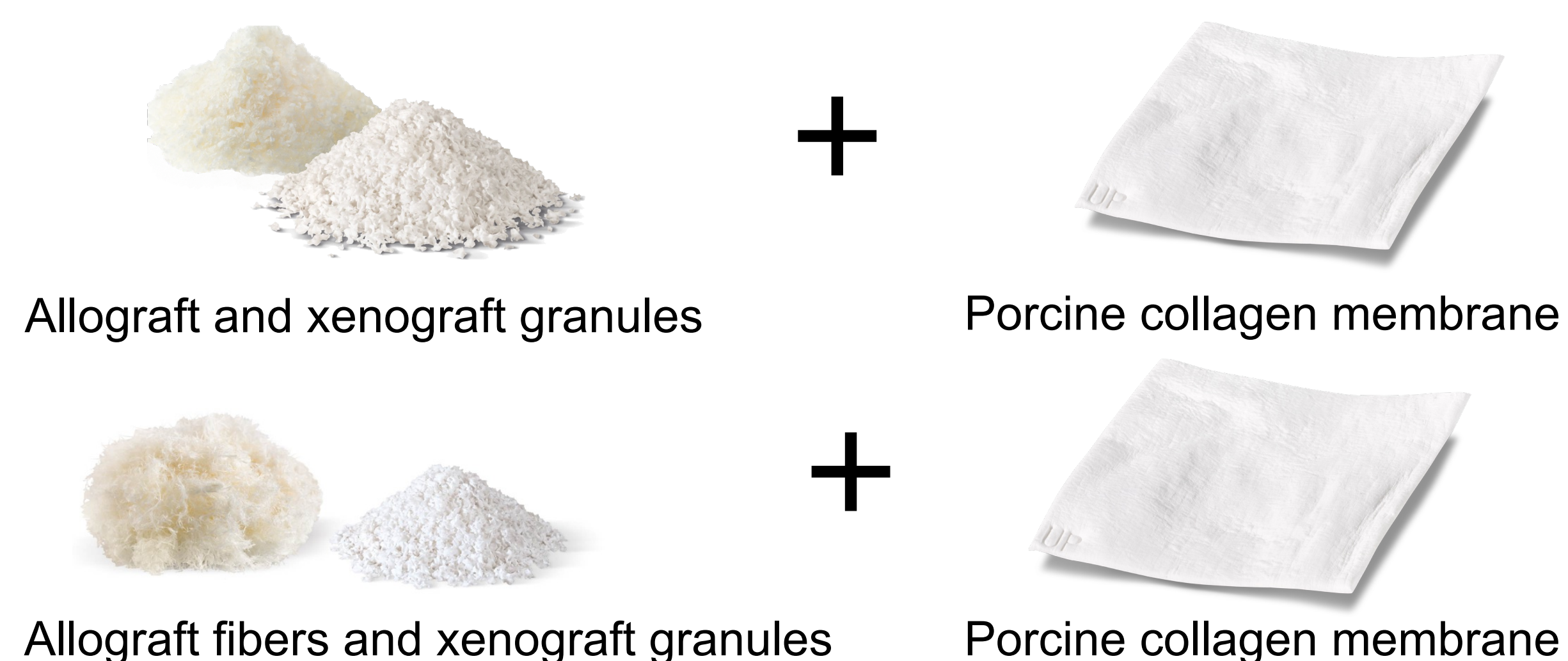


Introduction

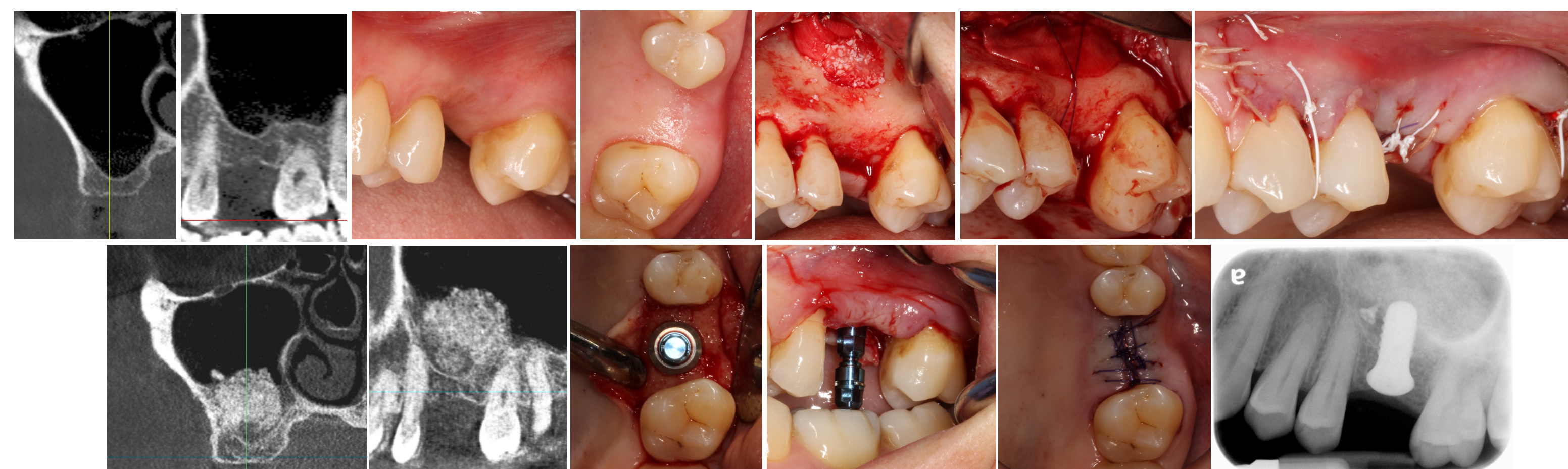
Augmentation of the maxillary sinus floor (SFA) is a commonly used surgical procedure to increase bone volume prior to implant placement in the posterior maxilla. Various bone grafting materials (autogenous, allograft and xenograft) or bone substitutes have been used alone or in combination to achieve this goal.¹⁻³

We present a series of cases where a combination of cancellous anorganic bovine bone with either demineralized cortical allograft fibers or demineralized cortical allograft granules, was used for a staged or simultaneous implant placement approach. Subsequently, a porcine collagen membrane was used to cover the access window.

