Deploying Alpha-Bio Tec's NeO Self-tapping Implant in an Atrophic Crest: Vestibular-Cortical Stabilization with Bone Graft

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Dr. Massimiliano Favetti graduated with honors from the University of L'Aquila, Italy in 1995, where he collaborated with the ENEA Research Center on the study of biocompatibility of metals in dentistry. Dr. Favetti specializes in prosthetics, implantology and oral surgery. Since 2008, he has been on the Board of Experts, Italian Civil Court, Rome. His main interests are piezoelectric surgical techniques and CAD/CAM systems for prosthetics and implantology; he has been a guest speaker on these topics at various conferences and courses. Dr. Favetti has used the Alpha-Bio Tec. implant system since 2005. He is currently the owner of Dentamed Clinics, Rome.

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Abstract

In daily clinical practice, it is often necessary to re-treat patients who have previously undergone prosthetic rehabilitations. It is not uncommon, in fact, to have to prosthetically re-treat patients who have a prosthetic abutment (due to decay, root fracture etc), and a rehabilitation with implant support often becomes necessary. In cases in which extractions took place several years earlier, we may find ourselves faced with atrophic crests, into which the insertion of an implant can be difficult and often requires an increase in bone volume. An example is presented below in which, by using self-tapping implants, the vestibular-cortical bone loss is minimized, increasing the odds of implant success.

Introduction

The insertion of implants in atrophic bone crests can easily create fenestrations in the coronal part of the implant site. For this reason, many authors advocate using GBR (guided bone regeneration) to prevent possible dehiscence in the post-surgical phase and to guarantee the survival of implants, which is attributed to adequate bone thicknesses in the cortico-vestibular portion of the crest. [1-2] Vestibular bone loss is frequently caused by the technique used to prepare the implant site, that, for insertion of an implant of Ø3.75 mm diameter, usually anticipates an osteotomy with a drill of at least Ø3.2 mm diameter [3]. In such cases, the use of self-tapping implants and auto-condensers enables us to reduce the osteotomy to a Ø2.8 mm diameter drill, making it possible to save at least 0.4 mm of vestibular cortical bone, fundamental in obtaining an optimal aesthetic and functional result that is long-lasting [4].

Case Overview

Patient, female, 45-years old, non-smoker, without any particular problems in his medical history, presented complaining about a problem in the mandibular left quadrant. The physical examination reveals bridge decementation from elements 35, 36 and 37. Simply redoing this bridge is impossible, due to the absence of an adequate ferrule as well as uncertainty regarding the long-term prognosis for tooth 37. It was decided, therefore, to replace tooth 36 with an implant and GBR with a resorbable membrane and heterologous graft.

Extraoral Examination

The patient is normotrophic as regards to soft tissues and the perioral musculature without significant asymmetries of the face.

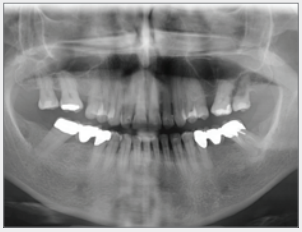
Intraoral Examination

Good level of oral hygiene, some signs and facets of dental wear, absence of mobility problems **(Fig. 1).**

1 Frontal view of the patient

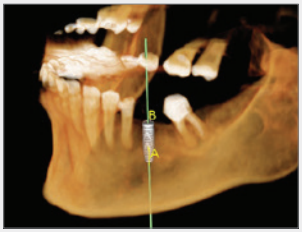
X-ray Examination

The preoperative oral X-ray **(Fig. 2)** suggests that tooth 37 has an uncertain long-term prognosis as bridge abutment.

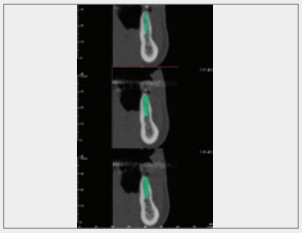


2 Ortho-panoramic X-ray

The CBCT (**Figs. 3a and 3b**) shows the crestal bone to be very thin, but of adequate height for the insertion of an implant of 13 mm in length.



3a CBCT with implant planning



3b CBCT with implant planning

Materials Used

- NeO implant Ø3.75 x 11.5 mm (Alpha-Bio Tec., Israel) in zone 36
- Resorable collagen membrance
- Xenograft
- PTFE 4-0 suture (Omnia, Italy)

Treatment Objectives and Work Plan

The treatment plan includes a pre-implant hygiene session. Proper positioning of the implant will require an increase in volume from the vestibular side for the restoration of correct tissue harmony and a correct emergence profile of the prosthetic crown. Several post-surgical follow-up visits are planned at 2, 4, 7 and 14 days to disinfect the incision with chlorhexidine and to check for possible dehiscence of the flap. The prosthetic phase will be carried out approximately 4 months after the positioning of the implant and consists of a zirconia and ceramic crown on a titanium abutment.

