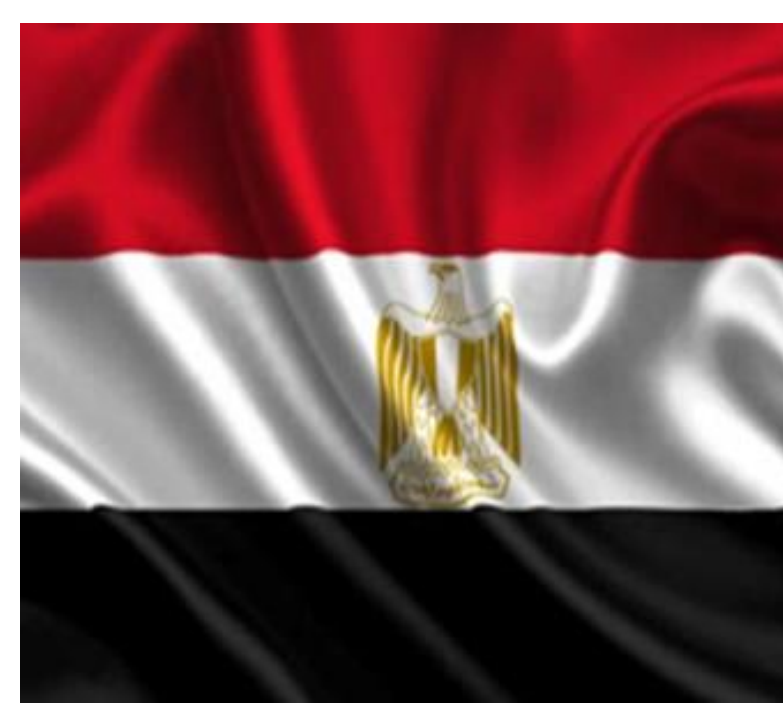
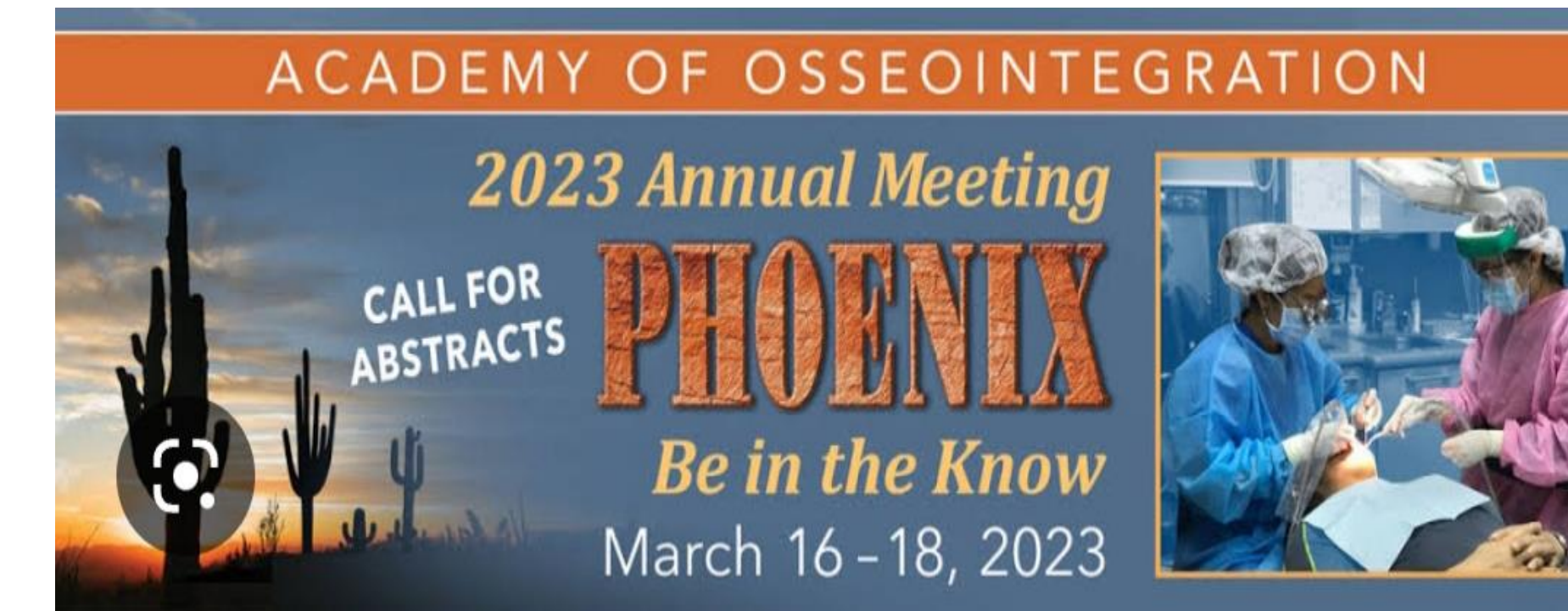