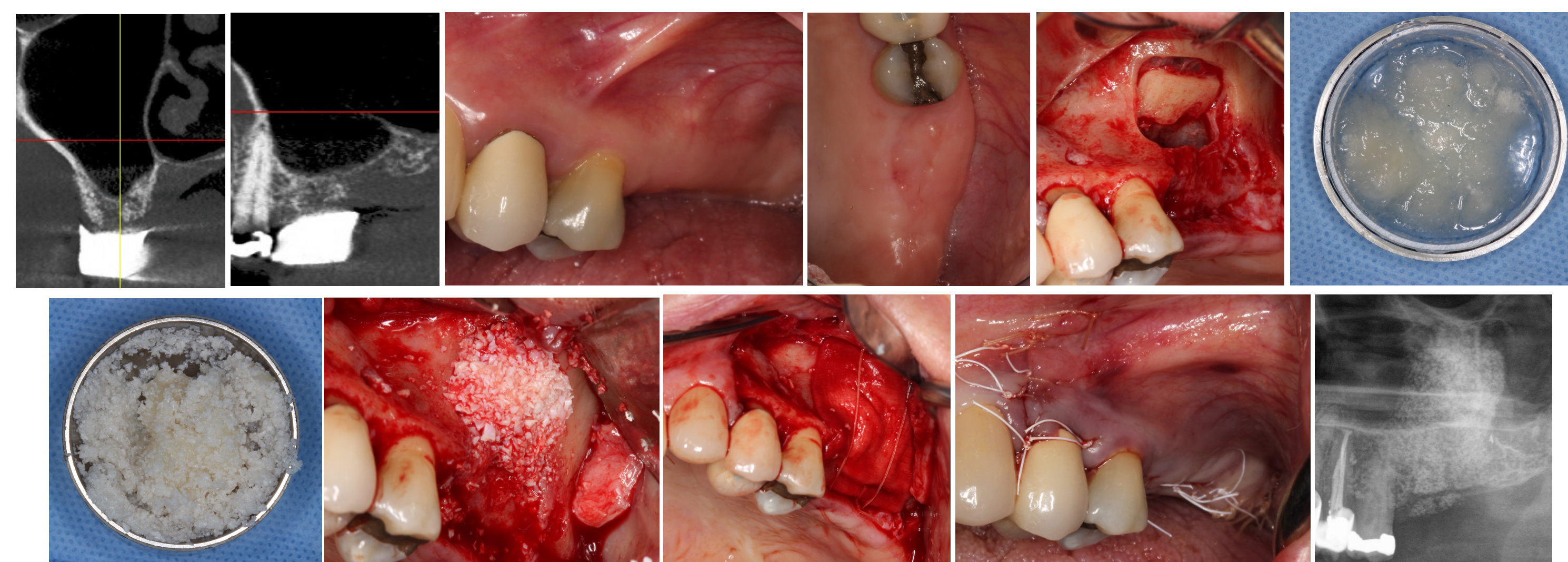


Cases

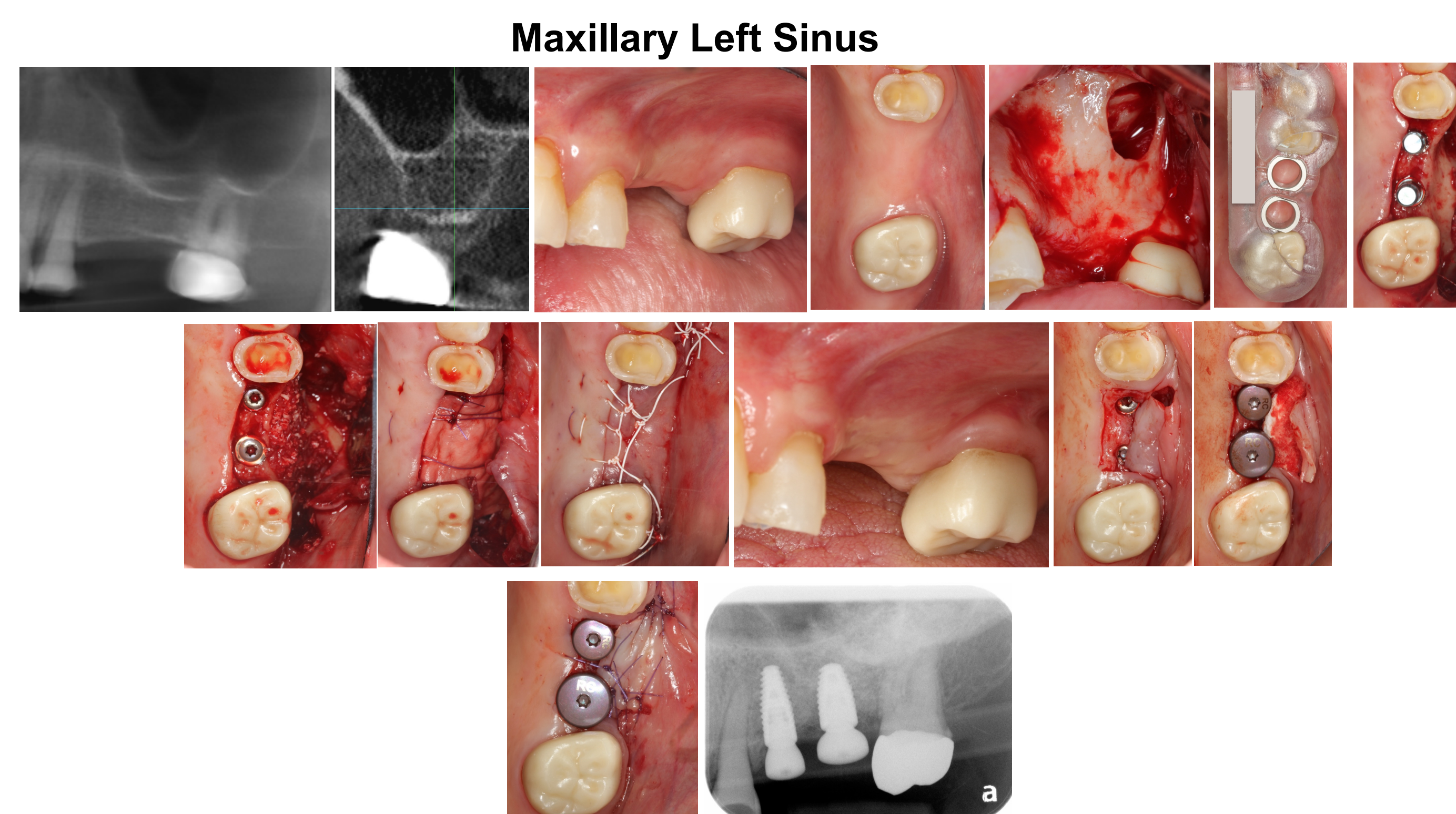
Case 1. Fifty-one-year-old female patient, needing implant #14. Patient has history of controlled hypertension. Used a staged approach. Sinus graft material: demineralized cortical allograft fibers + cancellous anorganic bovine bone (20:80 ratio) and porcine collagen membrane to cover the window. Implant placement at 6 months of healing.



