



PRECISION DENTAL MEDICINE

COMPUTER GUIDED BONE HARVESTING FROM MANDIBLE. CASE SERIES.



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BACKGROUND

During prosthetically driven restorations, optimal implant placement in the presence of alveolar defects is strongly dependent on bone augmentation procedures.[1] Autogenous bone is the most predictable material to support new bone formation, allowing for a higher bone survival rate and implant success.[1,2] Computer-guided bone harvesting (CGBH) (protocol by De Stavola et al. 2015), effectively translated the surgical plan into the surgical field, assisting the surgeon in performing the correct osteotomy and limiting the variability of the cut position due to skill factors.[1] Position, angulation, and depth of osteotomy is controlled, optimizing volume of the harvestable bone block while reducing risk of damage to anatomical structures.[1–3]

CASE SERIES

- Three patients in need of mandibular horizontal ridge augmentation were treated with autologous bone graft from the retromolar area using a CGBH.
- Anatomical structures such as alveolar canal and dental roots were located using Materialise® Mimics Innovation Suite and ideal bone-cutting planes were defined with secure surgical margins.
- SURGICAL GUIDE:** designed with Exocad®GmbH software and printed on Phrozen®Mini 8k printer.
- Clinical wound healing was evaluated 8d post-surgically and 15d for suture removal. None of the cases showed any kind of complication in a 4mo follow-up.

CASE 1

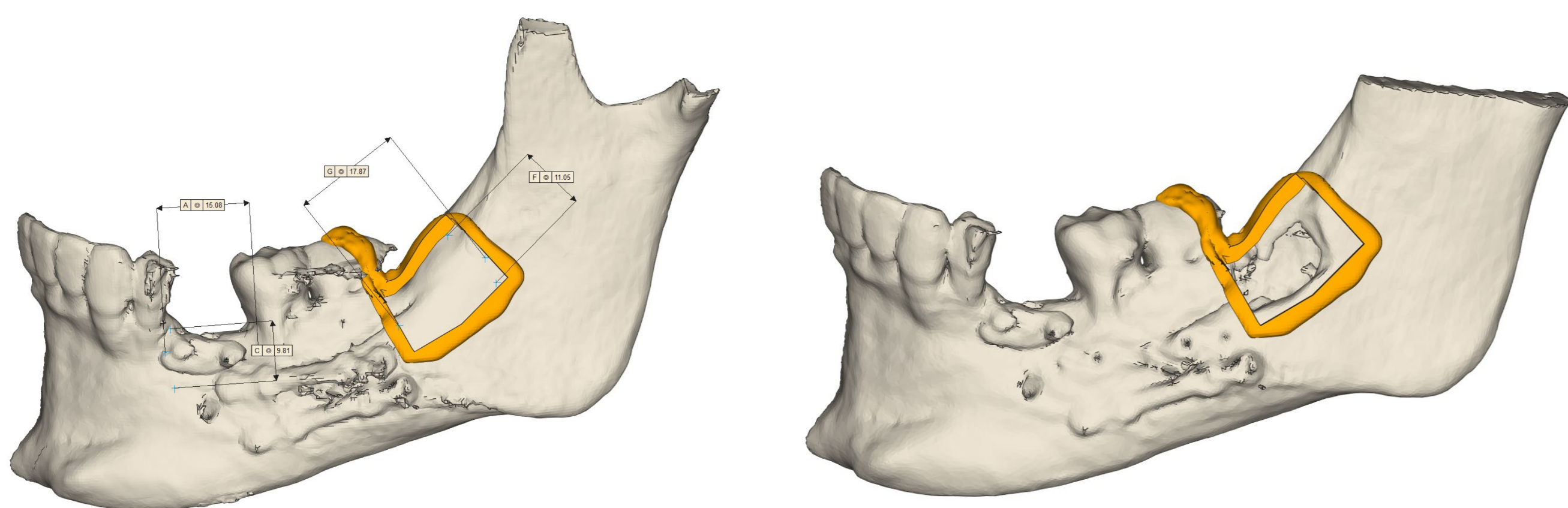


Fig.1. Digital bone harvesting planning, and after surgery confirmation of the osteotomies

