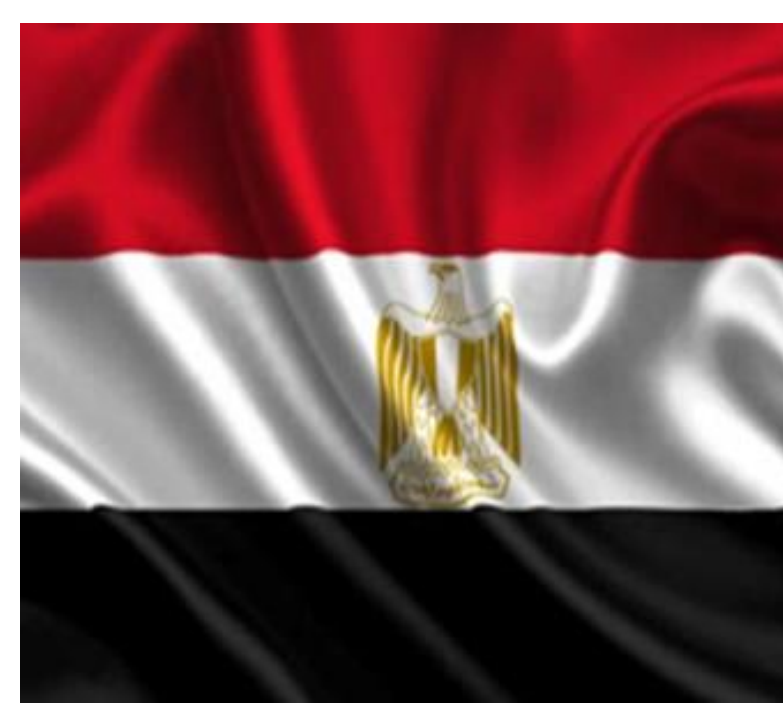
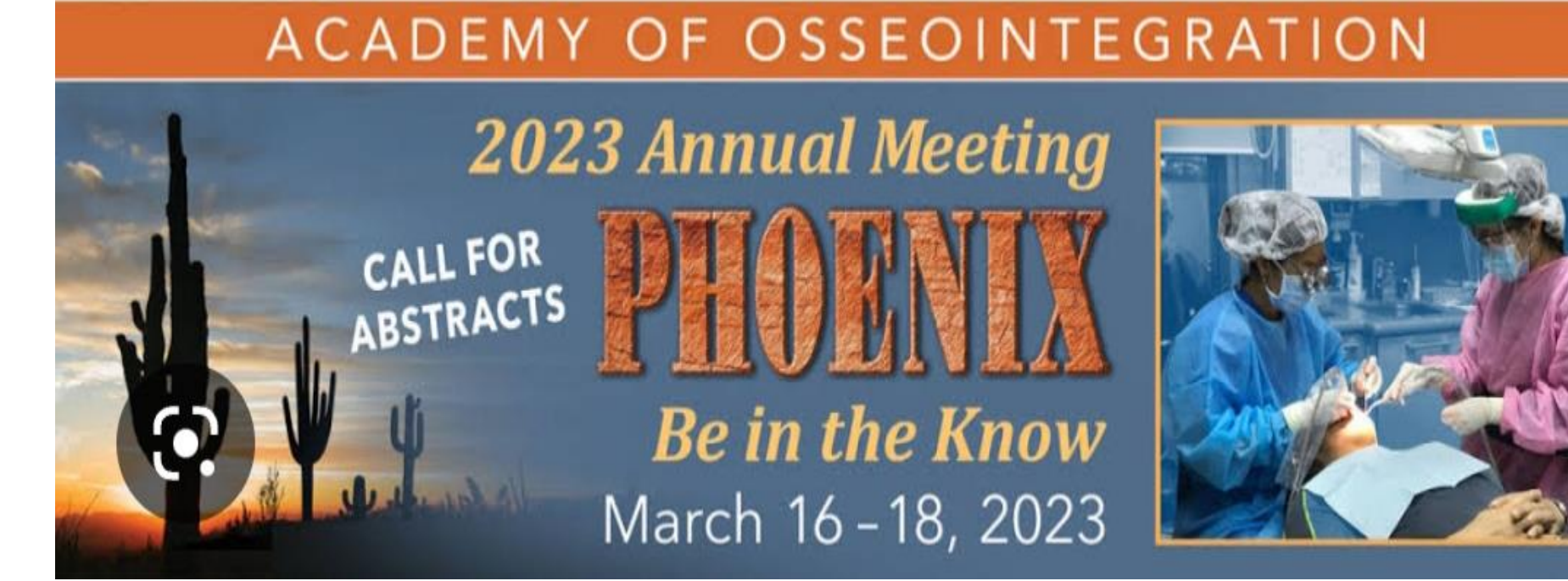




Guided Bone Regeneration For Horizontal Maxillary Alveolar Ridge Augmentation Using Patient Specific Solid Titanium Barriers: A Case Series



Mohamed Mounir , Abdel Wakeel Mohamed, Adel Abou Elfetouh, Nada Noureldin, Marwa Sayed, Amr Gibaly

oral And MaxilloFacial Surgery Department Faculty Of Dentistry Cairo University

Introduction: Guided Bone Regeneration technique is considered one of the successful horizontal bone augmentation procedures specially for the maxillary bone, the aim of this study was to assess the radiographic and histomorphometric outcomes of horizontally augmented maxillary alveolar ridge using solid non perforated customized titanium barriers



Figures 1,2: severely atrophied anterior maxilla

Methods:This was a case series study including 8 patients who were assigned to Guided Bone Regeneration at the anterior maxillary esthetic zone (8 patients, 20 dental implants) using patient specific solid non perforated titanium barriers loaded with a mix of autogenous and xenogenic particulate bone grafts 1:1 . Radiographic Assessment was done immediately, 4 months and 10 months postoperatively included measurements of linear changes in the horizontal dimensions on cross sectional cuts of computed tomography (CBCT) using mimics software .,then core biopsies were taken for histmorphometric analysis from anterior , premolar and molar regions.