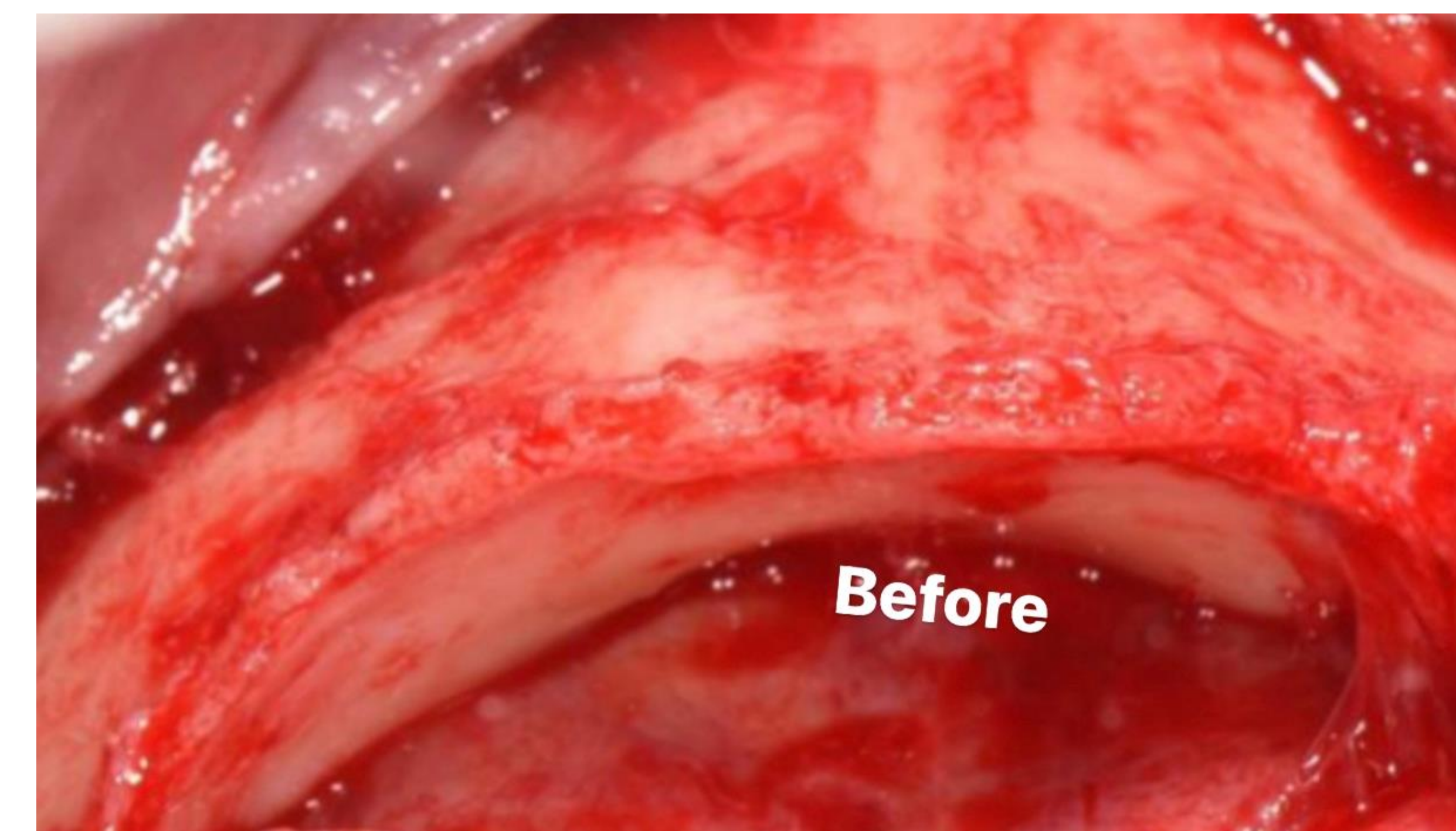


Assessment Of Bone Quality And Quantity Using Cortical Shell Technique Versus Cortico-Cancellous Onlay Bone Grafting For Horizontal Ridge Augmentation Of Anterior Mandible.



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- Introduction:** mandibular alveolar ridge atrophy is a main obstacle against oral rehabilitation with dental implants. Many causes were reported such as trauma, persistent infection and bone pathology however the most common cause is disuse atrophy after prolonged edentulism. Among the many techniques that have been described to be reliable for both vertical and horizontal alveolar ridge augmentation prior to implant placement are the onlay cortico-cancellous bone blocks and the cortical shells techniques. The aim of this study was to compare cortical shells and onlay cortico-cancellous blocks harvested from the same donor site when they are used to augment horizontally deficient anterior mandibular ridges regarding the quantity and quality of the gained bone.



**Figures 1,2: severely atrophied anterior mandible before
And after the procedure**

• **Methods:**10 Patients were included with severely atrophic anterior mandibular region with residual bone thickness ranging from 1 to 3mm. Divided into two groups 5 patients in each group. A Three incision line pyramidal flap was raised exposing both the donor and the recipient sites. Then for the cortical shell group, five autogenous cortical shells were harvested from the chin, each was thinned and smoothed using carbide discs and large round bur then fixed with micro screws (1.6 mm) at a distance from the buccal side of the ridge while filling the inter-positional gap with a 50-50 particulate mixture of xenograft and autogenous bone. For the onlay graft group the harvested cortico-cancellous blocks were fixed with micro screws in an intimate contact with the buccal side of the deficient alveolar ridge. Sharp edges were smoothed by large carbide round bur to avoid any soft tissue irritation. Scoring was done for tension free closure followed by using polypropylene 3-0 for deep horizontal matrices to transfer any residual tension on the flap apically, then polyglycolic acid 3-0 simple interrupted sutures at the wound margin. Bone width was assessed from the immediate and four months CBCT scans and core biopsies were retrieved from the implant sites at the second stage for histomorphometric analysis to calculate the bone area percentage.

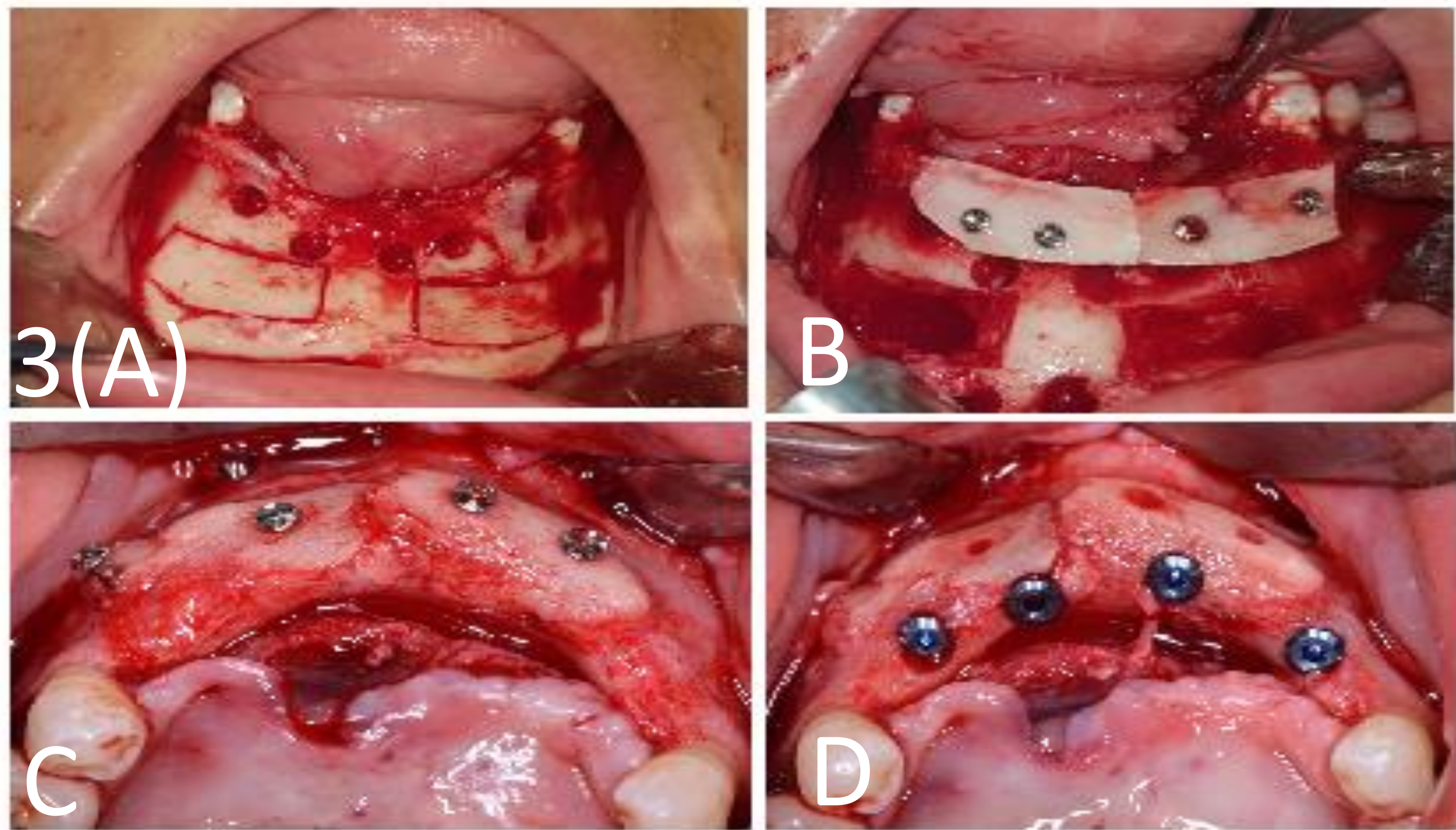


Fig 3 (cortical shell group) case 1(A,B) Full thickness flap reflection , (C) free hand harvesting of 2 thin cortical shells using carbide disc and fine chisels, and free hand fixation of the shell then filling the interpositional gap with particulate xeno and auto bone graft (1:1) (C,D) : second stage surgery with implant placement

