PO-SU-014

CLINICAL RESEARCH – SURGERY

Bone regeneration of horizontal defects in the posterior mandible: 1-year prospective study results.

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Background and Aim

Alveolar ridge defects caused by tooth extraction, trauma or periodontal diseases often require surgical procedures to allow implant-supported prosthodontic rehabilitation. Guided bone regeneration (GBR) utilizing bone graft substitutes and collagen membranes is considered a preferred treatment option able to provide bone of sufficient volume and quality for implant placement.[1,2] To ensure long-term success, however, the augmented bone should also promote stable and healthy response of the peri-implant tissues.

AIM

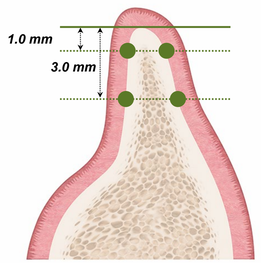
To evaluate GBR in severe horizontal bone defects using bovine bone graft material creos xenogain and collagen membrane creos xenoprotect prior to implant placement.

Methods and Materials

This multicenter prospective study included patients requiring GBR prior to implant placement in the premolar and posterior region of the mandible and presenting with approximately 4 mm of horizontal ridge. All patients underwent a GBR procedure with a 1:1 mixture of creos xenogain (CXG; Nobel Biocare AB)/autogenous bone and the creos xenoprotect membrane (CXP; Nobel Biocare AB) followed by implant placement (NobelParallel CC, Nobel Biocare AB) 8 months after augmentation.

Primary endpoint (Fig 1): bone gain calculated using CBCT scan measurements of the ridge at the time of patient inclusion and prior to implant insertion.

Figure 1. Primary endpoint of the study. Ridge measurements at 1 and 3 mm from the top of the crest were made using CBCT images at the time of patient inclusion and 8 months after bone augmentation with creos xenogain/ creos xenoprotect.

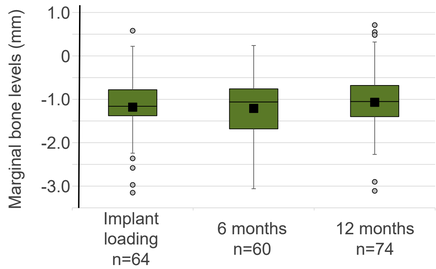


Secondary outcome measures: implant survival and success, marginal bone levels, soft tissue parameters, patient satisfaction (on a 1-10 Visual Analogue Scale), and oral health-related quality of life (QoL) based on the OHIP-14 questionnaire.

Results

- Of the 46 patients treated with GBR, 39 (84 implants) and 38 (83 implants) patients attended the 6- and 12-month follow-up visits, respectively.
- **Few complications** reported during the healing phase included wound dehiscence (10 cases; 21.7%) and membrane exposure (2 cases; 4.3%) were all resolved within the first three weeks of healing.
- **Significant bone width gain** 8 months post GBR of 4.0 ±1.5 mm and 4.8 ± 1.7 mm (n=45) when measured 1 and 3 mm from the top of the crest, respectively.
- **Successful implant placement** of 91 implants (43 patients) with an average insertion torque of 37.8 ±5.2 Ncm (range: 30–45 Ncm).
- **High cumulative implant survival and success** rates of 100% and 96.3%, respectively, from definitive prosthesis placement (DPP) to 1-year follow-up. One implant failed to osseointegrate prior to DPP.
- **Stable marginal bone levels** from implant loading to 6 months and 1 year (Fig 2).

Figure 2. Marginal bone levels throughout the study. Box-and-whisker plot with means indicated as squares and outliers as circles.



- **Healthy soft tissue** from DPP to the 1-year follow-up, with improved papilla and plaque indices and Pink Esthetic Score, stable keratinized mucosa presence and height; but a small increase in the bleeding index.
- **High patient satisfaction** with function and esthetics, with all mean scores >9.5 on a scale of 0 to 10.
- **Significantly improved QoL** from pre-treatment to the 1-year follow-up.

Conclusion

Within the limitations of the 1-year follow-up, the results from this prospective study indicate that augmentation of severe horizontal bone defects with creos xenogain bovine bone graft material and creos xenoprotect collagen membrane led to bone regeneration allowing successful implant placement and demonstrated healthy and stable response of the peri-implant tissues.

References

1. de Azambuja Carvalho PH et al. Oral Maxillofac Surg. 2019 Sep;23(3):271-279.
2. Urban IA et al. Clin Oral Implants Res. 2019 Jun;30(6):487-497.

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Clinical Case

A 62-year-old female with horizontal posterior mandible resorption underwent a GBR procedure. After 8 months of healing, she received two parallel-walled, conical-connection implants (10 × 4.3 mm and 11.5 × 4.3 mm), and 3 months later the final prosthesis, a 3-unit veneered NobelProcera Zirconia Implant Bridge (Nobel Biocare AB).

Figure 3. Clinical views at pre-treatment (left) and immediately prior to bone augmentation (right).

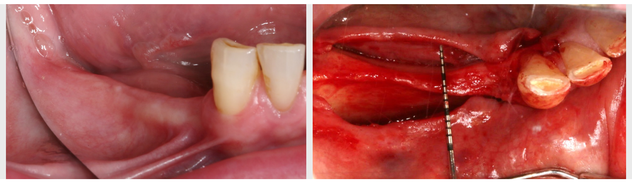


Figure 4. Clinical views during bone augmentation procedure: at ridge measurement (top left), implant insertion (top right), buccal view after implant insertion (bottom left) and a panoramic radiograph immediately after implant insertion (bottom right).

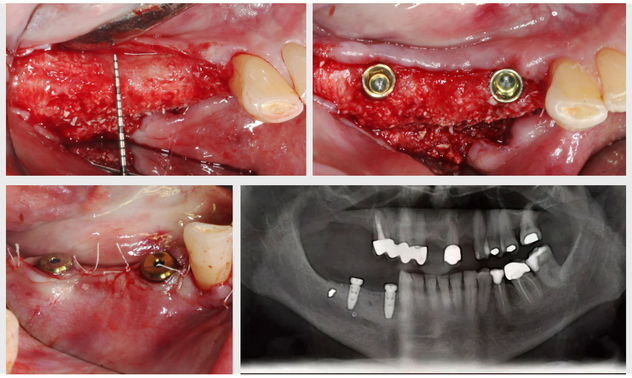


Figure 5. Peri-apical radiograph (left) and clinical view (right) 6 months after final prosthesis delivery.

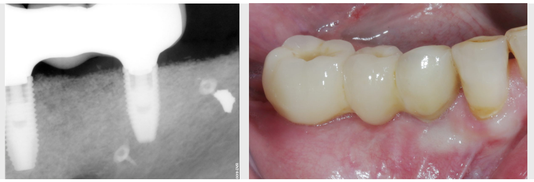
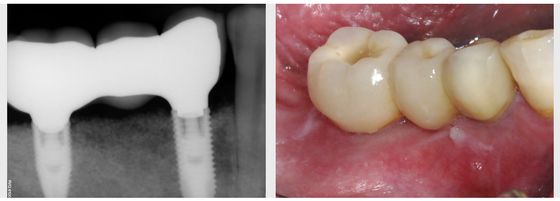


Figure 6. Peri-apical radiograph (left) and clinical view (right) 12 months after final prosthesis delivery.



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