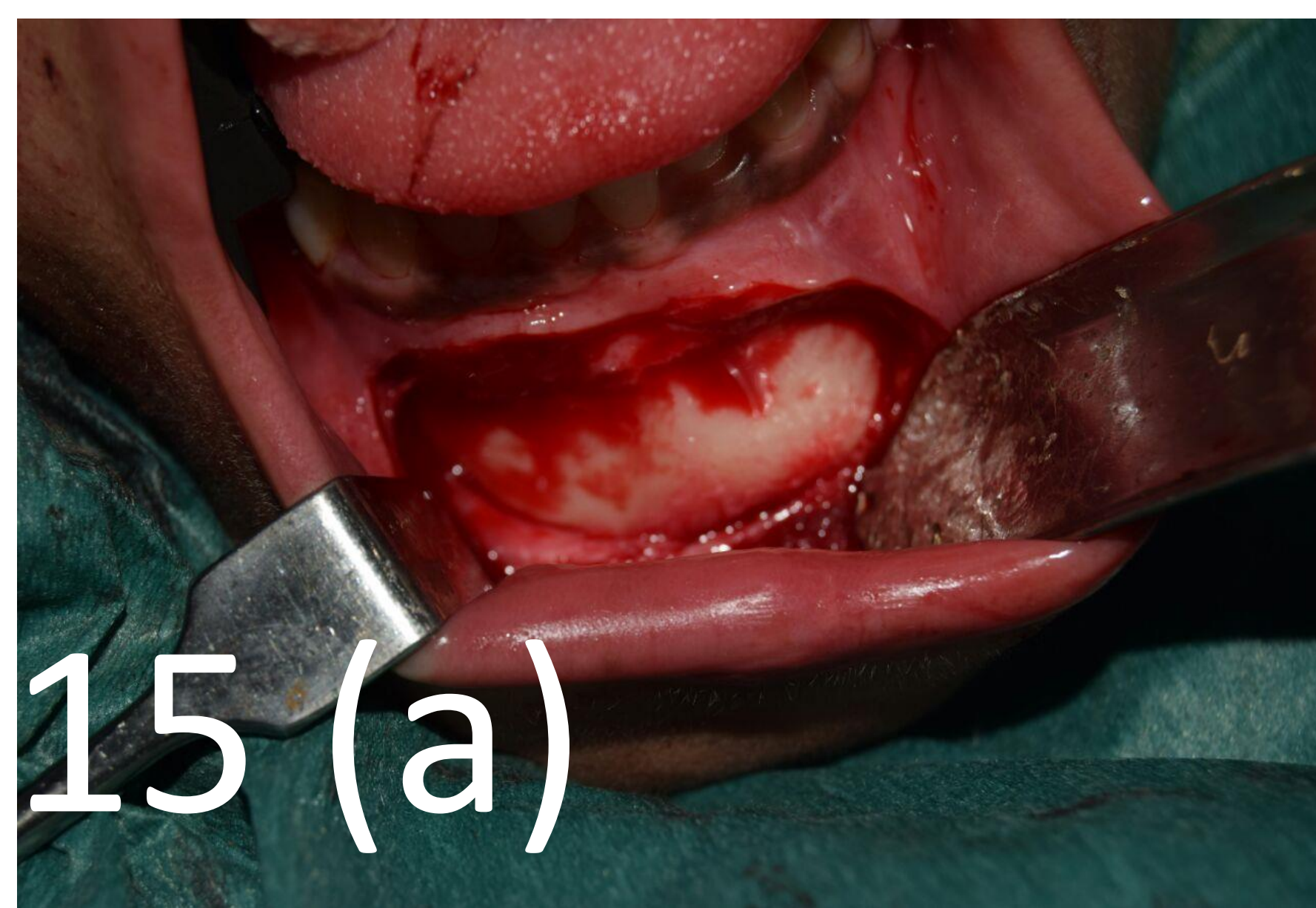
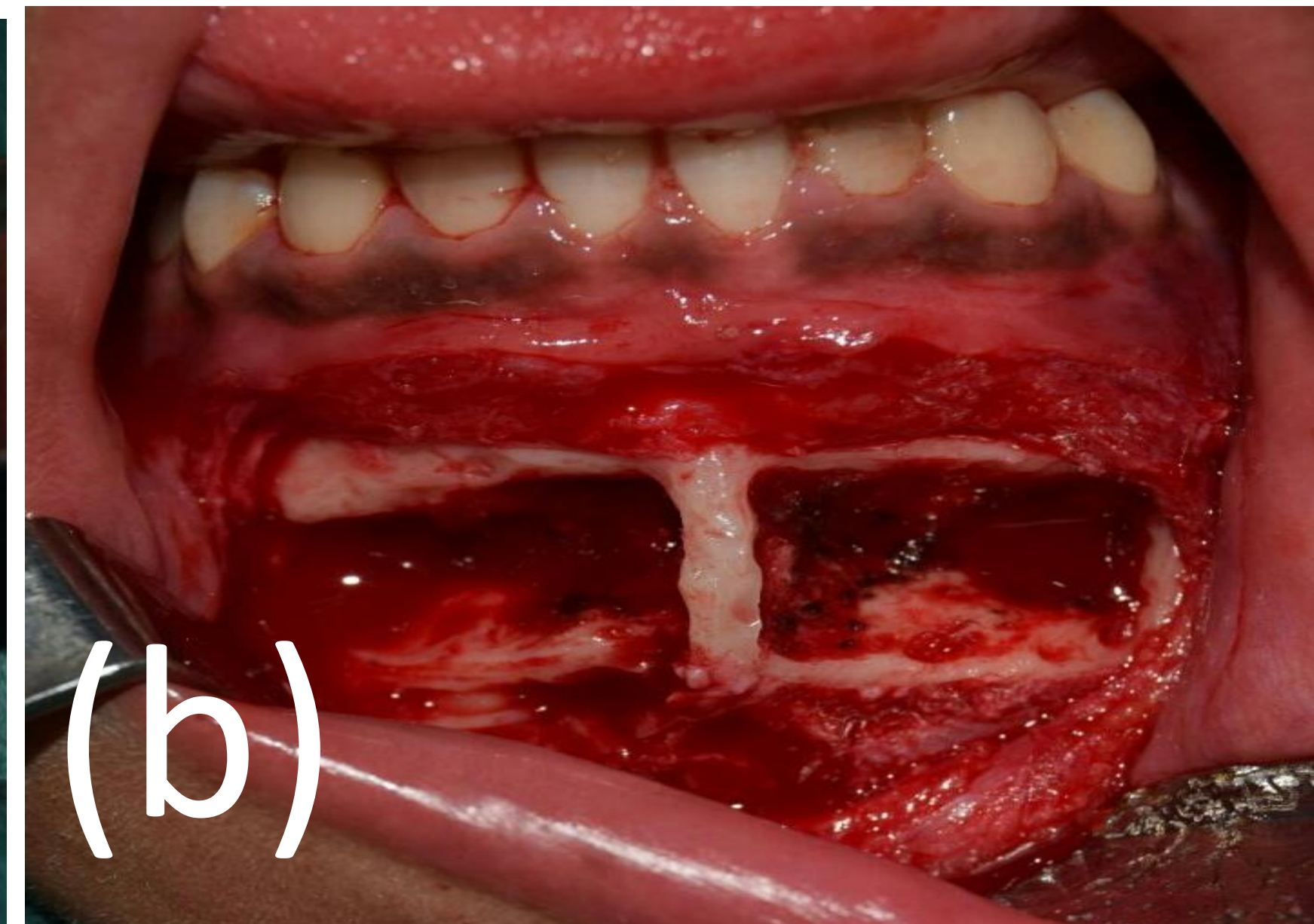


Fig 15 CASE 2 (a,b,c): vestibular approach cortical block harvesting from the symphysis then autogenous particulate bone mixed with xenograft (1:1).