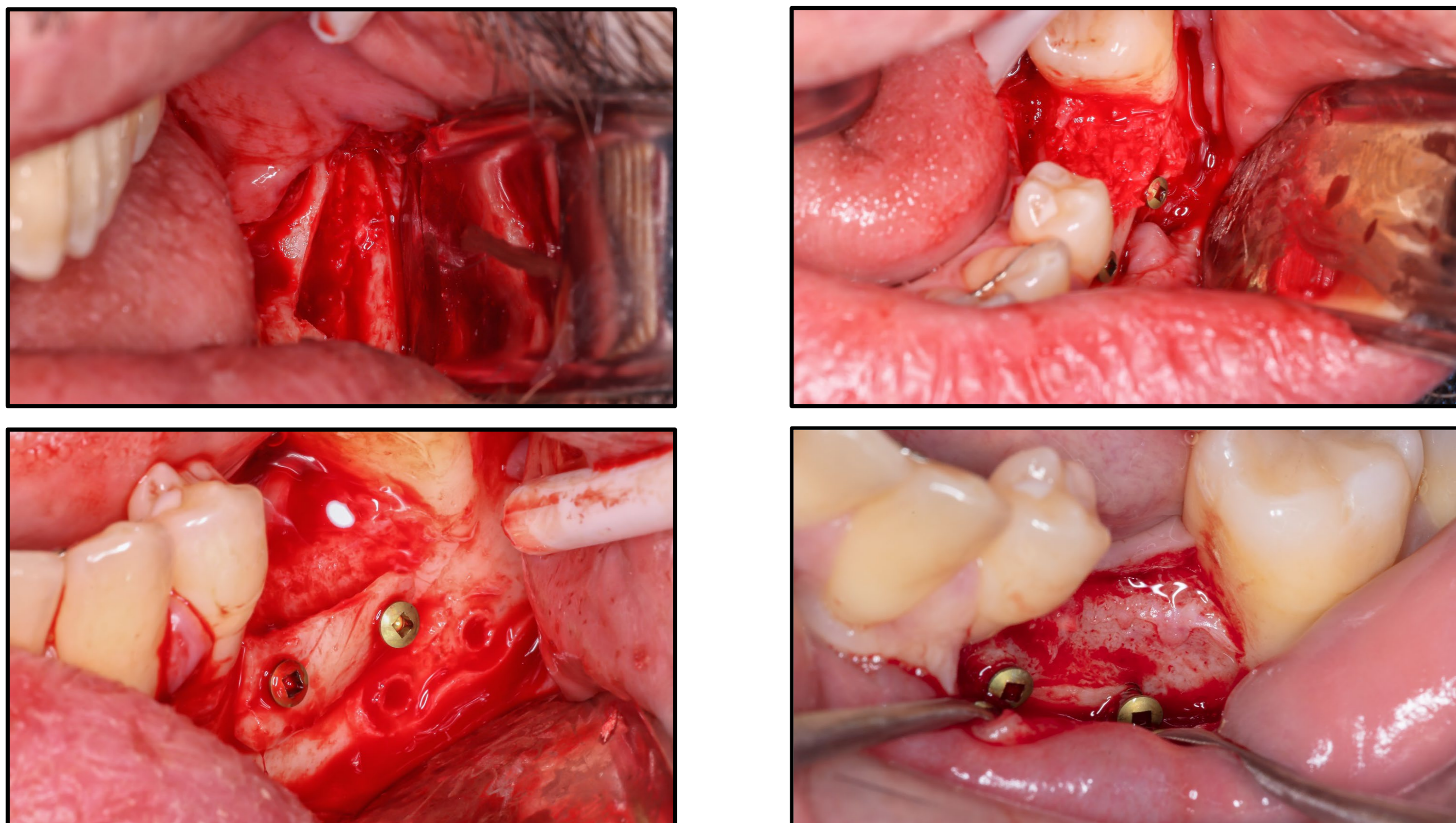


Fig.2. Intra-operative views of planned osteotomy, bone block fixation with titanium screws with ridge reconstruction, and clinical situation after 4mo.