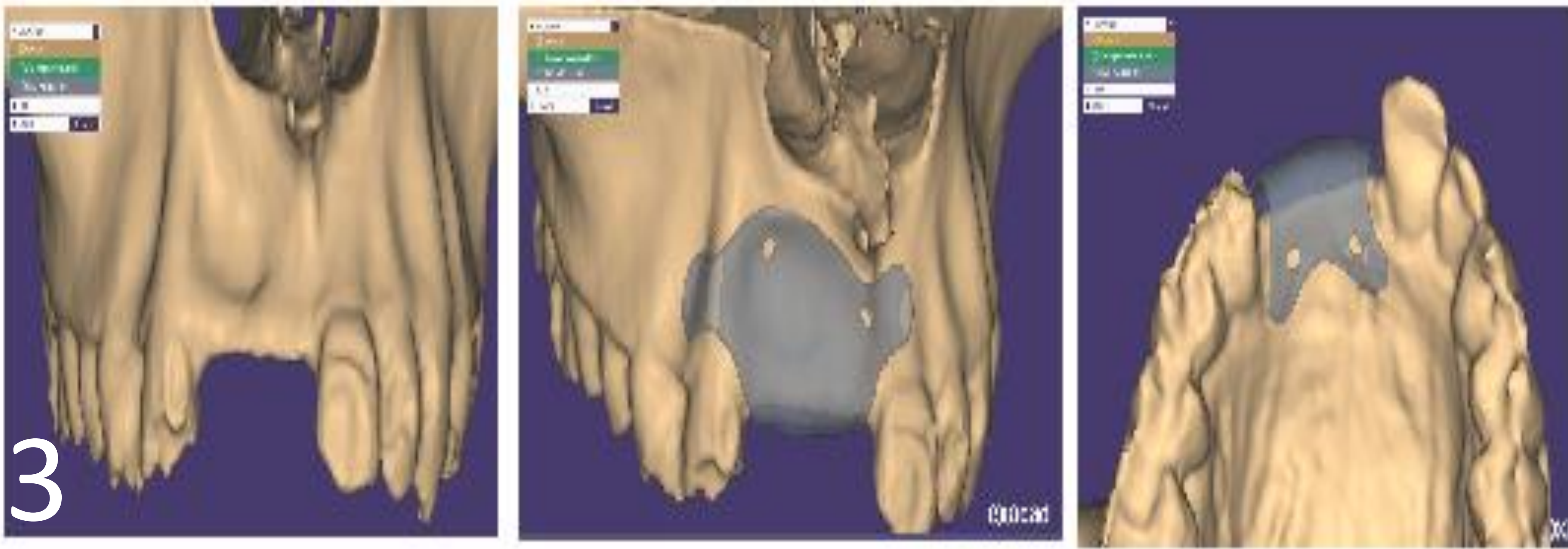


Fig 3 Case 1: preoperative virtual 3D design of the patient specific solid barrier facial and occlusal views.

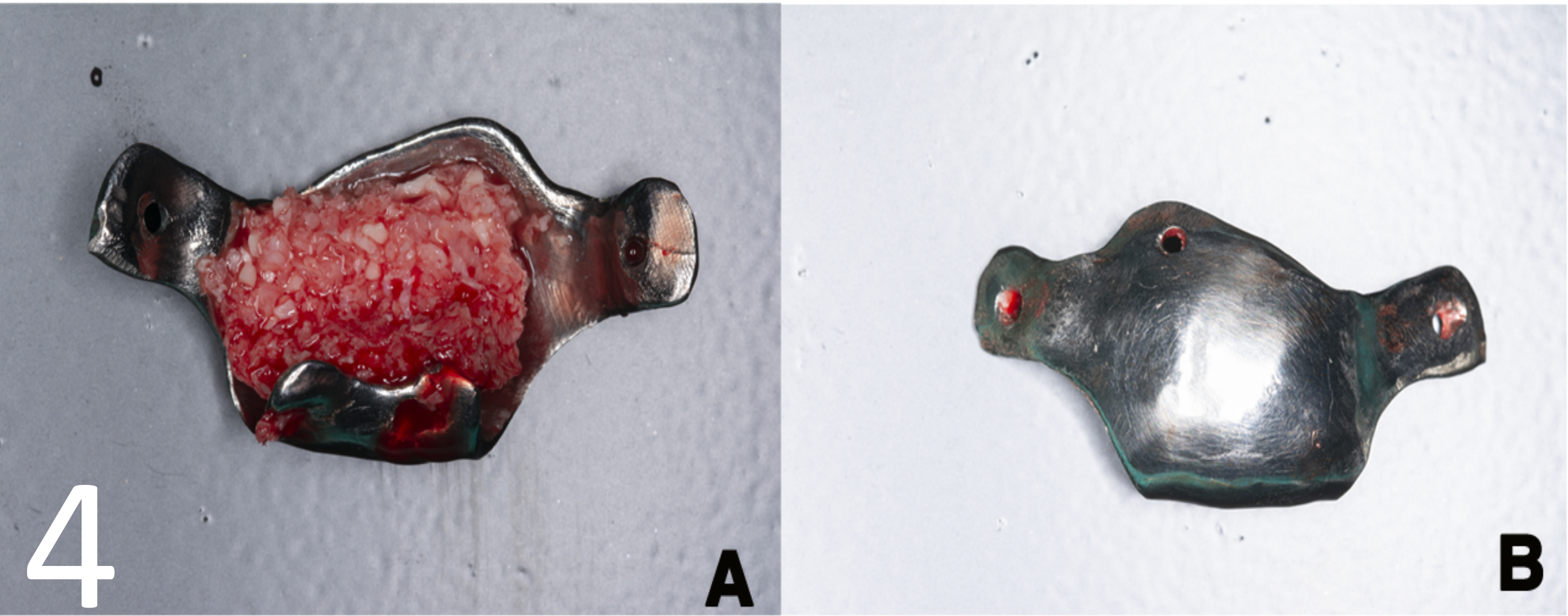


Fig 4: 3D Milled Titanium Solid Non Perforated Glazed Titanium Barrier Loaded With particulate mix of xeno and auto grsafts (1:1)