Surgical Phase

After plexus anesthesia, performed with mepivacaine 1:100.000 both in the vestibular and lingual fornix, a crestal incision was made without releasing cuts, so as not to reduce the vascularization of the flap, As predicted by the CBCT **(Figs. 3a, 3b, 4)**,

4 Flap incision

the bone crest appears very thin, but of adequate height for the insertion of an implant of 13 mm **(Fig. 5)**.

5 Occlusal view of the gap

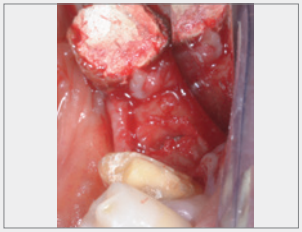
In order to minimize possible vestibular fenestration in the sub-crestal positioning of the implant of Ø3.75 x 11.5 mm, we decided upon a 13 mm preparation of the site, beginning the drilling sequence with a 2 mm stop drill. The osteotomy was stopped at the 2.8 mm diameter drill **(Fig. 6)**.

6 Preparation of implant tunnel

The implant was inserted using a manual ratchet and stabilized in a subcrestal position with approximately 50 Ncm of torque **(Figs. 7, 8, 9)**.

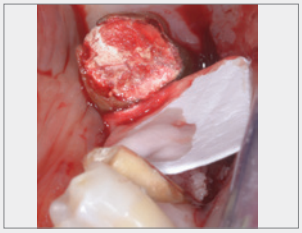
7 Manual insertion of the implant

8 Subcrestal insertion of implant

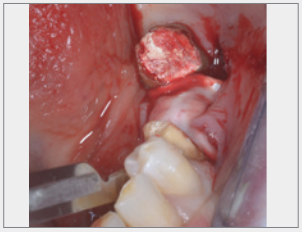


9 Subcrestal insertion of implant

Although no vestibular fenestration was observed at the time of surgery, it was decided to increase the vestibular cortical bone thickness, since some portion of this bone is usually resorbed after implant placement. First, the resorbable membrane was stabilized lingually and, after filling the relevant zone with heterologous bone, the membrane was folded down on the vestibular side to protect the graft **(Figs. 10, 11).**

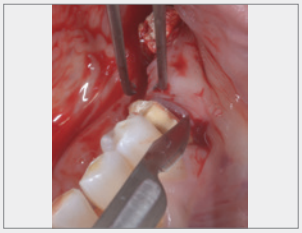


10 Regeneration with resorbable membrane and heterologous bone

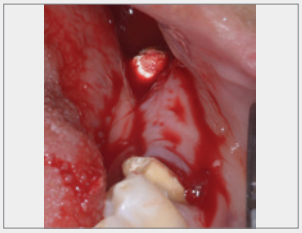


11 Regeneration with resorbable membrane and heterologous bone

The surface of the membrane was then disinfected with a 0.2% chlorhexidine solution, and the flap was closed passively in order to obtain a first degree closure without traction on the suture **(Figs. 12, 13)**.



12 Release of the flap and primary intention closure



13 Release of the flap and primary intention closure

Two lines of sutures are executed, the first with horizontal external mattresses, later stabilized with a second line of separate points more coronal to the first **(Fig. 14)**.

14 Suture

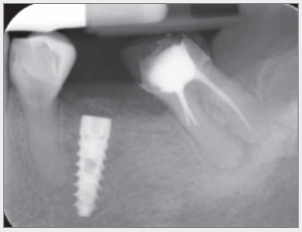
The patient was discharged with the following drug regimen: rinses with 0.12% chlorhexidine diclugonate for 60 seconds twice a day, antibiotic therapy with amoxicillin and clavulanic acid - 1 tablet of 875 mg twice a day, ice on the first day and a semiliquid diet for the first week. At 15 days after surgery, follow-up was performed to verify the healing of the tissues **(Fig. 15)**.

15 Suture follow-up at 15 days

After removal of the suture the site does not show signs of dehiscence of the wound **(Fig. 16)**.

16 Suture removal at 15 days

The successful osseointegration of the implant is visible on the 4 month follow-up X–ray and all tissues appear to be well healed **(Fig. 17,18)**



17 Rx after 4 months

18 Tissue healing after 4 months

A healing abutment was then inserted **(Fig. 19)**.

19 Healing abutment

The case will be finalized and updated in the next few months with the delivery of the final prosthetics to the patient.

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3. Giro, G., Tovar, N., Marin, C. et al. The effect of simplifying dental implant drilling sequence on osseointegration: an experimental study in dogs. Int J Biomater. 2013; 2013:230310.

4. Steier, L., Steier, G. Successful dental implant placement surgeries with buccal bone fenestrations. J Oral Implantol. 2015 Feb; 41(1):112-8.