CASE 2

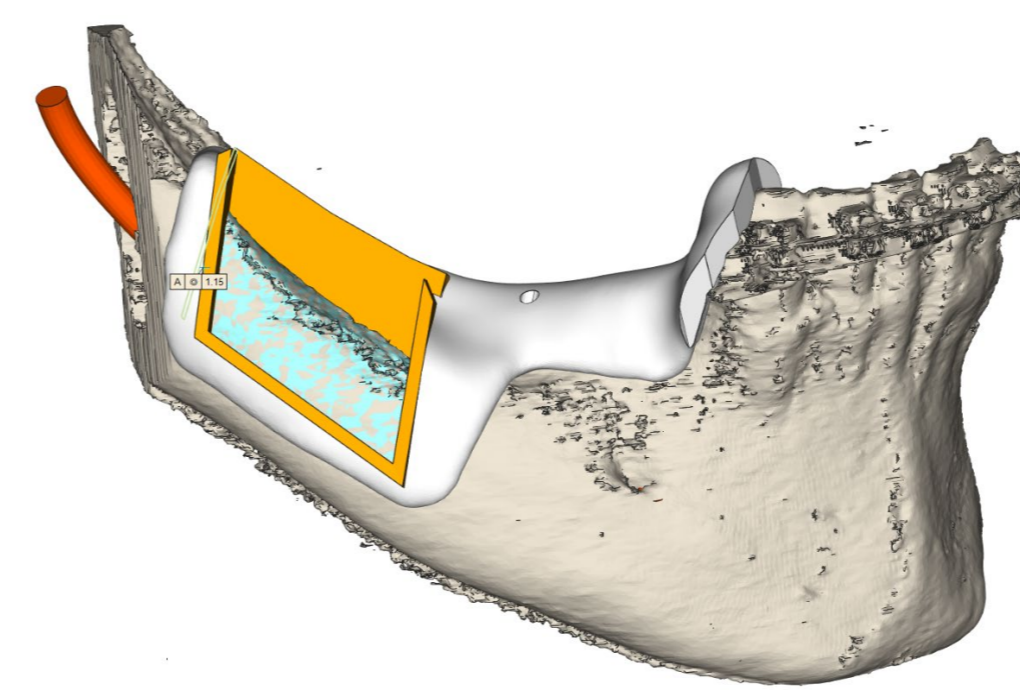


Fig.3. Digital bone harvesting planning

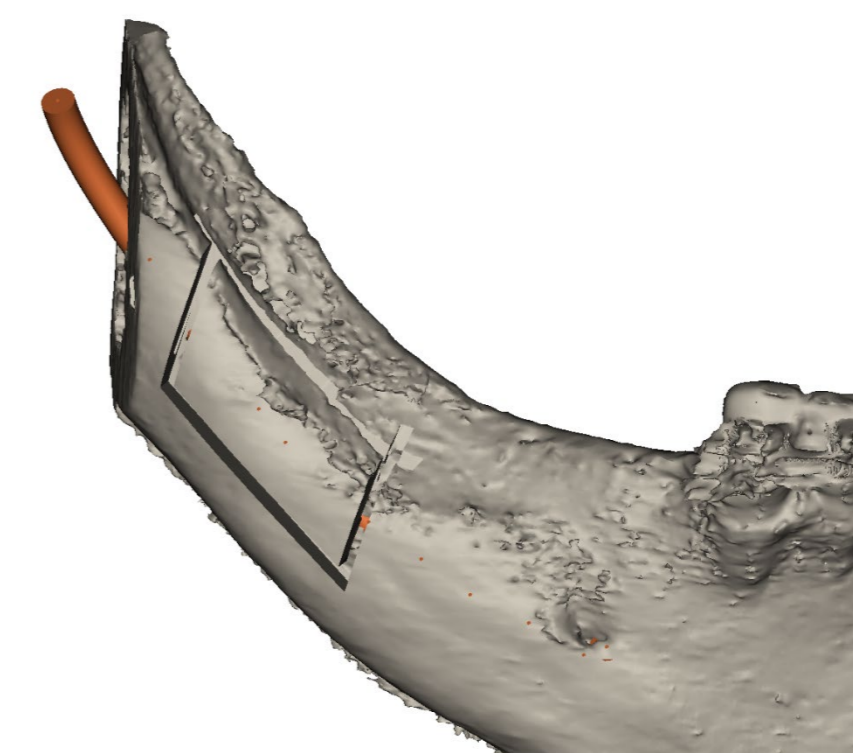