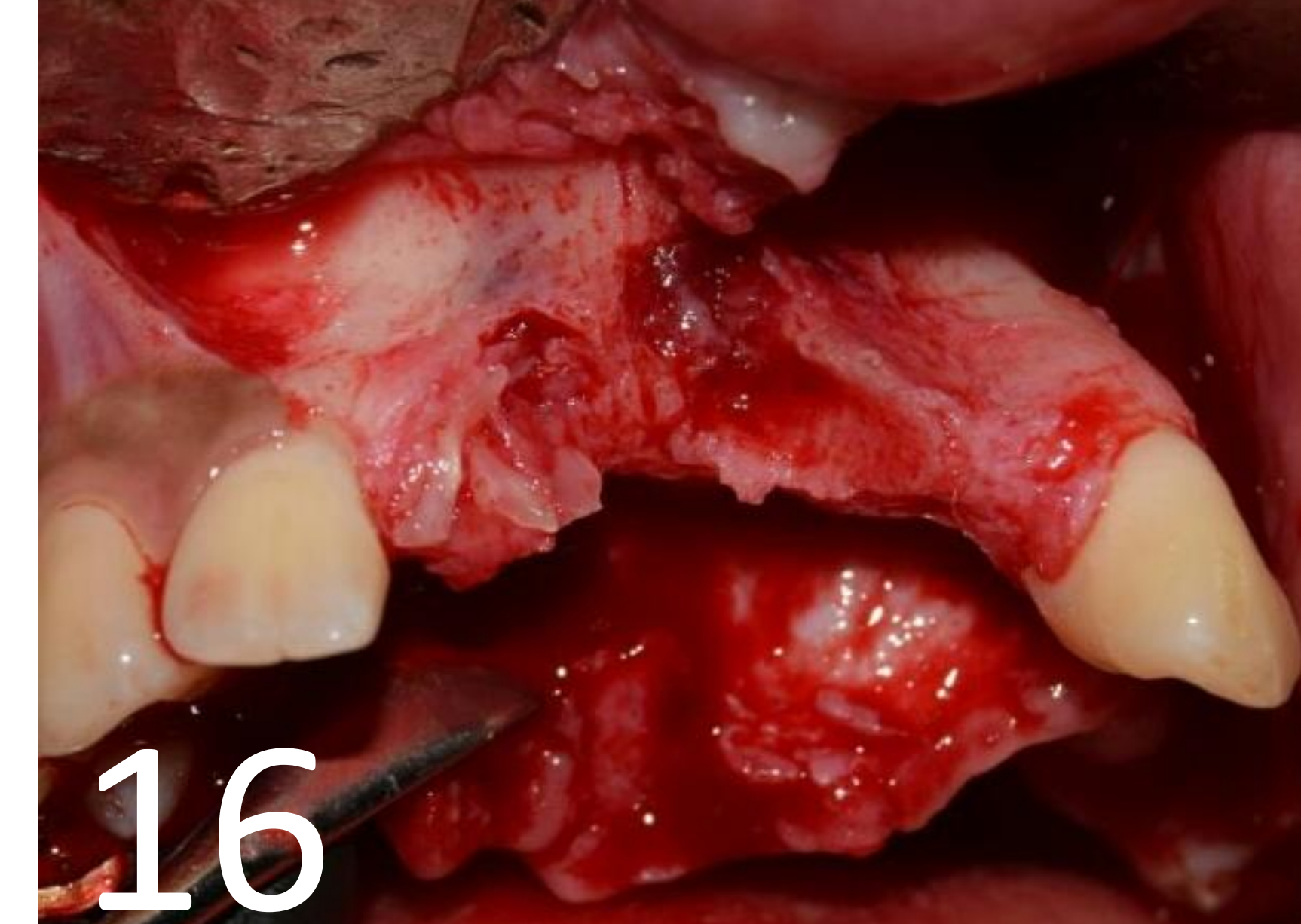
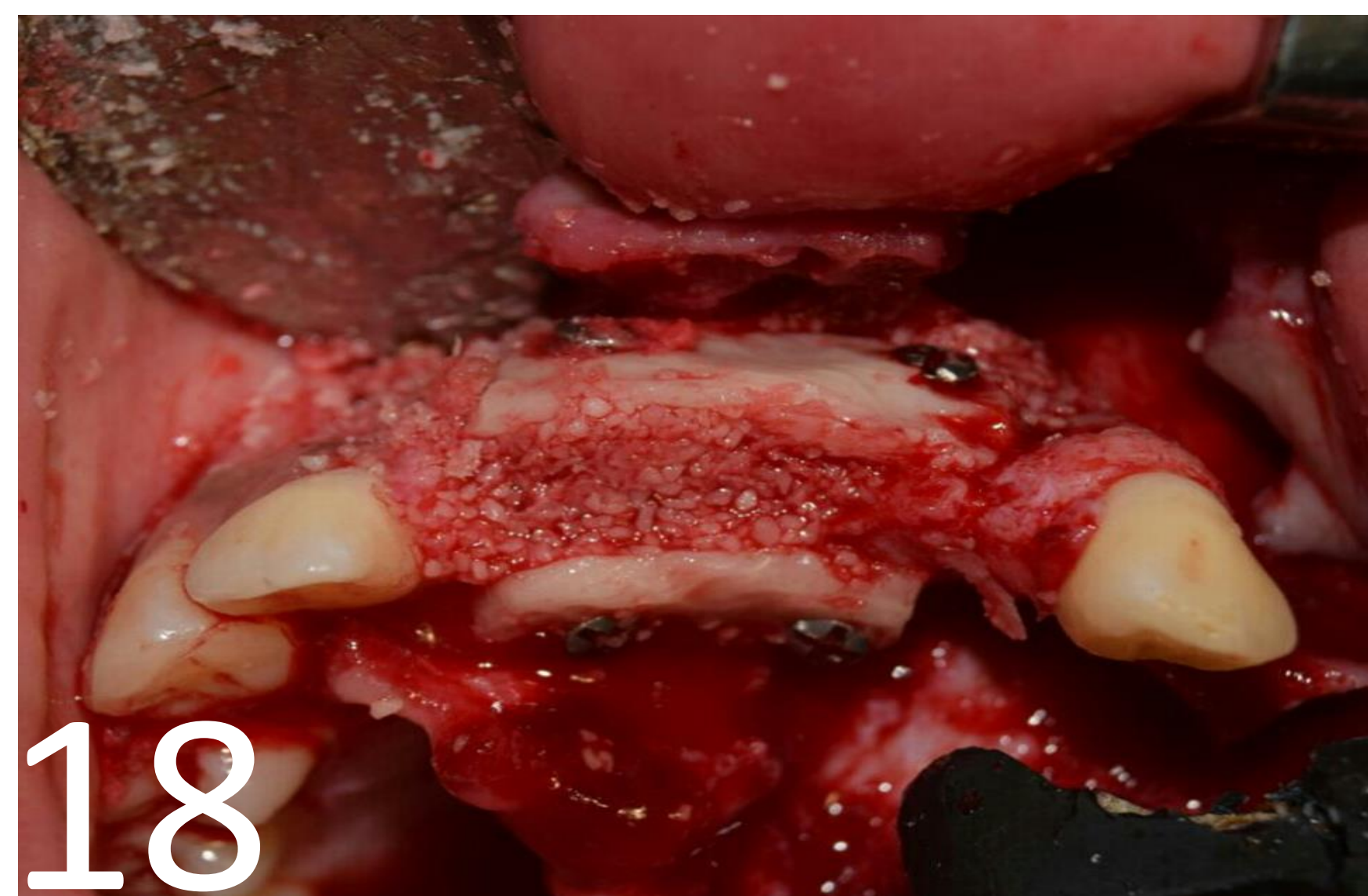
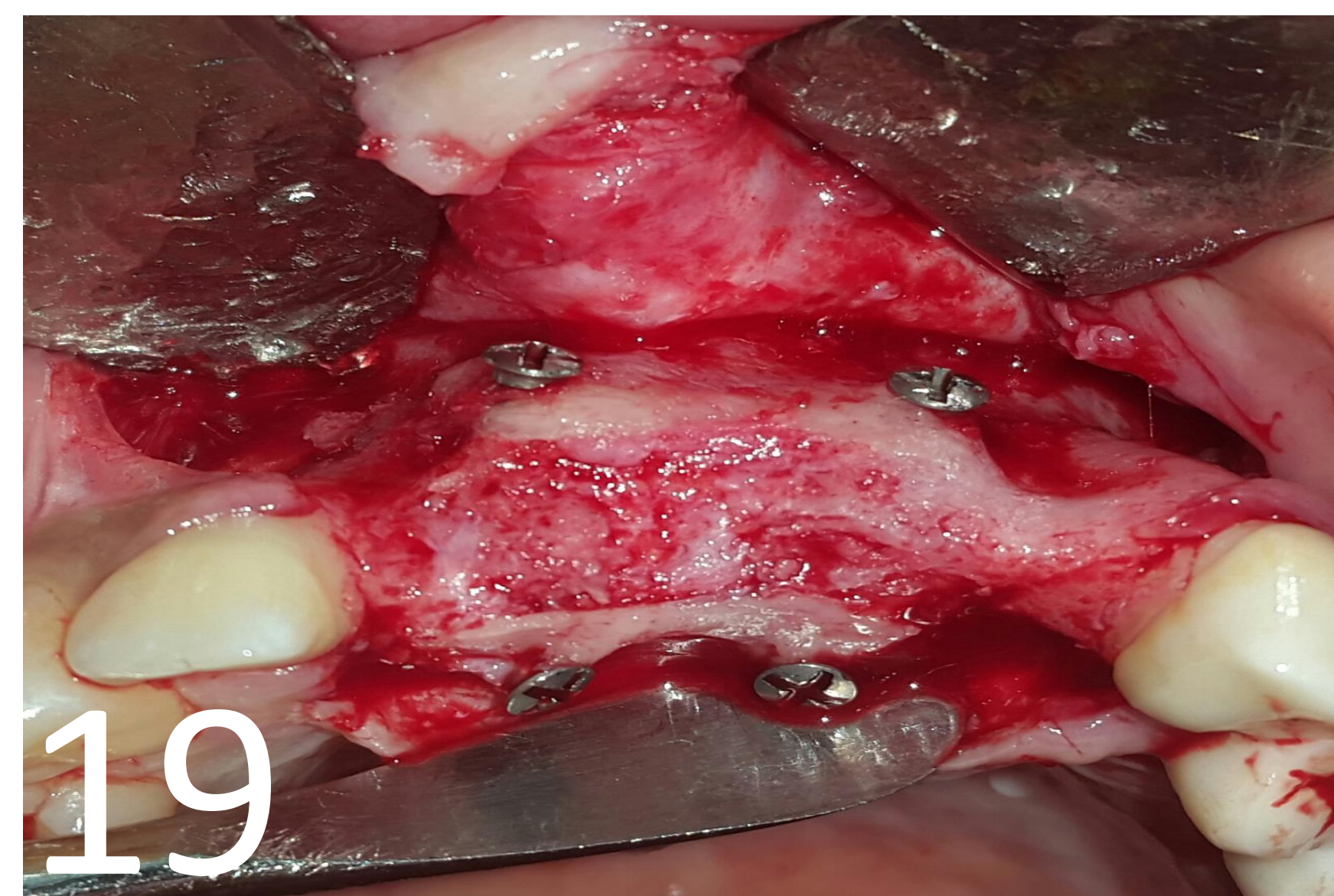
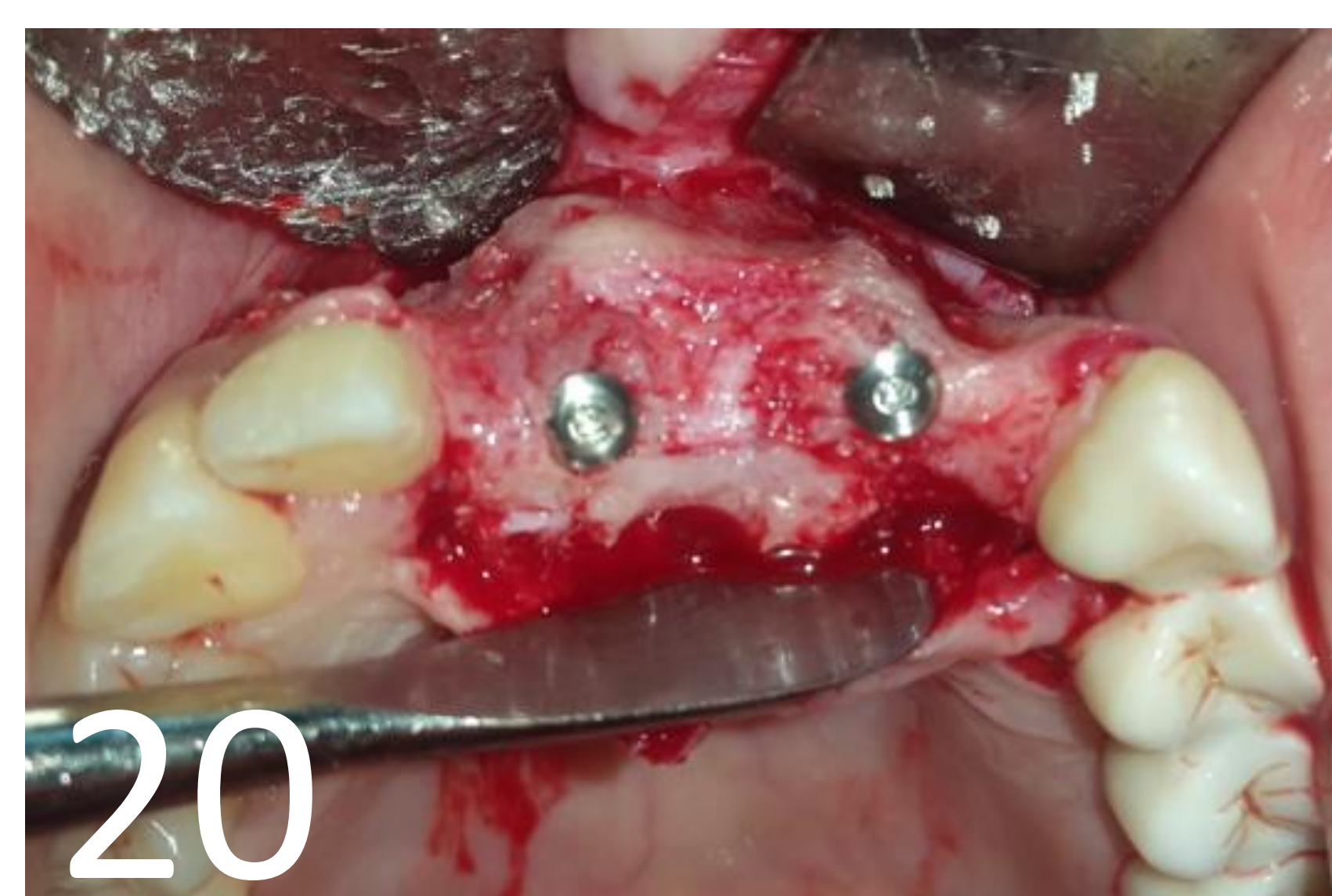