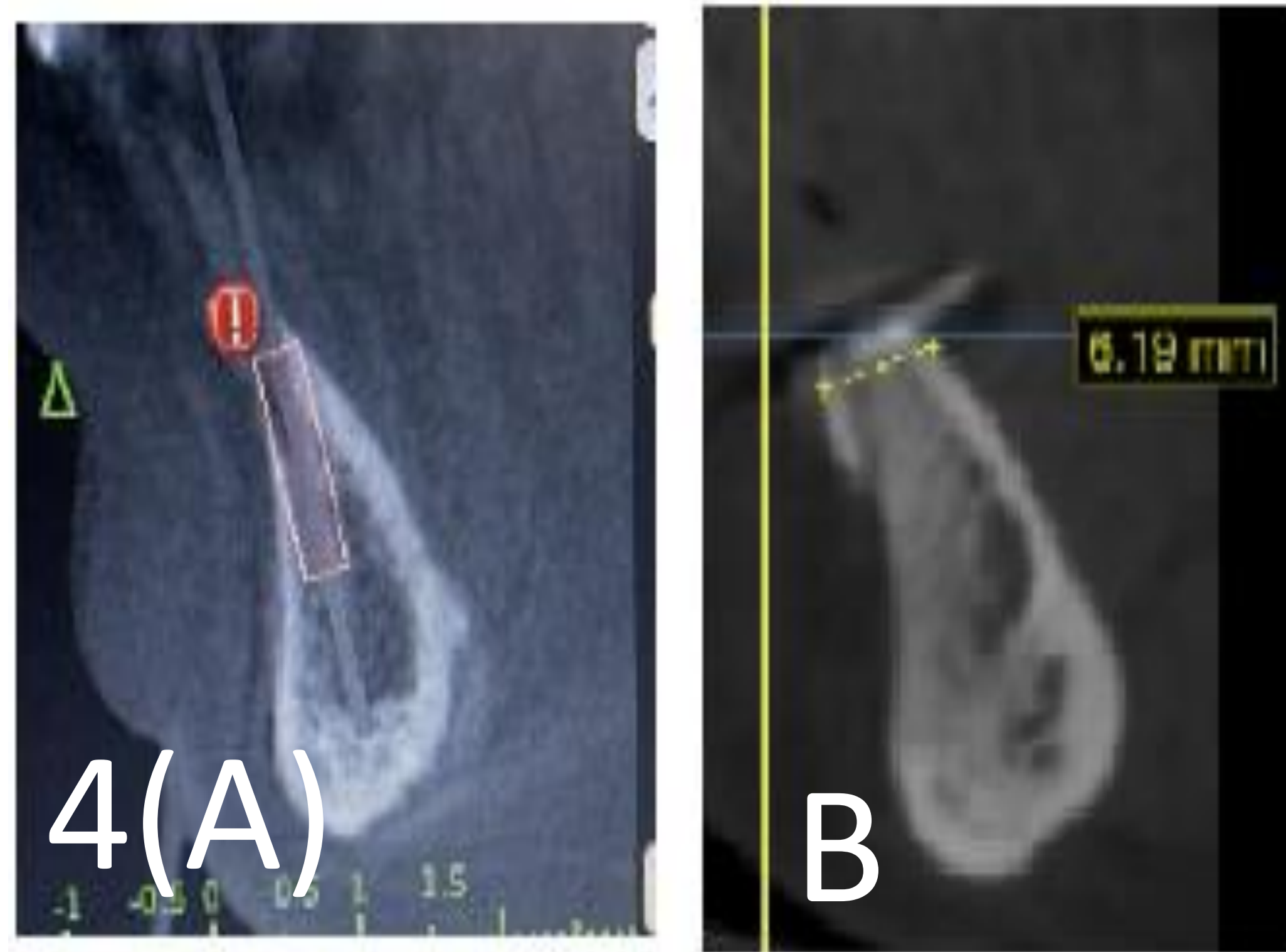


Fig 4(A,B) Case 1:pre and post operative CBCT showing horizontal bone gain

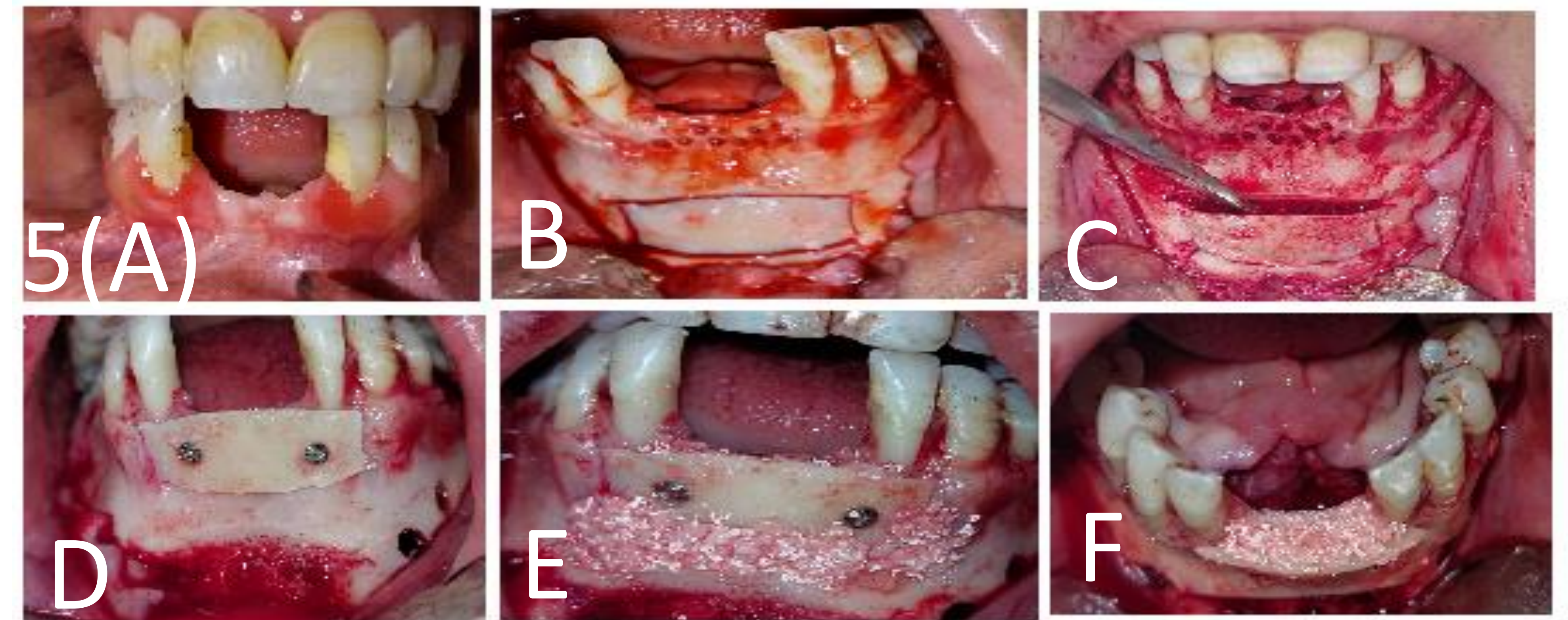


Fig 5 (cortical shell group)case 2 (A,B) Full thickness flap reflection , (C) free hand harvesting of a thin cortical shell using carbide disc and fine chisels, and free hand fixation of the shell (E,F) filling the interpositional gap with particulate xeno and auto bone graft (1:1)

