

Better horizontal ridge expansion

Using advanced minimal-invasive instruments and techniques allows for concomitant implant placement and regenerative procedures

By Liviu Steier and Gabriela Steier, U.K.

This 54-year old patient regularly attends our practice and takes part in our quarterly preventative program. His anamnesis contains no special entries. Figure 1 shows that the patient has lost tooth 12 as a result of a previously unsuccessful root canal treatment, followed by an unsuccessful apicotomy.

The prosthetic work has been in-situ for a long time and was performed alio loco. Secondary decay at the crown margins of tooth 11 created the need of prosthetic retreatment. The different treatment options were explained in great detail to the patient, one of which was fixed restoration using implants.

The patient decided on implantation in position 12, and was told that as a consequence of local infection, apicotomy, and long-term tooth loss, the alveolar ridge has collapsed and guided bone regeneration would be needed to restore the optimum anatomical condition.

The existing porcelain fused to metal bridge (abutment teeth = 13 and 11, pontic = 12) was removed, decay eliminated and new adhesive core build-ups performed. Buccal infiltration anesthesia was given and the patient was offered a new metallic, composite, veneered bridge.

A full gingival flap was raised allowing the extensions of the bone resorption to be identified. It was obvious that implant placement without bone augmentation could not be performed. The two treatment options available were:

1) Vertical and horizontal bone augmentation with a healing time of at least five months and an implant placement with an additional surgery.

2) Horizontal ridge widening with immediate implant placement and bone grafting.

Of course, there were advantages and disadvantages of each treatment option.

Advantages of bone augmentation and implant placement in two stages:

- ▶ Direct full control of bone augmentation procedure.
- ▶ Predictable bony support at implant placement time.
- ▶ Risk-free implant placement.

Disadvantages of bone augmentation and implant placement in two stages:

- ▶ Treatment delay by healing time of at least five months.
- ▶ Two surgical procedures needed.

Advantages of bone augmentation and implant placement at the same time:

- ▶ Single surgical procedure.

▶ Reduced healing time. Disadvantages of bone augmentation and implant placement at the same time:

- ▶ Bone management knowledge skills for the surgeon requested.
- ▶ Additional technical equipment required.

Meisinger has introduced a so-called Split Control instrument kit it described as a '[...] minimally invasive alternative to osteotomes. Bone



Fig. 1: Digital PAN before treatment.



Fig. 2: The initial bridge in place.



Fig. 3: Direct view of the horizontal bone resorption after removal of the temporary restoration.

spreading and bone condensing with special screw-like instruments (spreaders) achieve a controlled and standardised dilation of horizontally resorbed bone and a gentle densification of cancellous bone'.

The Split Control Kit by Meisinger (www.bone-management.com) contains different sized screws, built

similarly to a Hedström file, but reversed. Initial small-sized drills are offered within the kit intended for use as markers and access instruments, and to be followed by

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75% of US adults experience some degree of dental fear^{1,2,3}

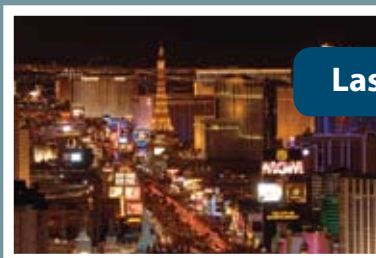
31% of baby boomers never go to the dentist (or only go in an emergency)⁴

15% of the population declines necessary dental treatment, because they fear oral injections⁵

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¹ Harkavy, J., Kleinknecht, R.A., McGlynn, F.D., & Thorndike, R.M. (1984). Factor analysis of the dental fear survey with cross-validation. *J Am Dent Assoc.* 108 (1): 59-61.
² Getka, E., Glass, C.R. (1992). Behavioral and cognitive-behavioral approaches to the reduction of dental anxiety. *Behavior Therapy.* 23 (3): 443-448.
³ Getz, T., Milgrom, P., Weinstein, P. (1995). Treating fearful dental patients: A patient management handbook. University of Washington.
⁴ Academy of General Dentistry. (2007). National survey reveals baby boomers miss links between oral and overall health. Retrieved May 30, 2008, from: <http://www.agd.org/support/articles?ArtID=1287>
⁵ Hamilton, J.G. (1995). Needle phobia: A neglected diagnosis. *Journal of Family Practice.* 41: 169-175.

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the spreaders in increasing dimensions.