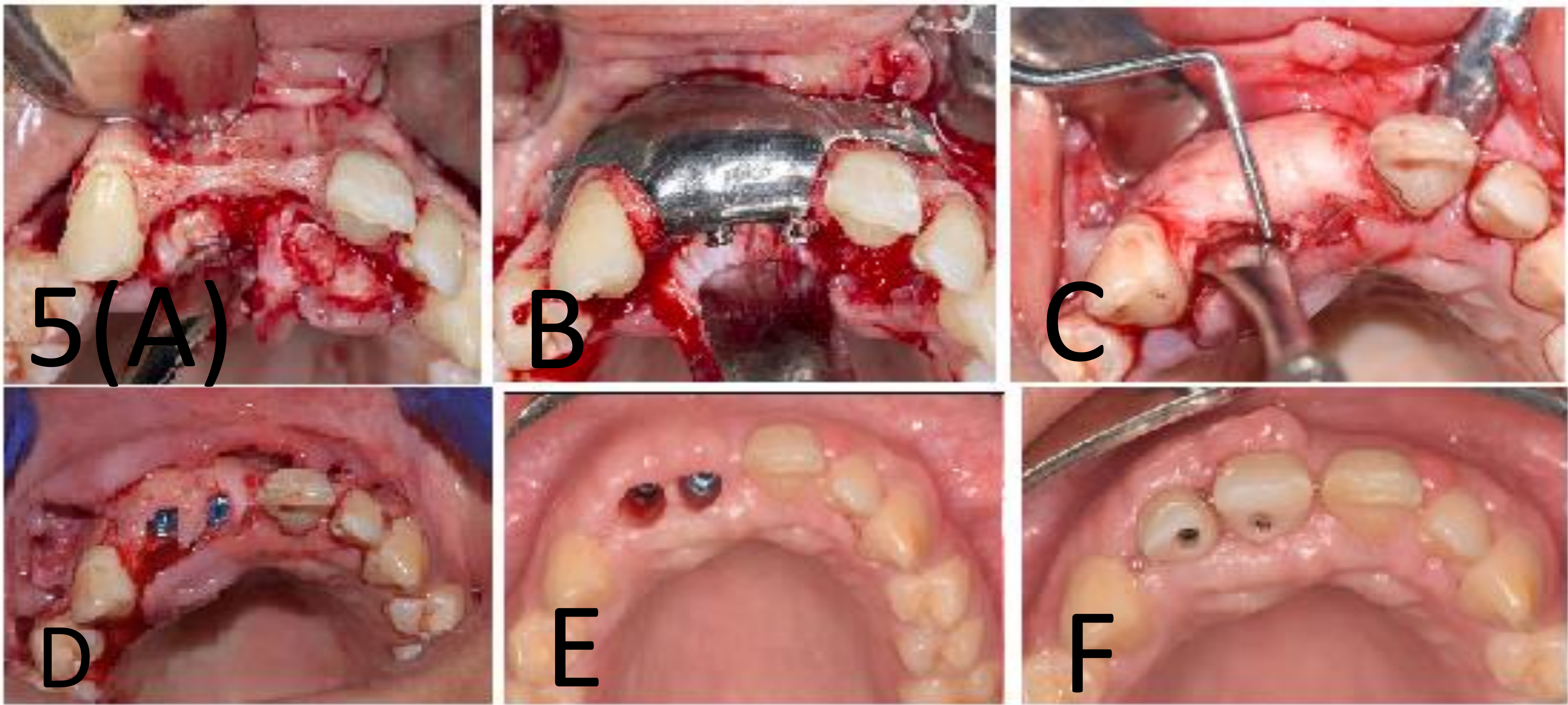


Fig 5: (A)full thickness flap reflection . (B) fixation of the patient specific barriers in place using monocortical mini screws. (C) re entry exposure showing excellent ridge contour after barrier removal. (D) dental implant placement. (E) healing around implants .(f)Screw Retained zirconia crowns

