



Vertical Ridge Augmentation using Autogenous Onlay Ring Blocks combined with Guided Bone Regeneration using Native Collagen Membrane in Atrophic Posterior Mandibles.

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Introduction: Vertical ridge atrophy in the posterior mandible is one of the challenges that hinder dental implant placement due to proximity of the inferior alveolar nerve. Guided bone regeneration using a native collagen membrane is considered a predictable procedure for horizontal ridge augmentation. However, it is considered a challenge during vertical augmentation. Hence, **the aim of this study** was to assess vertical bone gain following vertical ridge augmentation using autogenous onlay ring blocks combined with guided bone regeneration using a native collagen membrane and a mixture of 1:1 autogenous and anorganic bovine bone minerals.

Methods: 10 patients suffering from vertical ridge deficiency in the posterior mandible were included in the study, with residual alveolar bone height to the IAN ranging from 5 to 7 mm.



Fig. 1: Panoramic radiograph showing vertical deficiency.

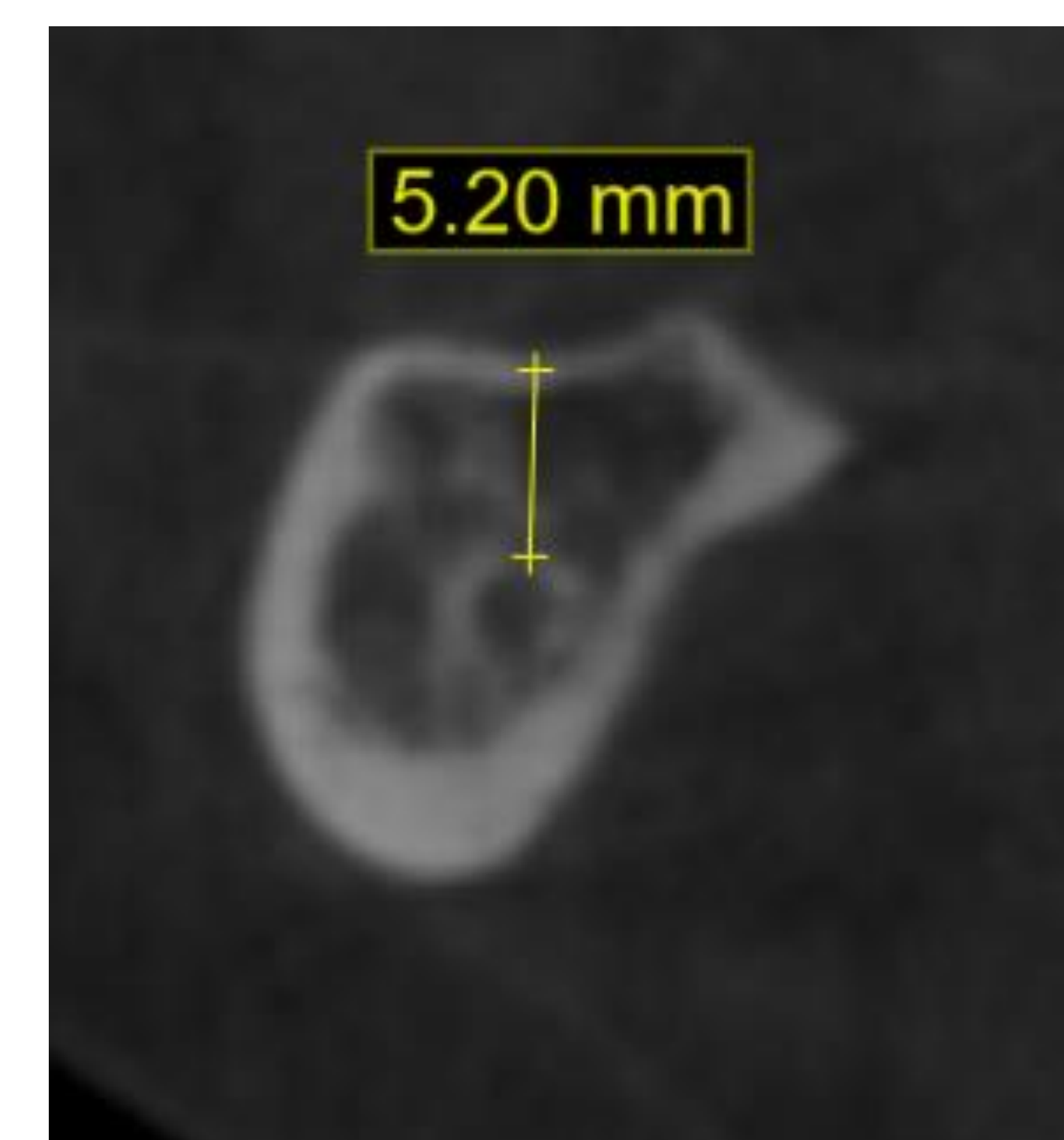


Fig. 2: Preoperative CBCT cross section.

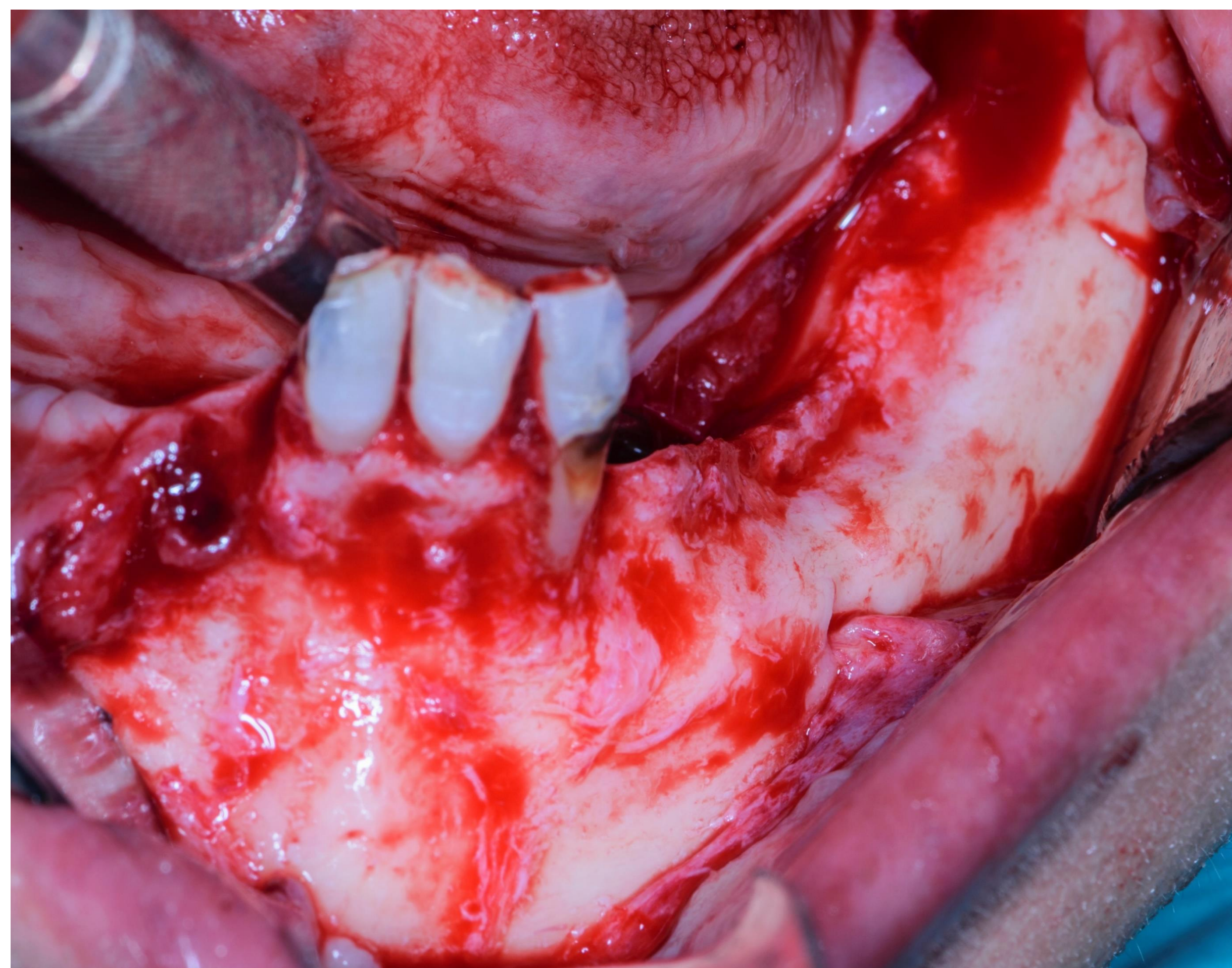


Fig. 3: Flap elevation and adequate exposure of the recipient site and the mandibular symphysis.