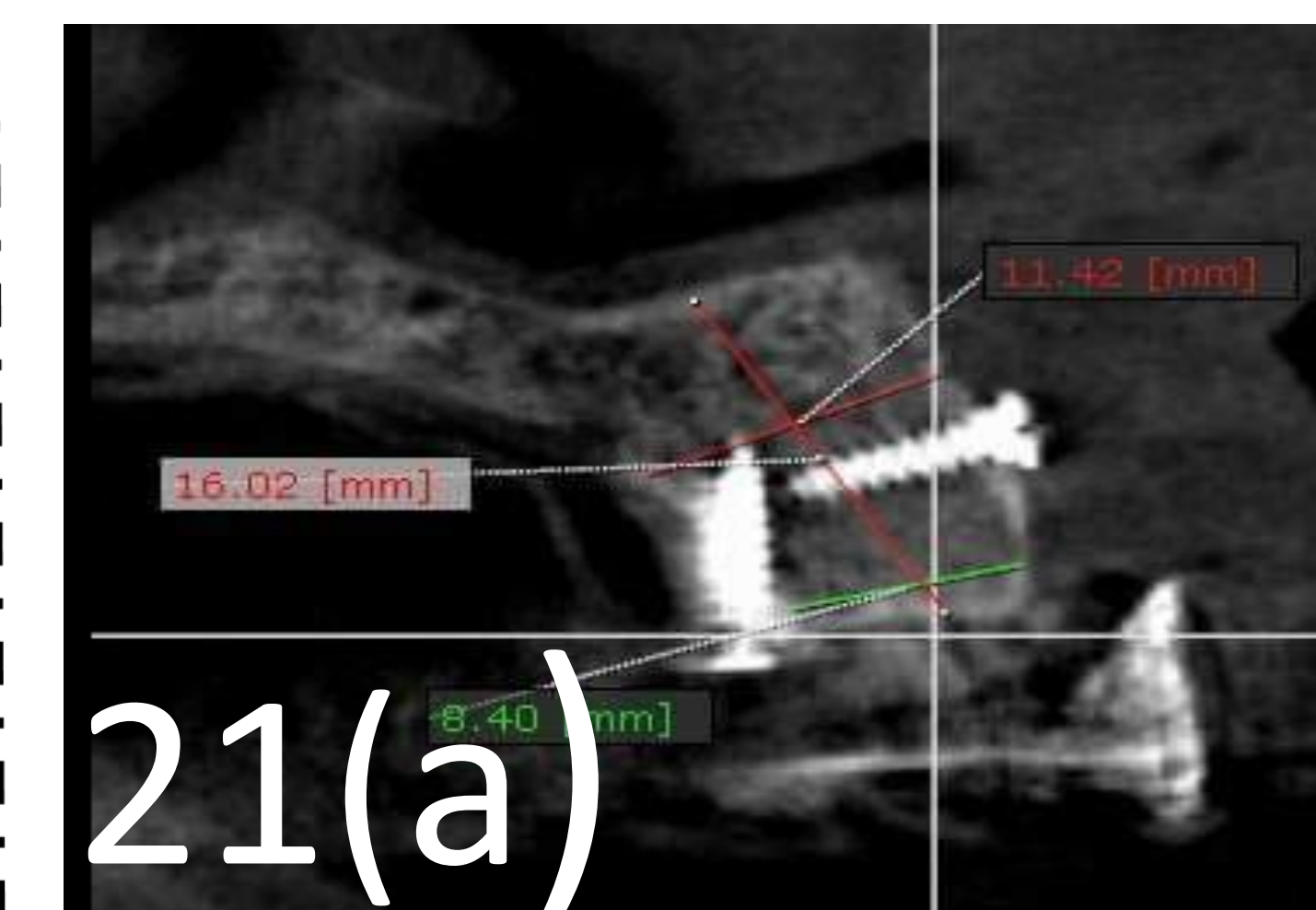
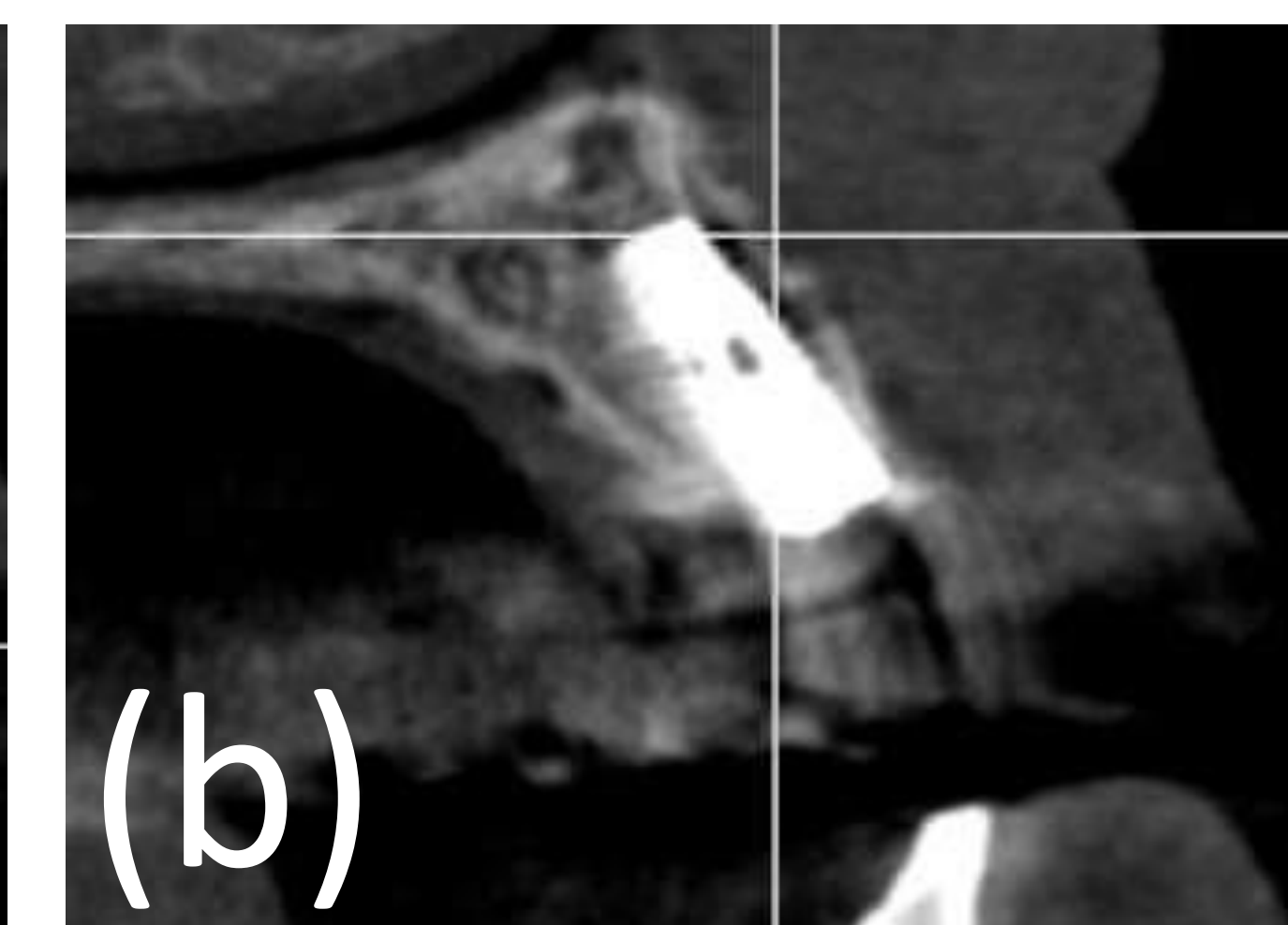
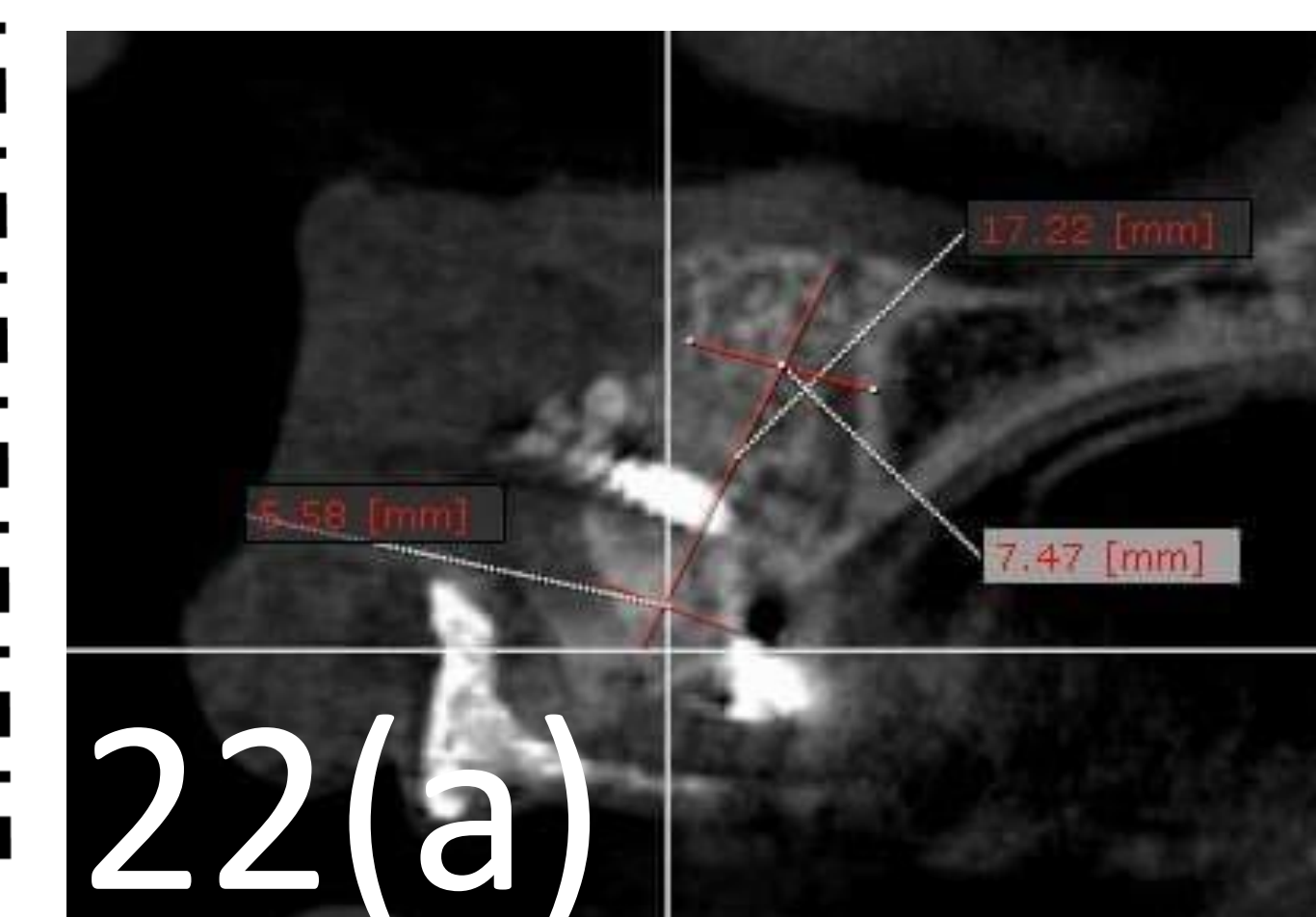
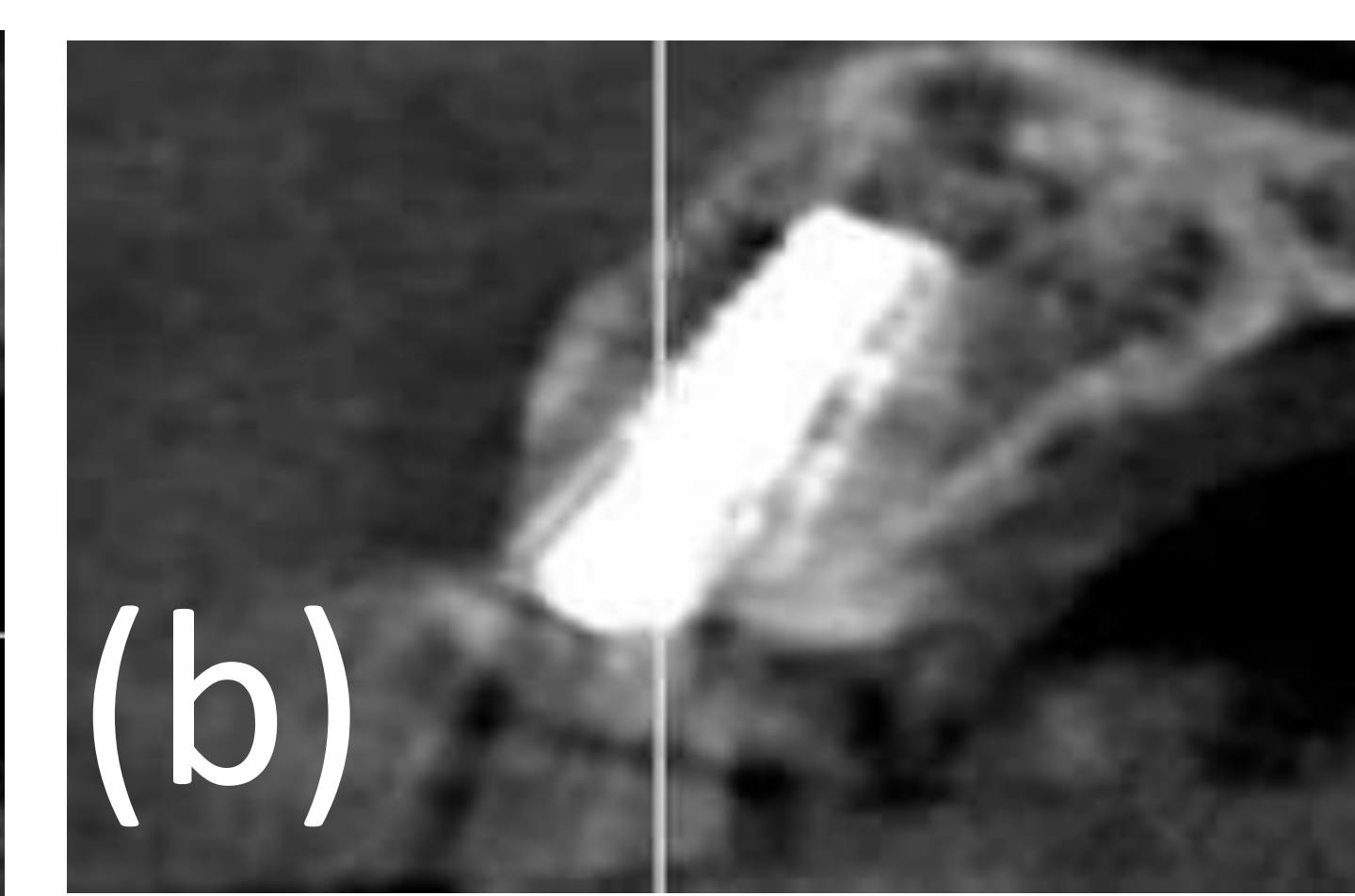


