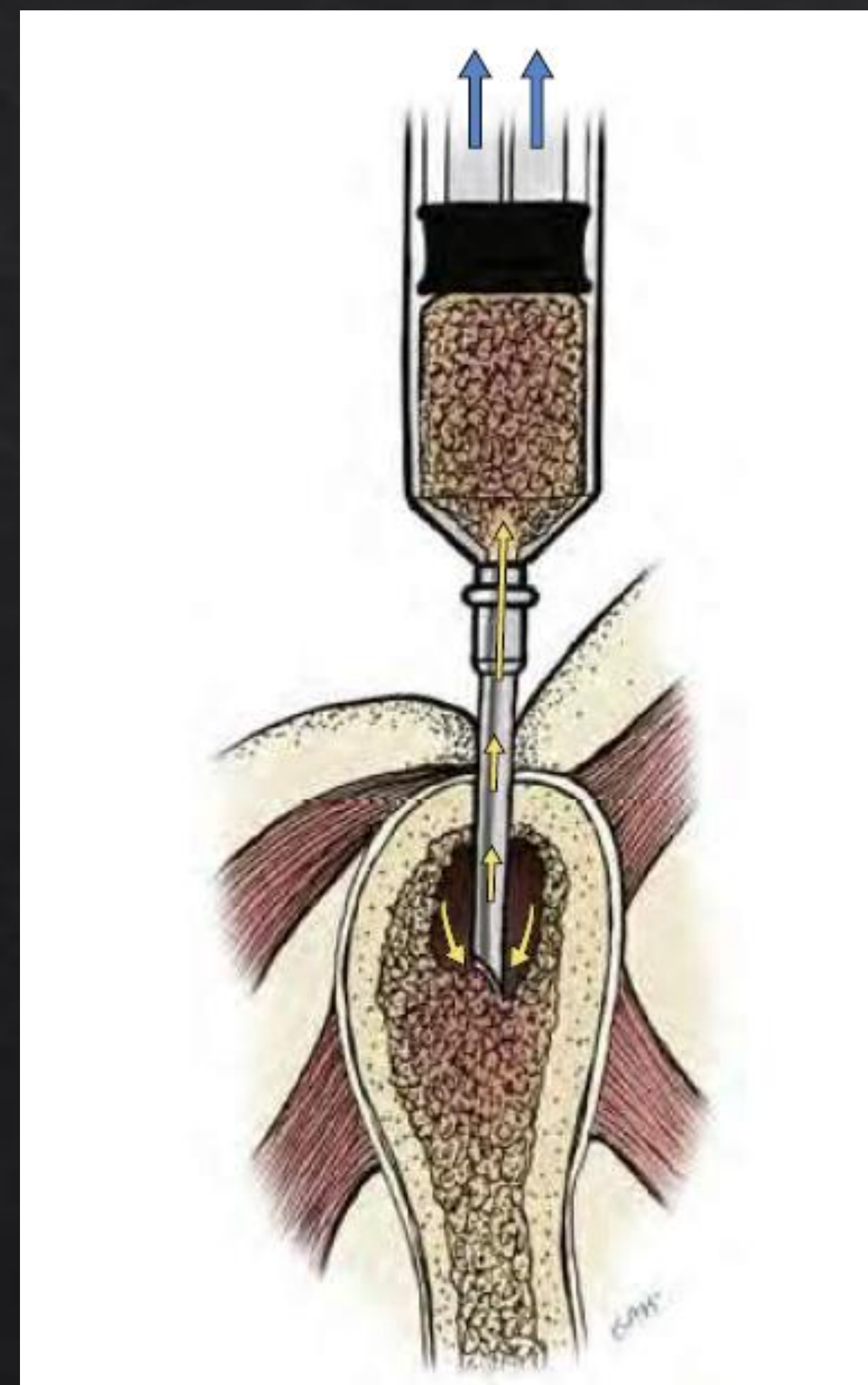




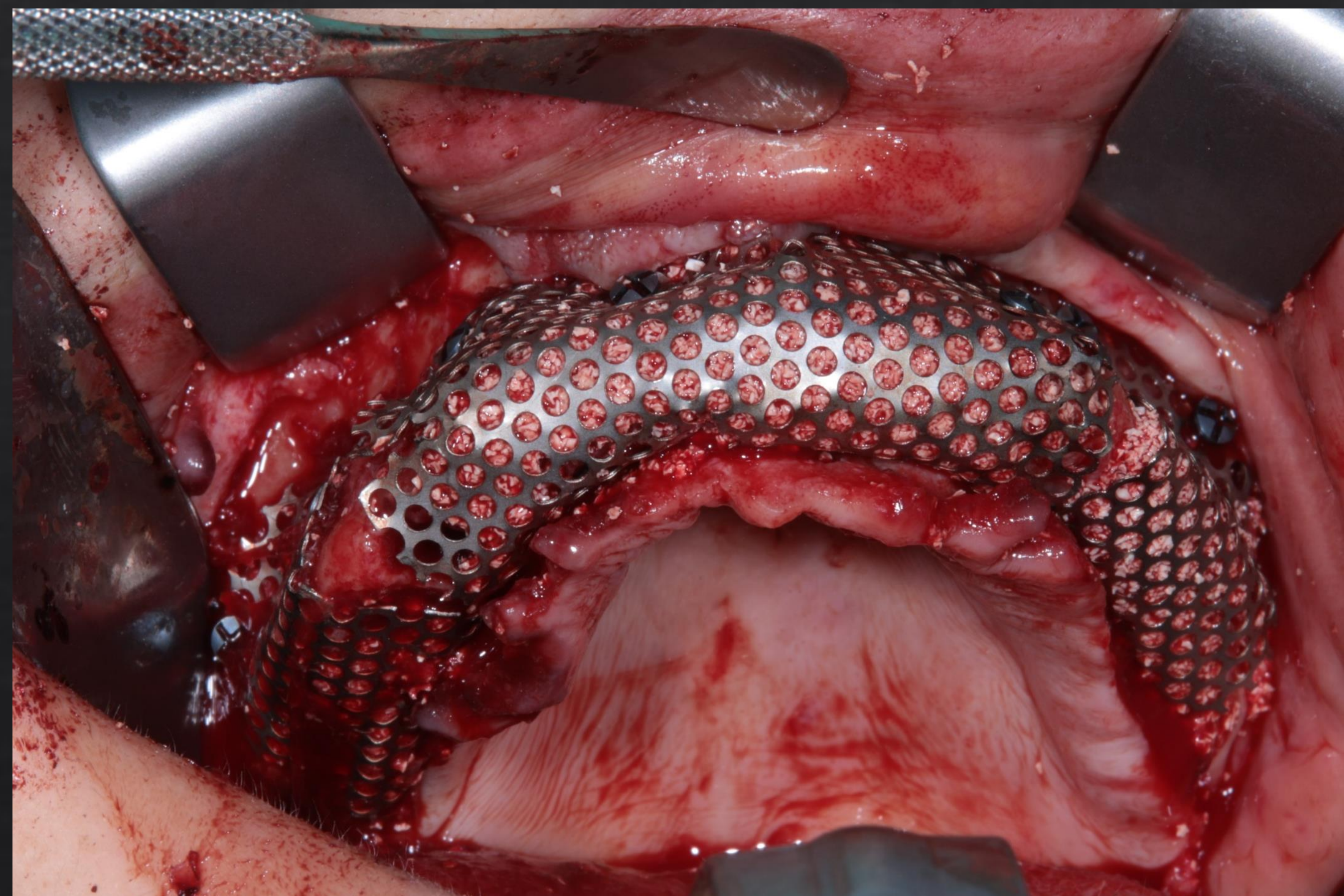
Guided Bone Regeneration (GBR) for Horizontal Maxillary Full Arch Ridge Augmentation using prebent titanium mesh loaded with bone marrow aspirate concentrate (BMAC) mixed with xenograft: A case series study