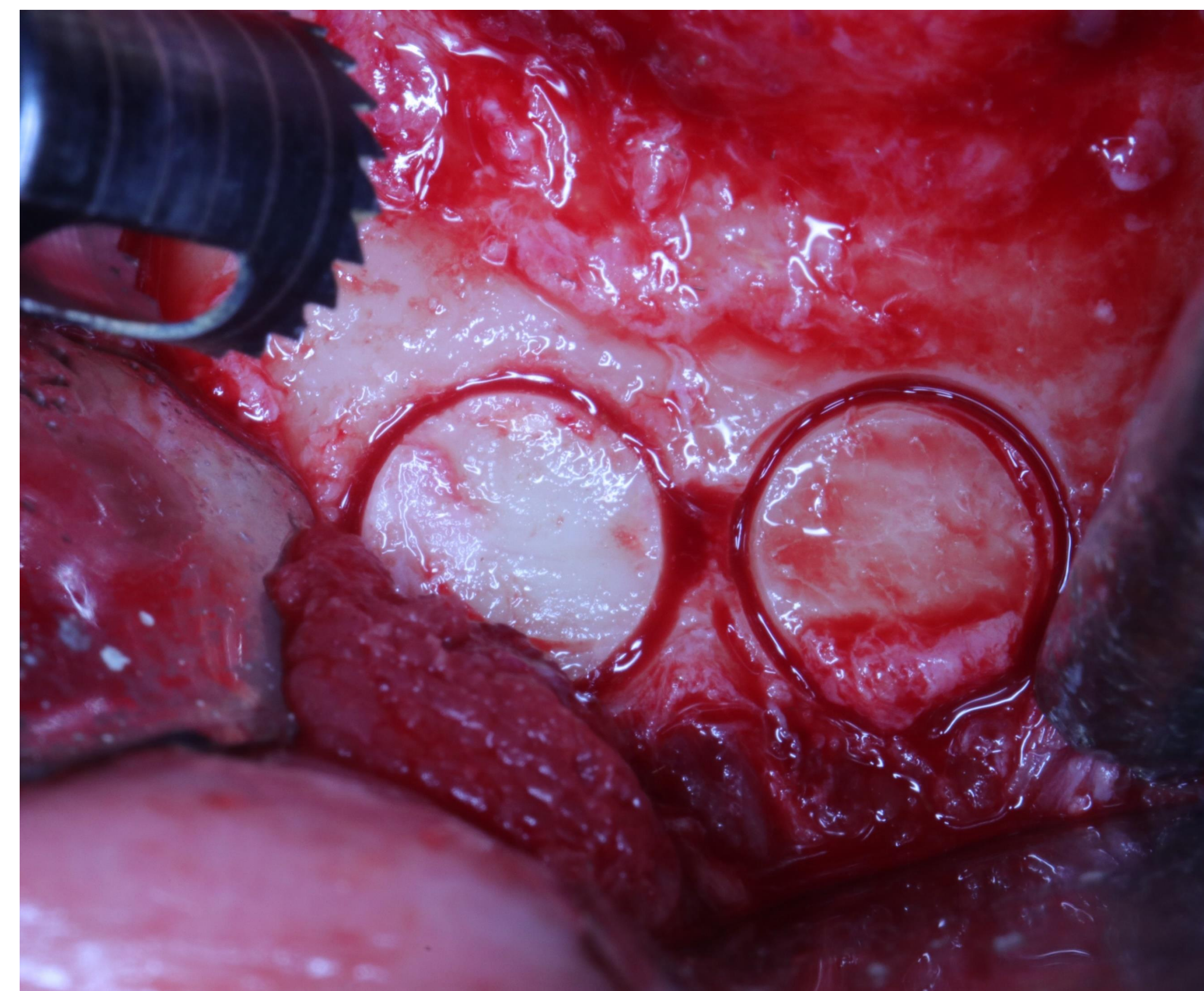


Fig. 4: Harvesting ring blocks using an 8mm trephine bur.

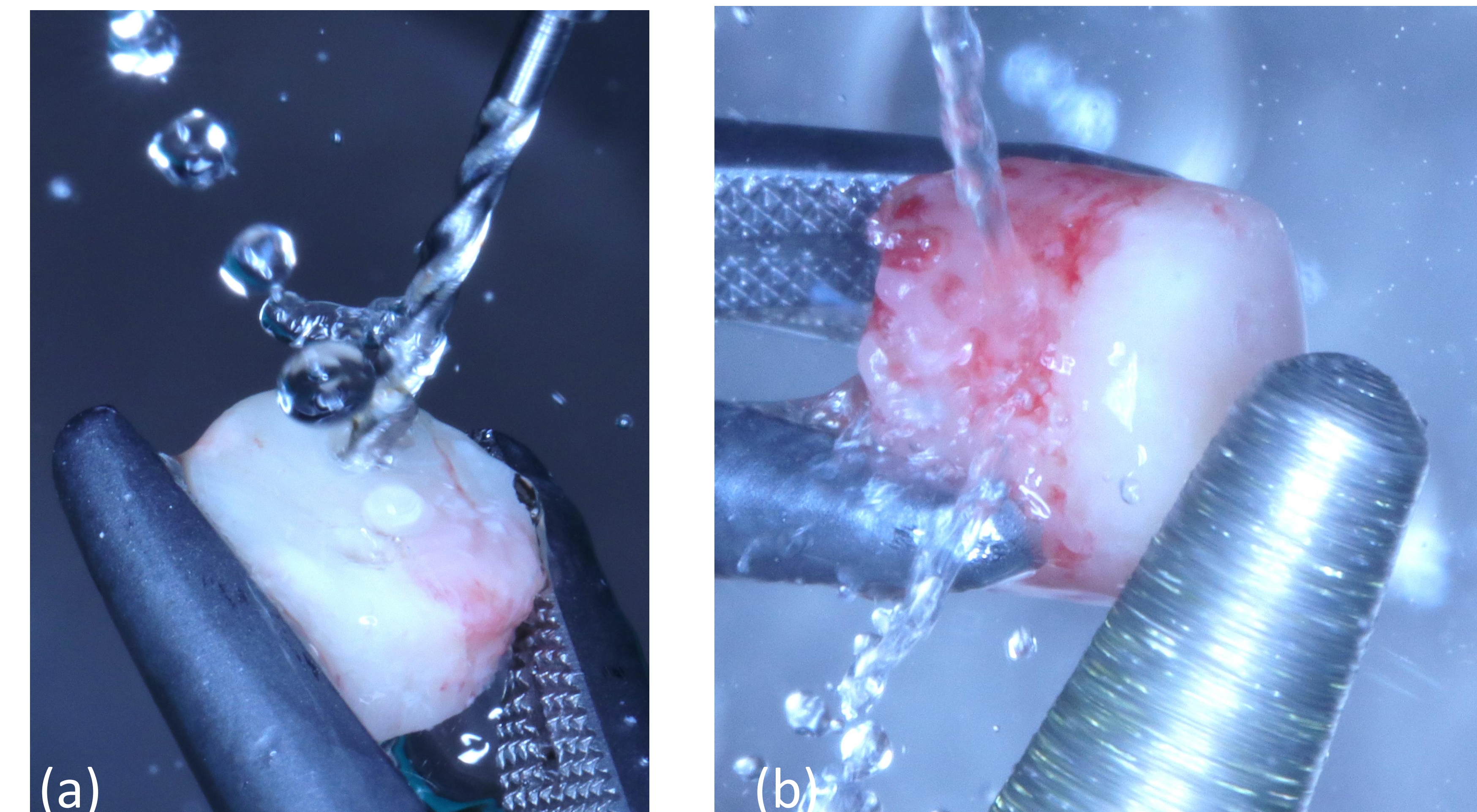


Fig. 5: (a) Drilling fixation screw hole. (b) Smoothing any sharp edges using a large diamond bur.