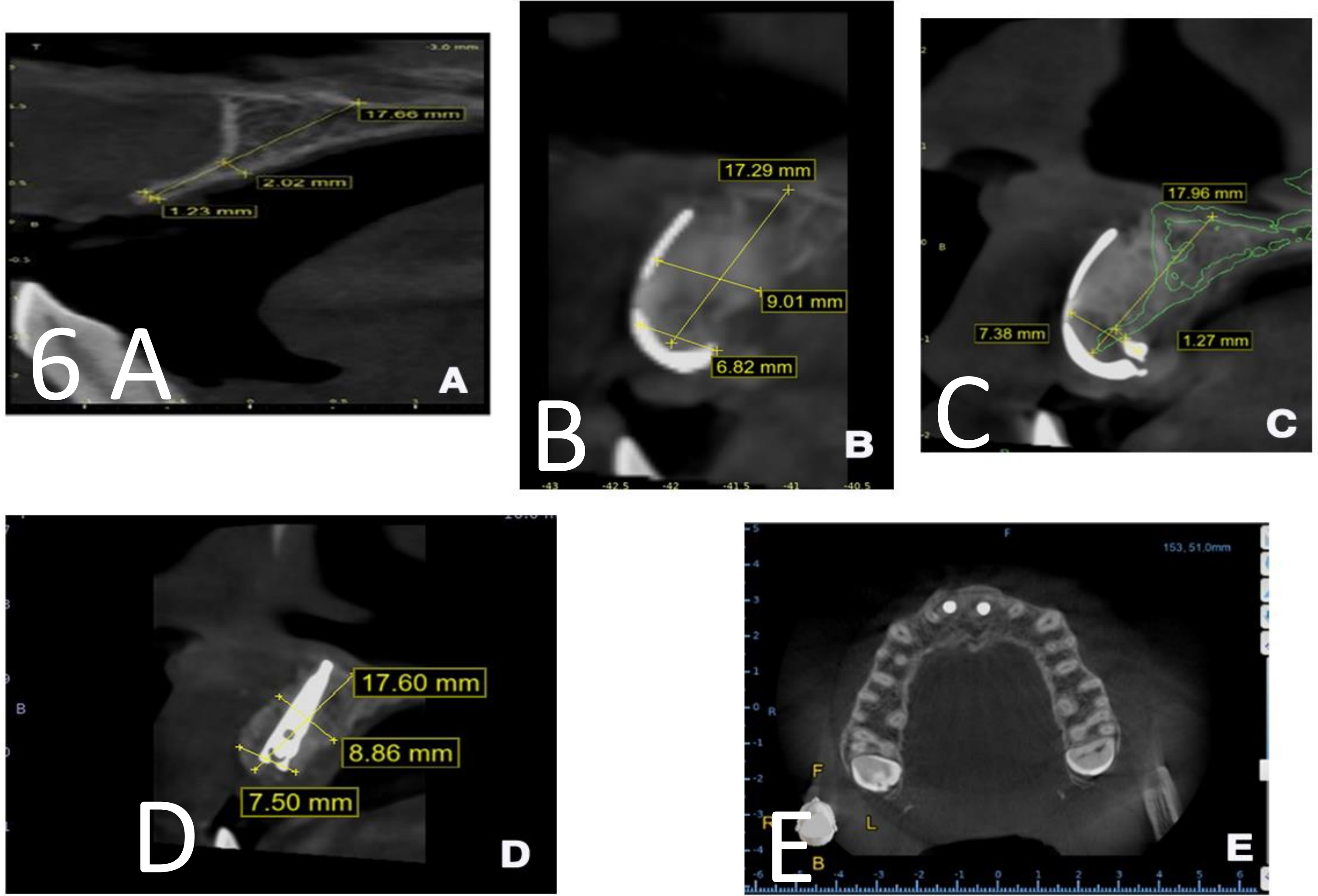


Fig 6:(A) preoperative cross sectional views of cbct . (B) 4 months postoperative cbct . (C) 4 months postoperative cbct the green color showing the preoperative ridge dimesion.(D) 10 months postoperative cbct . (E) axial cuts of CBCT perfect contour of the labial bone .

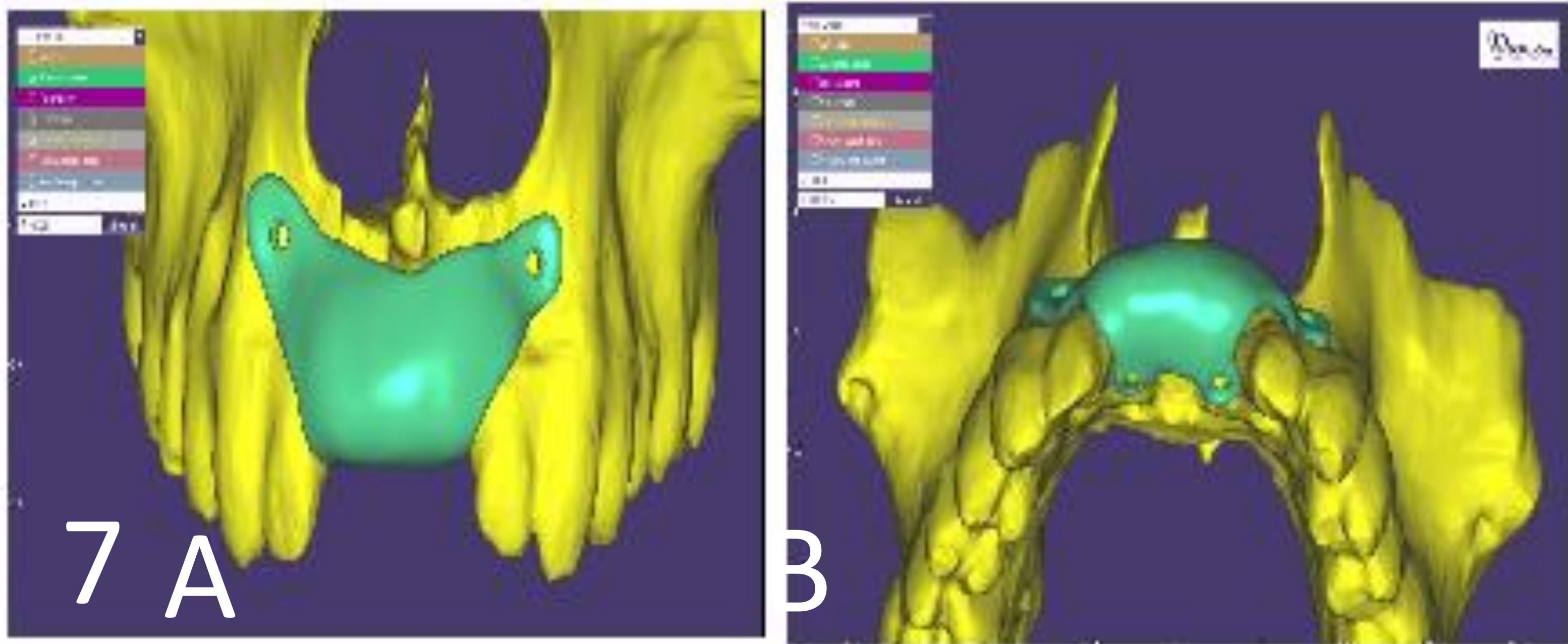


Fig 7 **CASE 2** (a,b,)) virtual 3D design of the patient specific occlusive barrier facial and occlusal views