Fig.4. Planned Osteotomies

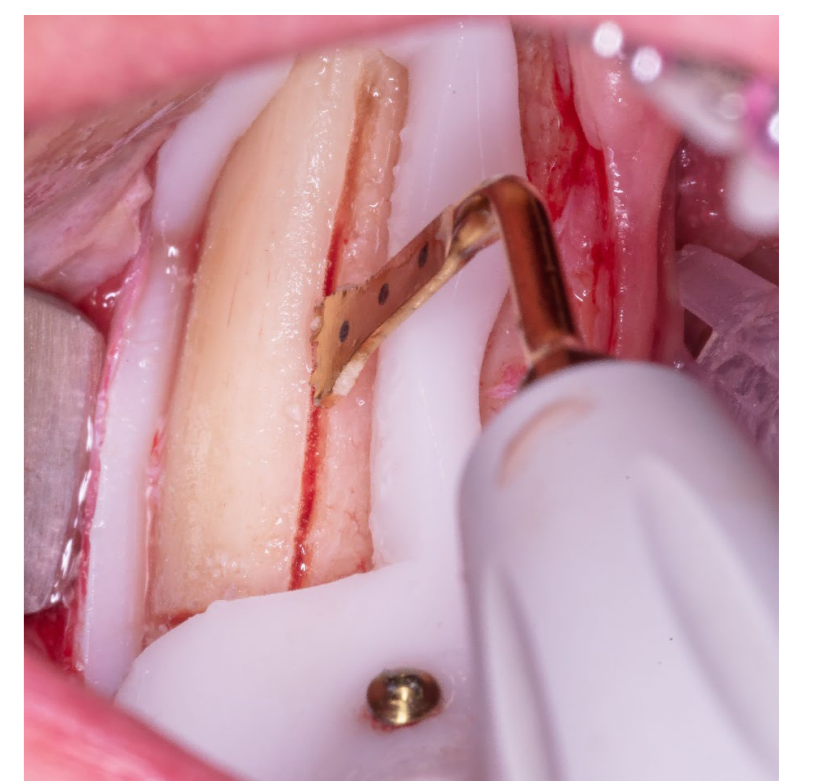


Fig.5. Piezo-surgery osteotomy