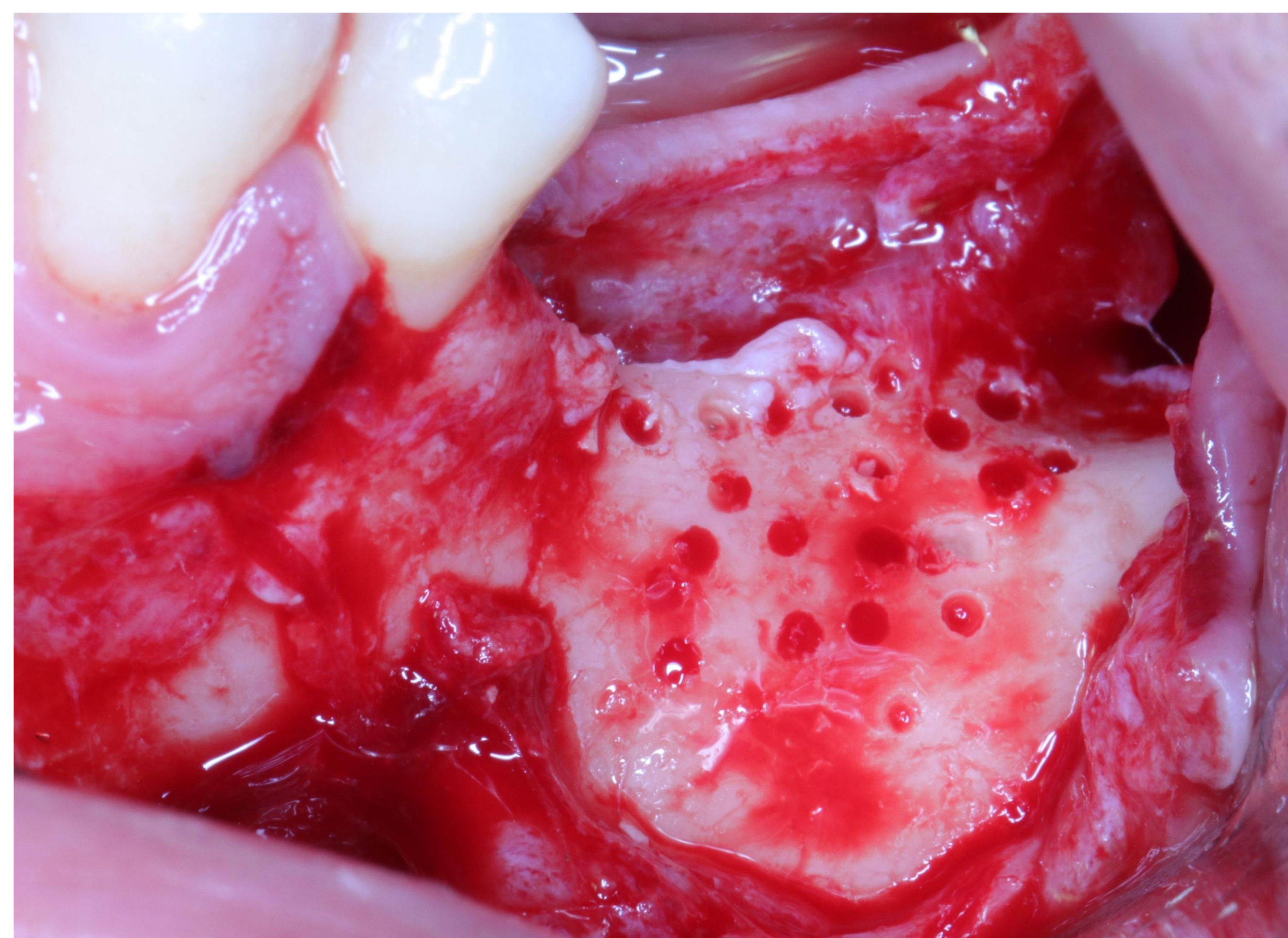


Fig. 6: Multiple cortical perforations at the recipient site.

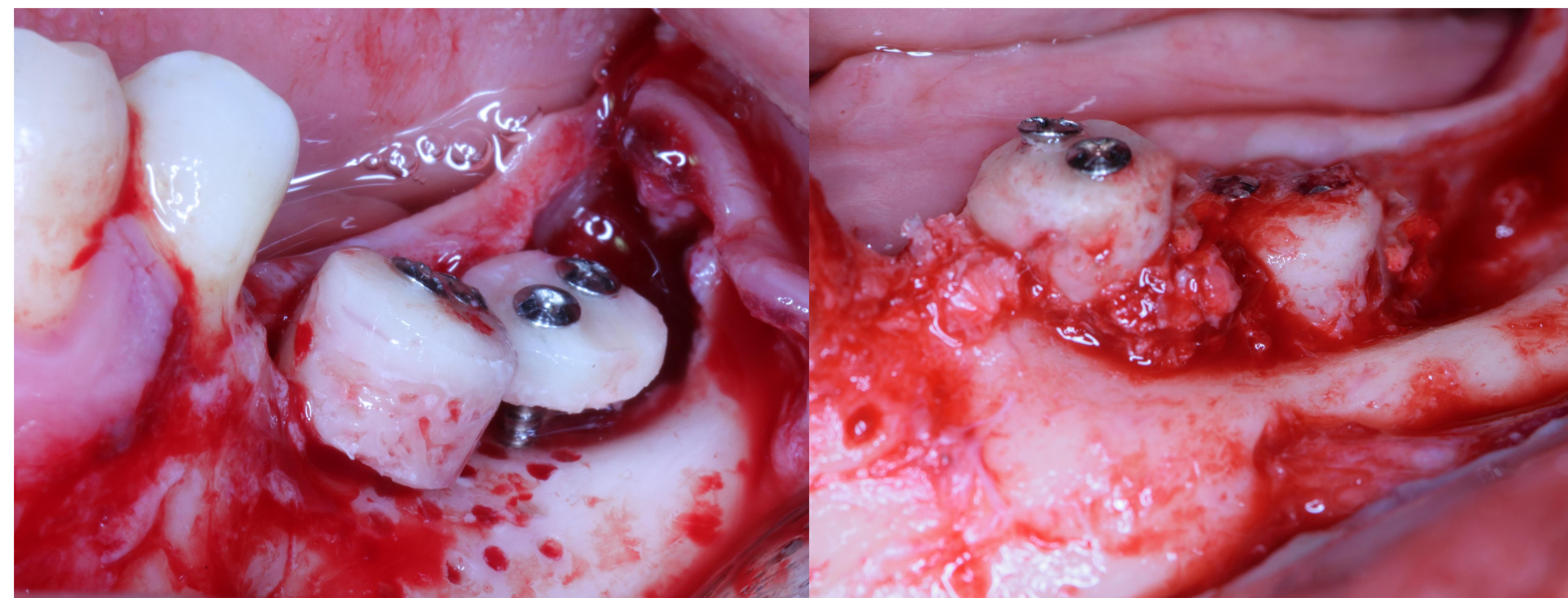


Fig. 7: Autogenous ring blocks fixed at the recipient site with 2 screws each.

