Case study 28

Implant-prosthetic rehabilitation in a periodontally compromised patient using Alpha-Bio Tec SPI dental implant and aesthetic abutment

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About the Author

Dr. Magda Mensi is a staff researcher of Oral Surgery and Endodontics at the Faculty of Medicine's Dental Clinic, University of Brescia, and executive Medical Director of the Dental Clinic at Community Hospital (Spedali Civili), Brescia. She is Adjunct Professor, Oral Surgery, Faculty of Dentistry and Prosthetics, and Adjunct Professor, Surgery and Oral Hygiene, Faculty of Dental Hygiene, both at the University of Brescia. Dr. Mensi has been a member of the Italian Society of Periodontology since 2000. She holds a Ph.D. in Dentistry and Prosthetics (cum laude), and a Masters in Periodontal Surgery and Implantology, with a focus on periodontally compromised patients, under the mentorship of Professor Leonardo Trombelli (2010-2012), University of Ferrara Dental Clinic. Dr. Mensi is the author of numerous national and international publications in the areas of surgery and endodontics, a frequent speaker at conferences and congresses, and a freelance consultant in periodontology and implantology.

Abstract

Implant-prosthetic rehabilitation of patients with aggressive periodontitis (AGP) is a subject of considerable controversy and debate[1]. This case report examines a 40 year-old patient suffering from AGP and treated with an Alpha-Bio Tec SPI implant in position 26, together with a maxillary sinus elevation with crestal approach. Prosthetic restoration is performed with the use of an aesthetic abutment and a ceramic crown.

Introduction

Classic surgical techniques and prosthetic rehabilitation can be particularly complicated in patients with aggressive periodontitis[2]. The first approach in stabilising the disease is always non-surgical. This includes eliminating plaque retentive factors, hopeless elements, rebalancing the patient's lifestyle by eliminating smoking and correcting systemic abnormalities such as glycated haemoglobin levels in diabetic patients.
As a result, it is possible to establish best suited treatment plan for individual patients during the reassessment phase[3]. Periodontal surgeries are often necessary to correct bone and tissue defects resulting from the disease. For this reason, the patient must be functionally and aesthetically rehabilitated. It is likely to face shortage of bone, both horizontally and vertically, as well as altered and mixed gingival parables, when implantology is required, in order to rehabilitate these cases. This requires the implementation of sophisticated and minimally invasive surgeries, the use of specific devices, the need for regenerative techniques possibly supported by autologous growth factors and selecting prosthetic components that minimise the aesthetic deficit[4].

Background

The 40 year-old, healthy non-smoker patient, B.R., suffering from generalized aggressive periodontitis, treated with one-stage full mouth disinfection causal therapy in 2010, surgical re-sectioning of sector 1 and regenerative surgery of sector 3, is found without periodontal relapses in 2013, during one of the routine quarterly hygiene sessions. The patient asks to restore left-hand chewing where, in 2010, element 26 was lost due to an acute periodontal abscess.

- **Extraoral Examination**
  The patient's smile line is particularly high and exposes the gingival margins of the upper molars, so much so that on the right-hand side, we can see the residual aesthetic problem resulting from the surgical re-sectioning that was needed to treat pockets and furcations present on the bridge abutments (Figures 1-2).

- **Intraoral Examination**
  The surgical site of interest is in excellent clinical condition. The soft tissues are intact and do not show signs of inflammation, the thickness of the residual ridge looks good, and the adjacent teeth do not show pathological problems.

- **X-ray Examination**
  The intraoral radiography shows residual bone height up to the cortex of the maxillary sinus floor equal to 4mm. The sinus is free from opacification or other pathological signs (Figures 3-4).

Materials Used

- SPI implant (Alpha-Bio Tec, Israel)
- USE Hydro kit (piezoelectric tips) for the preparation of the implant site (Silfradent, Italy)
- Medifuge Blood Phase Separator to obtain the CGF membrane and fibrin block (Silfradent, Italy)
- 15° aesthetic abutment (Alpha-Bio Tec, Israel)
- GRAFT Natural Bovine Bone (Alpha-Bio Tec, Israel)
- PTFE 5-0 suture (Omnia, Italy)

Prosthodontics

The cement-retained restoration prosthesis is completed using an aesthetic 15° abutment in order to minimise any aesthetic problems that could derive from the gingival parabolic architecture, from the high smile line, from the light color of the adjacent natural elements and from the inclination of the implant.

Treatment Objectives and Work Plan

The treatment plan envisions the preparation of maxillary sinus elevation with crestal approach, supported by the use of autologous CGF (Concentrated Growth Factors) obtained by centrifugation of the patient's whole blood in order to stimulate and accelerate bone regeneration in a site subject to periodontal disease; and finally, contextual placement of a one-stage SPI implant to be restored with aesthetic abutment and ceramic prosthetic crown.