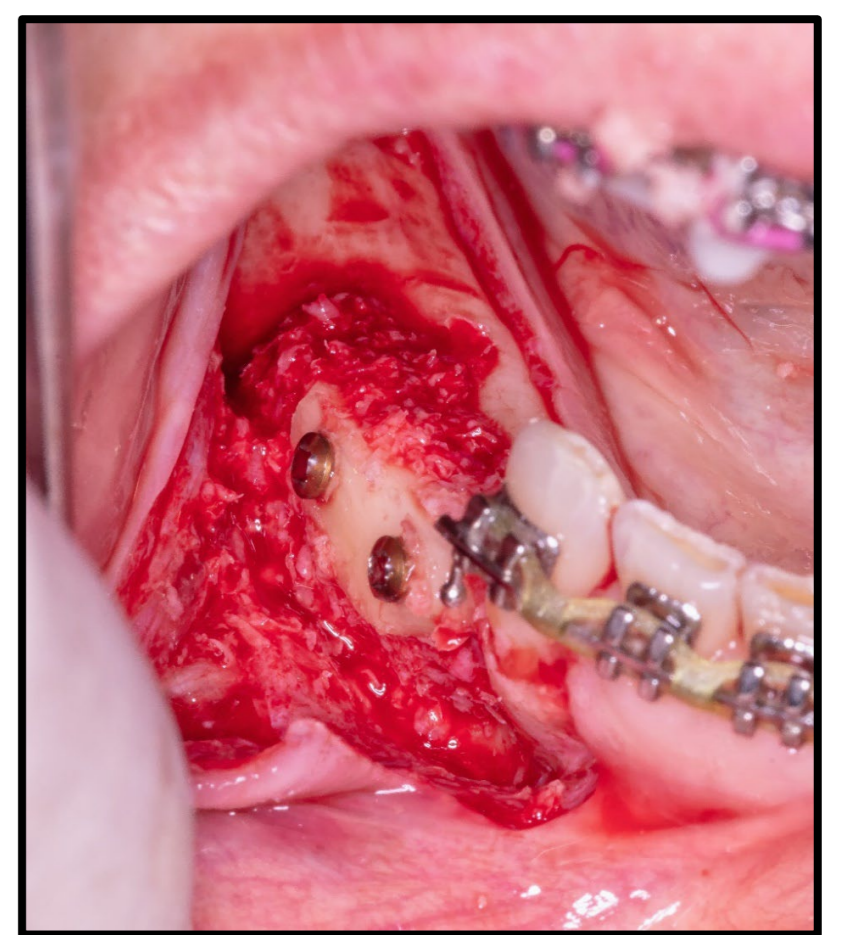
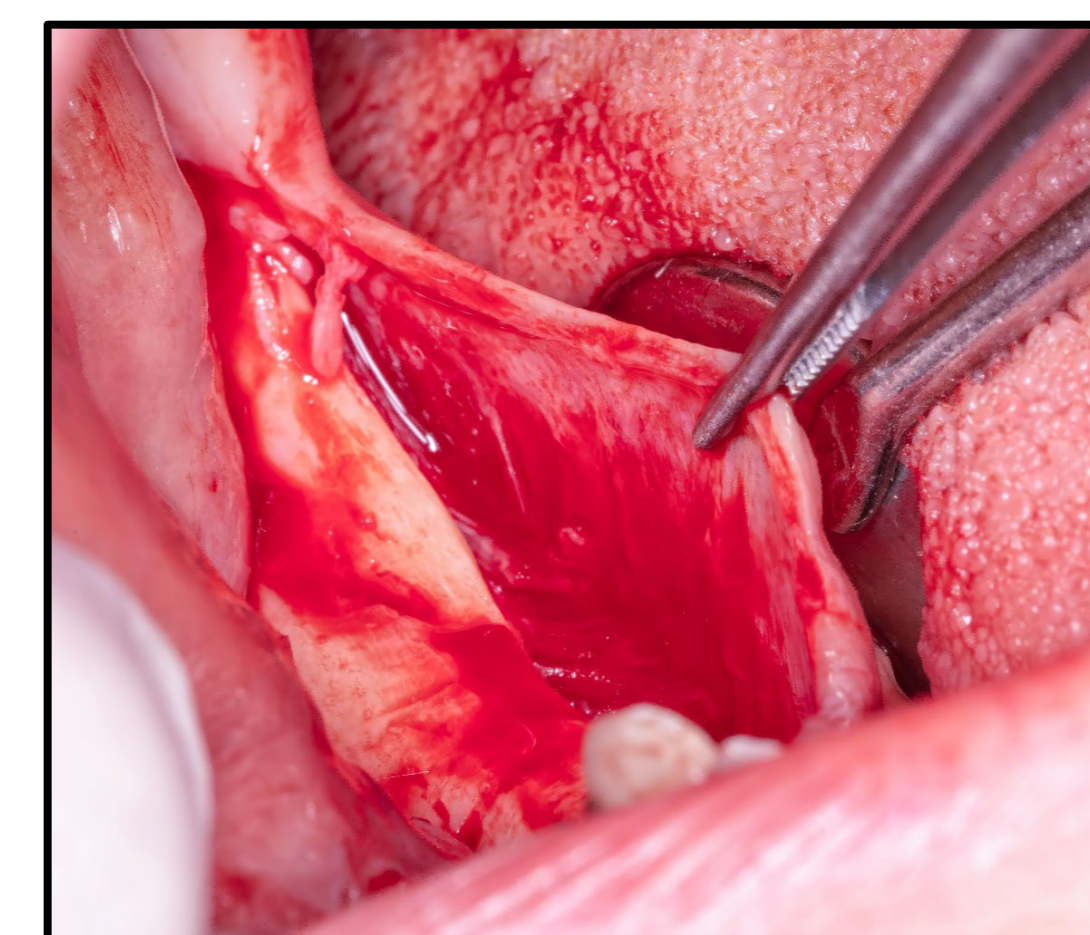
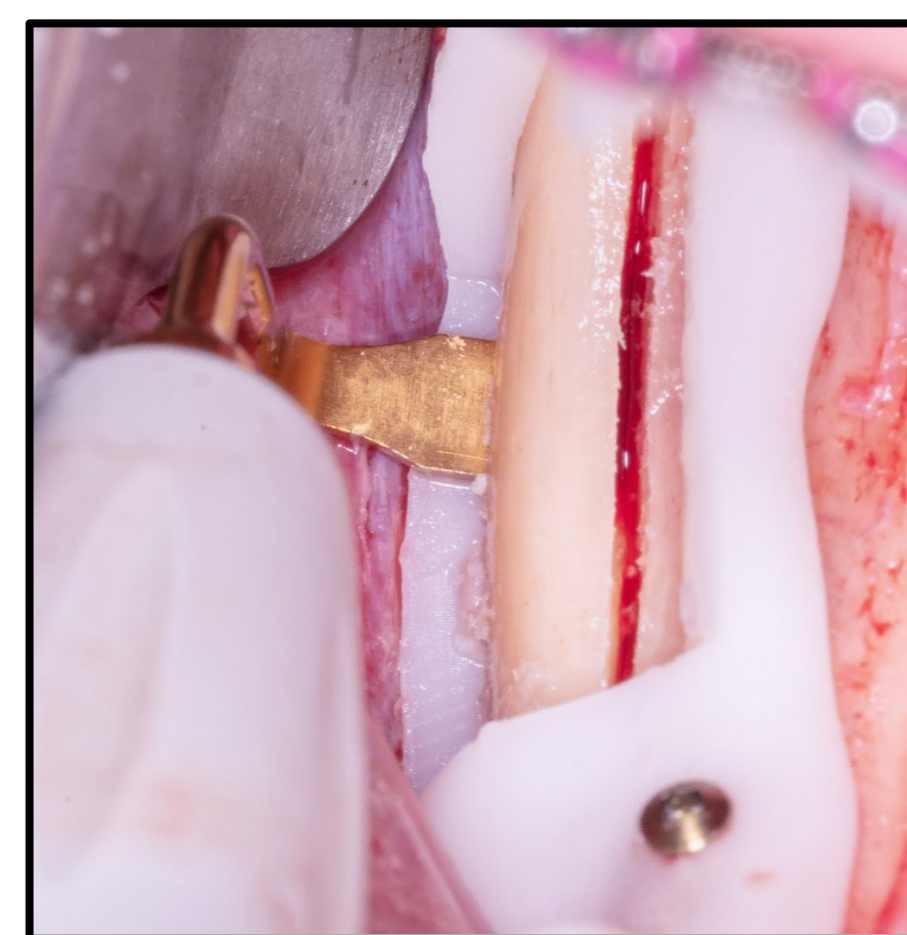