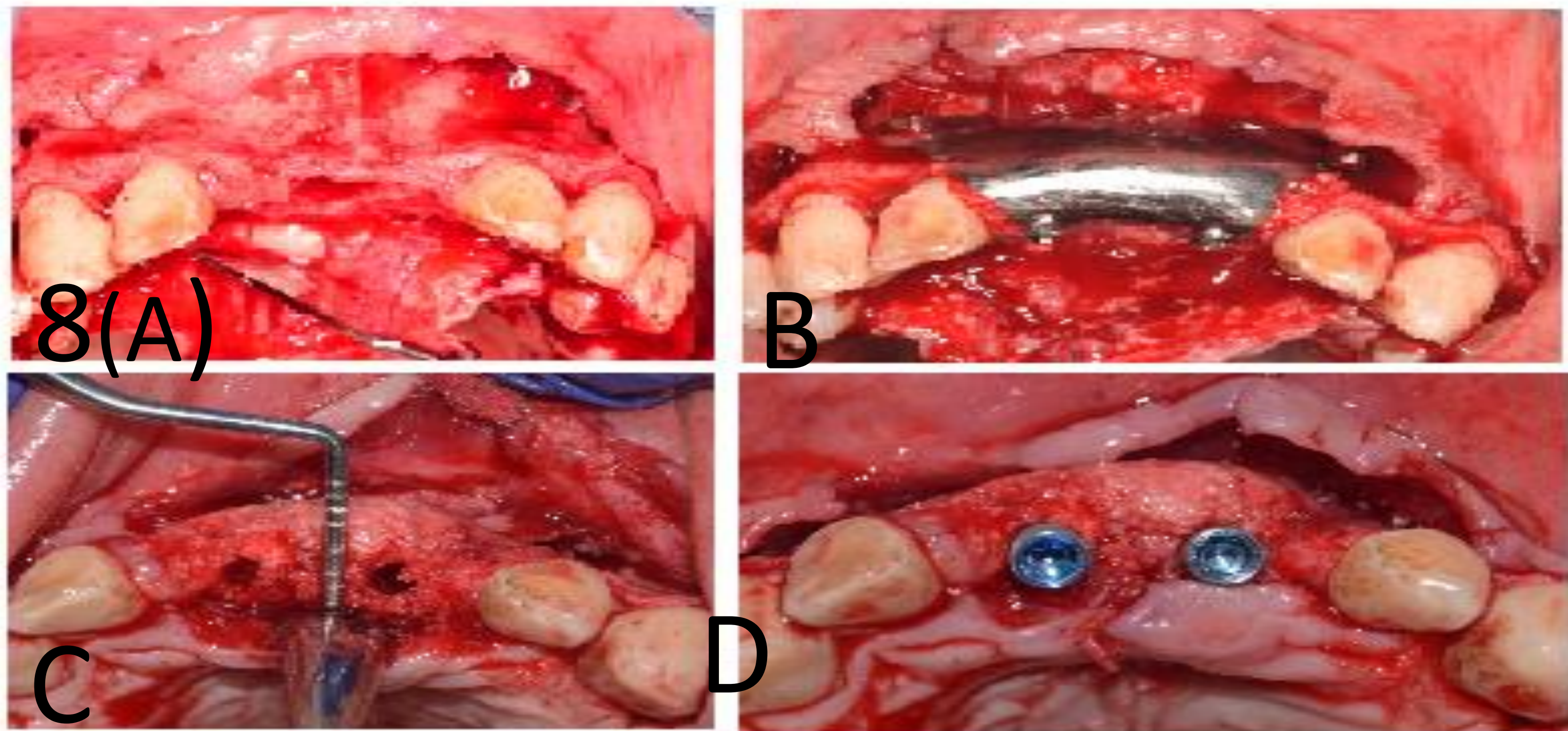


Fig 8 **CASE 2** (A)full thickness flap reflection . (B) fixation of the patient specific barriers in place using monocortical mini screws. (C) re entry exposure showing excellent ridge contour after barrier removal. (D) dental implant placement. :



Fig 9 (A) **CASE 2**: : (A) healing around Implants (B); screw retained full ceramic crowns