Fig 16 ,17 full thickness flap exposure showing post traumatic defect .buccal and palatal cortical chin shell fixation each with 2 mini screws

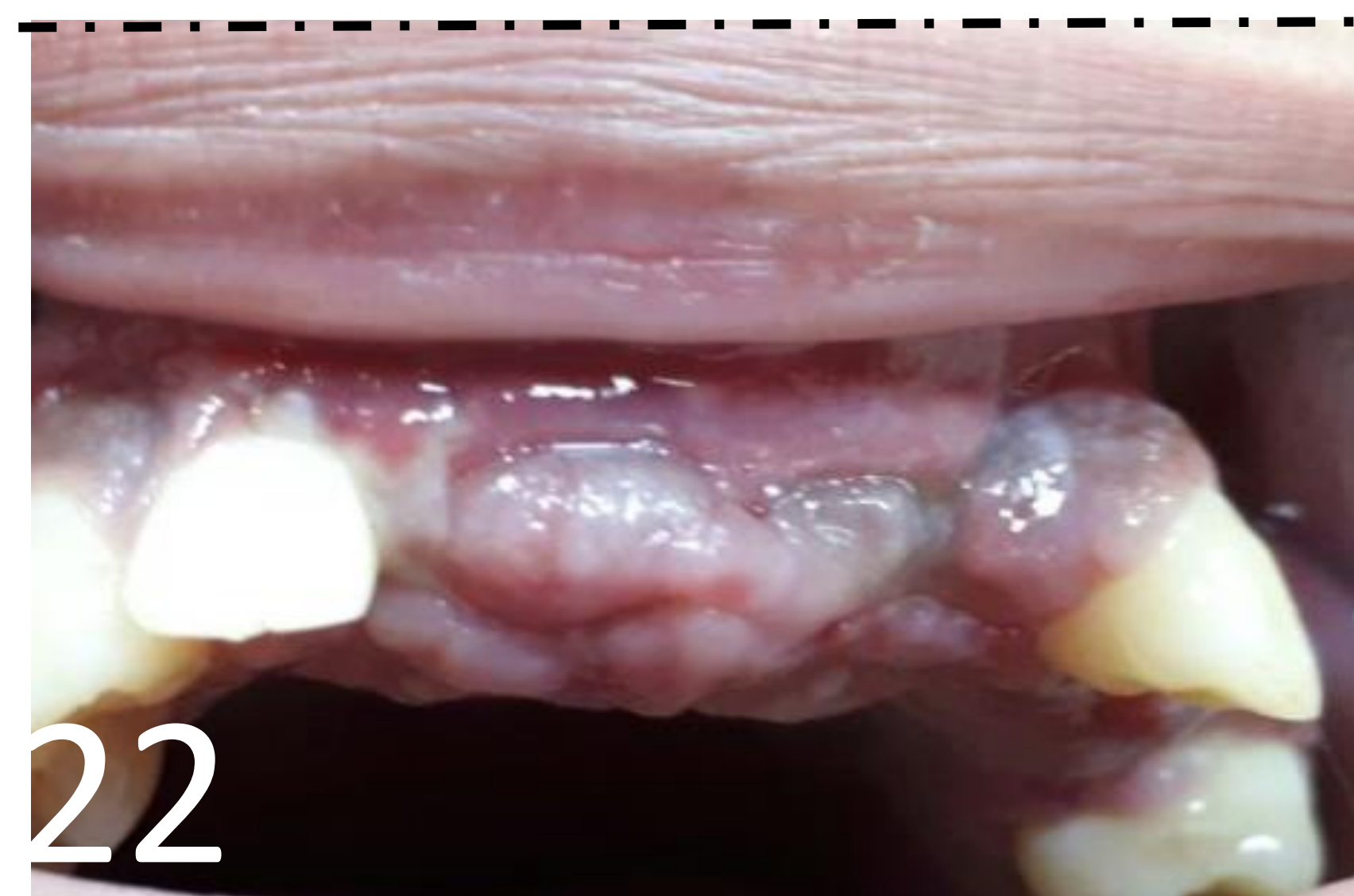


(Fig 18)buccal and palatal cortical shell fixation each with 2 mini screws with interpositional mix of particulate graft.. **(Fig 19, 20)** 6 months re- entry surgery and implant placement