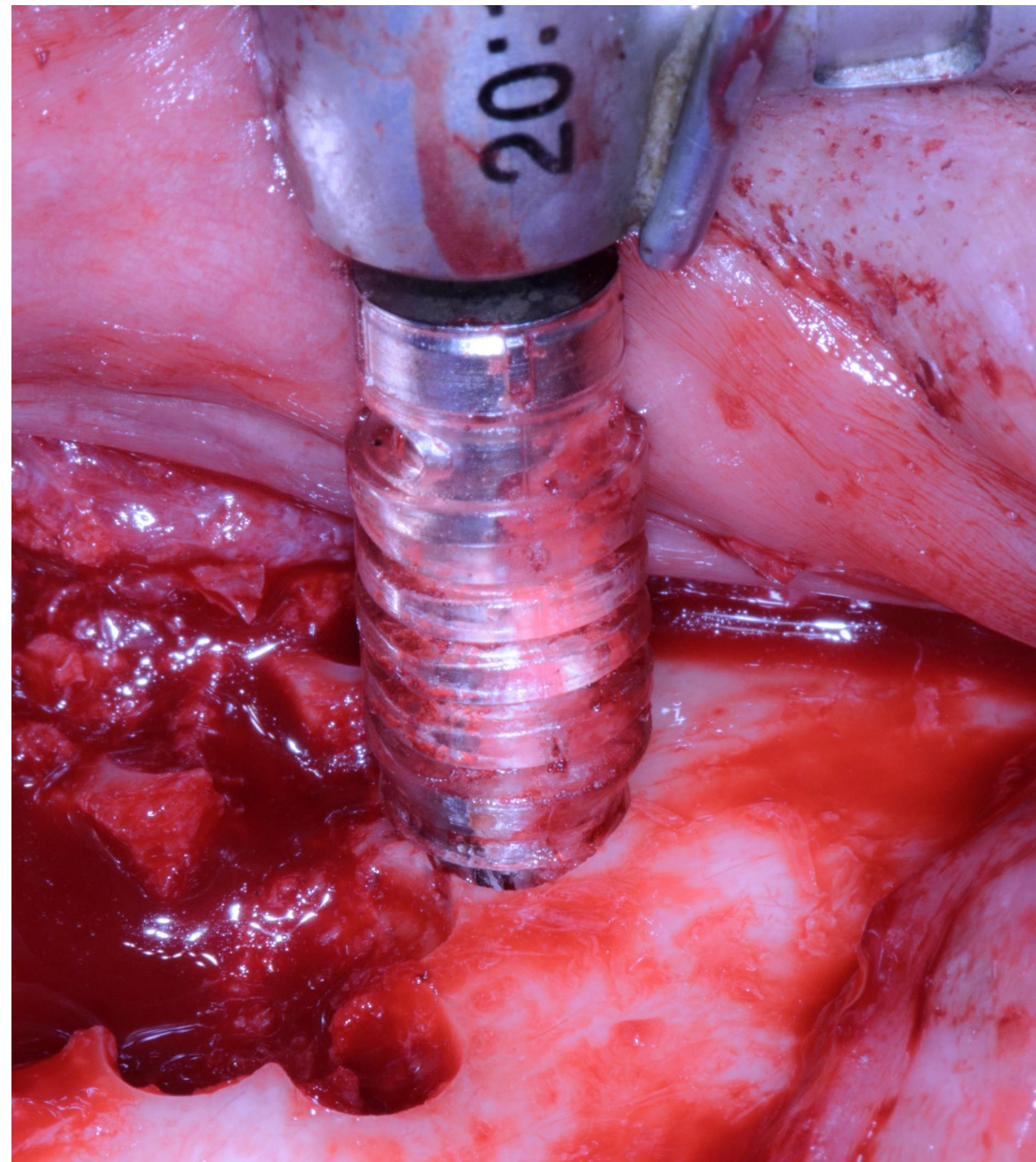


Fig. 8: Autogenous particulate harvest using ACM bur.



Fig. 9: 1:1 ratio of autogenous and anorganic bovine bone minerals.

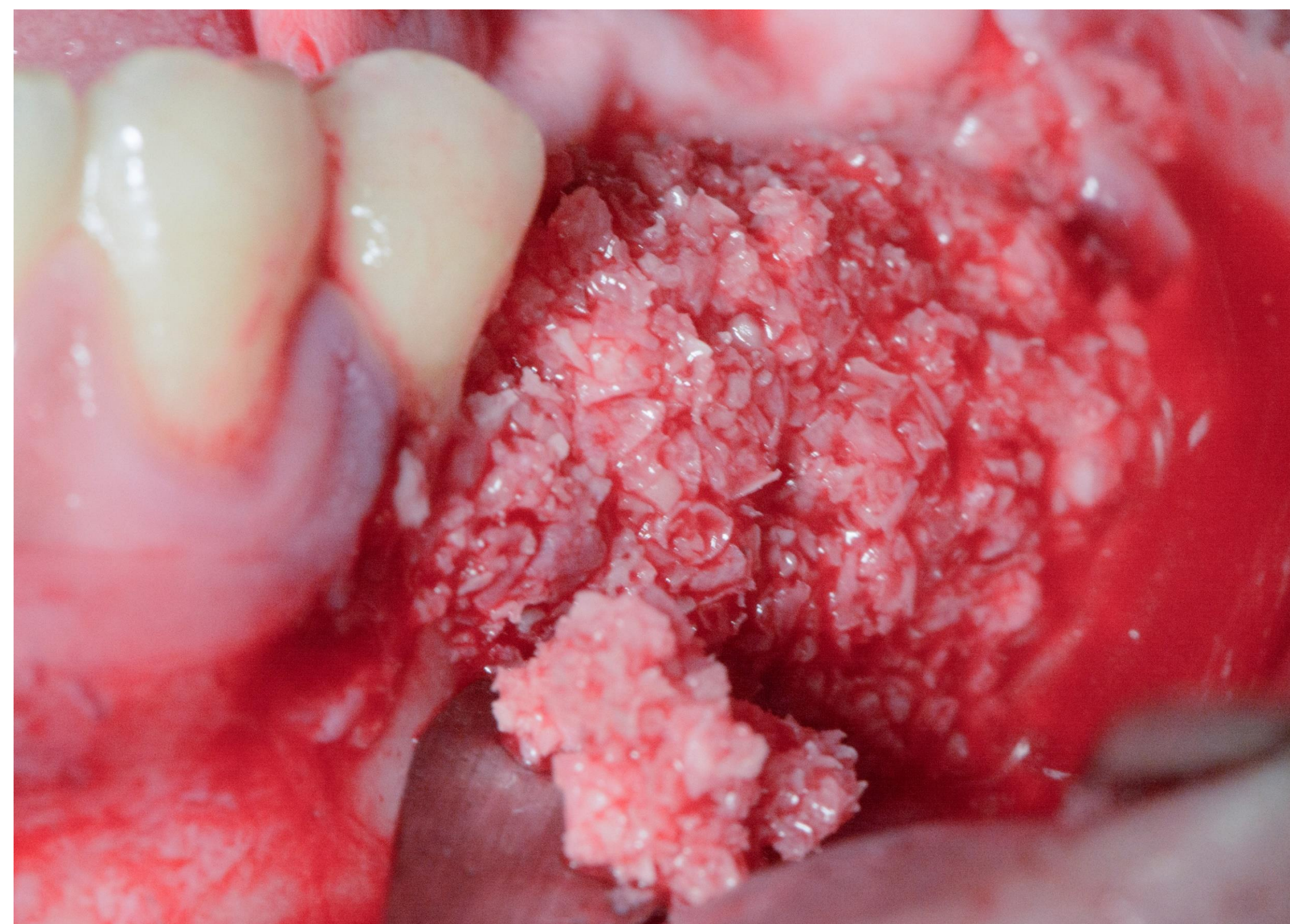
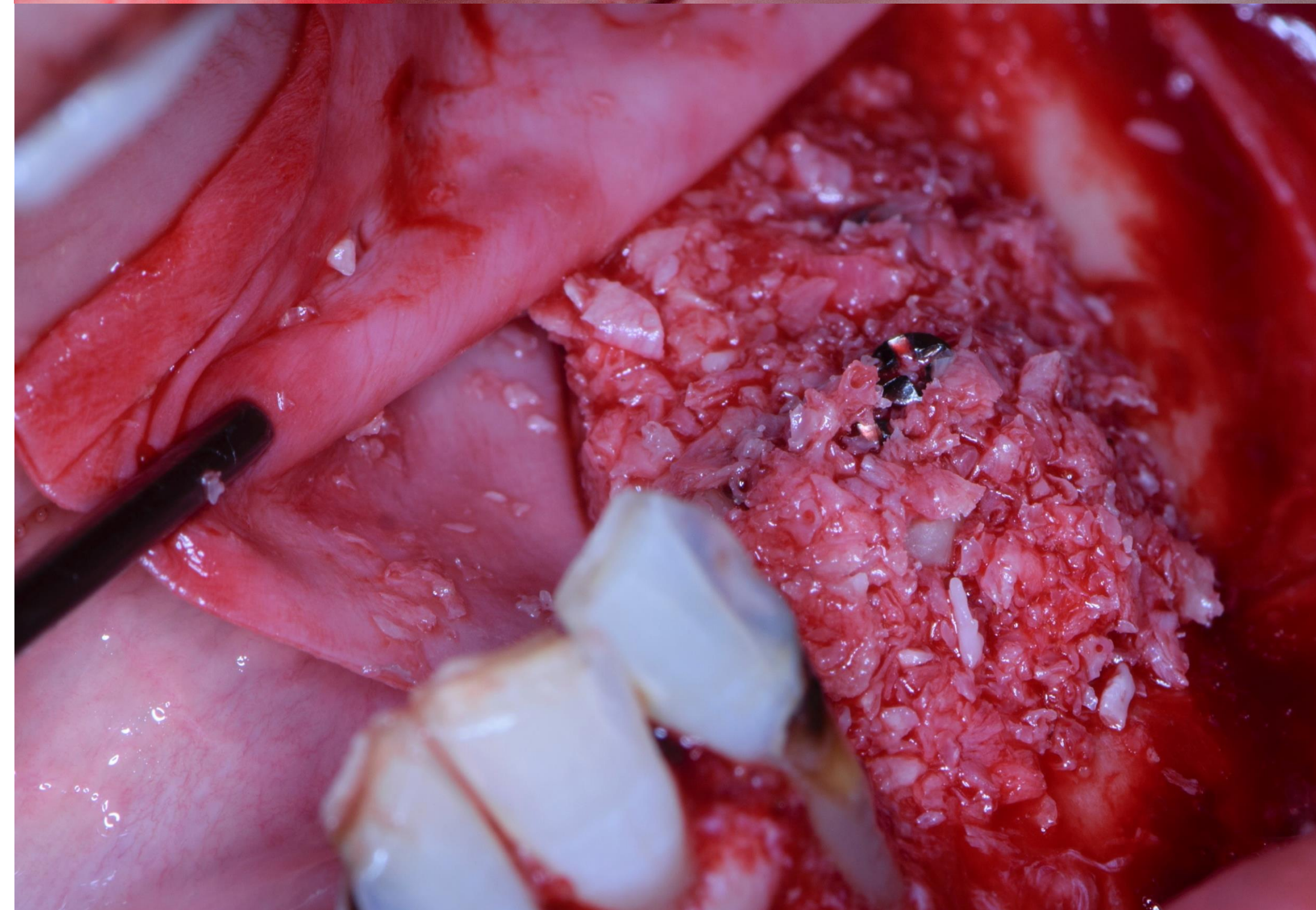