Ahmed Mostafa, Mohamed Mounir, Moataz Bahaa, Yasmin Nassar, Sara ElMoshy

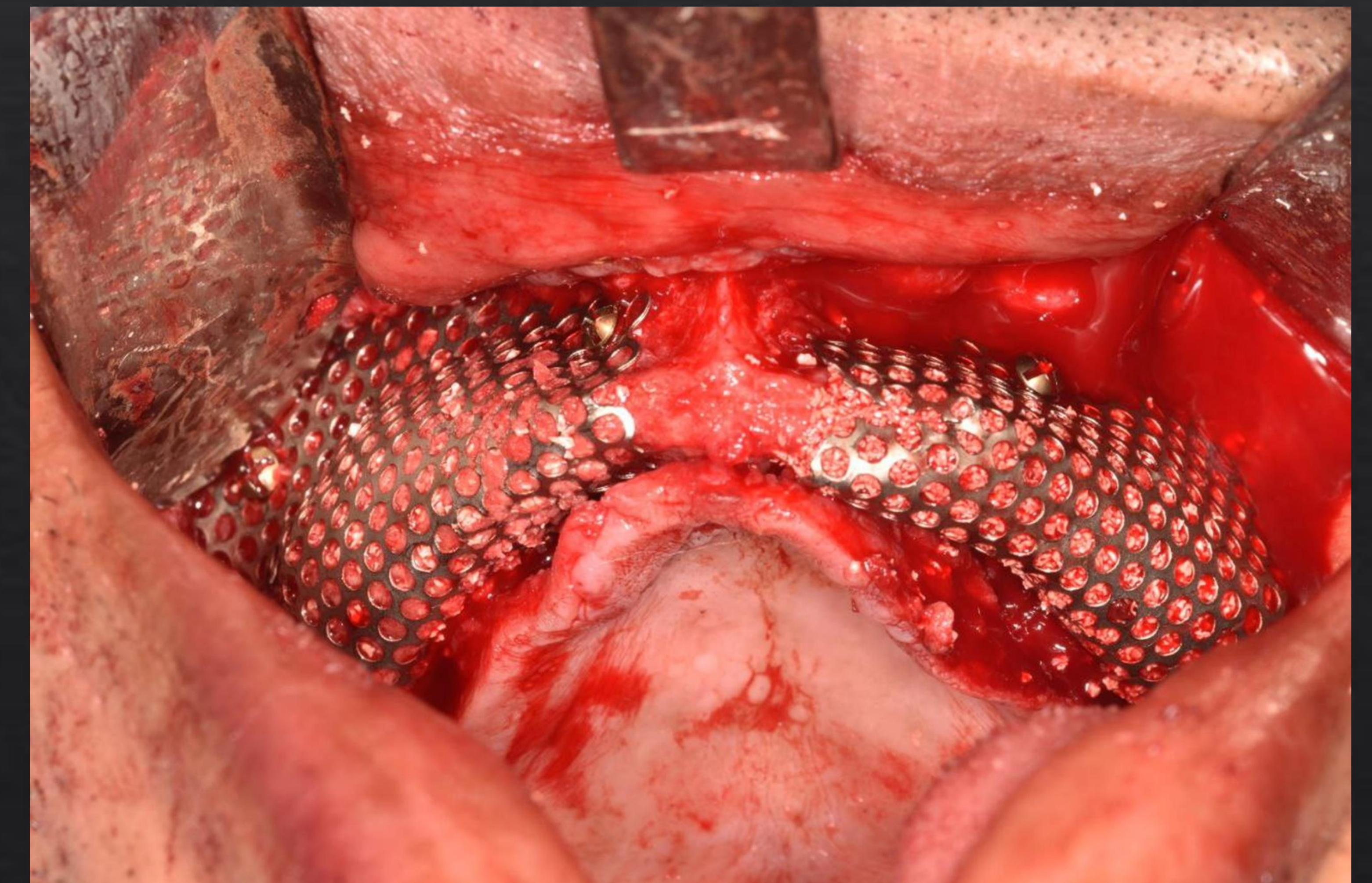
Guided bone regeneration is considered a reliable technique, yet there is a wide range of results concerning quality and quantity of the regenerated bone, the aim of this study was to assess both quality and quantity of the regenerated bone for horizontal augmentation of full arch maxillary cases using prebent titanium meshes loaded with bone marrow aspirate concentrate mixed with xenograft.



Bone Marrow aspiration procedure



Case 2 Full Arch Augmentation



Case 1 Full Arch Augmentation

Method: 5 patients suffered from severe horizontal and vertical maxillary deficiency were subjected to guided bone regeneration. Virtual bone augmentation was done for the whole maxillary alveolar ridge using special software to produce virtually augmented stereolithographic plastic models to guide for prebending of the titanium meshes preoperatively. In this study group, prebent titanium meshes were loaded with a mix of xenograft and Bone Marrow Aspirate Concentrate (BMAC). From the iliac crest.