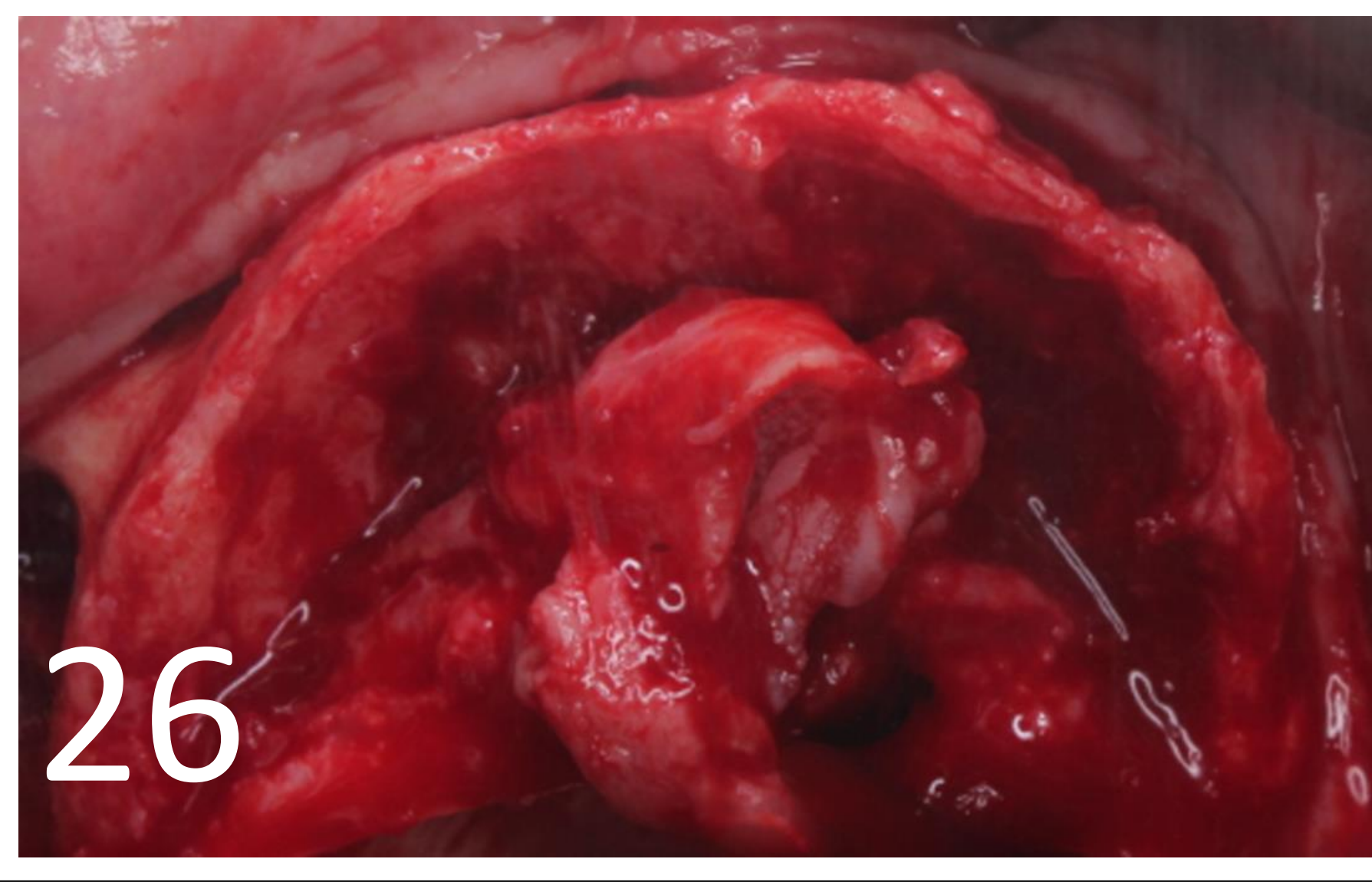
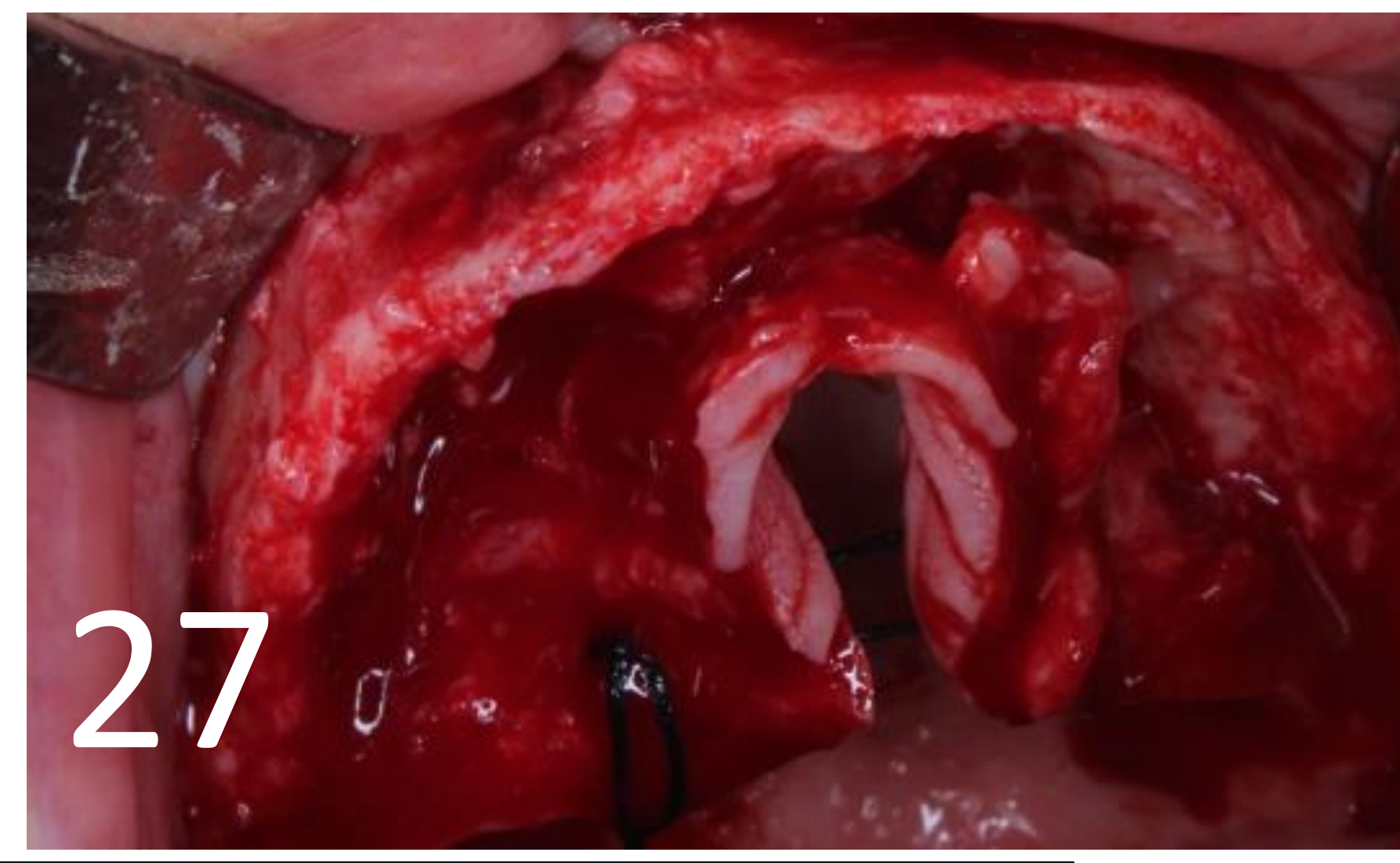


Figs 21, 22 (a,b) :postop. Cbct .

(a) immediate and **(b)** 6 months postoperative after implant placement

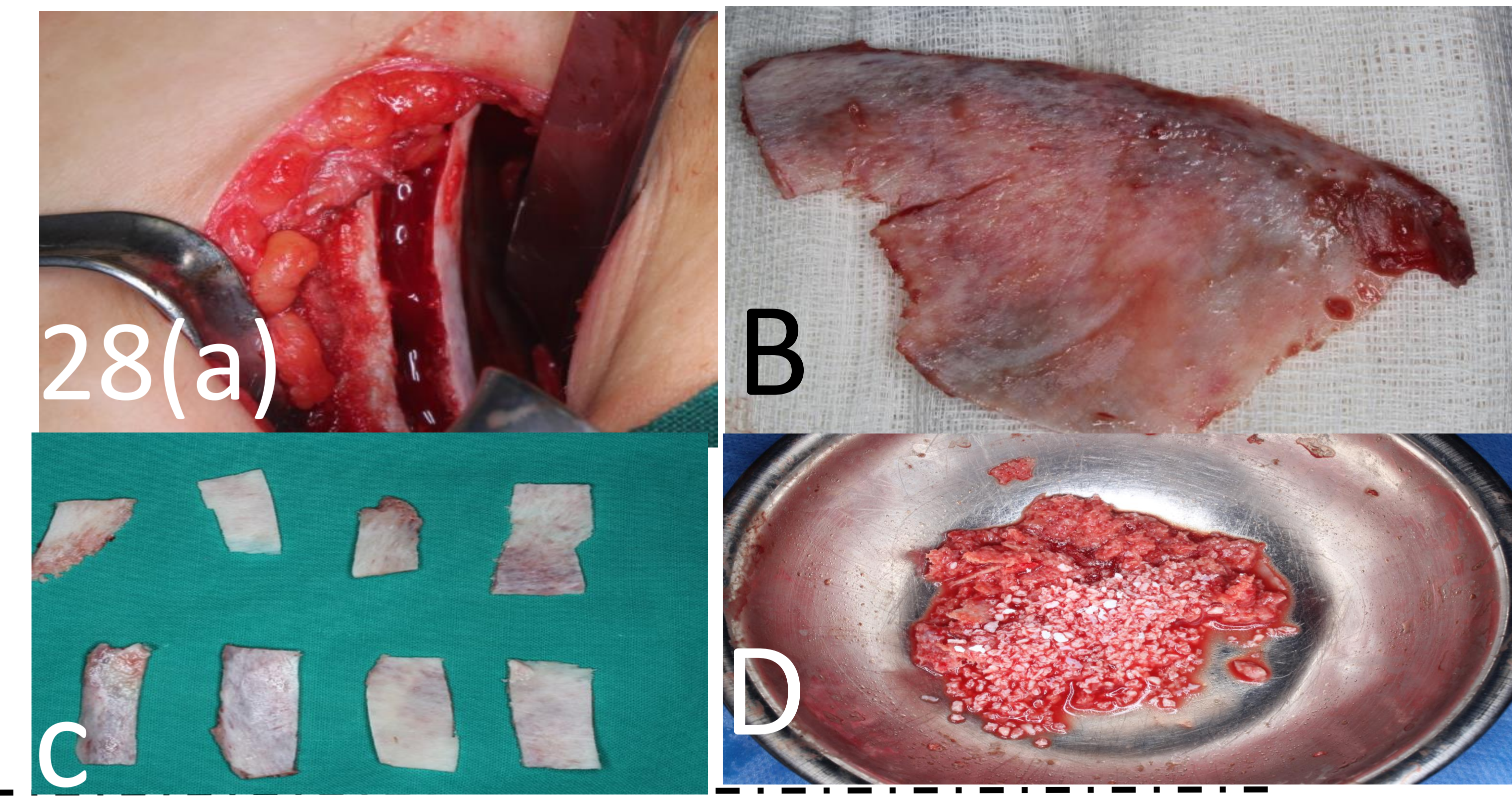
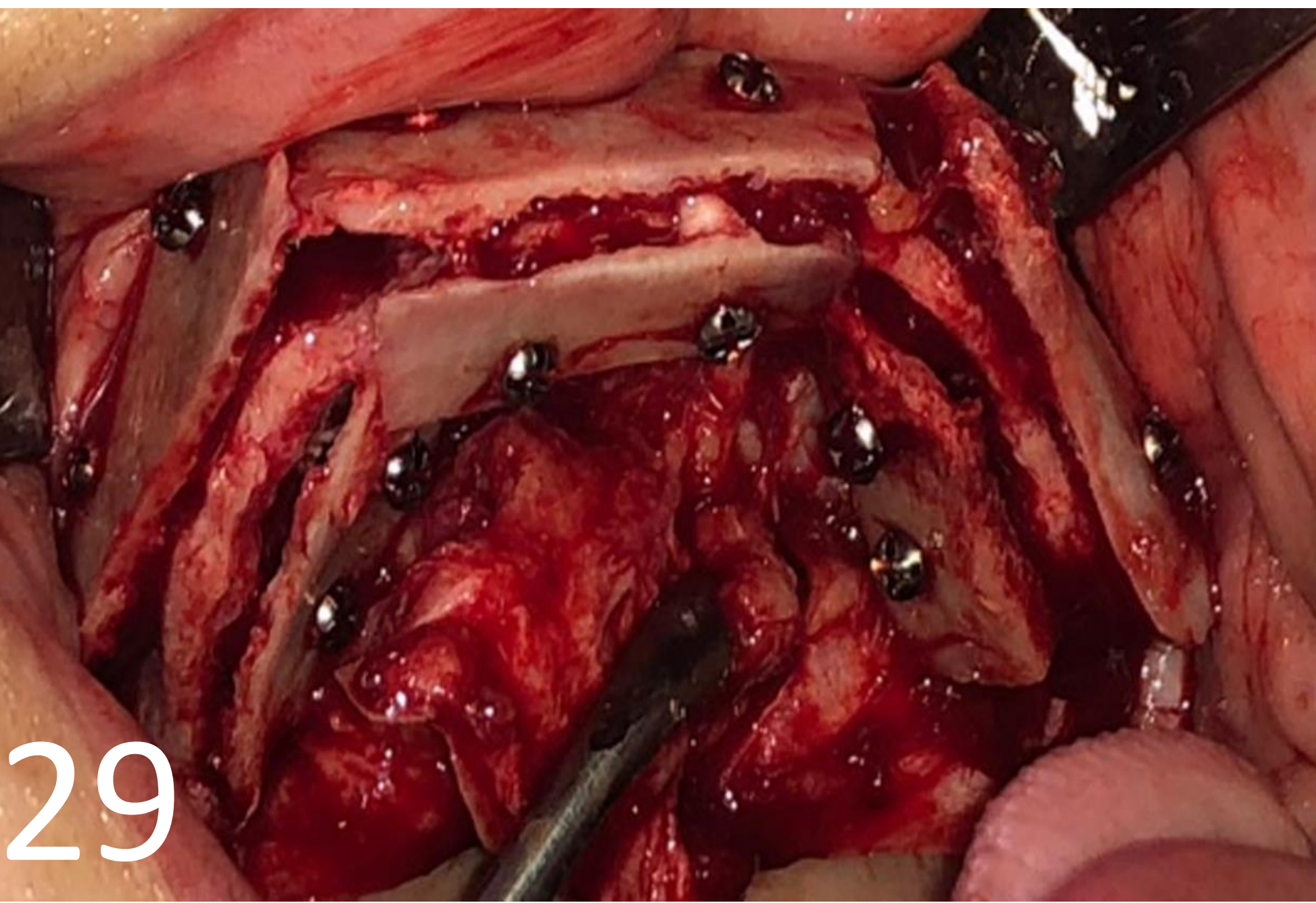
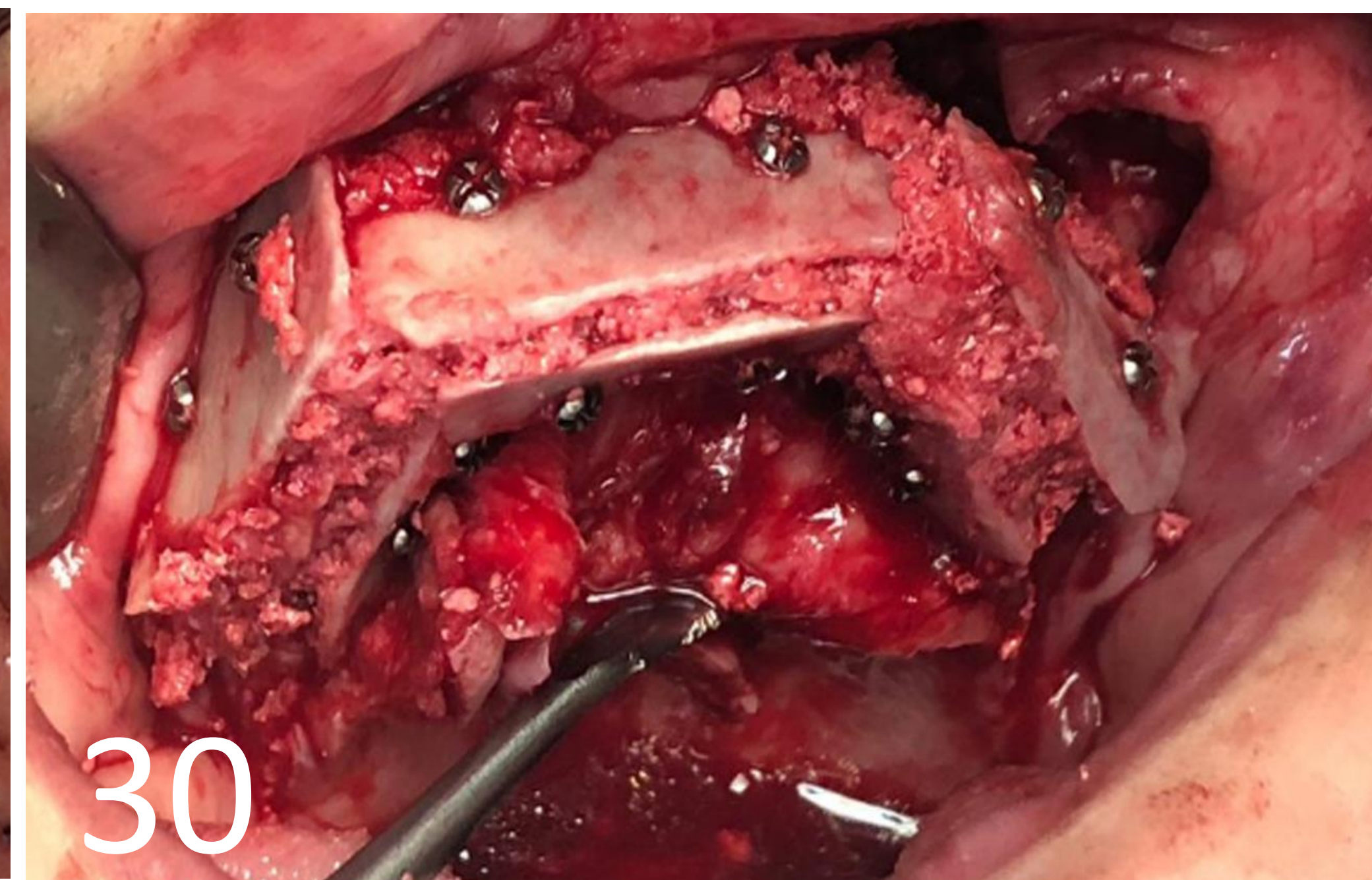