Fig. 10: Packing particulate mixture around and covering the ring blocks.

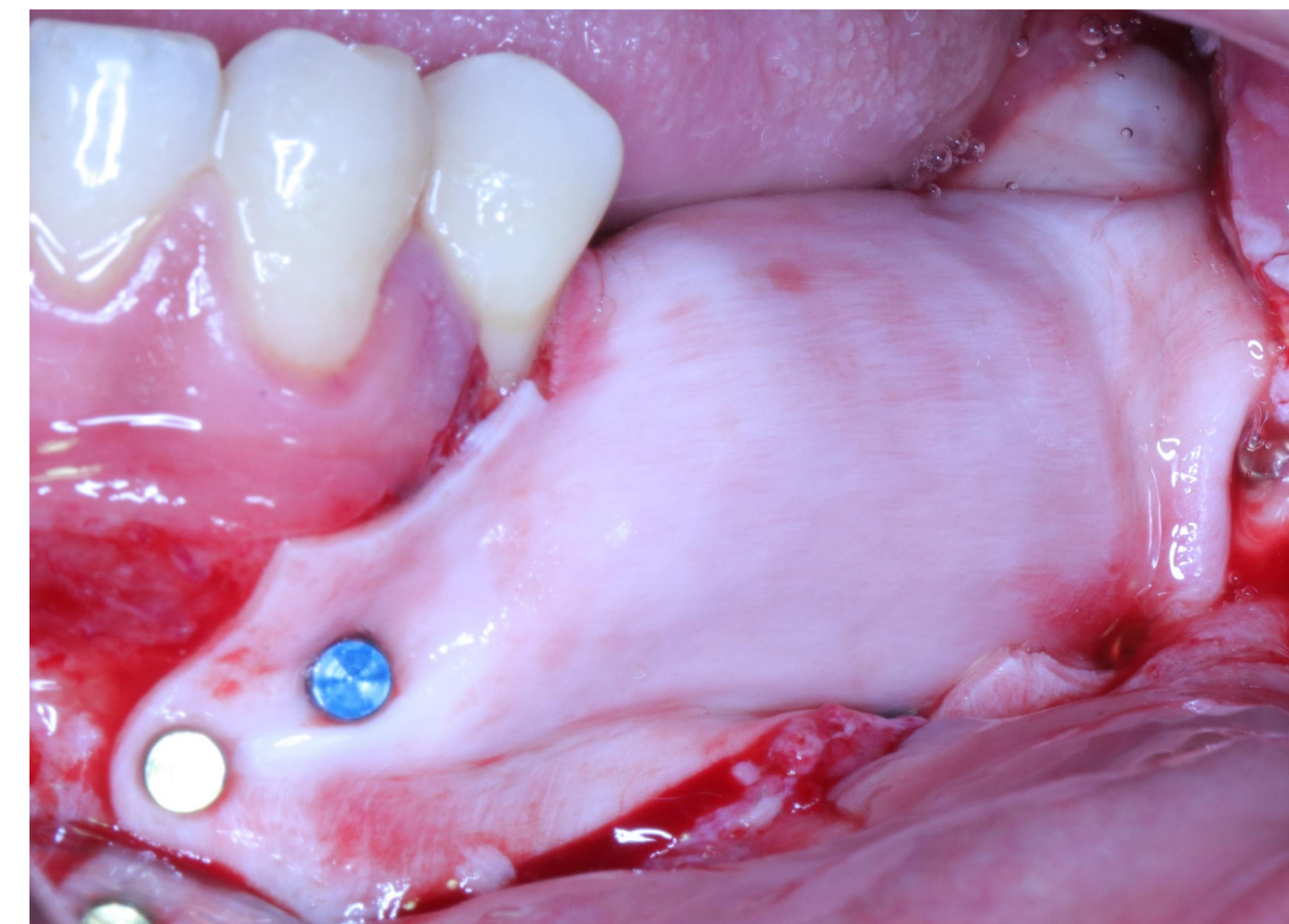
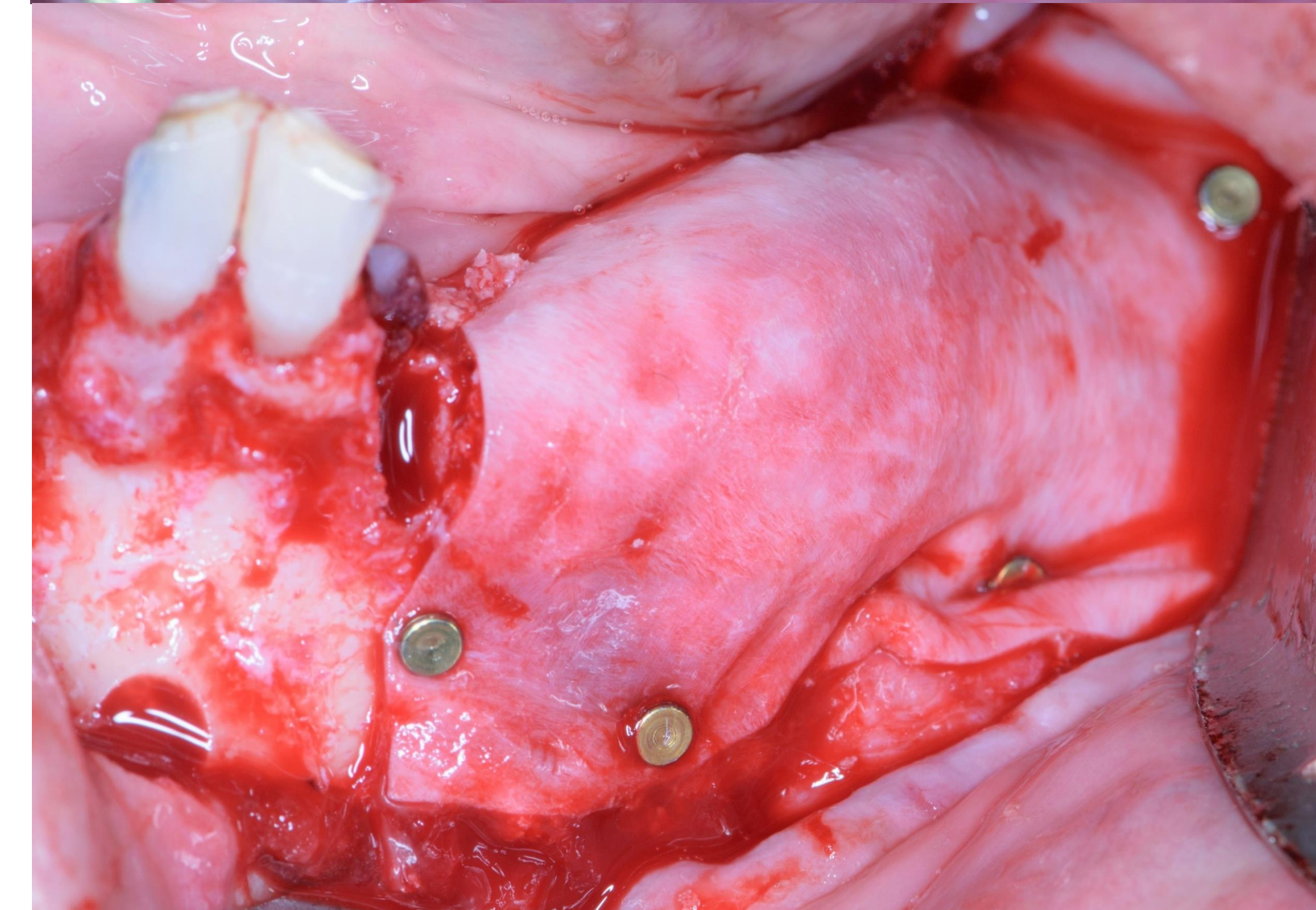