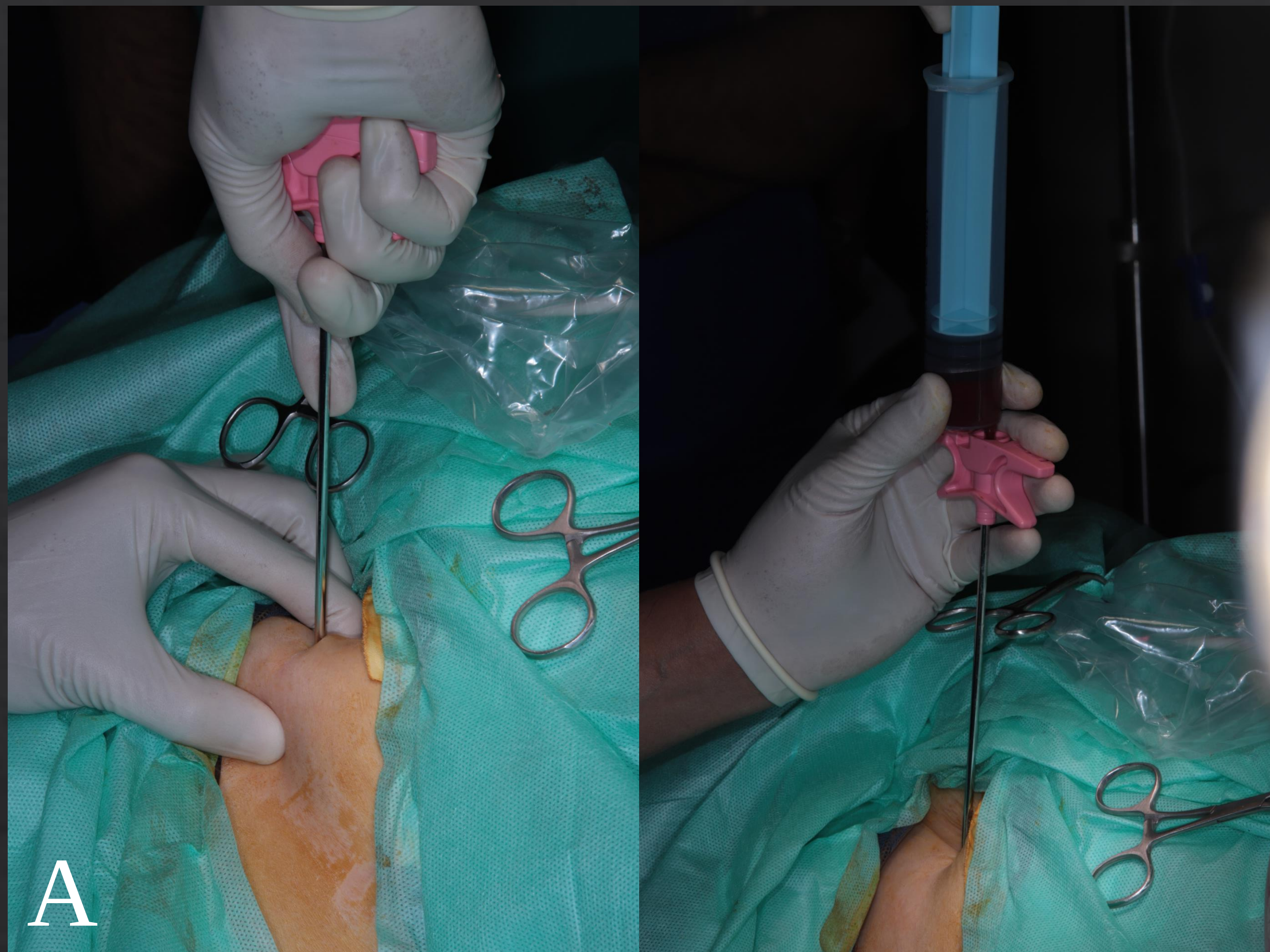


Figure A: showing Bone Marrow aspiration procedure from anterior iliac crest

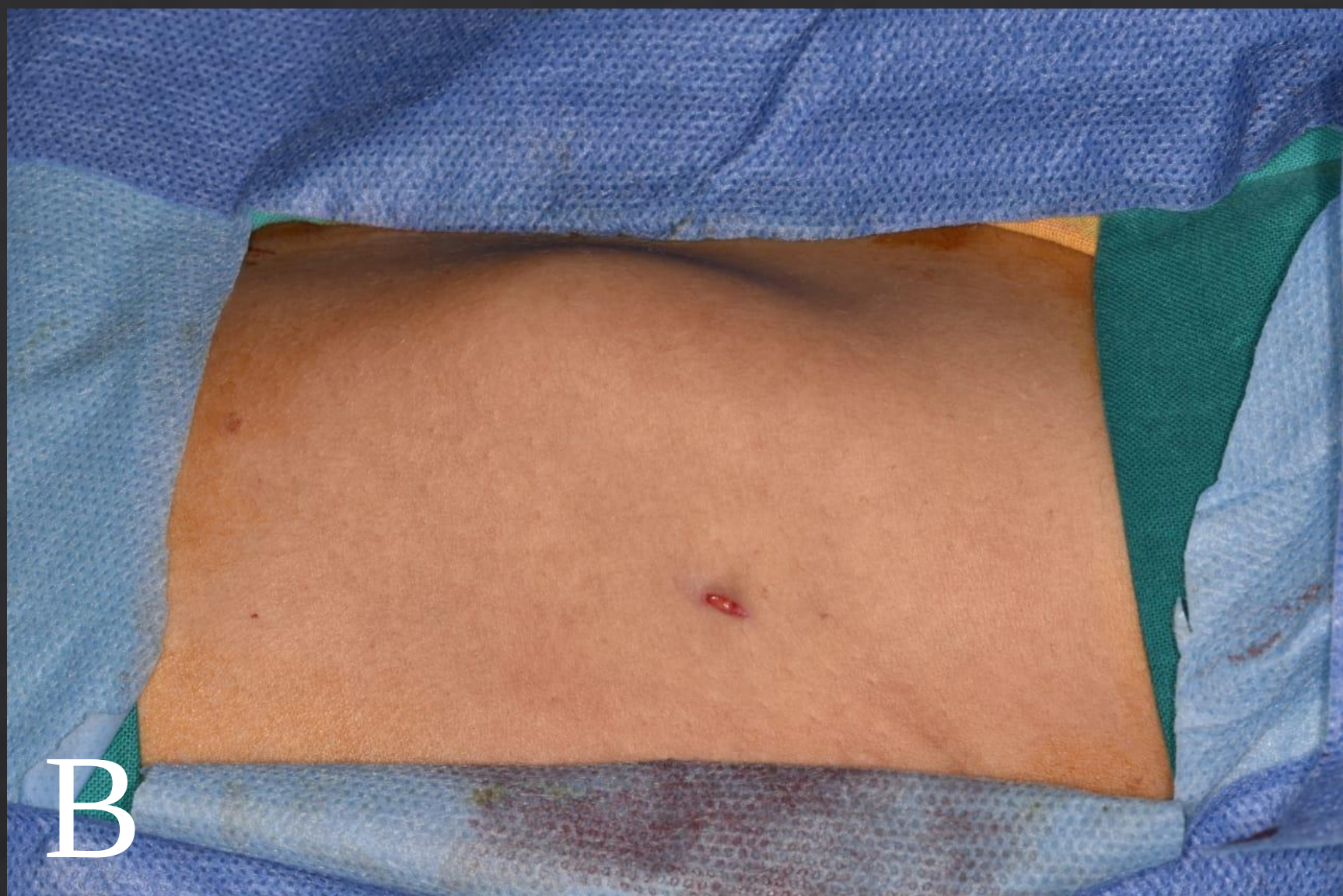


Figure B: Stab incision made on the anterior iliac crest



Figure C: Aspirated Bone Marrow being processed in the centrifuge

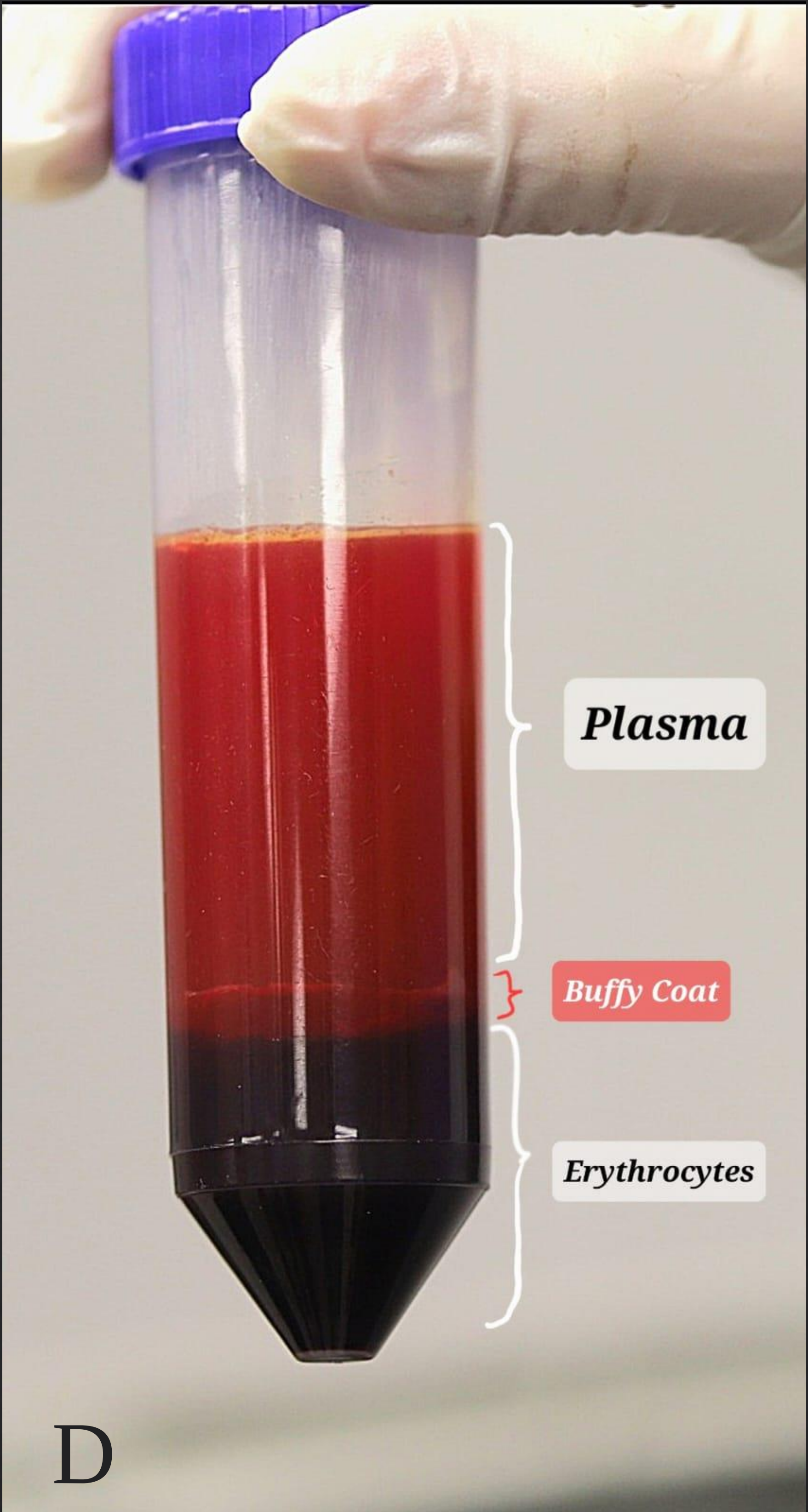


Figure D: Bone marrow after centrifugation revealing the buffy coat know to contain the desired multipotent cells with osteogenic properties



Figure E: Bone marrow aspirate concentrate (*BMAC*) mixed with Xenograft material

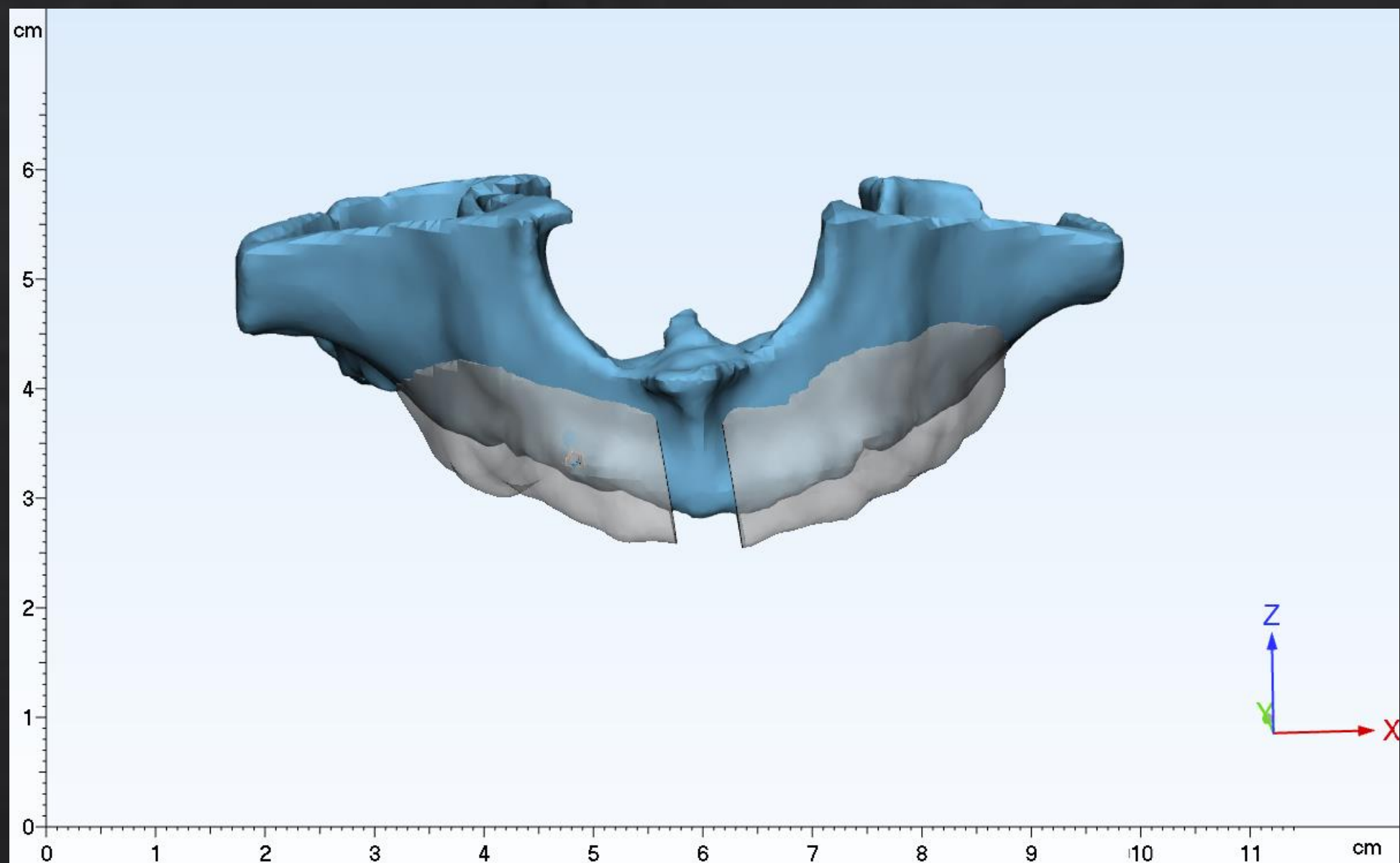


Figure F: 3D printed Model with the desired augmentation dimensions for titanium mesh prebending