Figs 22,23,24: postoperative healing and implant placement with fixed cemented prosthesis

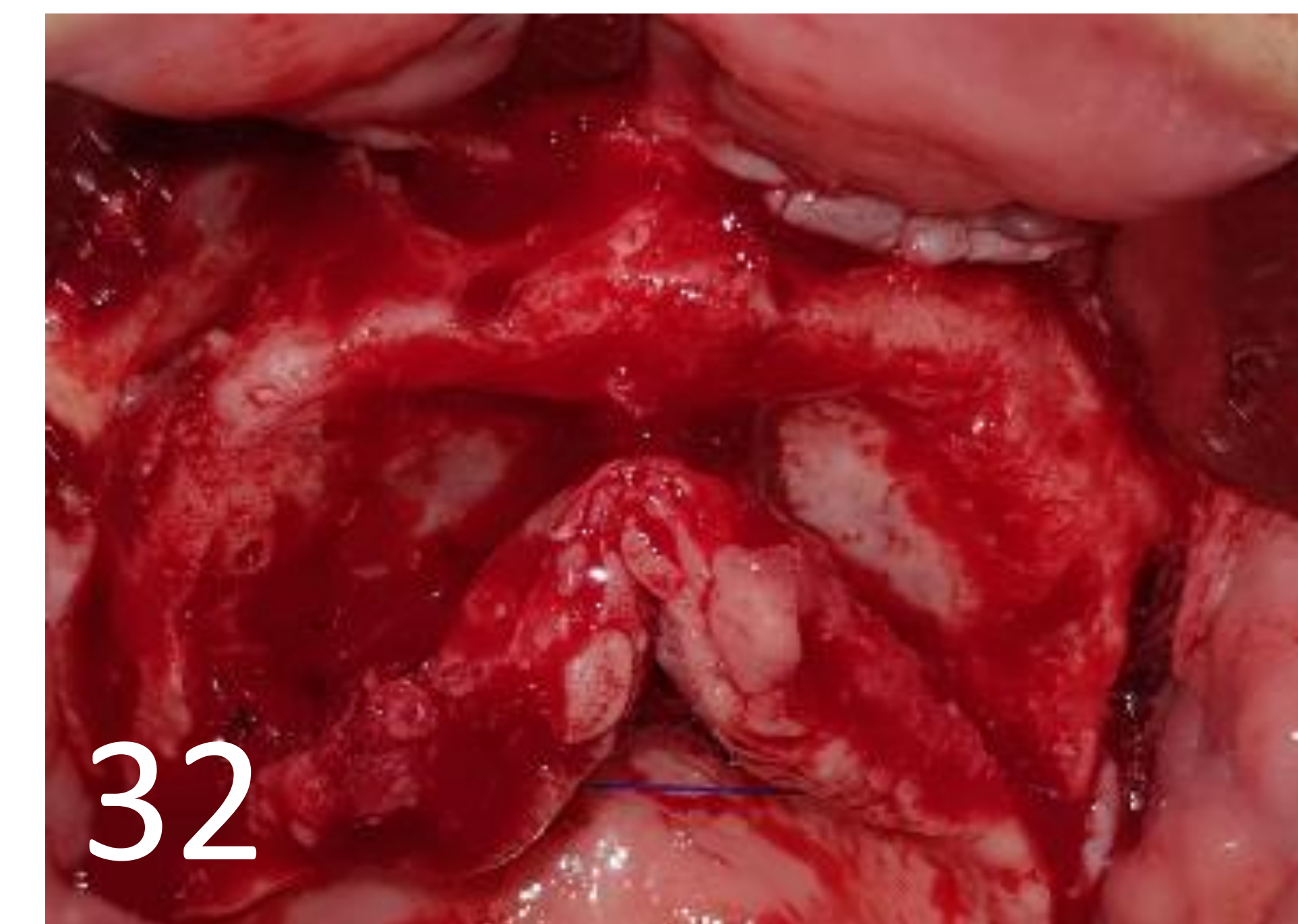
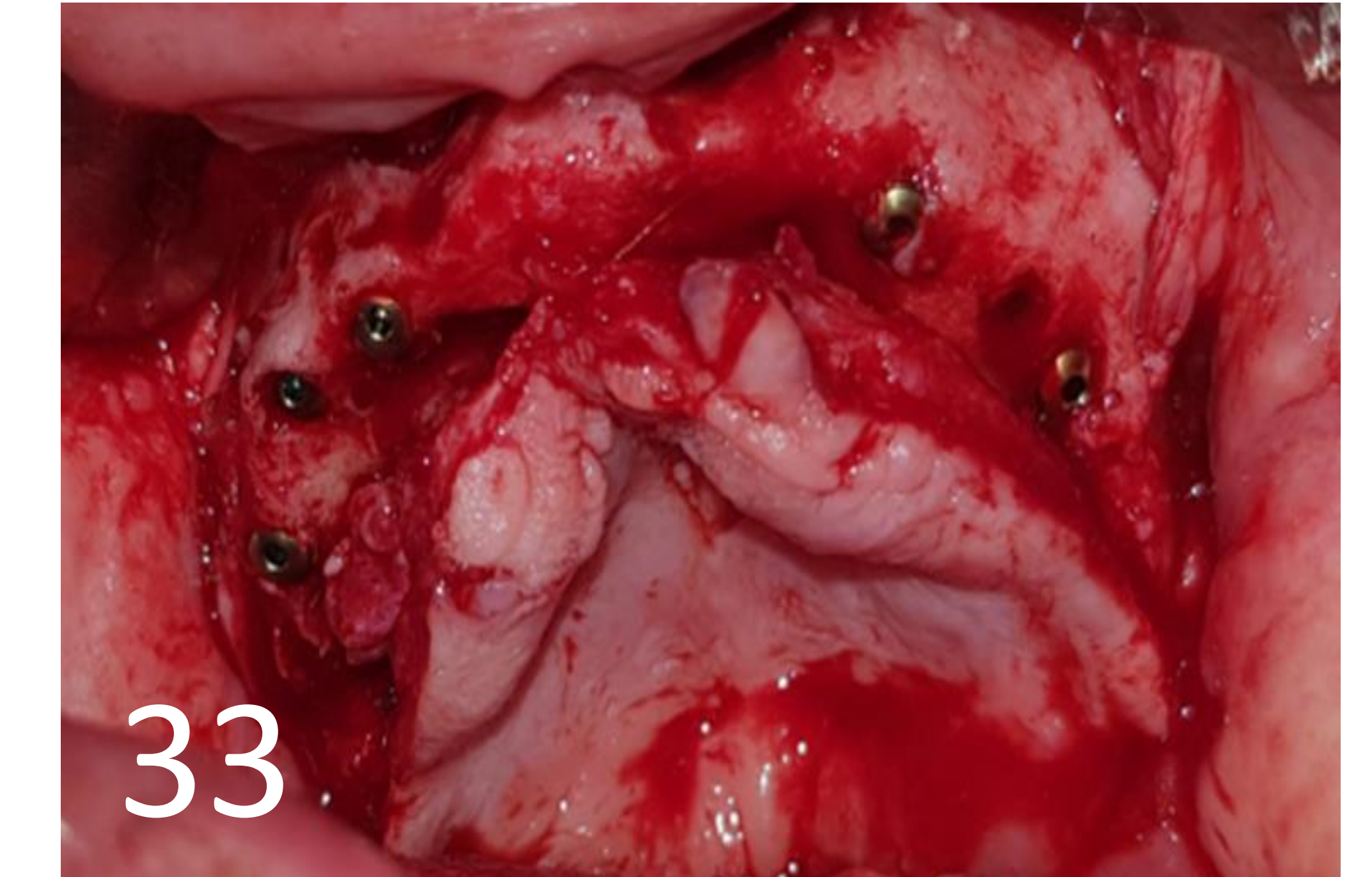