Fig.6. Surgical guide screwed to the bone and piezo insert used to prepare the osteotomies, lingual flap mobilization, bone block screwed to the bone and ridge reconstruction

CASE 3

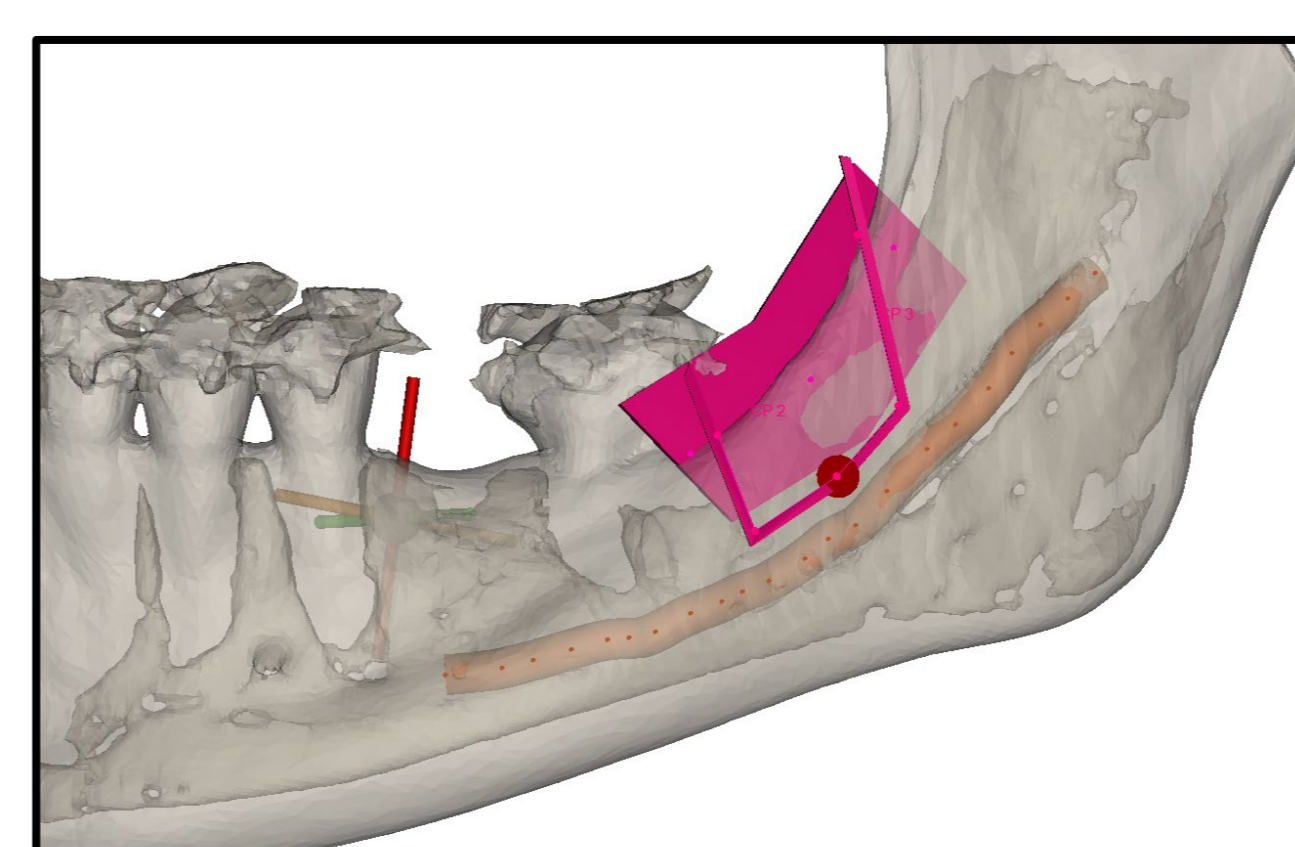


Fig.7. Planned Osteotomies, with safe distance to alveolar nerve

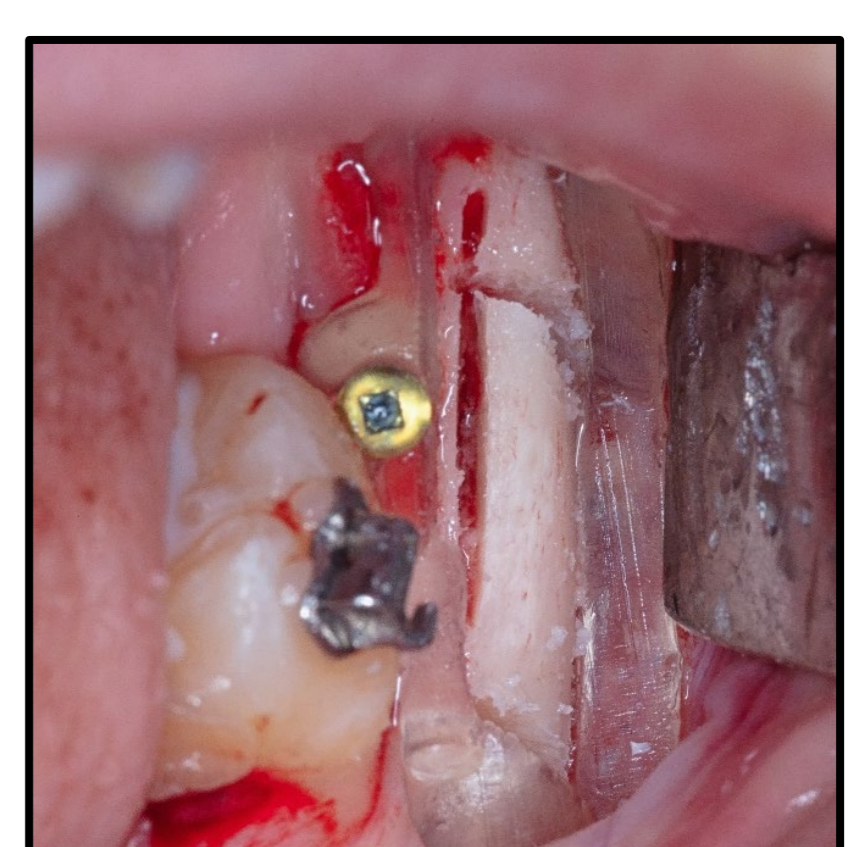
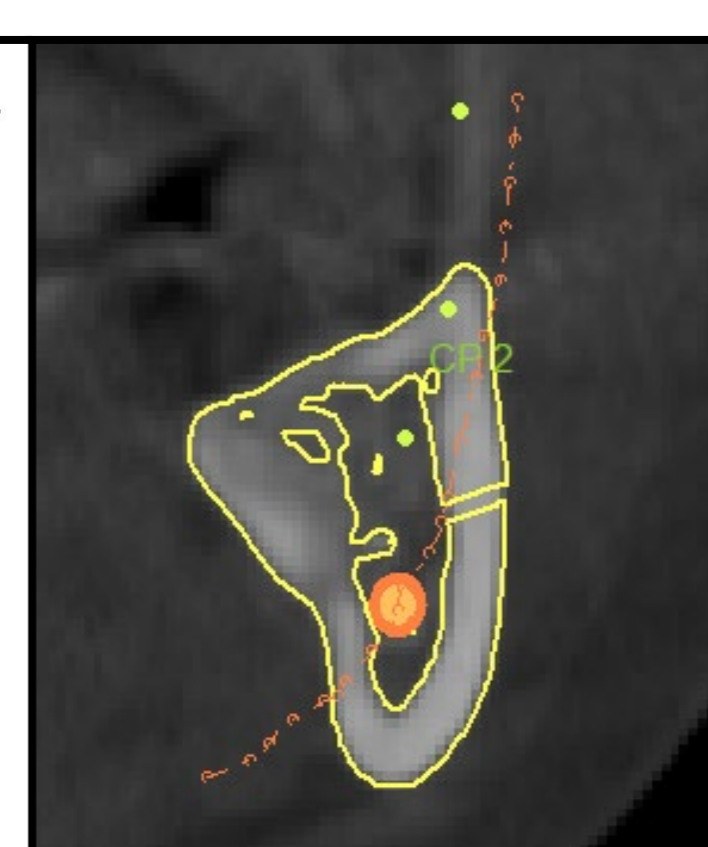