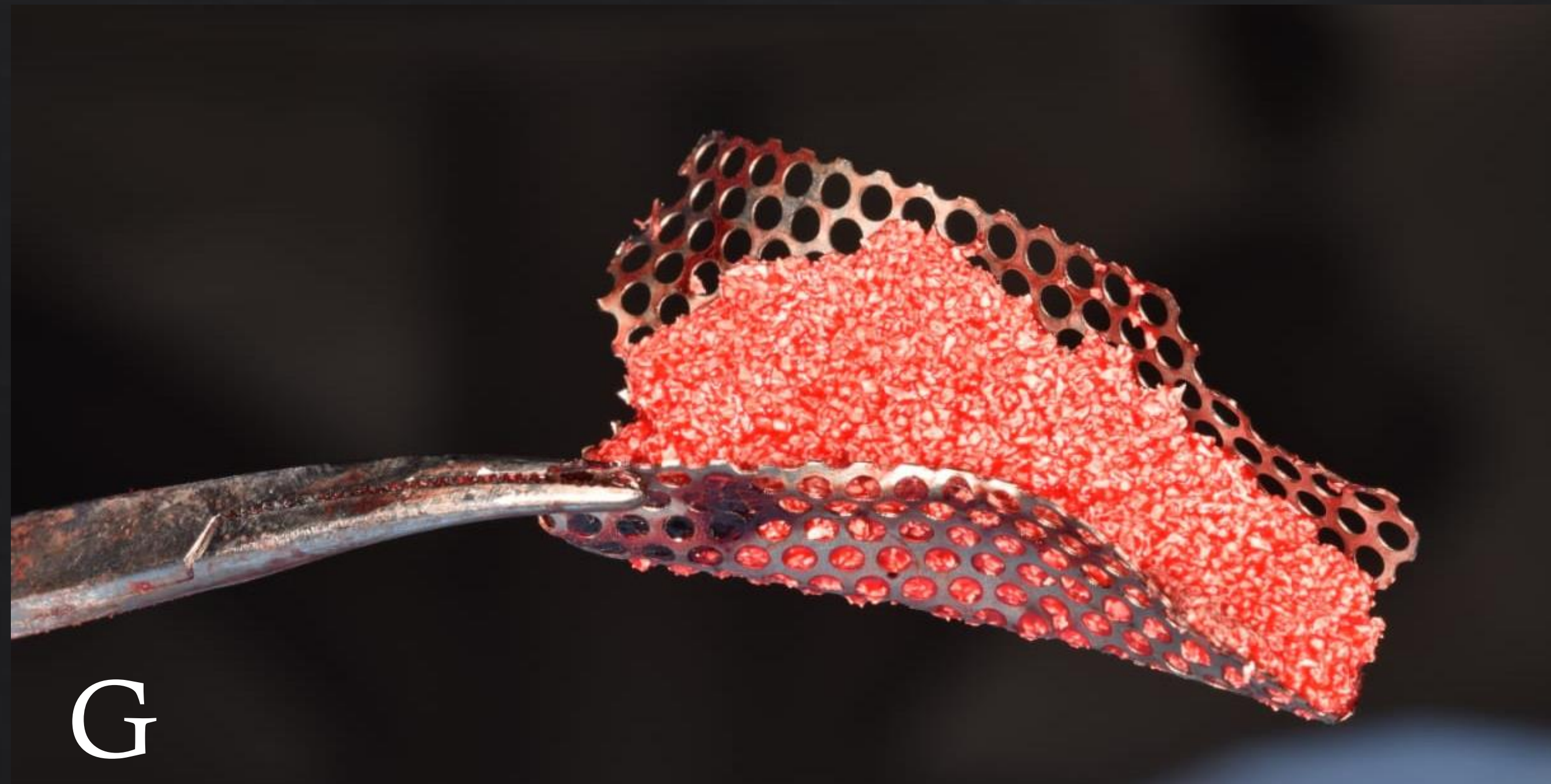
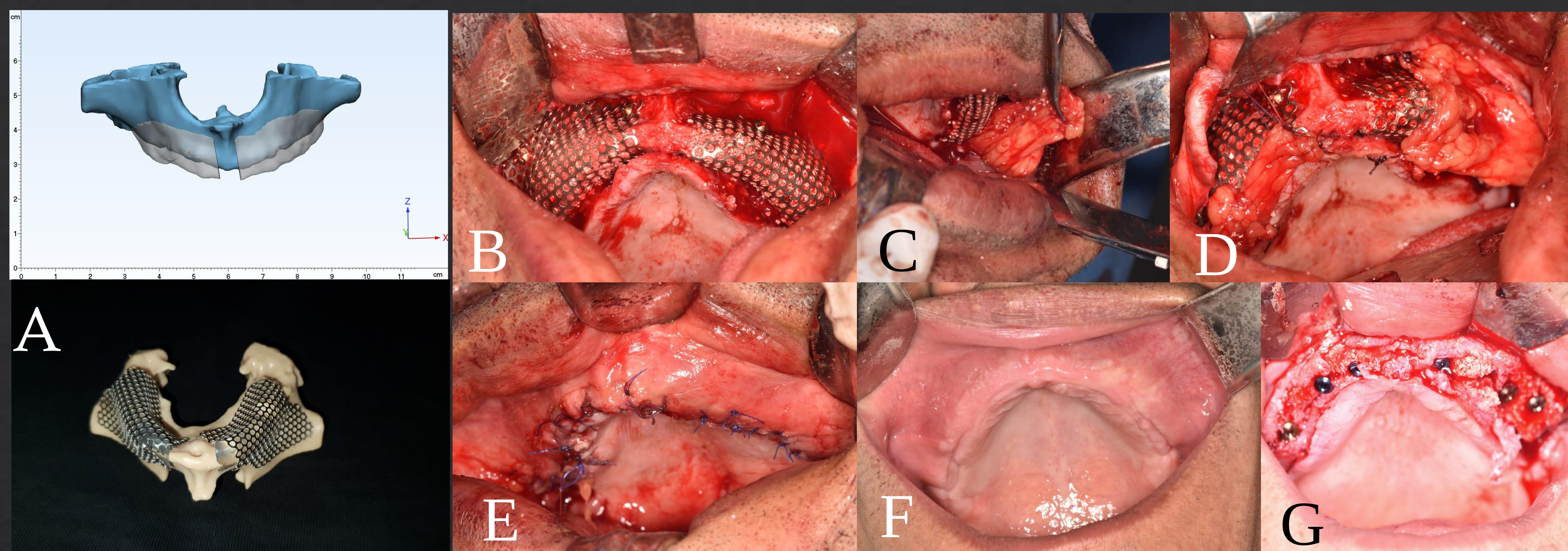
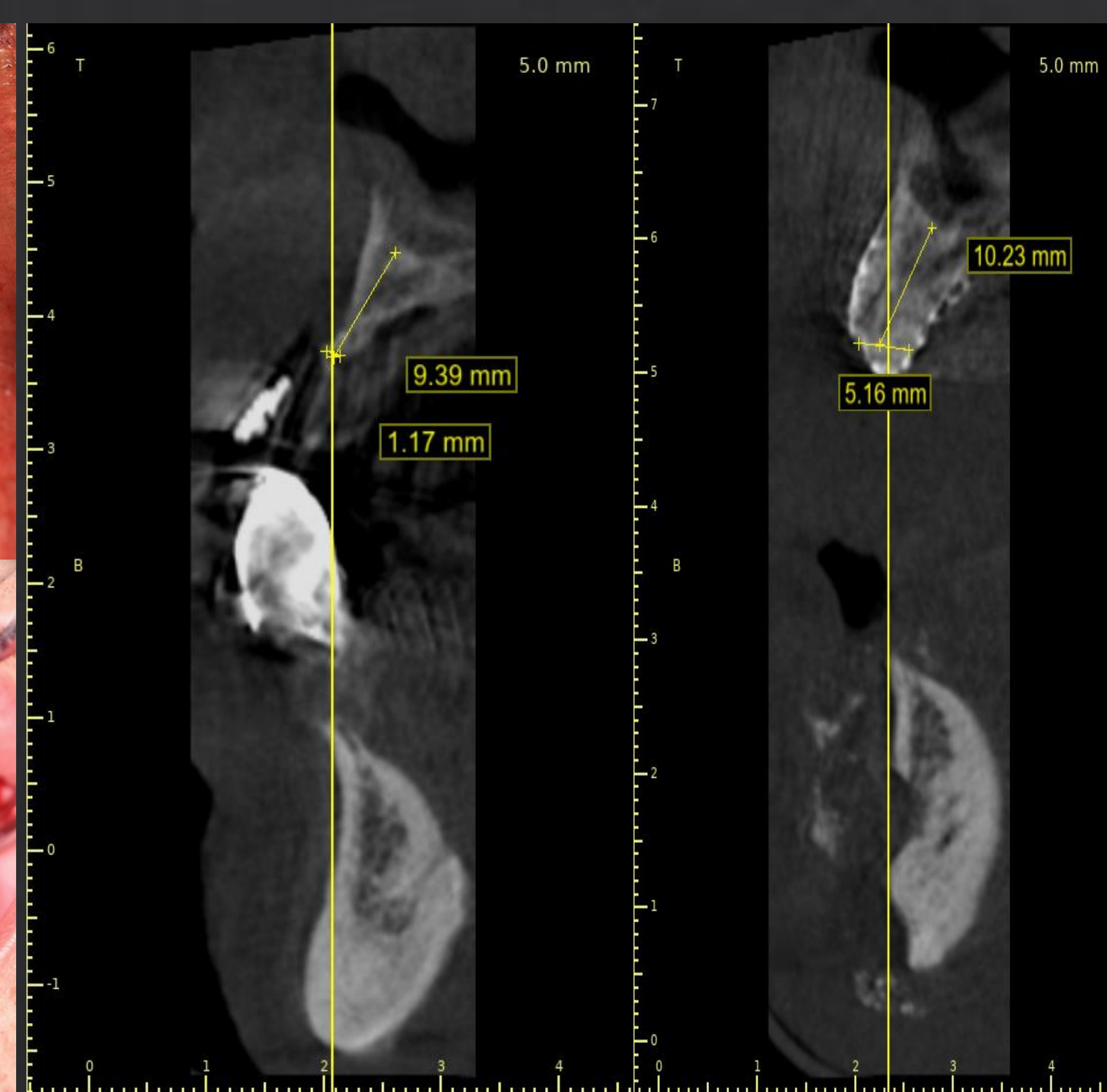


Figure G: *BMAC* mixed with xenograft loaded into the Prebent titanium mesh ready for the augmentation