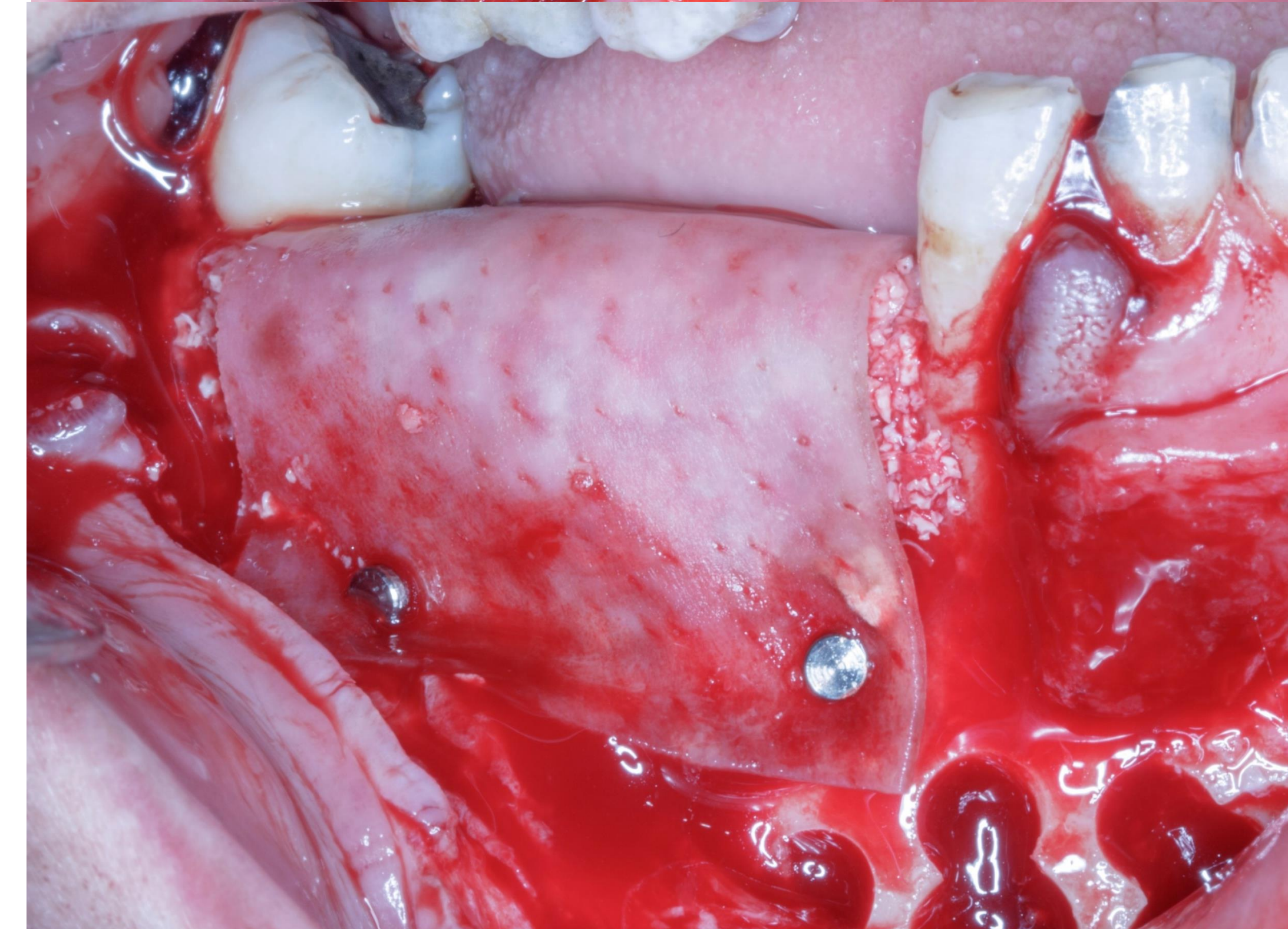


Fig. 11: Fixation of the native collagen membrane over the graft complex.



Fig. 12: Adequate flap advancement to ensure tension free closure.