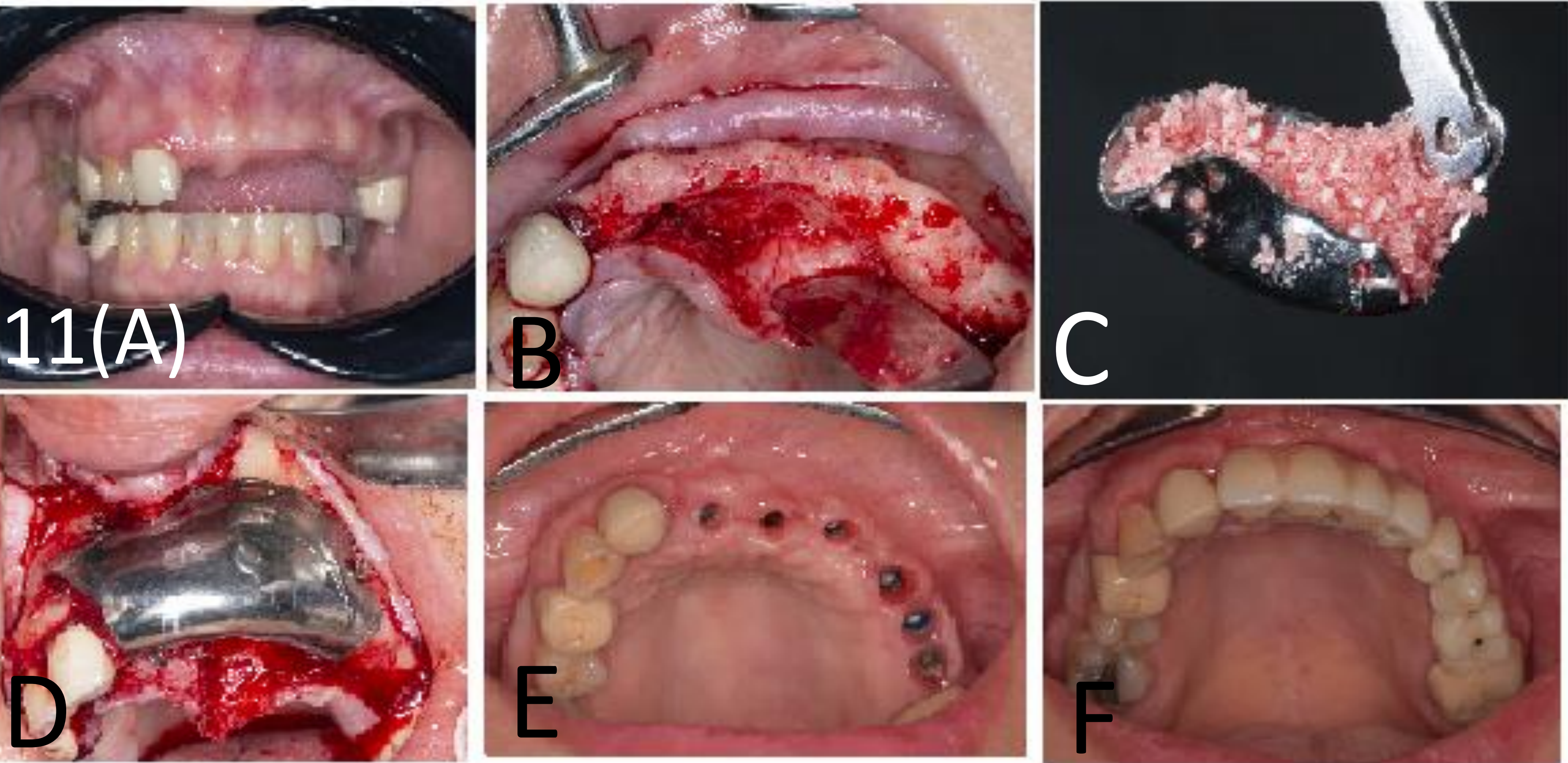


Fig 11 **CASE 3** (a,b)full thickness flap reflection . (c) 3D milled Solid titanium barrier loaded with particulate bone graft, (d) fixation of the patient specific barriers in place using monocortical mini screws. (e) healing around implants .(f)Screw Retained full ceramic crowns



Fig 10 **CASE 3**: cross sectional and axial cross sections showing well contoured buccal plate of bone surrounding the implants.

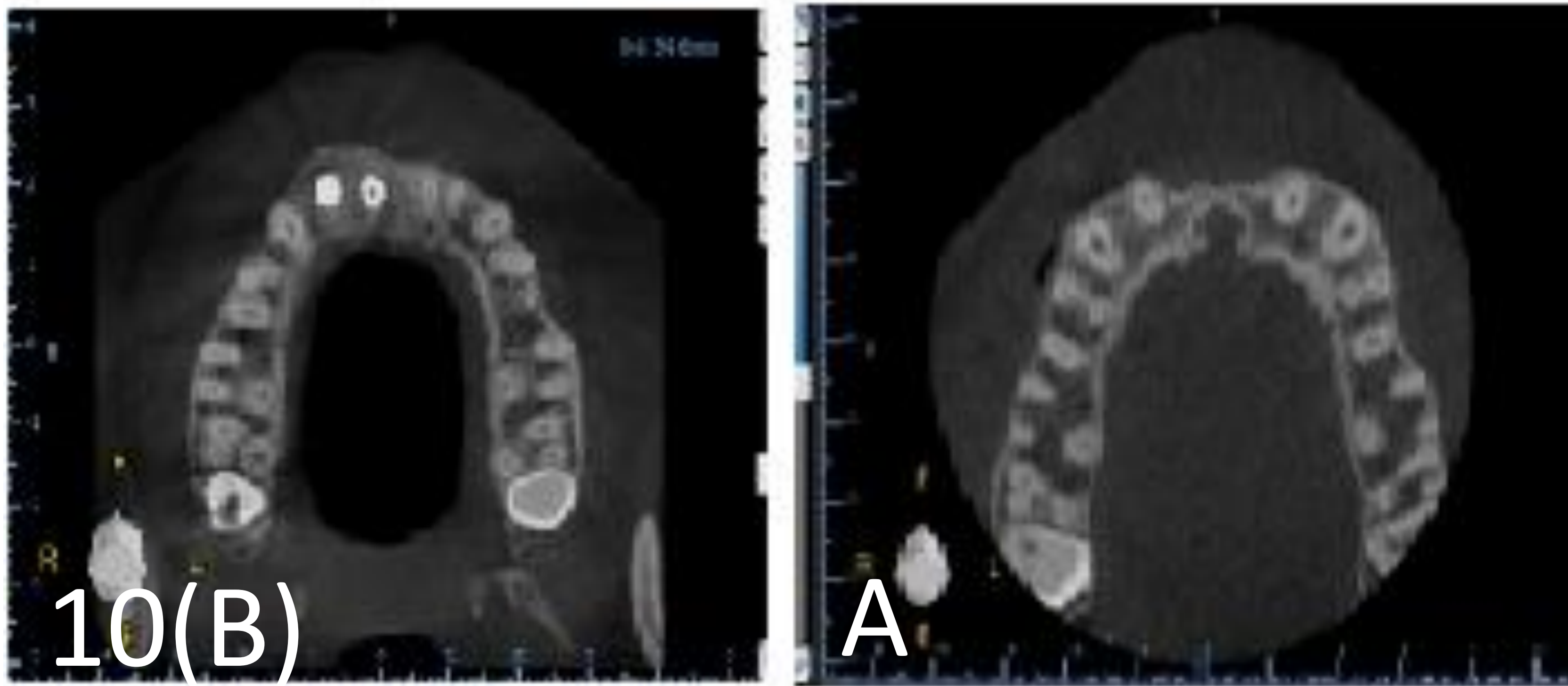


Fig 11 :postop. Cbct . **CASE 2**:
(A) Preoperative axial cut showing massive horizontal bone loss. (B) 6 months postoperative axial cuts showing excellent bone contour after implant placement .