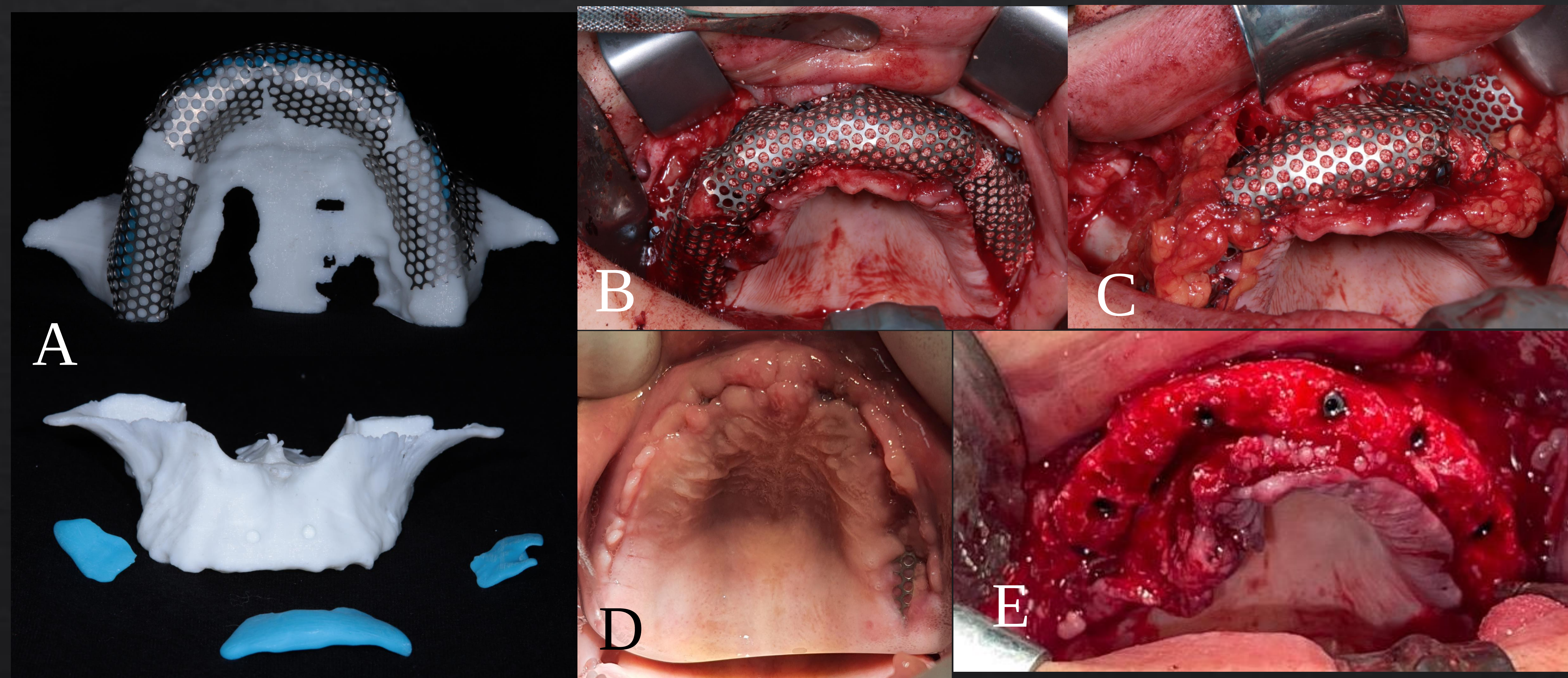
Case 1: showing (A) Prebent titanium meshes on 3D printed model with the desired amount of augmentation, (B) Prebent titanium meshes fixed into the desired position for full arch augmentation, (C,D,E) Buccal pad of fat used to cover the titanium mesh and mucosal closure, (F) soft tissue healing after 6 months, (G) implants placed in the augmented arch



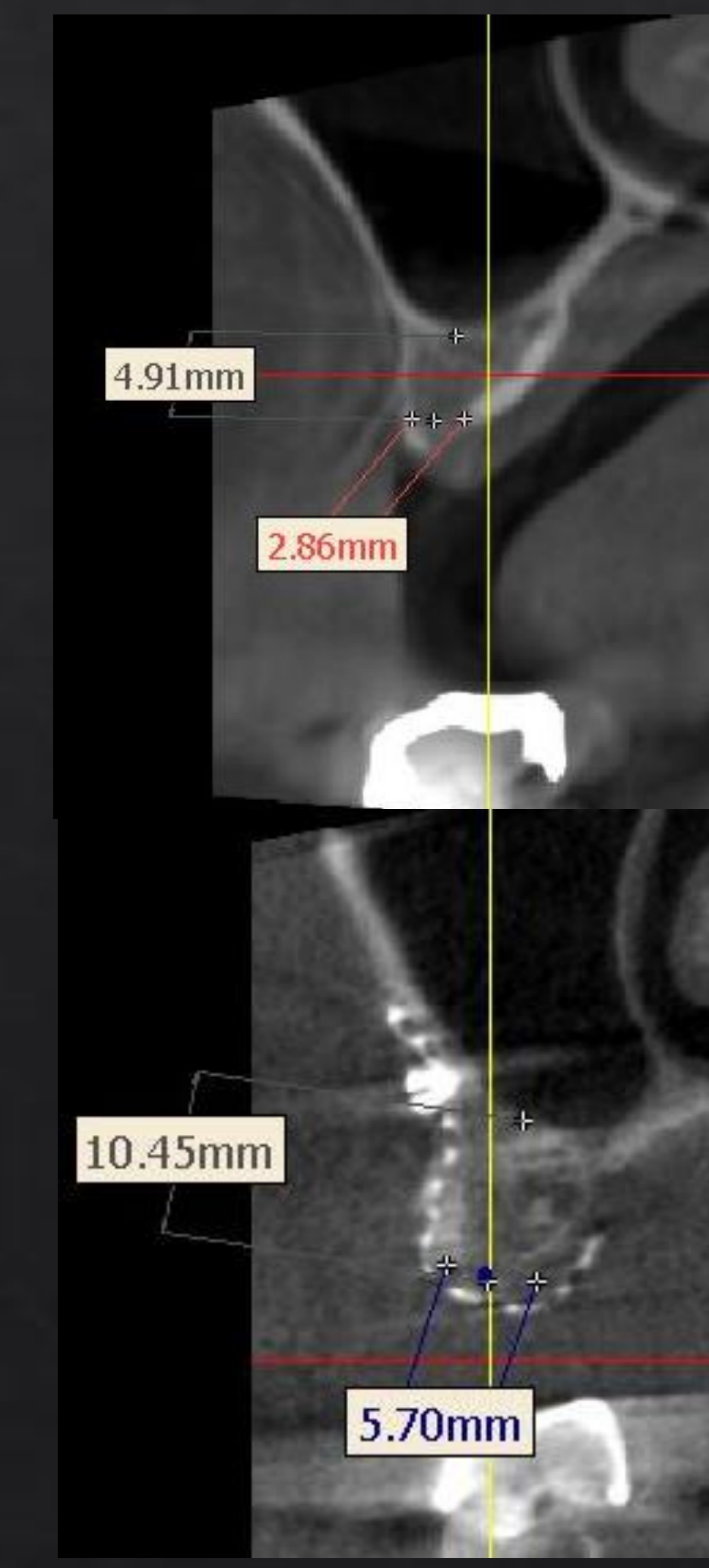
Same Cross sectional cut before and after augmentation showing a 4 mm gain in horizontal dimension



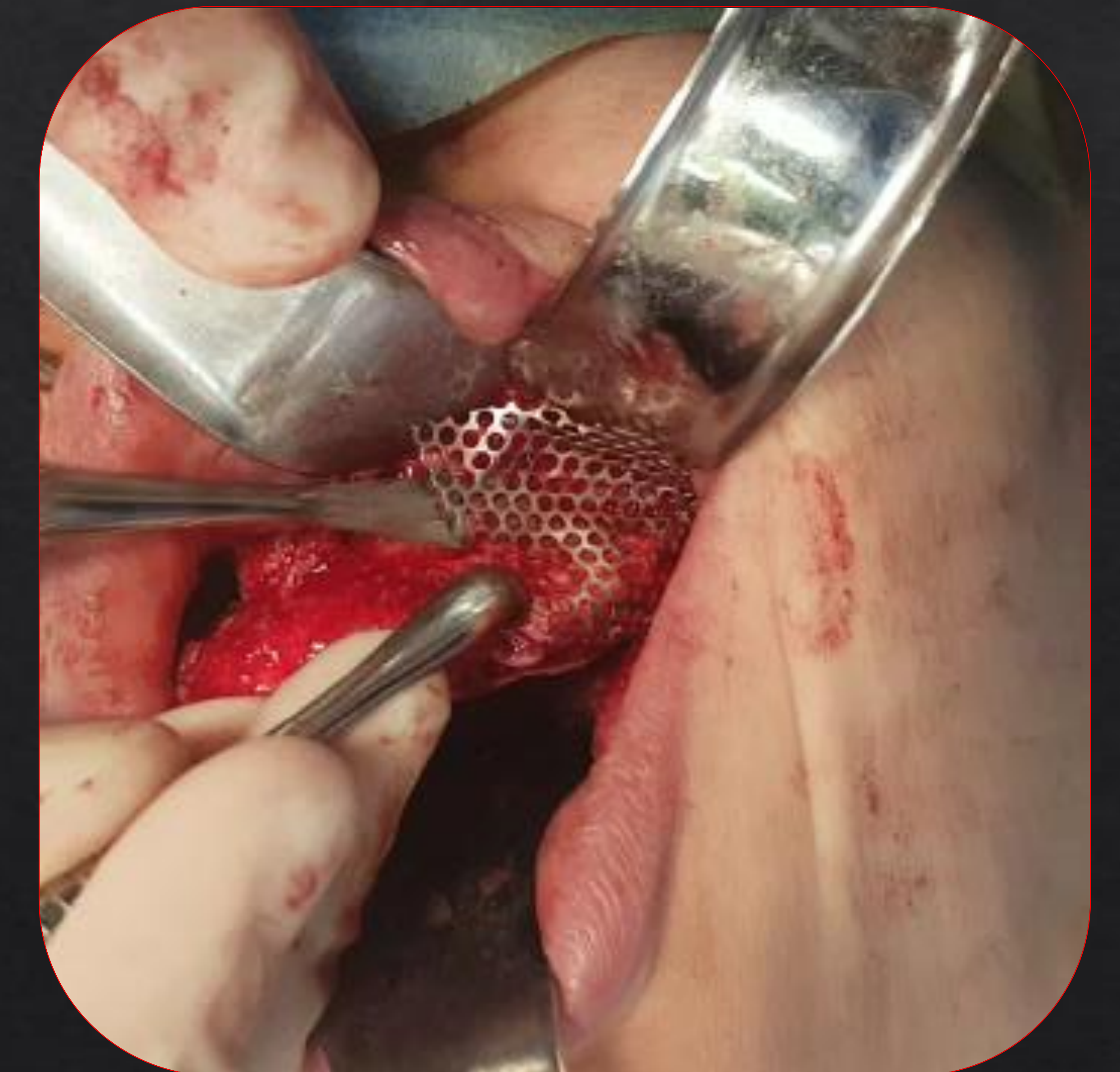
This photo from case 2 shoing the bone formed over the titanium mesh with no sign of any fibrous tissue under the titanium mesh