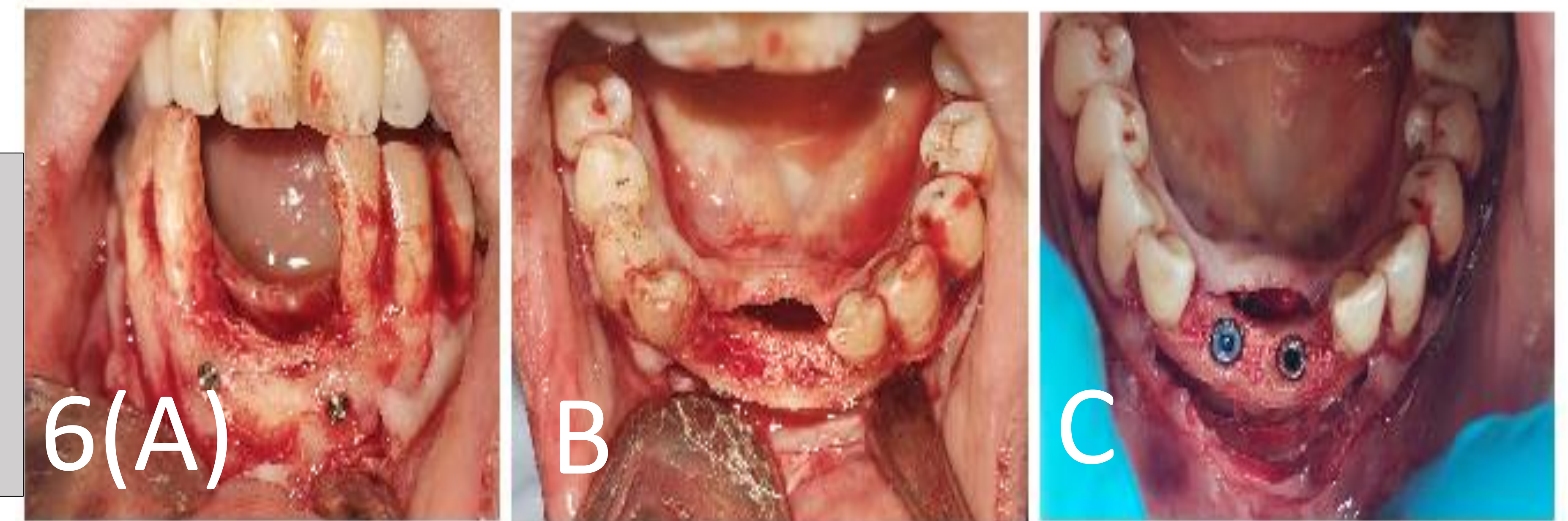


Fig 6 CASE 2: : second stage surgery with implant placement.

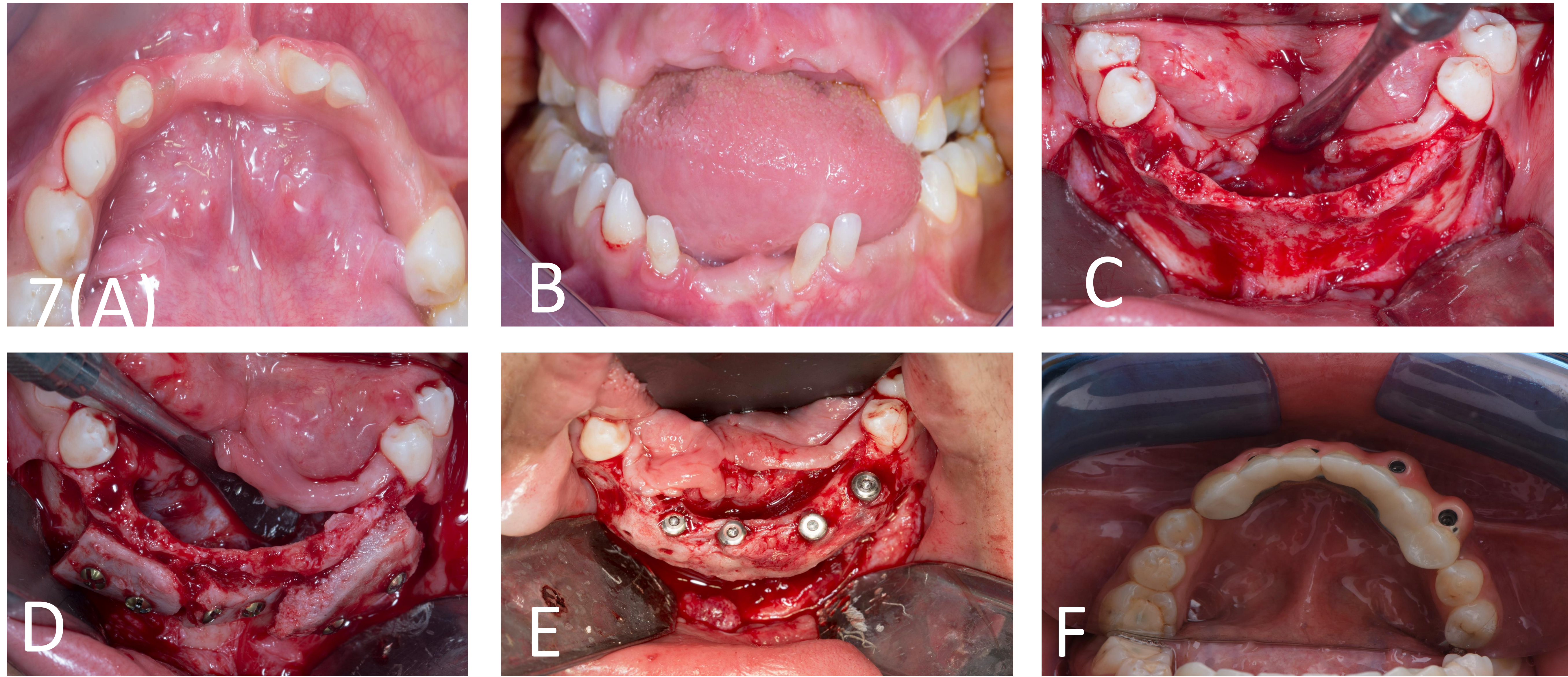


Fig 7: (A,B) **cortico cancellous onlay group case 1**: preoperative occlusal and facial views of the deficient ridge, (c) full thickness flap exposure, (D) Harvest cortico-cancellous blocks fixed by bicortical screws in intimate contact to the ridge,(E) implant placement at second stage surgery,(F)screw retained prosthetic rehabilitation