The implant guiding system (by Innovative Implant Technology) was used to two-dimensionally position the primary marker drill. To begin with, an 010 followed by an 018 pilot drill was used, complimented by an expansion burr in the size of a 025 burr. The bony spreading was performed using the following spreaders: 027, 029, 031, 033.

As a next step, the guided bone regeneration was performed.

To augment the buccal resorption, Bio-Oss Spongiosa small granules, 0.25 mm (Geistlich Biomaterials) were used and covered with Geistlich Bio-Gide resorbable bilayer membrane 25 x 25 mm both soaked in wound blood.

With the membrane covering the augmentation material, additional fixation of the membrane was avoided because of the available fixation and immobilisation using the soft tissue.

The flap was sutured in place crestally using GoreTex suture because of its mechanical performance. The lateral-releasing incisions were closed using 6x0 Prolene suture material.

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Fig. 4: Primary incision line is placed in the sulci of the adjacent teeth using a 15 C scalpel blade.



Fig. 5: Second incision: a crestal incision line lightly deviated towards the palatal compliments the sulcular incisions.



Fig. 6: Full gingival flap isolation.

Conclusion

The buccal bone plate can resorb to a severe degree as a result of tooth loss. Conventional implantologic reconstructive therapy supposed until recently a two-stage approach: guided bone regeneration followed by a five-month healing time and a second surgery for fixture installment. Using advanced minimal-invasive instruments for extremely thin-ridge expansion allows for concomitant implant placement and regenerative procedures.



Fig. 7: Split Control Kit by Meisinger.



Fig. 8: The spreaders are screwed into the bone with a hand ratchet.

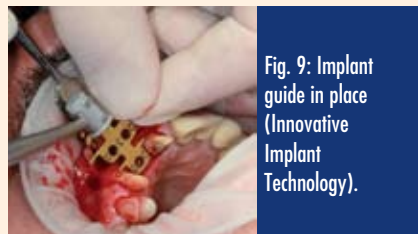


Fig. 9: Implant guide in place (Innovative Implant Technology).

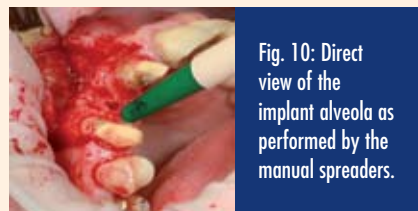


Fig. 10: Direct view of the implant alveola as performed by the manual spreaders.

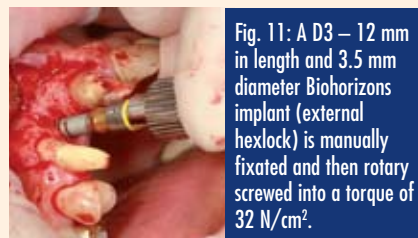


Fig. 11: A D3 - 12 mm in length and 3.5 mm diameter Biohorizons implant (external hexlock) is manually fixated and then rotary screwed into a torque of 32 N/cm².

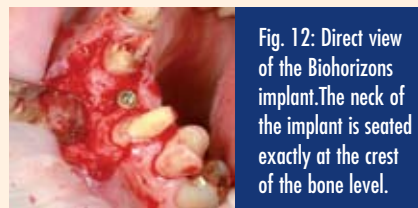


Fig. 12: Direct view of the Biohorizons implant. The neck of the implant is seated exactly at the crest of the bone level.



Fig. 13: To improve the local blood perfusion, small and superficial bony defects were added to the regeneration area.



Fig. 14: Bio-Oss® Spongiosa small granules in place.

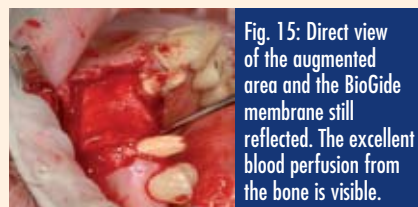


Fig. 15: Direct view of the augmented area and the BioGide membrane still reflected. The excellent blood perfusion from the bone is visible.



Fig. 16: Flap sutured in place.



Fig. 17: The pontic of the temporary restoration appeared overextended due to the three-dimensional augmentation. The needed reduction was marked.



Fig. 18: Temporary restoration after resizing.



Fig. 19: The temporary was recemented in place avoiding pressure in the augmented area.



Fig. 20: The correct three-dimensional position of the Biohorizons implant was confirmed with an X-ray.

About the author



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