Case 2: showing (A) Prebent titanium meshes on 3D printed model with the desired amount of augmentation, (B) Prebent titanium meshes fixed into the desired position for full arch augmentation, (C) Buccal pad of fat used to cover the titanium mesh and mucosal closure, (D) soft tissue healing after 6 months, (E) implants placed in the augmented arch

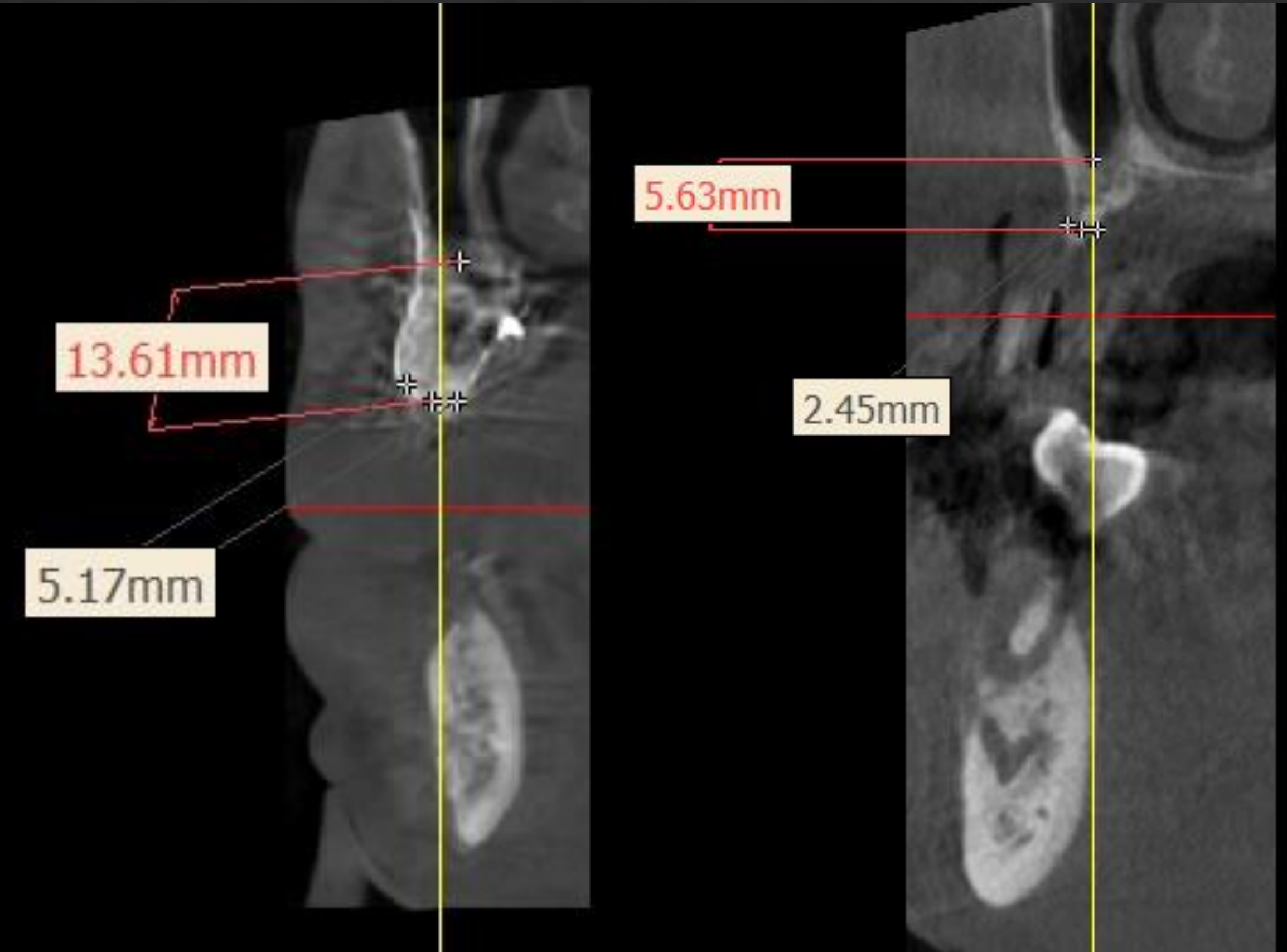
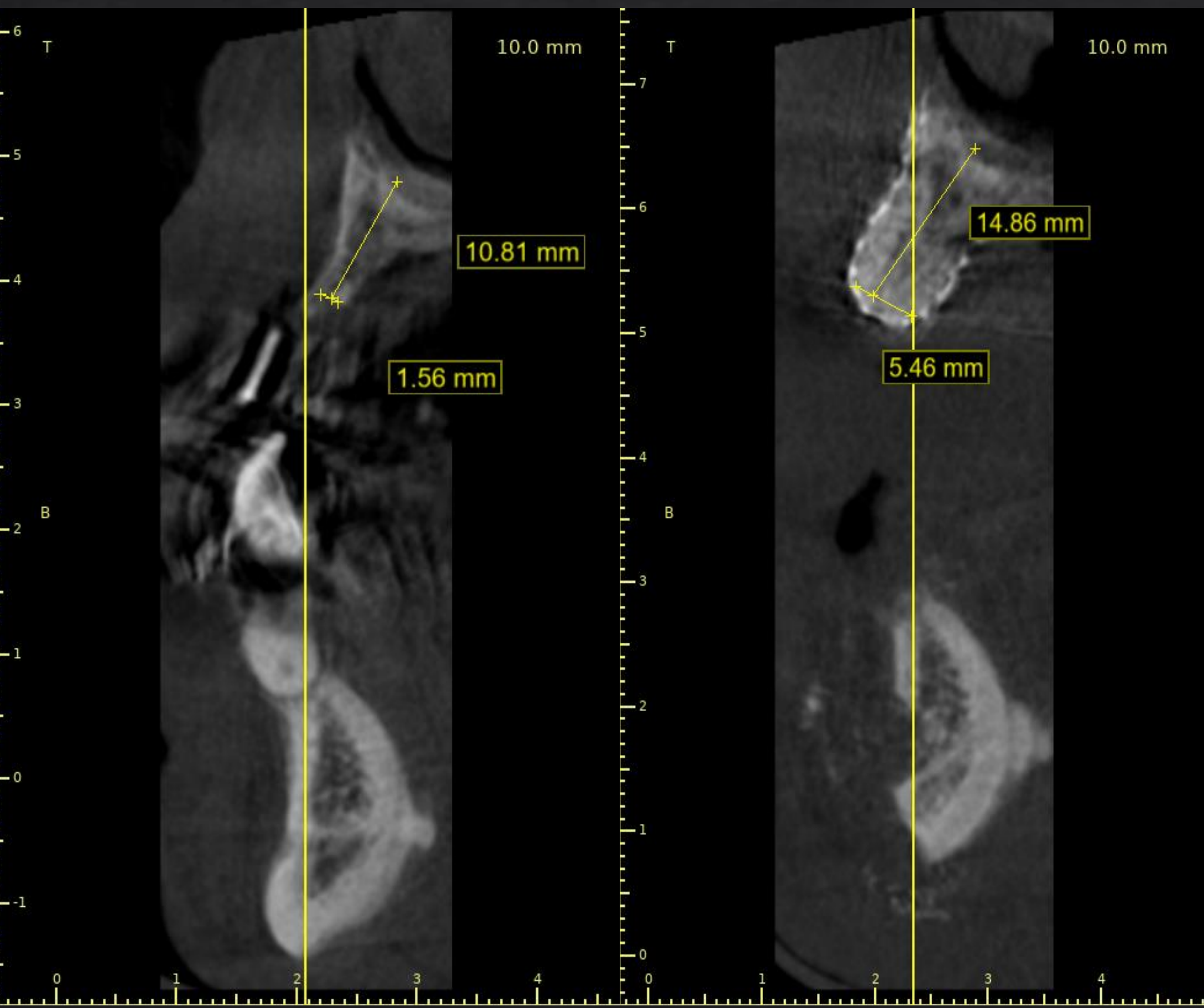
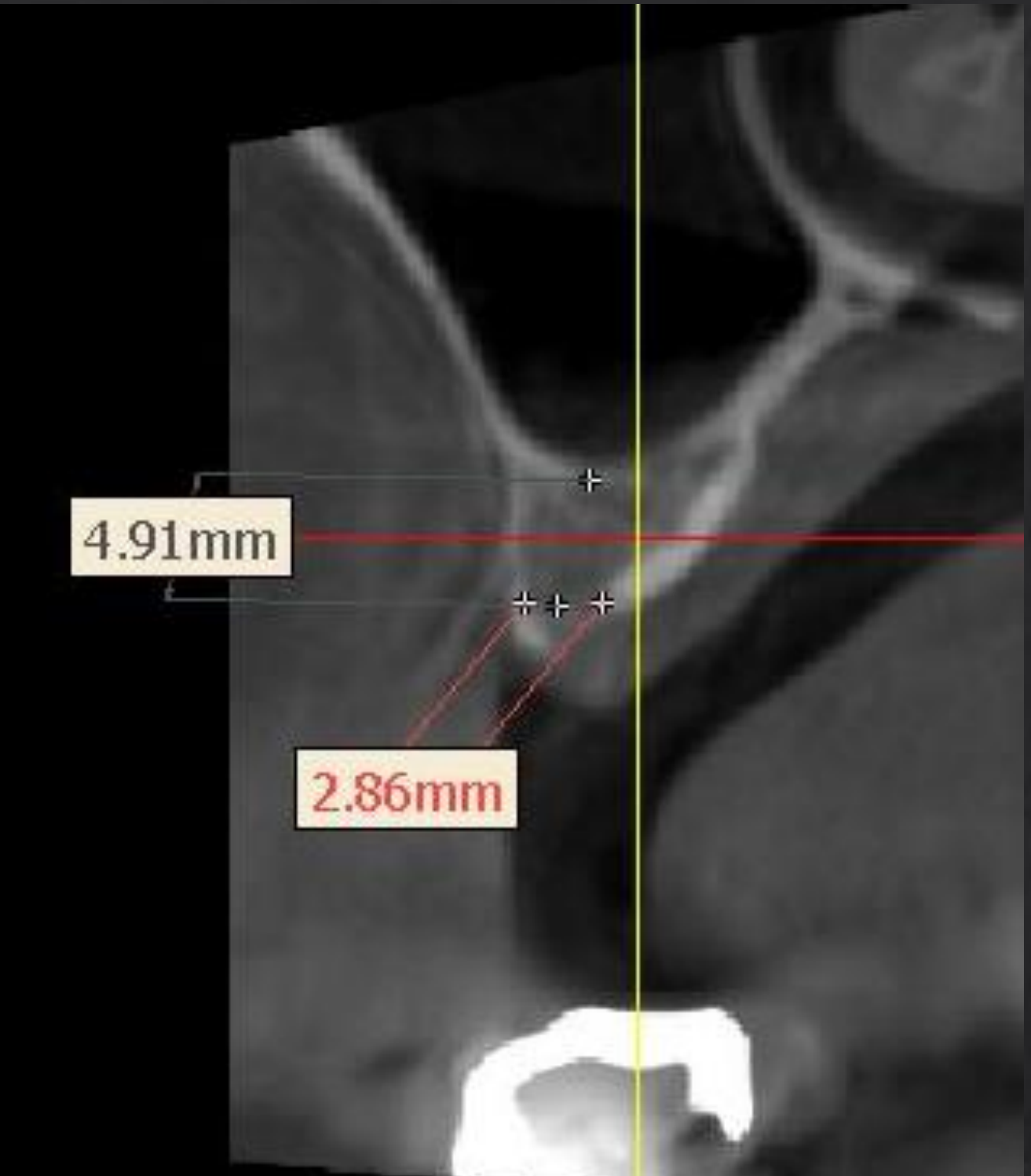
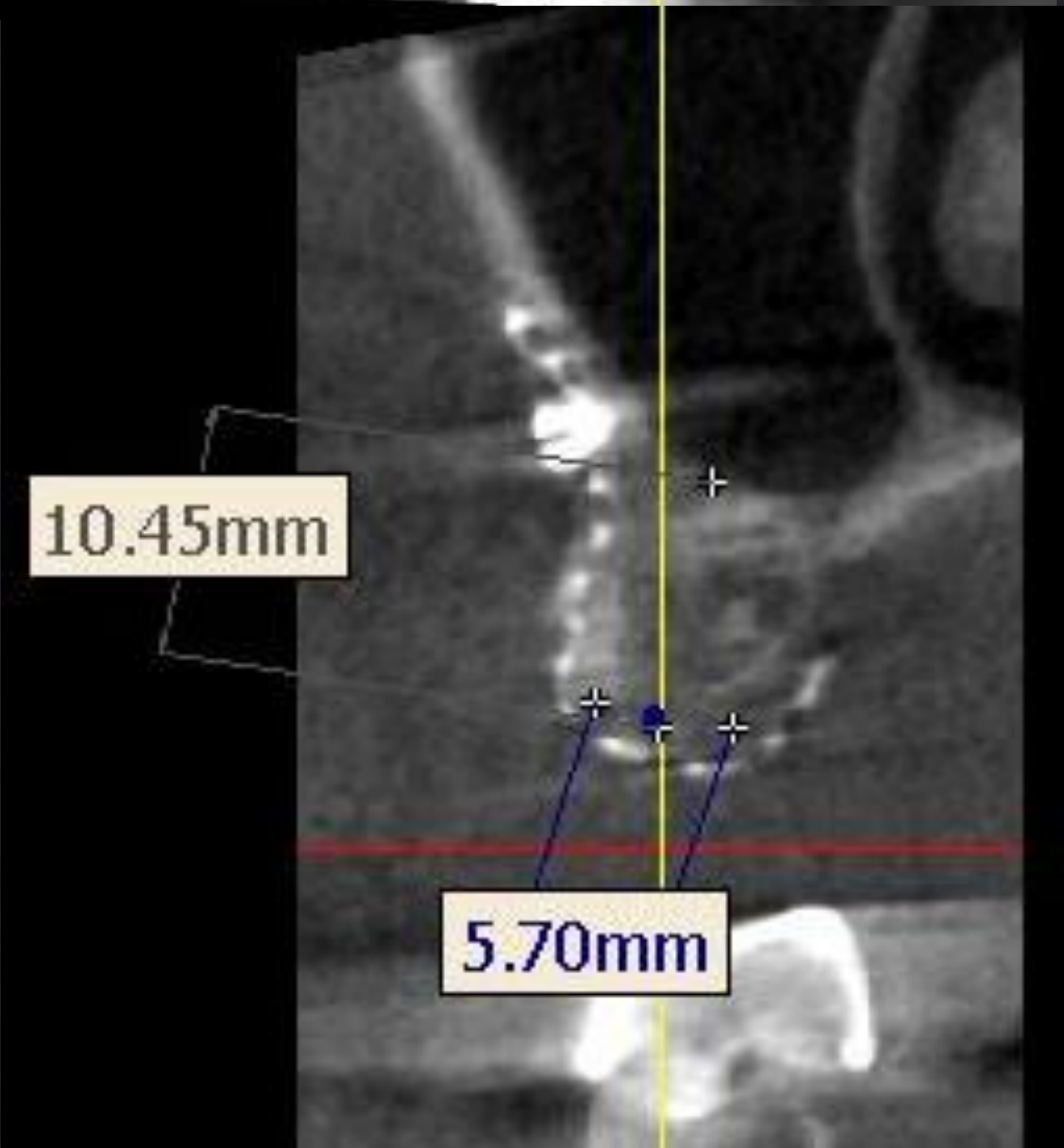
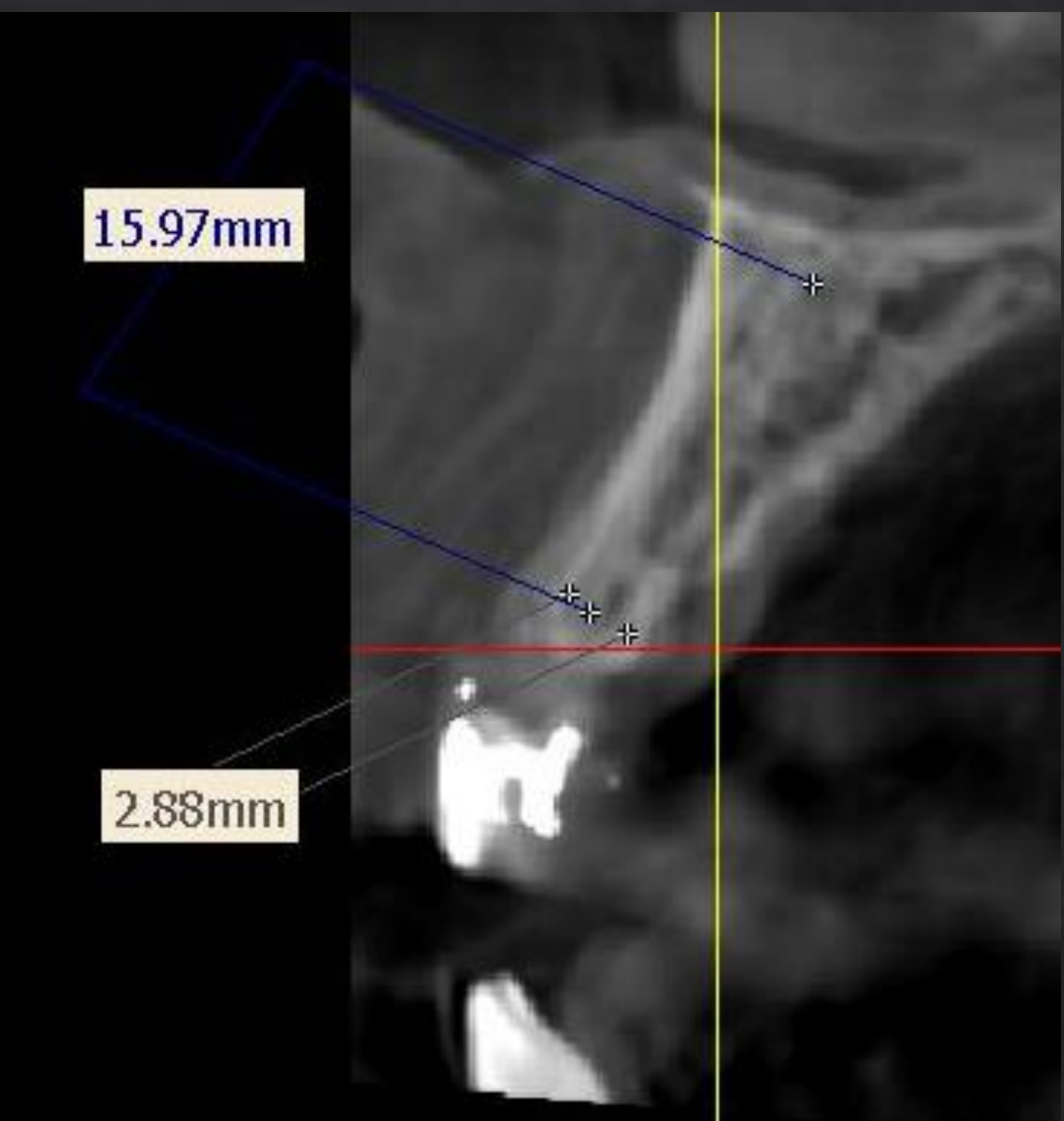
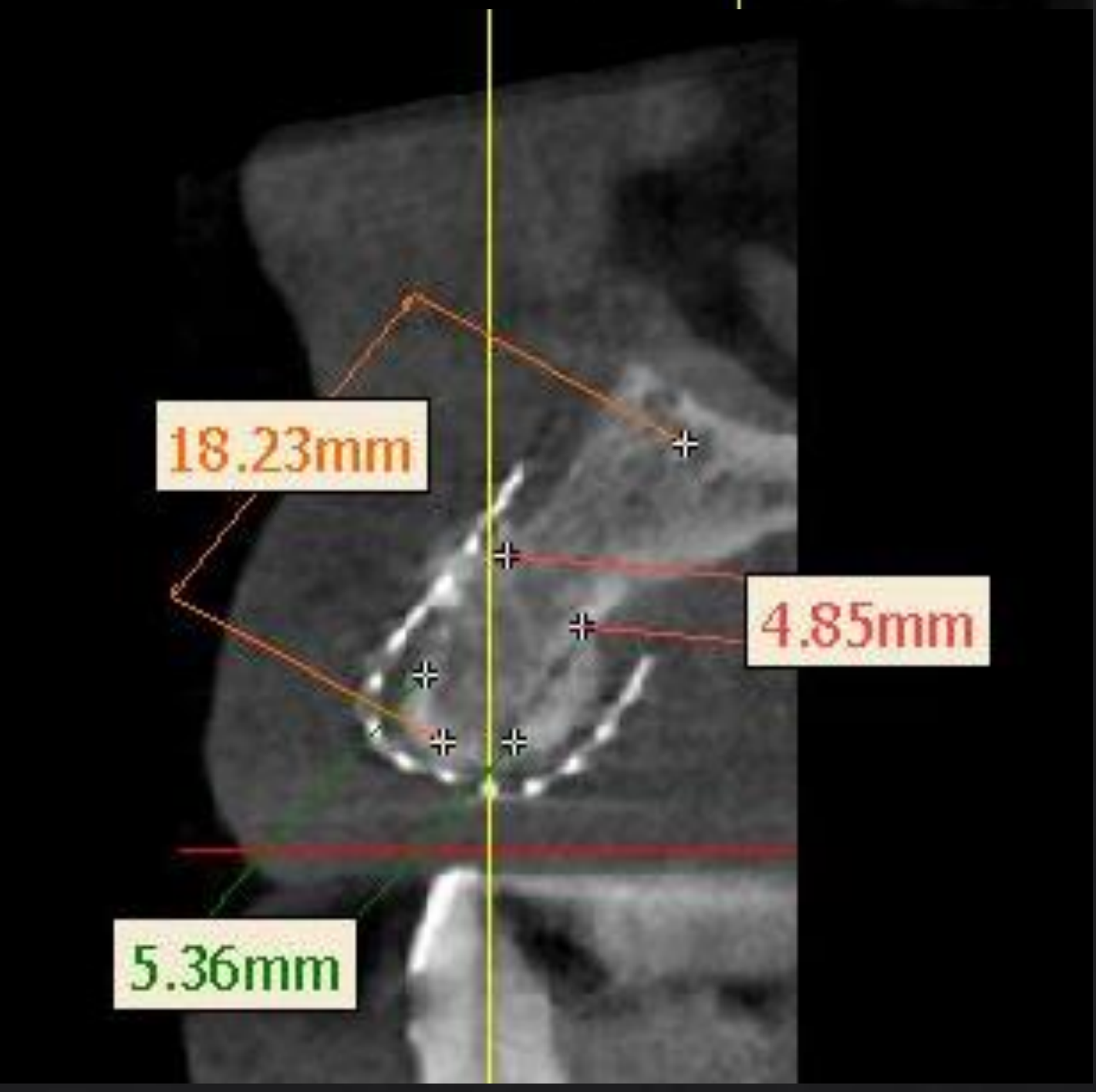