The surgical site is in excellent health conditions (Figure 5). Therefore, after local anaesthetic is administered, we proceed by cutting a trapezoid flap with a palatal incision line and two mesial and distal intrasulcular cuttings in order to apically position the flap and the keratinized palatal gingiva at the vestibular portion of the implant (Figures 6-7).

After the full thickness flap has been lifted, the implant site is prepared by means of piezoelectric tips up to the cortical sinus floor which is subsequently overcome by the proper tip, to then be raised by hydraulic pressure using internal irrigation tips (Figures 8-9-10).

After the control Rx (Figure 11) and the Valsalva manoeuvre to verify the integrity of the Schneider membrane, the CGF membrane is inserted by gently compressing it with piezoelectric tips, used as compactors, in order to protect the sinus membrane from any trauma induced by the sharpness of the graft material and the implant (Figures 12-13-14).
A CGF fibrin block is minced and incorporated into the bovine hydroxyapatite-based biomaterial. It is then inserted into the site that was prepared to lift the membrane and to insert the 8mm x 4.2 mm SPI implant.
At first, the implant is inserted manually, then with the manual ratchet, and, finally, by the torque ratchet that shows an implant stability of 35 Nw (Figures 15-16).

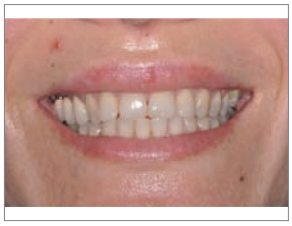
Doxycycline hyclate is used topically within the site to prevent bacterial growth in the first weeks. Following, a 6 mm healing abutment is inserted (Figure 17), which supports the gingival tissue apically and vestibularly, and is modified creating a half moon which allows, by means of a PTFE internal modified mattress suture (Gottlow), an excellent marginal seal and, therefore, first intention healing (Figures 18-19).
A control Rx is performed (Figure 20).

One 4mg vial of dexamethasone is administered intramuscularly on-site to avoid oedema and pain. Post-surgical therapy involves the administration of azithromycin 500mg every 24 hours for 6 days, Brufen 600mg every 12 hours for 4 days, pure 0.12% chlorhexidine for 1 minute every 8 hours for 1 month, ice for the first day and soft and cool food for the first 5 days.

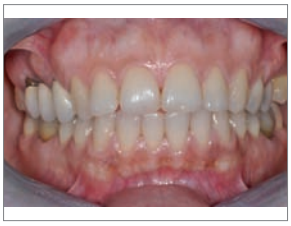
The first check up is carried out at 7 days (Figure 21) and the sutures removed at 14 days after cleaning of the area (Figure 22). Patient undergoes further check-ups at 30 and 60 days. At this stage, the open tray impression is taken with pick-up technique. Finally, shade selection is carried out. (Figure 23-24).

A temporary crown is inserted using the final aesthetic abutment which was slightly adjusted in the laboratory (Figures 25-26-27). After 15 days, the occlusion, aesthetics, detergibility and adaptation of the soft tissues are tested. The process is completed by making required changes with a ceramic crown using the same abutment (Figure 28).

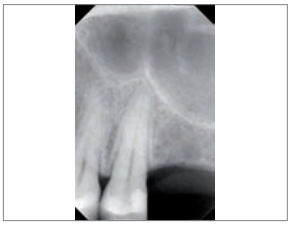
The control x-ray at 6 months shows the corticalization of the regenerated bone apical to the implant and the absence of crestal bone resorption, indicating a good integration of both the implant and the prosthetic restoration (Figure 29).