Fig 8(A,B):pre and post operative CBCT showing horizontal bone gain

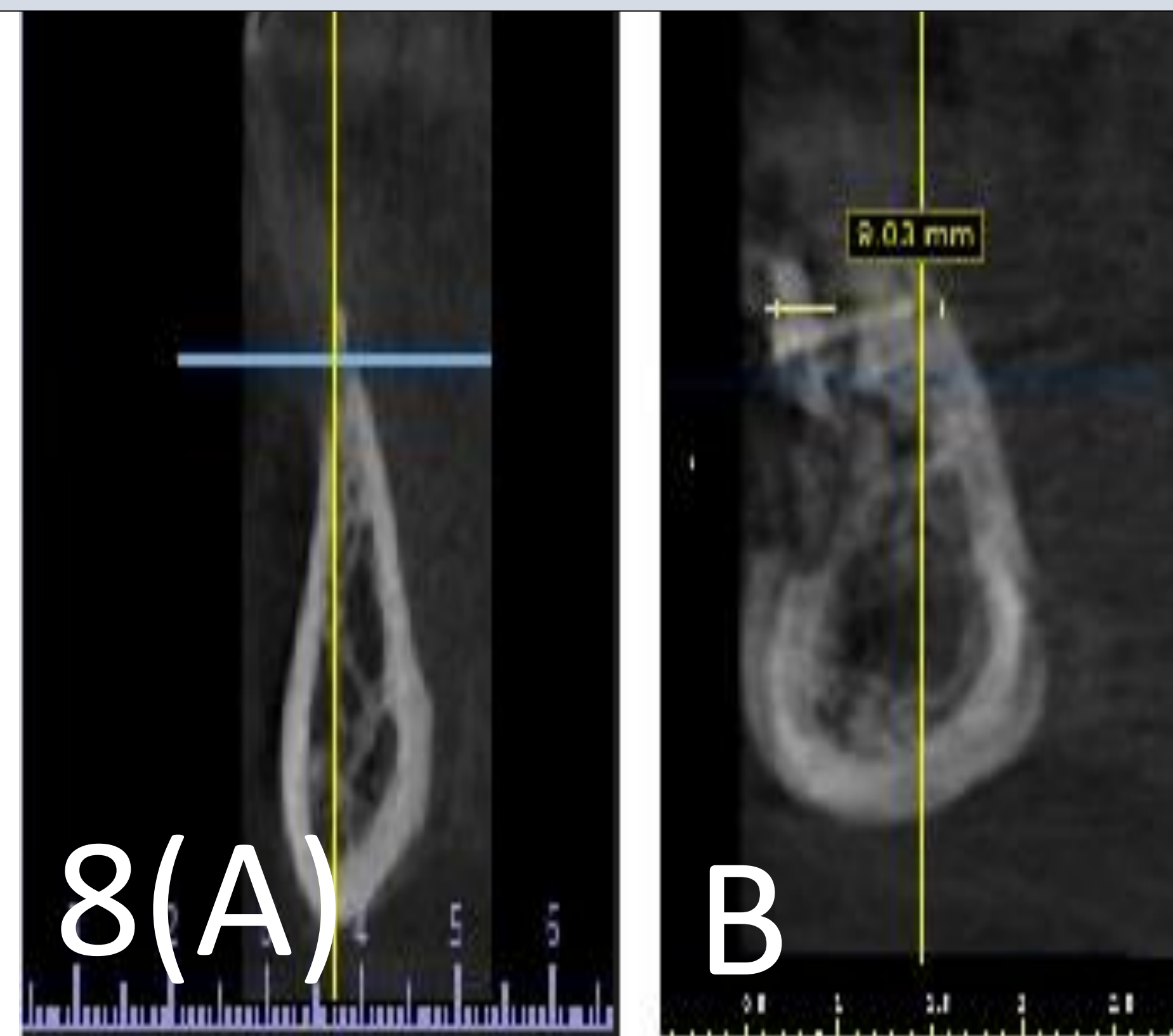