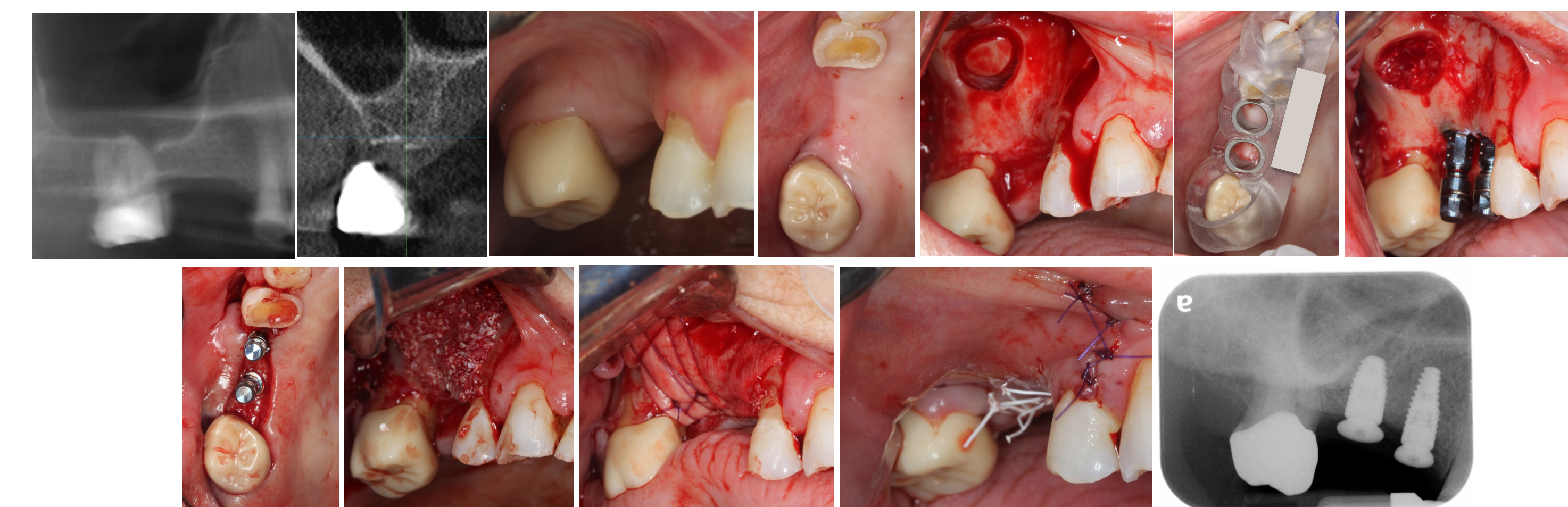
Case 2. Sixty-seven-year-old female patient, needing implant #14. Patient has history of controlled hypertension and diabetes, and osteoporosis. Used a staged approach. Sinus graft material: demineralized cortical allograft fibers + cancellous anorganic bovine bone (20:80 ratio) and porcine collagen membrane to cover the window. Implant will be placed at 6 months of healing.