Results:Wound healing was uneventful for all the patients except one patient showed soft tissue breakdown that did not affect the final outcome where the smooth closed barrier allowed for better oral hygiene and for full graft protection at the dehiscd site. There was a statistically significant difference between mean horizontal bone change at different time intervals (P<0.001) and the bone area percent of the newly formed bone was of a mean of (79.6 ± 29.2) for all the subjects

Conclusion: GBR using customized solid titanium barriers appear to be efficient and promising concerning the final horizontal bone gain and the quality of the augment sites.

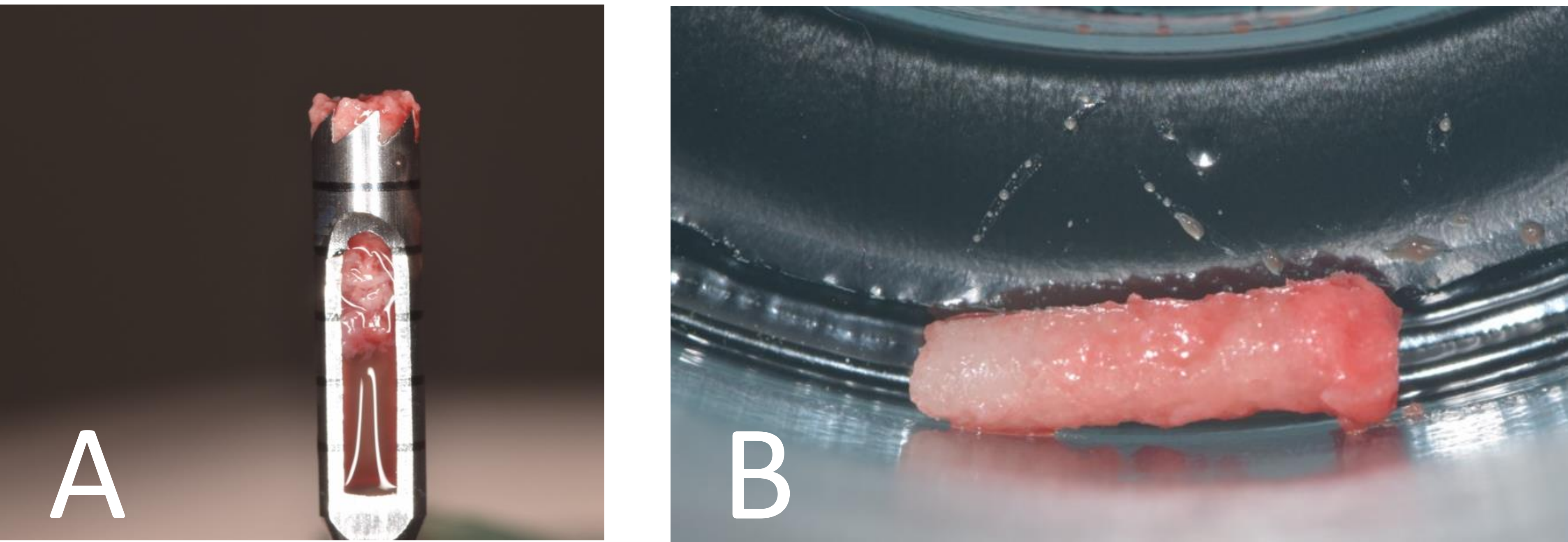


Fig 13: core biopsy retrieval using 2mm trephine bur