CASE 3: Figures 25-27: full thickness flap elevation showing severe full maxillary arch resorption

Figures 28 (a,b,c,d)
Anterior iliac crest exposure then harvesting of a monocortical block that was segmented into six shells and particulate mix of auto and xeno grafts



Figures 29,30: buccal and palatal cortical shell fixation each with 2 mini screws with interpositional mix of particulate graft



Figures 31-33: Healing 6 months postoperative with full thickness exposure and implant placement

Results: The immediate postoperative healing went uneventful for all cases except for two full arch cases in iliac group that showed minor dehiscence that did not affect the final outcome. Histomorphometric analysis showed that the bone area percent of the newly formed bone from the implant sites augmented with chin shells was $(52.53\% \pm 1.68)$, ramus blocks was $(47.97\% \pm 1.9)$, while that of the iliac crest sites was $(38.77\% \pm 2.83)$

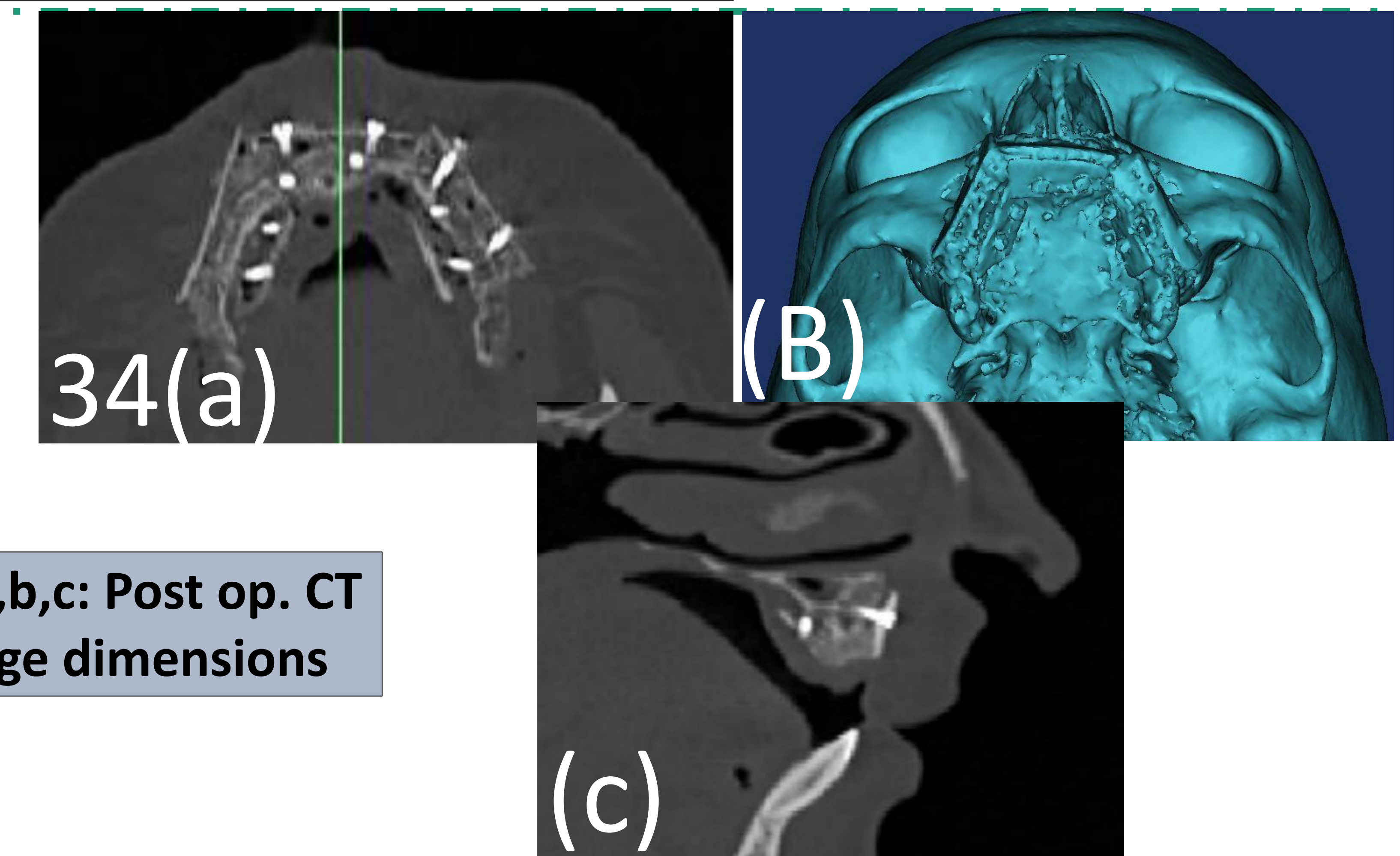


Figure: 34 a,b,c: Post op. CT showing ridge dimensions



Figure 35, 36 : core biopsy retrieval using trephine bur

P.O.C	Group I	Group II	Group III
Mean	52.53 ^a	38.77 ^b	47.97 ^c
Std Dev	1.68	2.83	1.97
Std Error	0.97	1.63	1.14
Max	54.70	42.75	50.73
Min	50.59	36.48	46.24
F value	30.054		
P Value	0.001*		

Table (1) Area percent in all patients and significance of the difference using (ANOVA) test.

- **Conclusion:** sympheseal buccal and palatal cortical shells showed significant better results followed by that of the ramus and finally graft harvested from anterior iliac crest regarding both the quality and stability of the grafted volume of bone

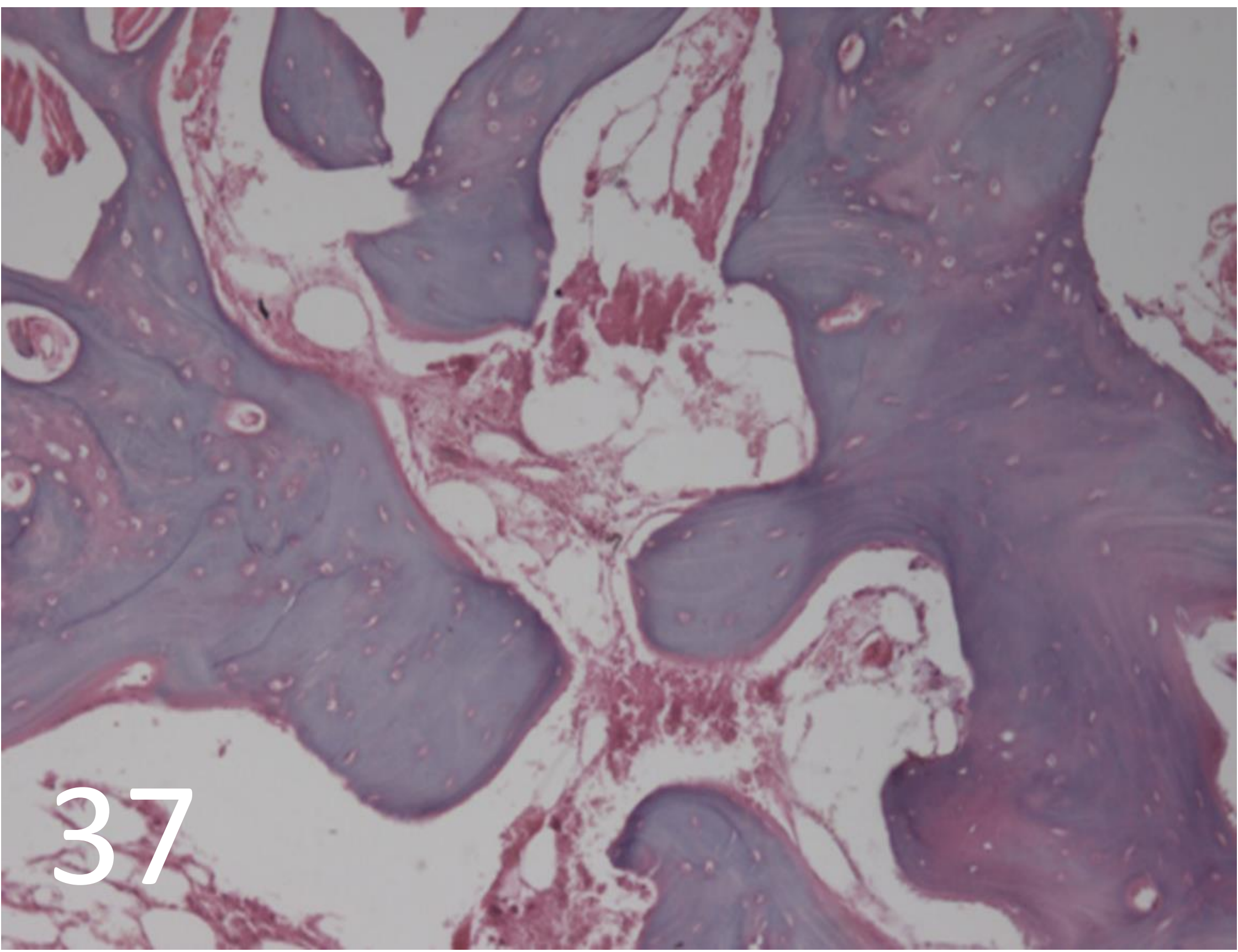


Figure 37 :Microscopic picture of the core biopsy taken from (chin group) showing trabeculae of lamellar bone showing many reversal lines and an intervening fatty marrow (Magnification X100).