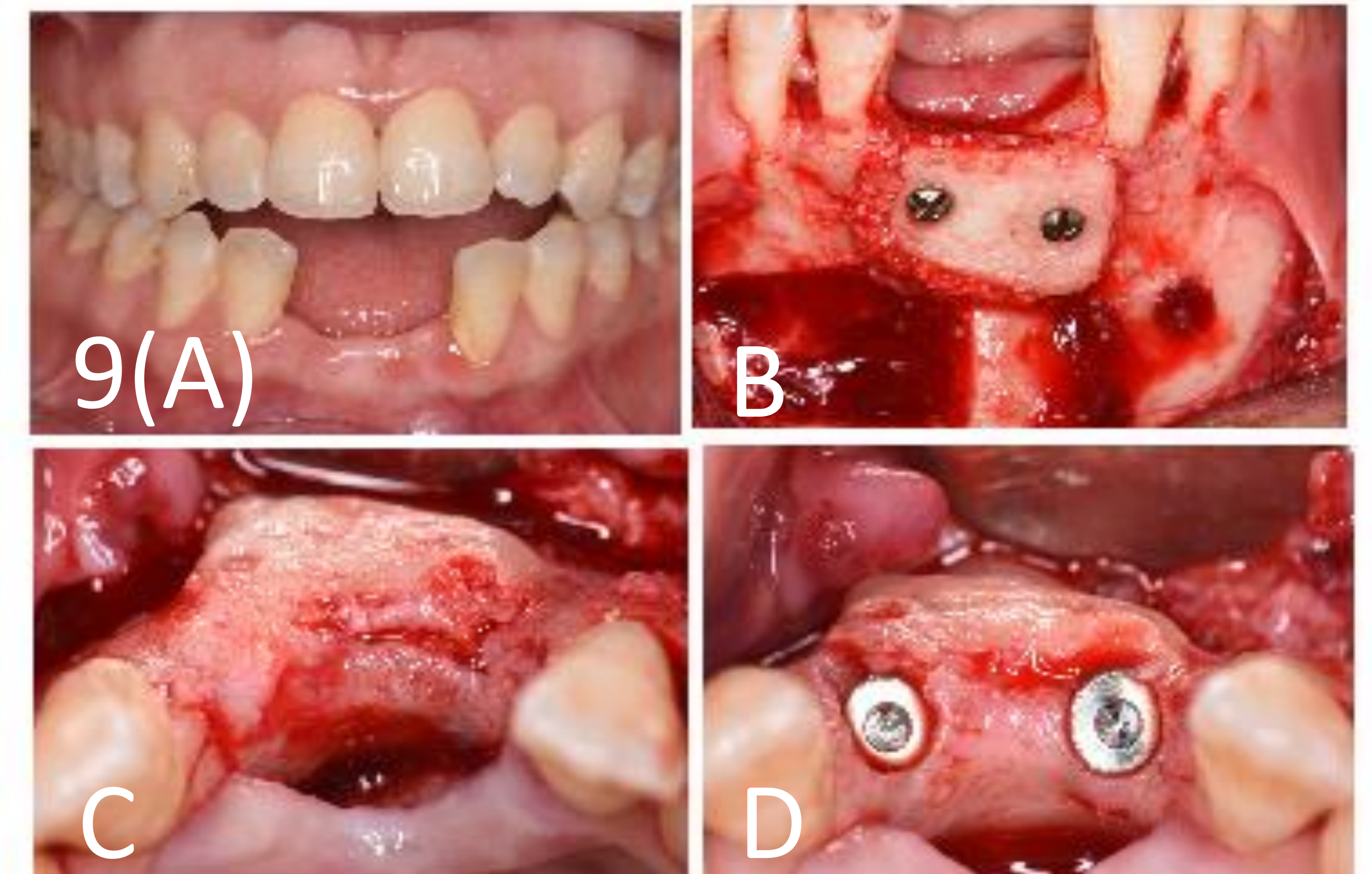
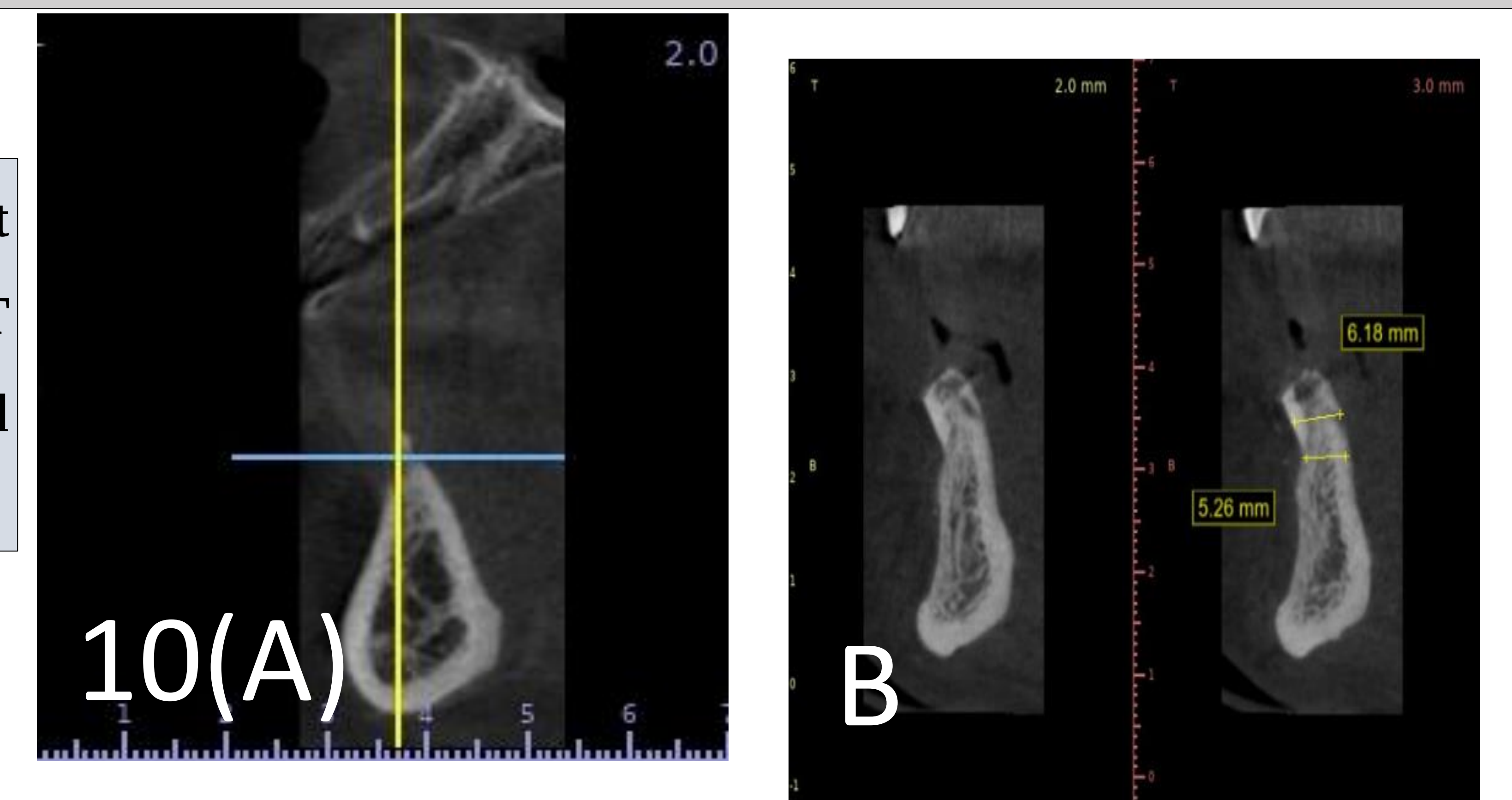