Same Cross sectional cut before and after augmentation showing a 5.54mm gain in height and 2.81mm gain in width

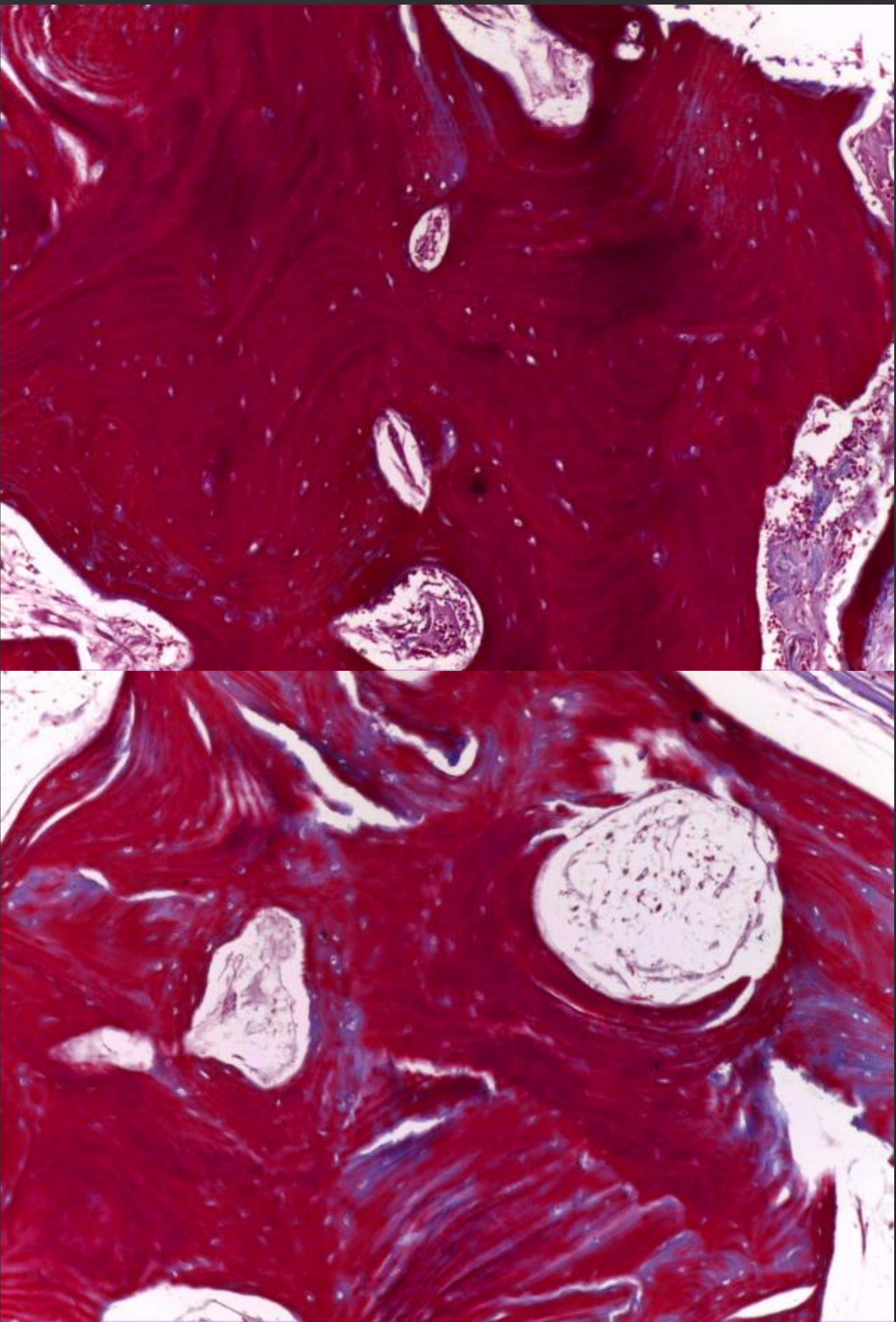


This video live from the mesh removal showing the bone being chipped from the mesh and no fibrous tissue formation underneath

Results: CBCT was performed 6 months postoperatively for each patient, they showed a 5.2mm horizontal bone gain and a 5mm gain in vertical dimension. At the re-entry surgery; core biopsies were retrieved from the regenerated sites using trephine burs for histomorphometric analysis. A statistically significant bone area percent was detected (47%), A statistically significant percentage of mature bone as detected by Masson trichrome was also detected (67.7%).



Core biopsy taken using a trephine bur for histomorphometric analysis



Histomorphometric analysis showing significant bone area percentage