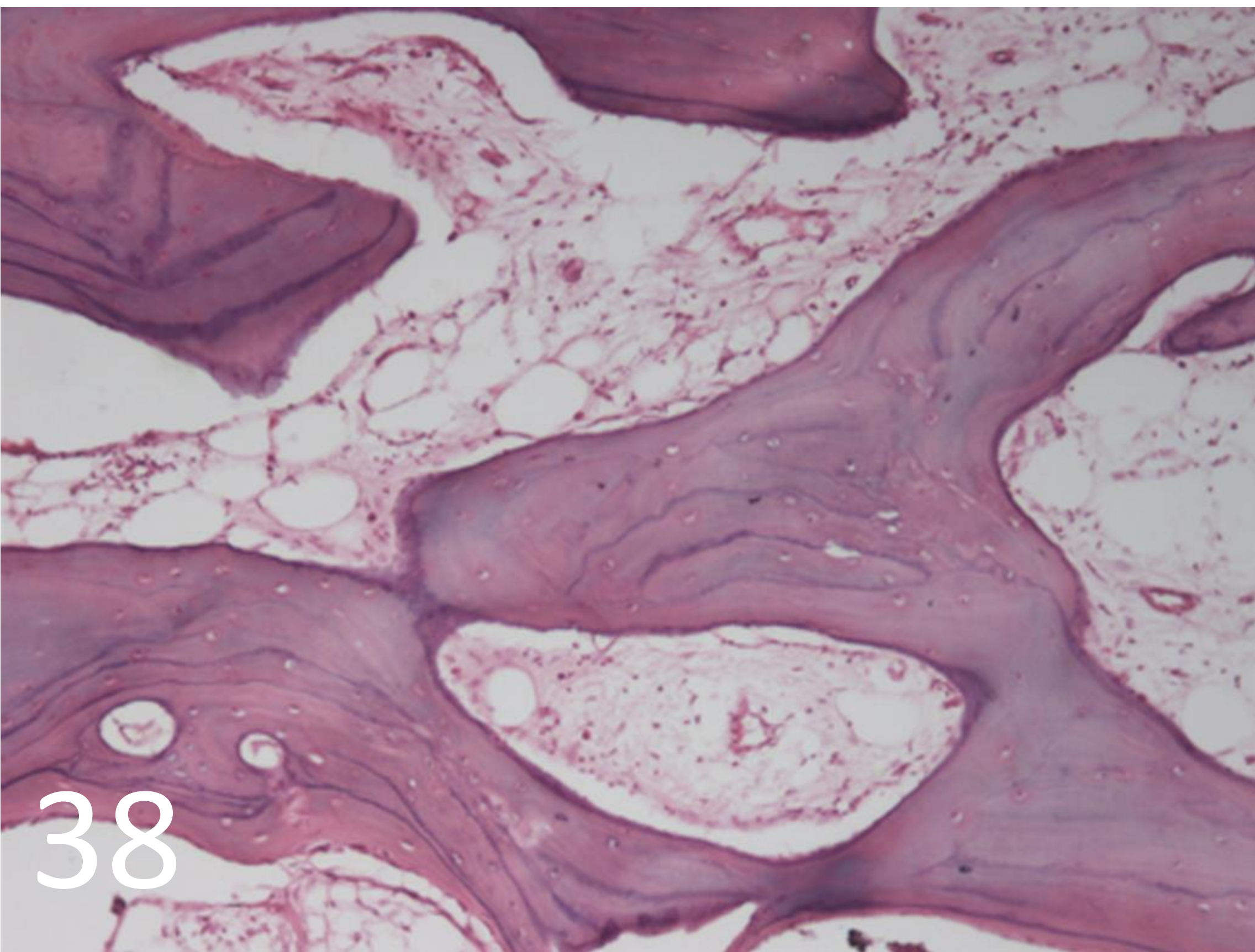
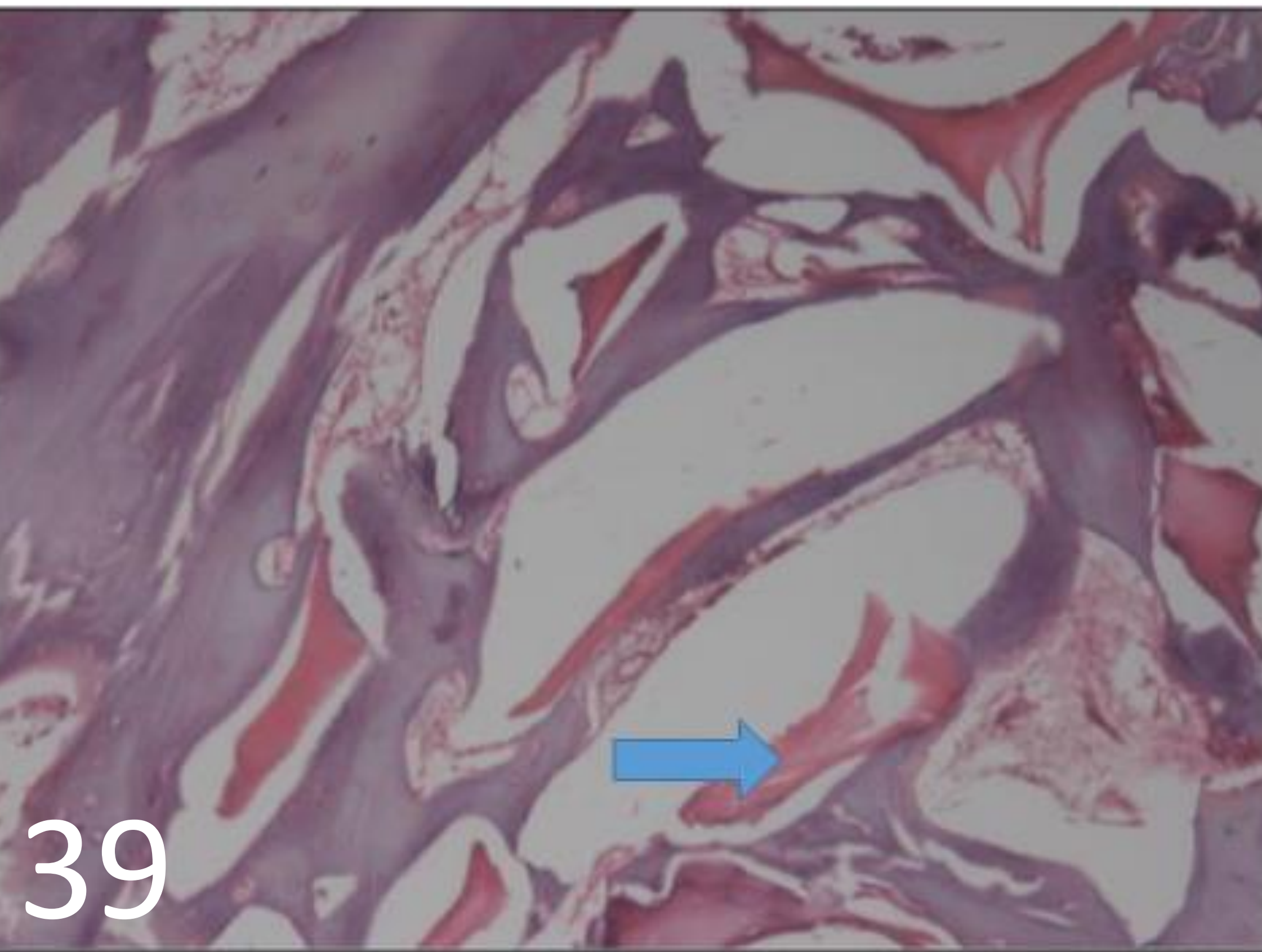
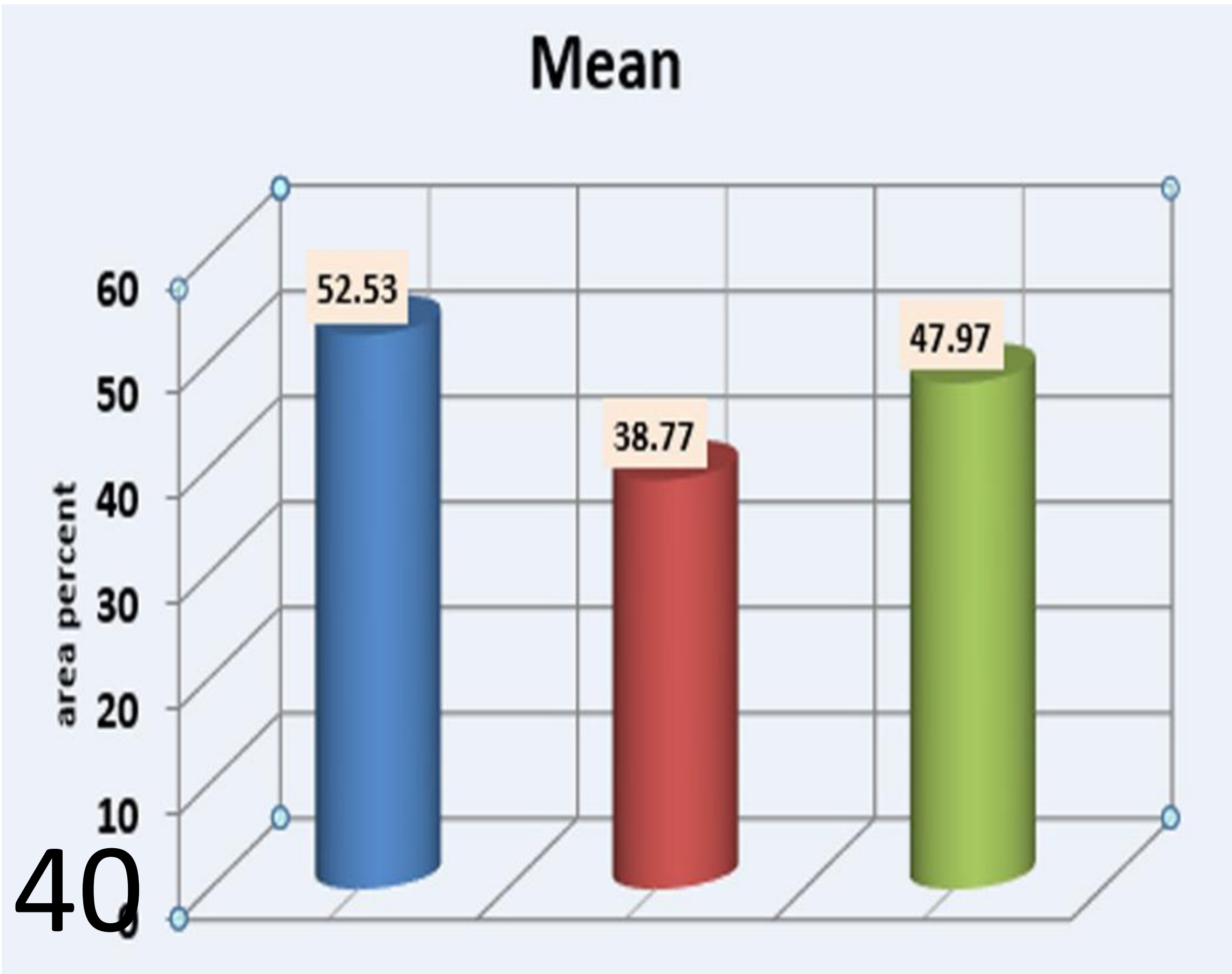


Fig 38: Microscopic picture of the core biopsy taken from (retromolar group) showing trabeculae of lamellar bone and an intervening fatty marrow (Magnification X100).



Microscopic picture of the core biopsy taken from Group II (iliac group) demonstrating trabeculae of woven bone with interfering xenographic particles (Blue arrow) (Magnification X100).



Column chart showing mean area percent in all patients. Group I represented in blue color, Group II in red color and Group III in green color