

Towards optimal alveolar crest enhancement: autologous chin grafts in horizontal bone regeneration (case report)

Volume 15 Issue 2 - 2024

Karen Barahona,¹ Juan José Guifarro,² Cesar Vilo¹

¹Universidad católica de Honduras, Honduras

²Chief of the Dentistry Service, Hospital Escuela. Professor at the Catholic University of Honduras, Honduras

Correspondence: Karen Barahona, Universidad católica de Honduras, Honduras, Email karen.ib13@gmail.com

Received: March 27, 2024 | **Published:** April 22, 2024

Introduction

Autologous bone grafting of the chin emerges as a prominent option in the field of bone reconstruction and alveolar ridge augmentation. Numerous studies support its preference, not only because of its easy accessibility, but also because of its distinctive biological properties. The chin, being an easily accessible bone, exhibits osteoinductive and osteogenic characteristics, with the cortex serving as an osteoconductive membrane and the medullary portion imparting osteoinductive properties. In addition, revascularisation of chin grafts has been observed to be more rapid compared to other thicker grafts.¹⁻¹⁰

The relevance of the autologous chin graft is supported by its role as a fast, safe and reliable solution, with the additional advantage of avoiding immunological rejection due to its own origin. The scientific literature highlights its superior efficacy and prognosis compared to other types of grafts, such as allografts, xenografts, alloplasts or synthetics.⁵

The paucity of data on donor morbidity when harvesting chin grafts poses a challenge, and most reports focus on cleft patients, leaving gaps in our understanding of this procedure in other clinical settings. Although chin graft harvesting in cleft cases has been explored, specific details on morbidity are limited, highlighting the need for more comprehensive and specific research in this area.^{3,8}

Despite advances in techniques and biomaterials to correct alveolar ridge discrepancies, chin grafts remain a prominent option, offering advantages such as faster revascularisation, lower resorption rate and sustained long-term bone regeneration. This review dives into the wealth of existing research, addressing the morbidity associated with chin graft harvesting, the unique properties of this type of graft and its role in bone regeneration.^{7,11-13}

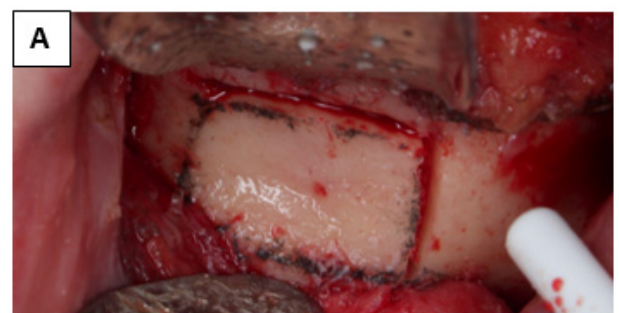
Case presentation

The case is presented of a 42-year-old female patient with no systemic compromises, referred to the Hospital Escuela de Honduras with a history of early tooth loss due to caries. Dental evaluation revealed generalised stage II periodontitis, with a horizontal bone defect of more than 6 mm identified by tomography and a ridge width of 3 mm (Figure 1). Given the clinical challenge of this bone deficiency, a comprehensive treatment plan was implemented that included periodontitis control, specific bone reconstruction techniques to correct the horizontal defect, followed by orthodontic treatment to optimise dental alignment and strategic placement of dental implants. After identification of the horizontal bone defect of more than 6 mm, bone regeneration using a chin block graft was chosen. A chin block was extracted, and secured in place with a 2.0 system, the diameter of the screws being 8 mm (Figure 2). To improve the quality of the graft, it was supplemented with a 1 cc particulate graft of porcine bone. Stabilisation of the graft was achieved by using a 20 x 30 mm

collagen membrane and fixation with 6/0 resorbable polydioxanone thread. Periodic assessments were performed on postoperative days 10, 15, 21 and 63 to monitor healing and graft stability. These follow-ups allowed for adjustments and detailed observations of the bone regeneration process at different stages of the recovery period. Following these evaluations, a period of nine months was allowed for consolidation and maturation of the graft before the next CT scan was performed (Figure 3).