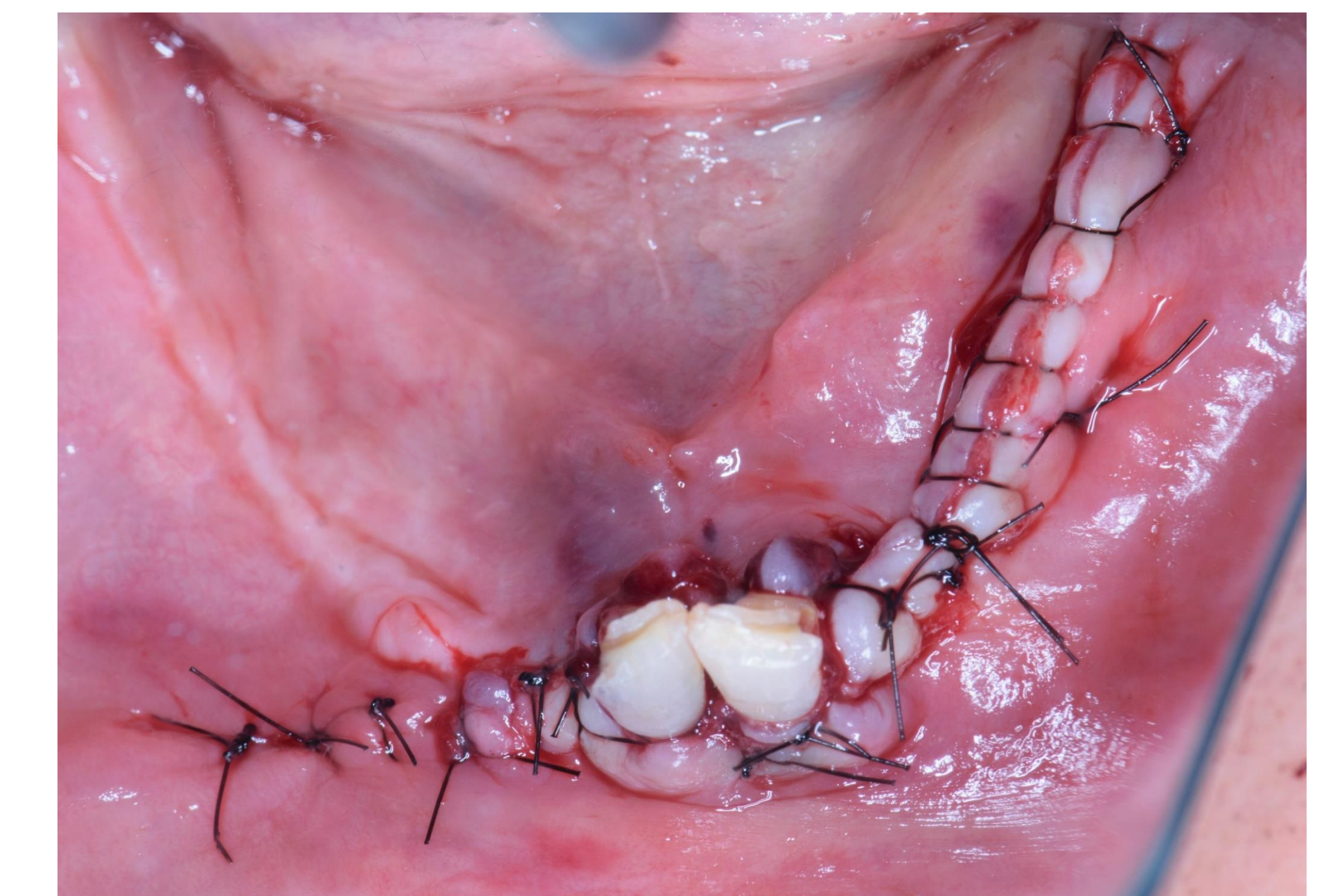
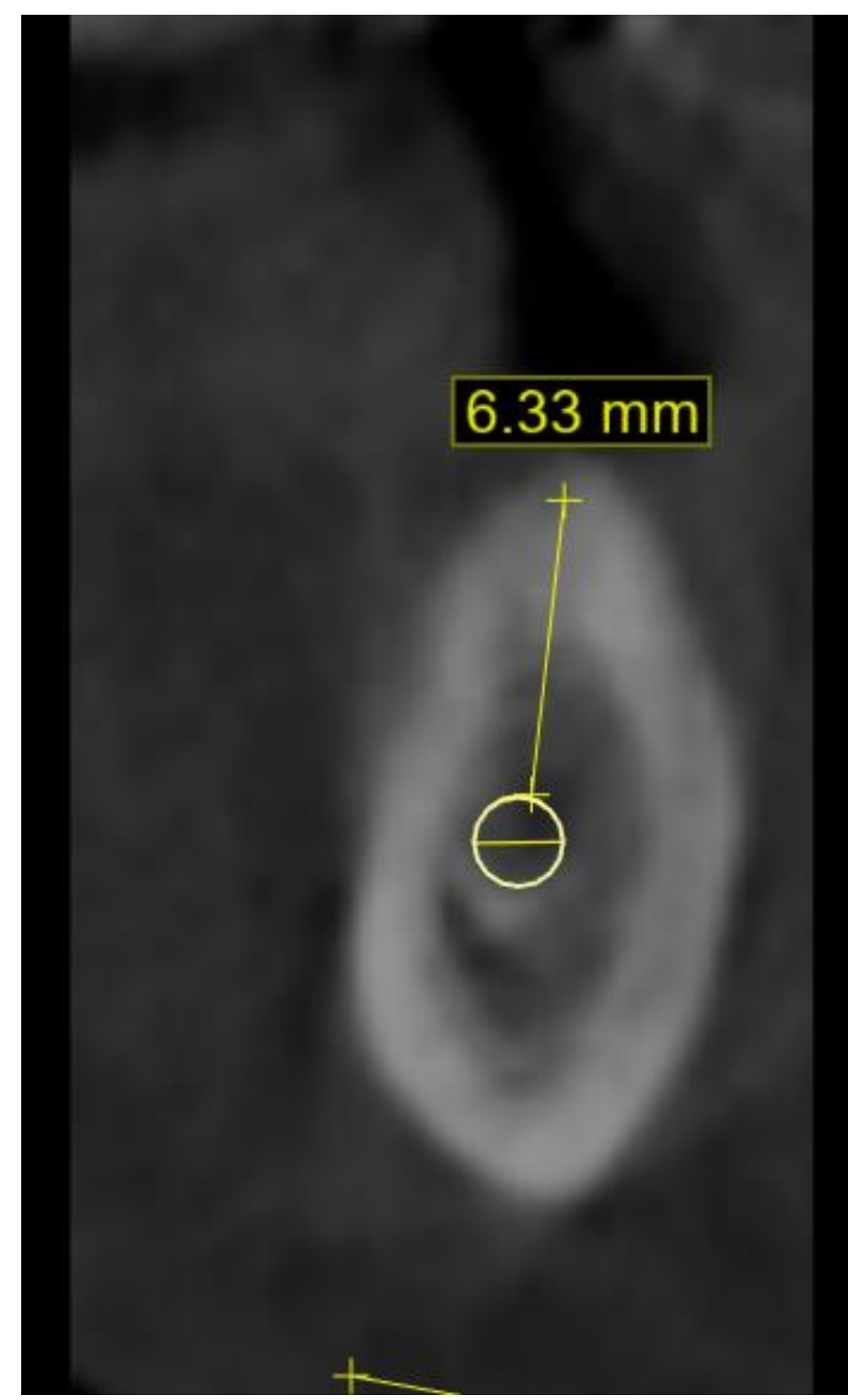


Fig. 13: Bilayer suturing using horizontal mattress followed by running lock sutures.



