

Computer Guided Bone Harvesting from Mandible. Case Series

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ABSTRACT

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, performed according to the protocol described 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] The position, angulation, and depth of the osteotomy is controlled, optimizing the volume of the harvestable bone block while reducing the risk of damage to anatomical structures.[1–3]

Case report: Three patients in need of mandibular horizontal ridge augmentation due to bone atrophy were treated with autologous bone graft from the retromolar area using a computer guided bone harvesting guide. All anatomical structures such as the alveolar canal and dental roots were located using Materialise Mimics Innovation Suite and ideal bone-cutting planes were defined with secure surgical margins. The final guide was designed using Exocad GmbH software and were printed on Phrozen Mini 8k printer. Clinical wound healing was evaluated 8 days post surgically and 15 days for suture removal. None of the cases showed any kind of complication in a 4 month follow-up.

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:

1. 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.
2. 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.
3. De Stavola L, Cristoforetti A, Fincato A, Nollo G, Ghensi P, Cantarutti A, et al. Accuracy and Technical Predictability of Computer Guided Bone Harvesting from the Mandible: A Cone-Beam CT Analysis in 22 Consecutive Patients. *J Funct Biomater.* 2022 Dec 10;13(4):292.