Fig 9 :postop. Cbct . **Cortico cancellous onlay CASE 2** (A,B) Full thickness flap reflection , (C) free hand harvesting of thin cortical shells using carbide disc and fine chisels, and free hand fixation of the shell then filling the interpositional gap with particulate xeno and auto bone graft (1:1) (C,D) : second stage surgery with implant placement :

Fig 10:pre and post operative CBCT showing horizontal bone gain



Results: The postoperative healing went uneventful for all cases as having a single surgical site (for donor and recipient) markedly reduced the surgical morbidity. In the cortical shells group the immediate postoperative CBCT showed ridge width ranging from 7 to 8 mm which measured from 6 to 7 mm after four months with 4 to 5 mm bone gain from the preoperative situation. While for the onlay cortico-cancellous group the immediate postoperative CBCT showed ridge width ranging from 5 to 7 mm which measured from 4 to 5 mm after four months with 3 to 4 mm bone gain from the preoperative situation.

Conclusion: sympheseal thin cortical shells showed significant better results than that of the symphyseal cortico-cancellous onlay blocks regarding both the quality, quantity and stability of the grafted volume of bone.

	Bone gain percentage (%)
Study group	53.52% ± 1.68
Comparison group	47.97% ± 1.9

Table : bone garea percent calculation between both groups

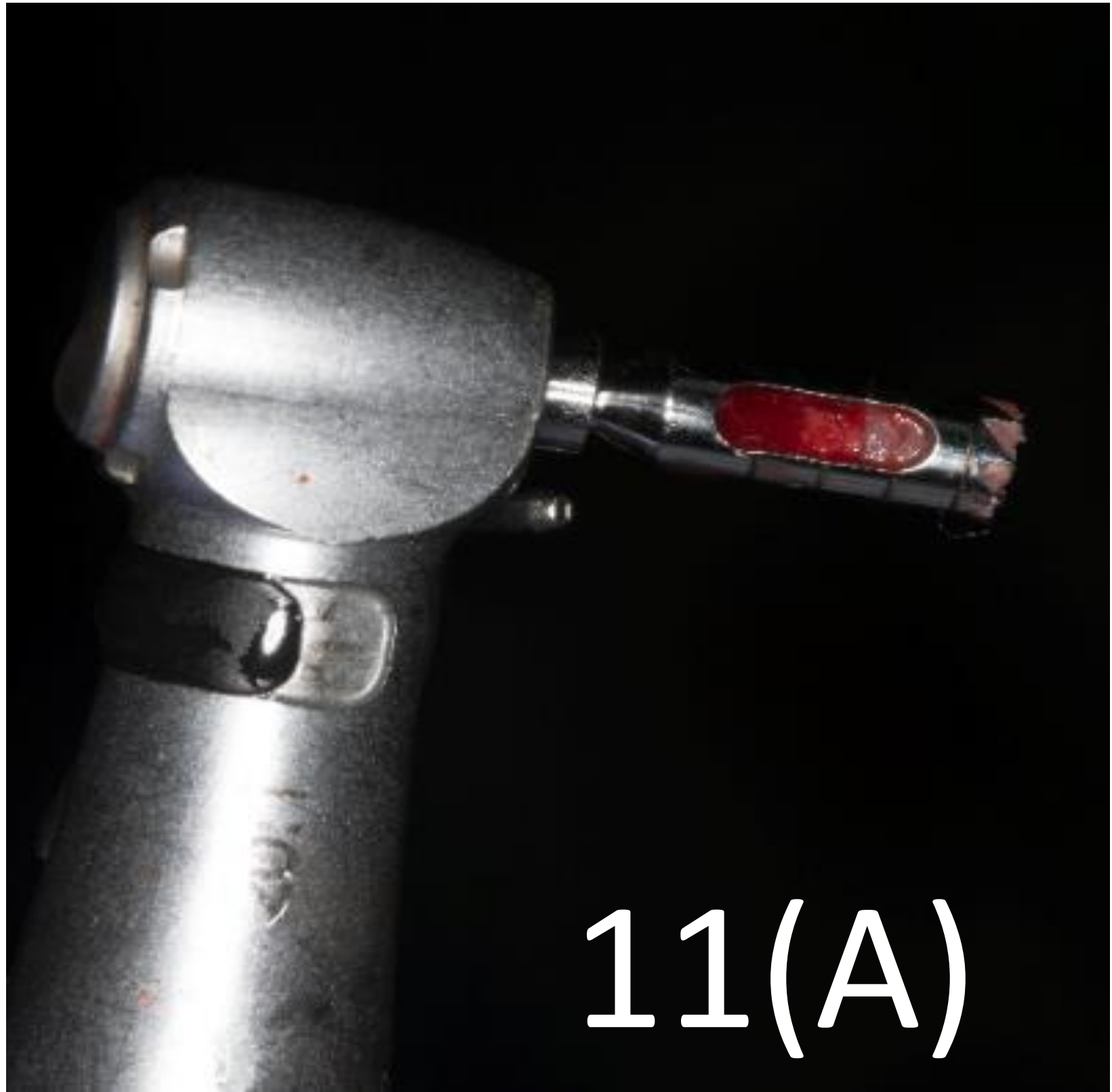
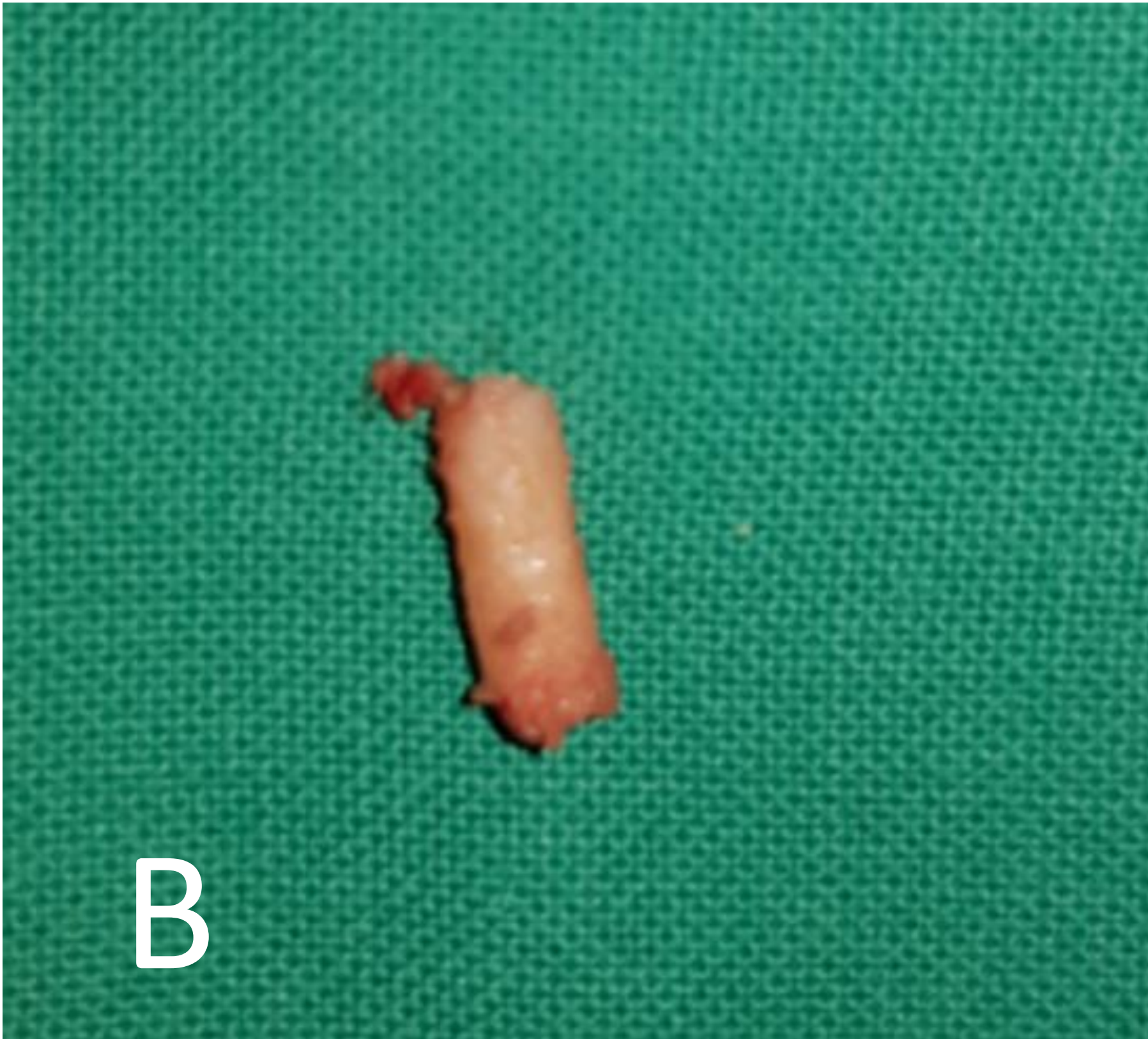