Figure 1 Seibert's I classification.



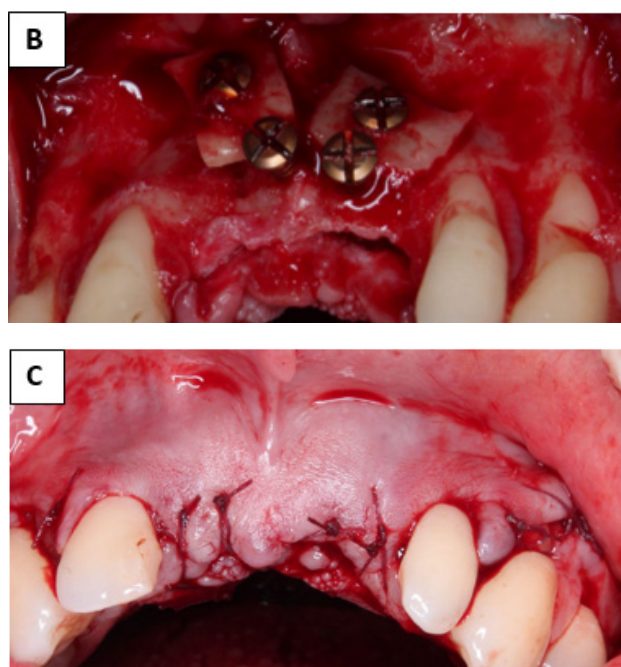


Figure 2 A chin block graft.

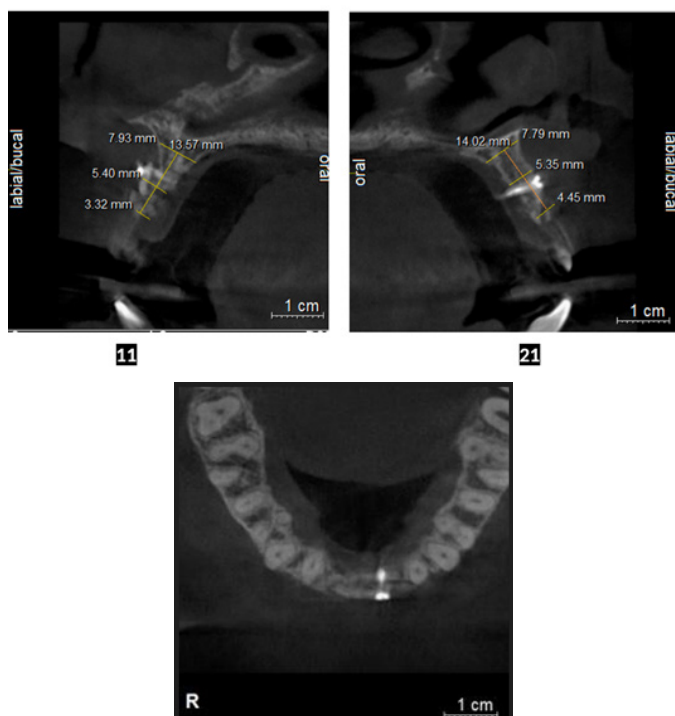


Figure 3 Maturation of the graft.

Discussion

The case presentation highlights the efficacy of autologous bone grafting of the chin in horizontal bone regeneration, successfully addressing an alveolar ridge defect of more than 6 mm. The choice of a comprehensive approach, combining specific bone reconstruction techniques, periodontitis control, highlights the importance of considering multiple aspects in treatment planning.

The decision to use a chin block graft, supported by the literature reviewed in the introduction, reveals a preference for this technique to overcome significant bone deficiencies. The application of a 2.0 fixation system and supplementation with a particulate porcine bone graft reinforces the stability and quality of the graft, evidencing a meticulous approach to the intervention.