Fig.8. Surgical guide screwed

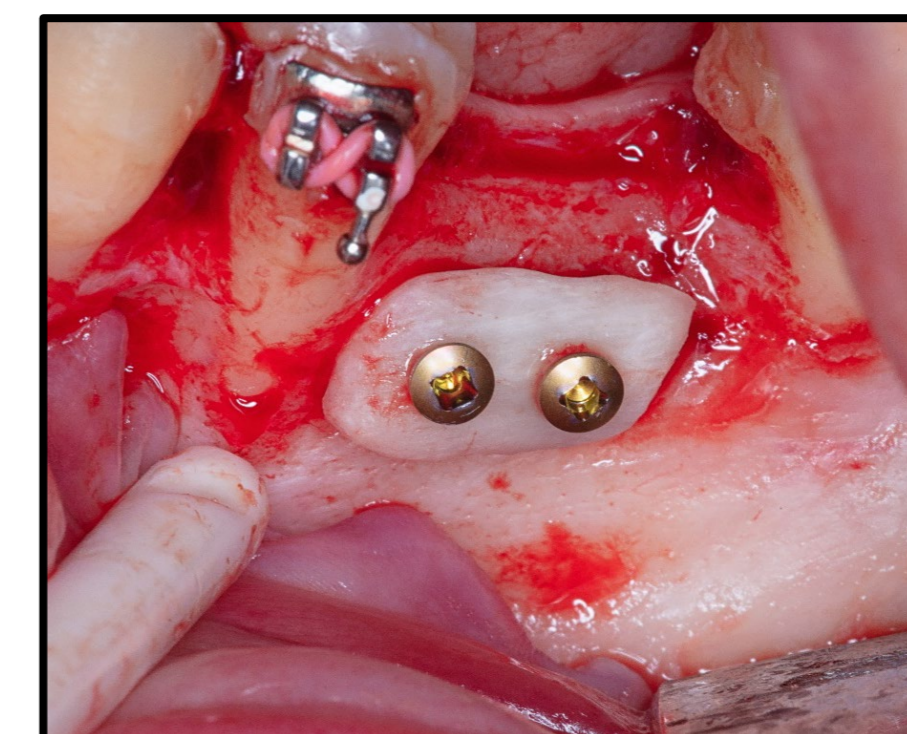
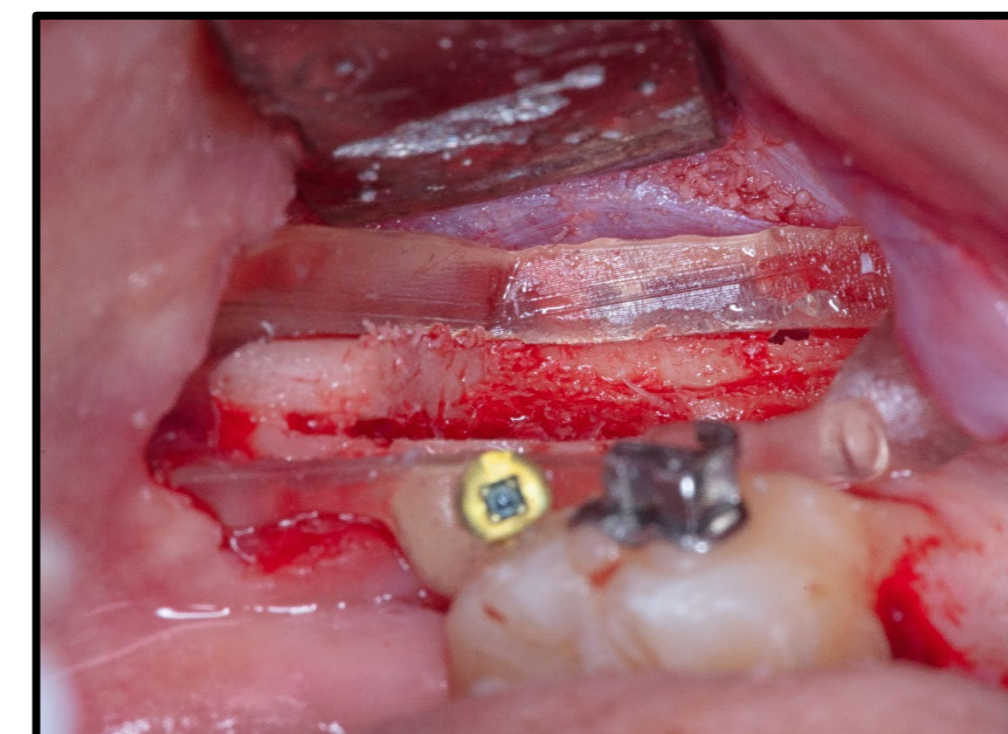


Fig.9. Optimal osteotomies , bone block fixation and ridge reconstruction

CONCLUSION

This case series clinical results confirm that this is a clinically proven technique allowing a minimal invasive procedure with satisfying clinical results. The use of digital planning simplifies the procedure and reduces the learning curve, in a reproducible way.

REFERENCES

- De Stavola L, Fincato A, Albiero AM. A computer-guided bone block harvesting procedure: a proof-of-principle case report and technical notes. Int J Oral Maxillofac Implants. 2015;30(6):1409–13.
- De Stavola L, Fincato A, Bressan E, Gobbato L. Results of Computer-Guided Bone Block Harvesting from the Mandible: A Case Series. Int J Periodontics Restorative Dent. 2017;37(1):e111–9.
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