Fig 11(A,B) : core biopsy retrieval for both groups

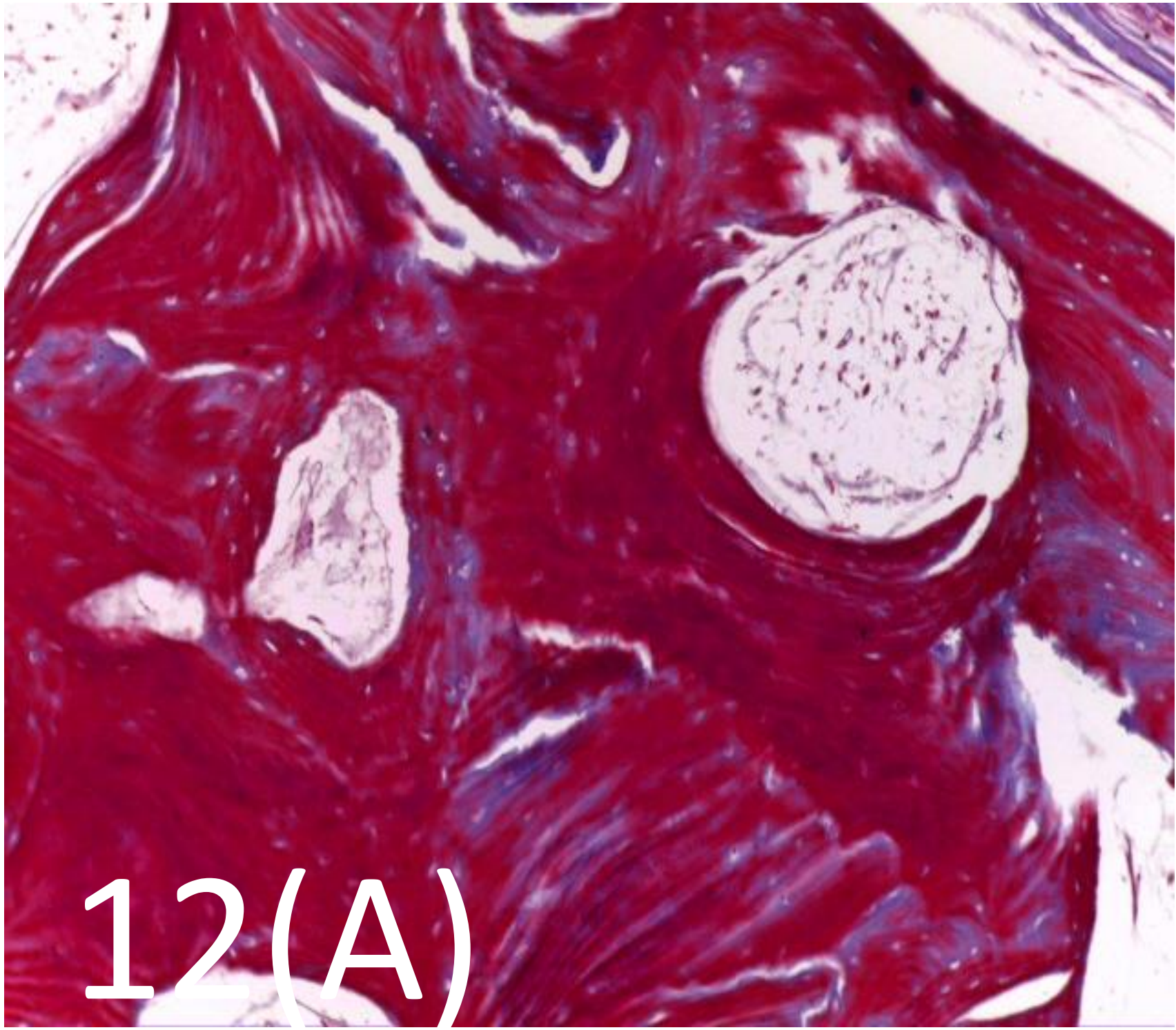
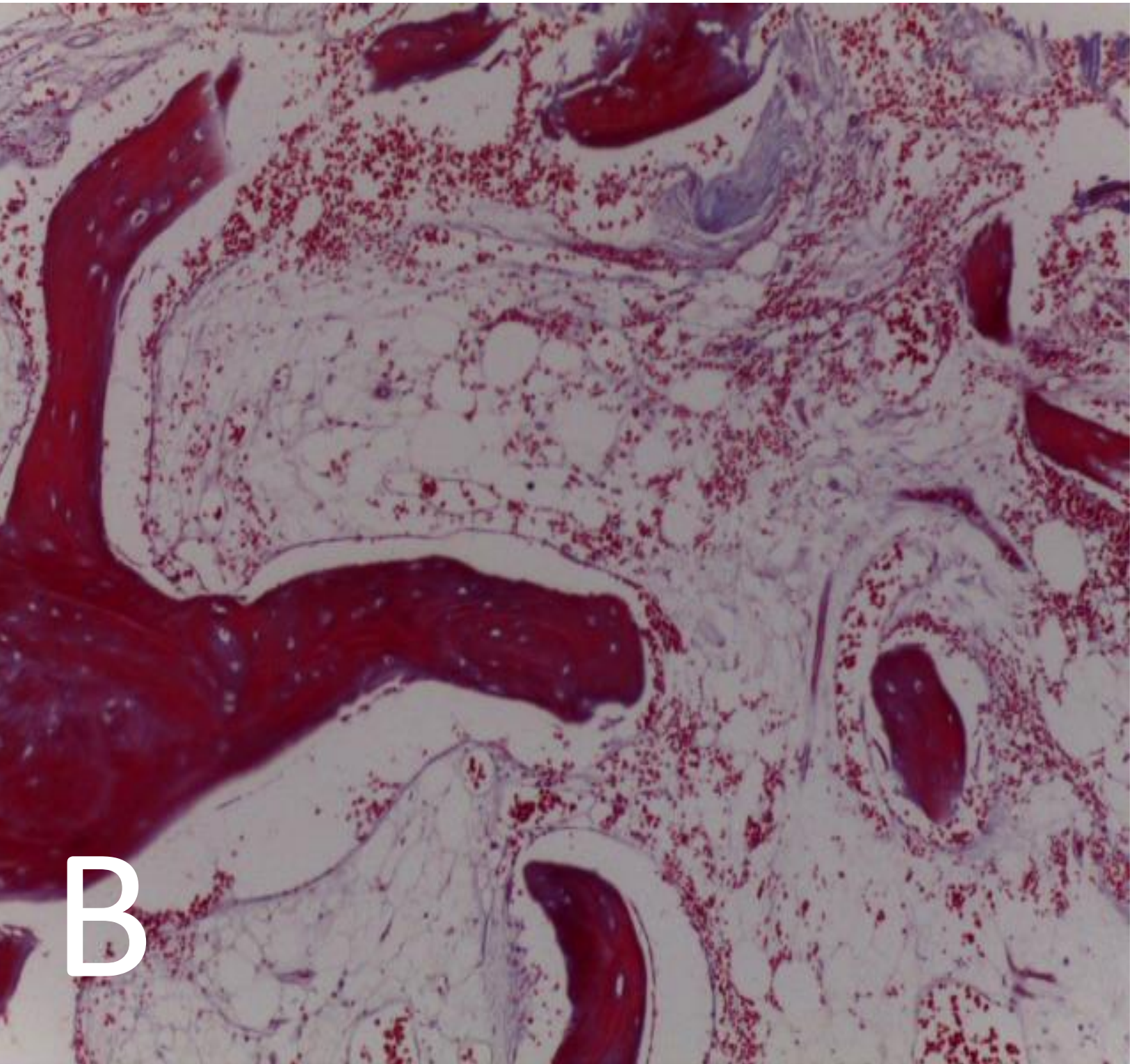


Fig 12 (A): Microscopic picture of the core biopsy taken from **(cortical shell group)** showing trabeculae of lamellar bone showing many reversal lines and an intervening fatty marrow (Magnification X100).(B) **(cortico cancellous onlay group)** showing trabeculae of lamellar bone and an intervening fatty marrow (Magnification X100).