Preoperative cross section

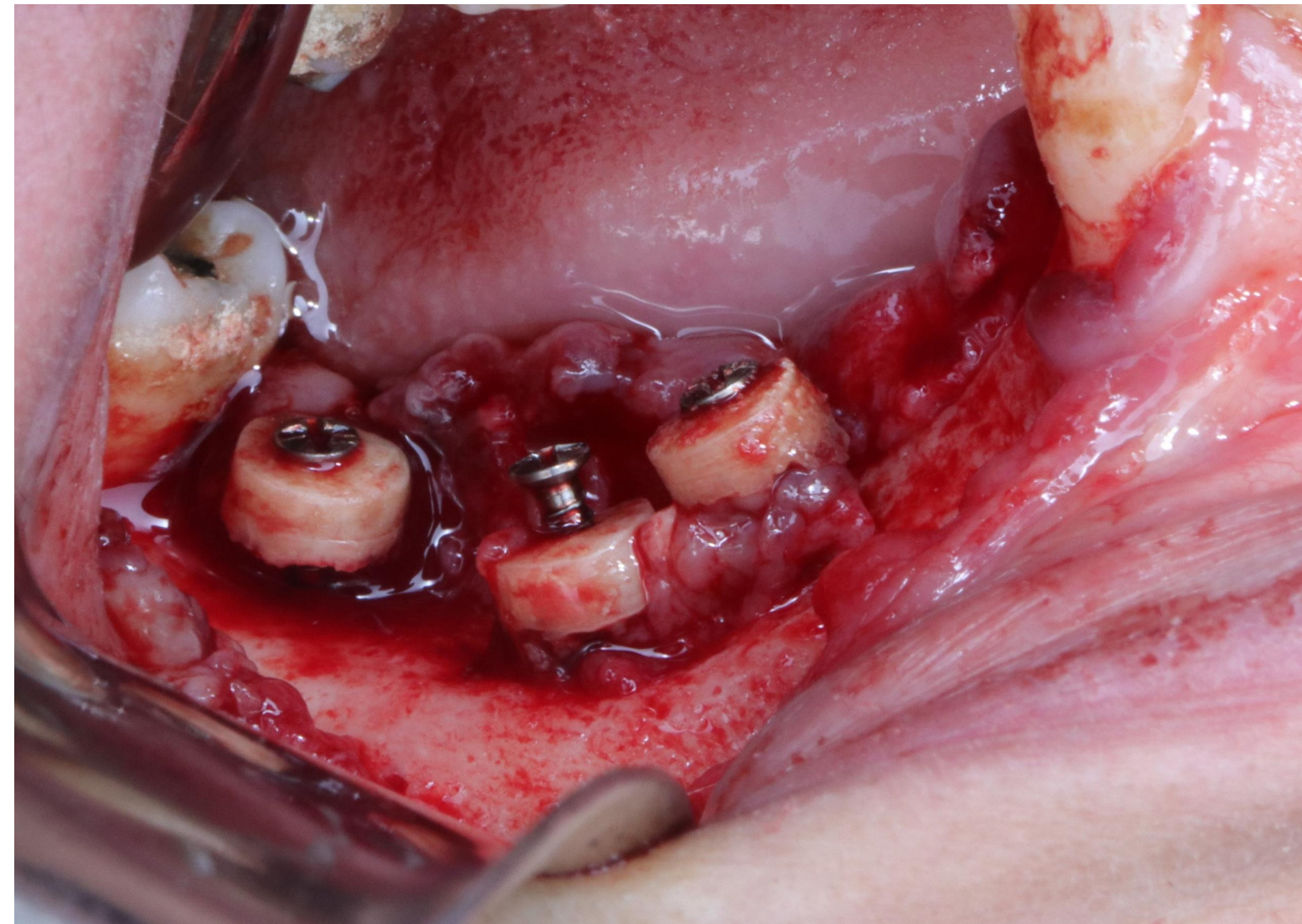


Immediate postoperative cross section

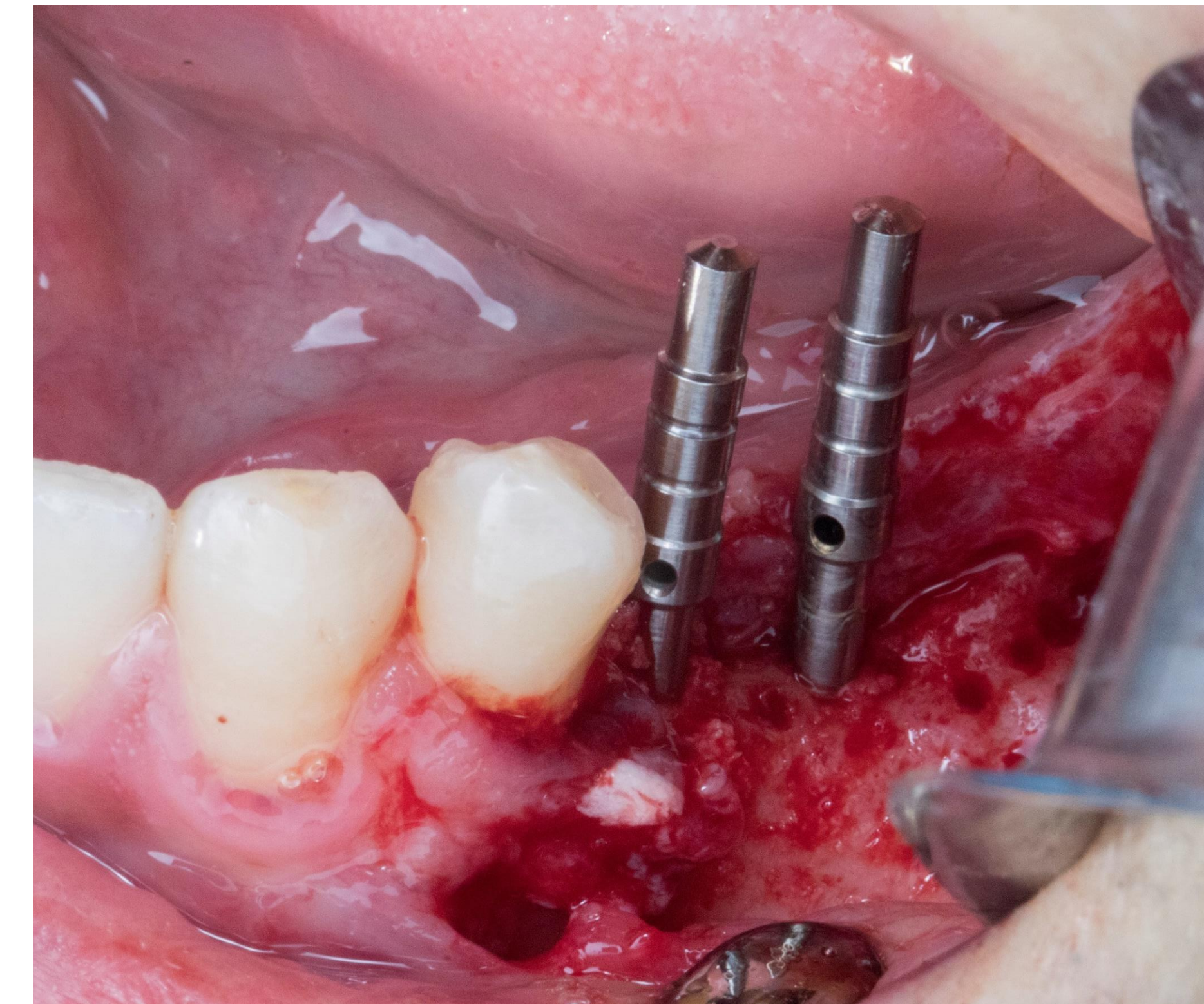


6 months postoperative cross section

Results: Healing was uneventful for all patients except 2 patients who showed a wound dehiscence that persisted for 6 months and the blocks were removed due to fibrointegration. Radiographically after 6 months, the mean vertical bone gain was 4.8 ± 1.1 mm excluding the failed cases. During re-entry, all 8 cases received dental implants successfully.



A case with fibrointegration of the blocks. They were removed



Paralleling pins during placement of dental implants



Occlusal view after implant placement

Conclusion: Within the limitation of this study, vertical ridge augmentation using autogenous onlay ring blocks covered by a native collagen membrane can be considered a successful technique regarding vertical bone gain, however, it is still an unpredictable technique regarding clinical complications.