Periodic postoperative follow-ups allowed detailed assessment of graft healing and stability at different stages, providing valuable information for adjustments and observations throughout the bone regeneration process. Waiting nine months before performing tomography demonstrates a prudent approach to allow for consolidation and maturation of the graft, ensuring optimal results.

Conclusion

In conclusion, the present case illustrates the success of autologous bone grafting of the chin in horizontal bone regeneration, demonstrating significant improvements in the alveolar ridge from 2 mm to 4 mm. The combination of specific techniques, careful use of adjunctive materials and detailed postoperative follow-up underscores the effectiveness and strategic planning of this intervention. These results support the assertion that autologous chin grafting remains a reliable and valuable option in bony reconstruction, especially in cases of significant horizontal deficiencies.

Acknowledgments

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

Funding

None.

References

1. Starch-Jensen T, Deluiz D, Deb S, et al. Harvesting of autogenous bone graft from the ascending mandibular ramus compared with the chin region: a systematic review and meta-analysis focusing on complications and donor site morbidity. *J Oral Maxillofac Res.* 2020;11(3):e1.
2. Park YW, Lee JH. Use of mandibular chin bone for alveolar bone grafting in cleft patients. *Maxillofac Plast Reconstr Surg.* 2016;38(1):45.
3. Raghoobar GM, Louwse C, Kalk WW, et al. Morbidity of chin bone harvesting. *Clin Oral Implants Res.* 2001;12(5):503–507.
4. Osman AH, Atef M. Computer-guided chin harvest: A novel approach for autogenous block harvest from the mandibular symphysis. *Clin Implant Dent Relat Res.* 2018;20(4):501–506.
5. Díaz F, Gorrín D, Villalobos M, et al. Autologous chin block graft, an alternative for reconstructing atrophic alveolar ridges in implant dentistry. *Lat Am J Oral Maxillofac Surg.* 2023;3(1):7–11.
6. Jensen AT, Jensen SS, Worsaae N. Complications related to bone augmentation procedures of localized defects in the alveolar ridge. A retrospective clinical study. *Oral Maxillofac Surg.* 2016 Jun;20(2):115–22.
7. Chiu GS, Chang CH, Roberts WE. Bimaxillary protrusion with an atrophic alveolar defect: orthodontics, autogenous chin-block graft, soft tissue augmentation, and an implant. *Am J Orthod Dentofacial Orthop.* 2015;147(1):97–113.
8. Pérez López C, Bazal Bonelli S, Sánchez-Labrador L, et al. Bone regeneration with intraoral grafts: branch vs. chin. *Update Sci Dent.* 2021;18(3):175–182.

9. Amaral Valladão CA Jr, Freitas Monteiro M, Joly JC. Guided bone regeneration in staged vertical and horizontal bone augmentation using platelet-rich fibrin associated with bone grafts: a retrospective clinical study. *Int J Implant Dent.* 2020;6(1):72.
10. Sakkas A, Wilde F, Heufelder M, Winter K, Schramm A. Autogenous bone grafts in oral implantology-is it still a “gold standard”? A consecutive review of 279 patients with 456 clinical procedures. *Int J Implant Dent.* 2017;3(1):23.
11. Sarmiento M, Perfecto D. Application of guided bone regeneration with chin block graft in implant placement. *Sanmarquina Dentistry.* 2016;18(2):106.
12. Jimi E, Hirata S, Shin M, et al. Molecular mechanisms of BMP-induced bone formation: crosstalk between BMP and NF- κ B signaling pathways in osteoblastogenesis. *Japanese Journal of Dental Science.* 2010;46(1):33–42.
13. Maiorana C, Ferrario S, Poli PP, et al. Autogenous Chin block grafts in the aesthetic zone: a 20-year follow-up case report. *Case Rep Dent.* 2020;2020:6525797.