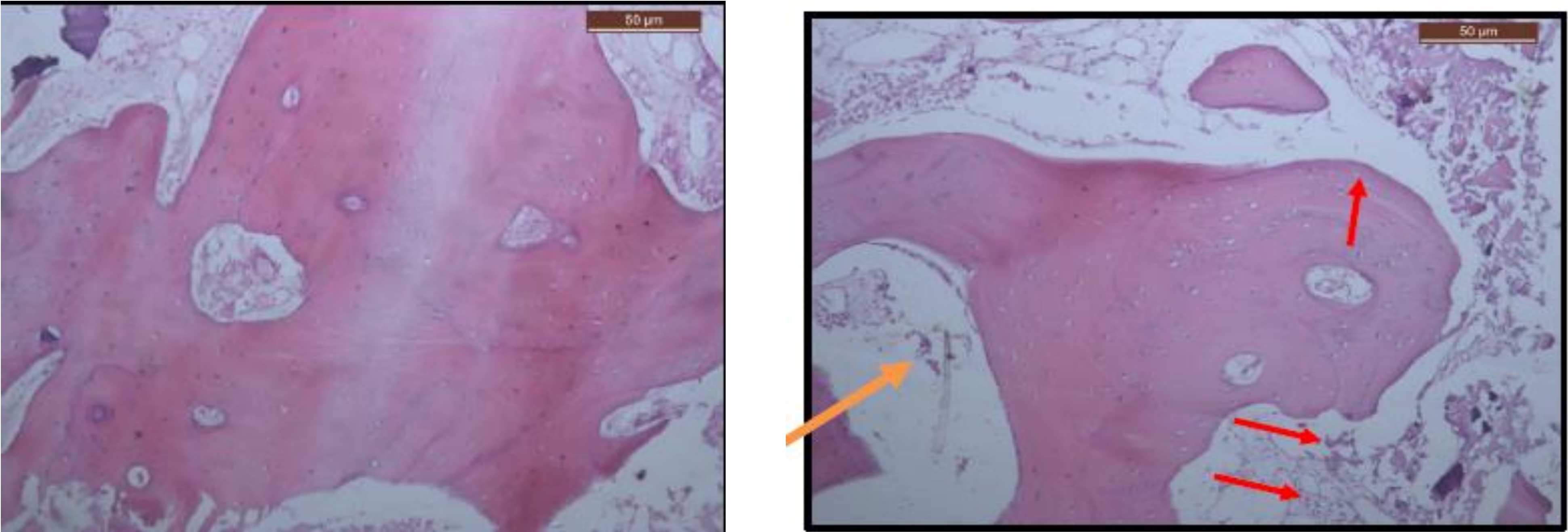


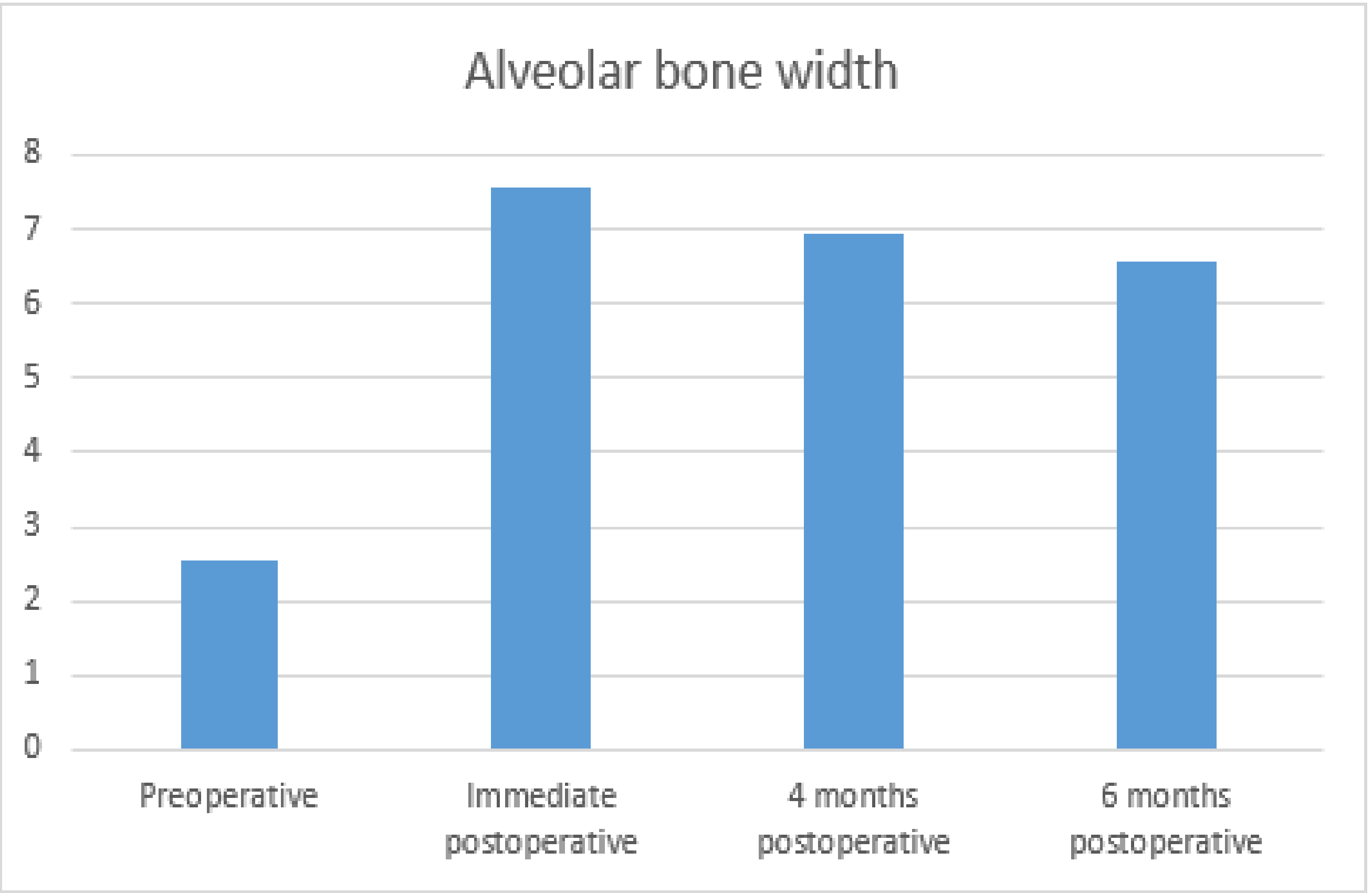
Fig 14: histomorphometric analysis , arrows showing bone area perecent of the regenerated bone

Group	N	Mean	Std. Deviation
Anterior region	8	69.2625	±32.65915
Premolar region	8	92.5813	±13.10314
Molar region	8	77.0375	±37.15186
Total	24	79.6	±29.287

Table 1: histomorphometric analysis , showing bone area perecent of the regenerated boneat three different regions

	Bone width
Preoperative	2.56 ± 0.69 ^d
Immediate postoperative	7.55 ± 0.70 ^a
4 months postoperative	6.93 ± 0.68 ^b
10 months postoperative	6.58 ± 0.82 ^c
P-value	<0.001*

Table 2: bone gain calculation at different time intervals



Bar Chart: radiographic bone gain calculation at different time intervals