Case 3. Sixty-three-years-old female patient, needing implants #'s 3, 4, 13, 14. Patient has history of controlled hypertension and hypothyroidism, and arthritis. Used a simultaneous approach (sinus floor augmentation with implant placement) with contour ridge augmentation bilaterally. Sinus graft material: demineralized cortical allograft granules + cancellous anorganic bovine bone (50:50 ratio) and porcine collagen membrane to cover the window and graft. Used a porcine, porous, resorbable and volume-stable collagen matrix for soft tissue regeneration, during second stage surgery for maxillary left implants.



Maxillary Right Sinus



Discussion

Various studies used a combination of demineralized allograft and anorganic bovine xenograft (Valentini and Abensur 1997, Kan et al. 2002, Valentini and Abensur 2003) for the augmentation of maxillary sinuses. After up to 107 months in function, survival rates were between 82.1% to 96.8%.² The main benefits of using this mixture are the osteoinductive and osteoconductive properties of the demineralized allograft and xenograft material, respectively.²⁻³ Furthermore, the xenograft material helps in preserving the volume, with no inflammatory or adverse responses, while the demineralized allograft aids restoring vital bone at a faster rate.^{2,3,7} Finally, this combination could avoid the need for an autogenous bone graft, hence decreasing morbidity.

Conclusions

These cases demonstrate the clinical application of this combination as well as a successful outcome. Studies investigating the histological and ultrastructural properties are needed in the future.

References

- Hallman M, et al. A clinical and histologic evaluation of implant integration in the posterior maxilla after sinus floor augmentation with autogenous bone, bovine hydroxyapatite, or a 20:80 mixture. *Int J Oral Maxillofac Implants.* 2002;17(5):635-643.
- Katsuyama H, Jensen SS. *ITI Treatment Guide Volume 5: Sinus Floor Elevation Procedures.* 1st ed. Berlin: Quintessence Publishing Co; 2011
- Misch CE. *Contemporary Implant Dentistry.* 3rd ed. USA: Elsevier; 2008.
- Valentini P, Abensur D. Maxillary Sinus Floor Elevation for implant placement with demineralized freeze-dried bone and bovine bone (Bio-Oss): A clinical study of 20 patients. *Int J Periodont Rest Dent.* 1997;17(3):233-241.
- Kan JYK, et al. Factors affecting the survival of implants placed in grafted maxillary sinuses: A clinical report. *J Prosthet Dent.* 2002;87(5):485-489.
- Valentini P, Abensur D. Maxillary sinus grafting with anorganic bovine bone: A clinical report of long-term results. *Int J Oral Maxillofac Implants.* 2003;18(4):556-560.
- Piattelli M, et al. Bone reactions to anorganic bovine bone (Bio-Oss) used in sinus augmentation procedures: a histologic long-term report of 20 cases in humans. *Int J Oral Maxillofac Implants.* 1999;14(6):835-840.