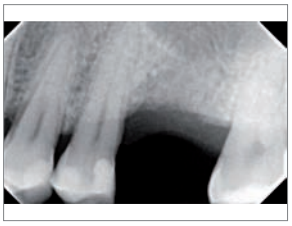
1 Patient's smile



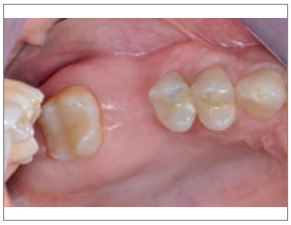
2 Close up



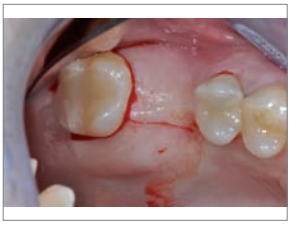
3 Preoperative Rx



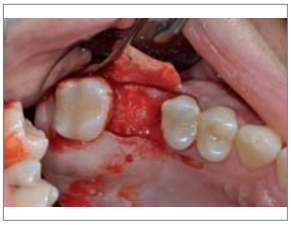
4 Preoperative Rx



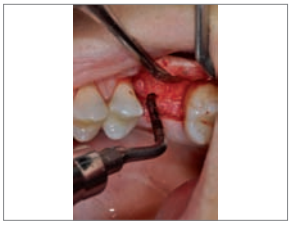
5 Pre-surgical site



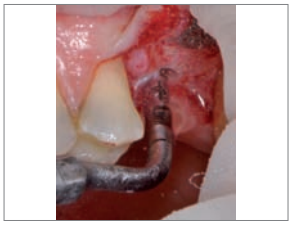
6 Flap incision



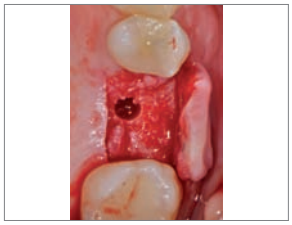
7 Lifting of the trapezoidal flap



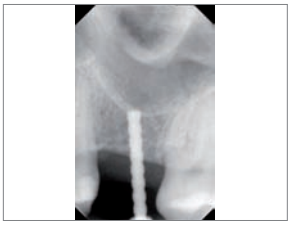
8 Initial preparation phase of the transcrestal site



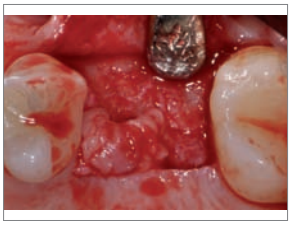
9 Preparation of the implant site



10 Occlusal view of the implant site



11 Intraoperative Rx with pivot



12 Transcrestal insertion of the CGF in the sinus

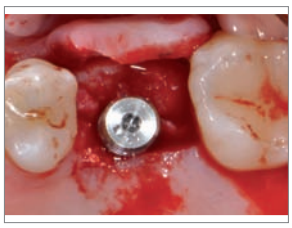
13 Alpha-Bio Tec GRAFT NBB with CGF

14 Mixing biomaterial and CGF in the sinus with osteotomy

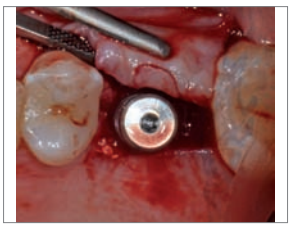
15 Alpha-Bio Tec surgical kit

16 Insertion of the SPI implant with torque ratchet (35 Nw)

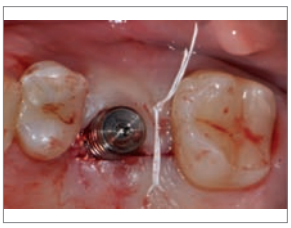
Implant-prosthetic rehabilitation in a periodontally compromised patient using Alpha-Bio Tec SPI dental implant and aesthetic abutment



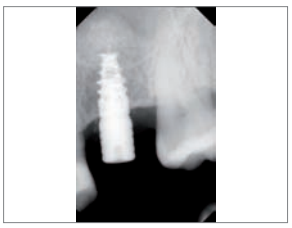
17 Insertion of the healing abutment



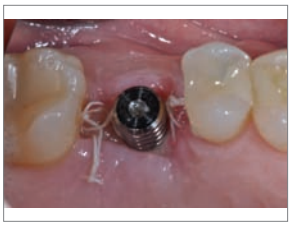
18 Positioning of the vestibular flap



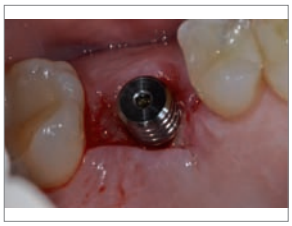
19 Vertical modified mattress suture



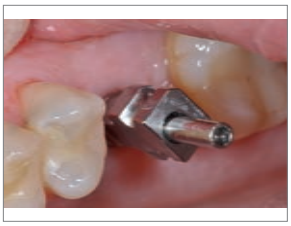
20 Post-operative Rx



21 Check up at 7 days

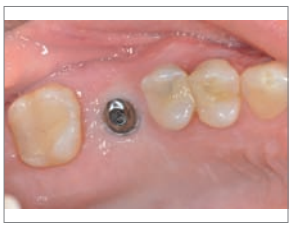


22 Removal of stitches at 14 days



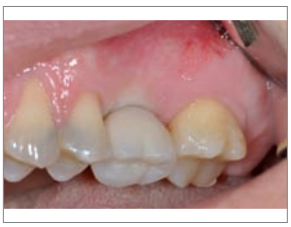
23 Pick-up impression

24 Shade selection

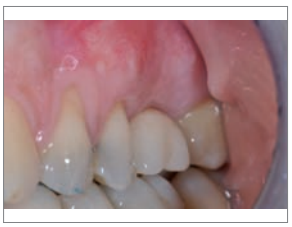


25 Aesthetic abutment in the occlusal position

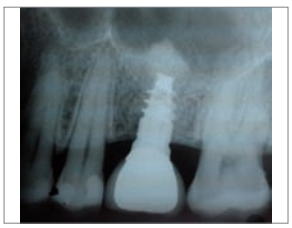
26 Aesthetic abutment in the vestibular position



27 Temporary crown



28 Final restoration



29 Final Rx

Conclusions

The success and long-term survival of implants in patients with aggressive periodontitis are unclear[5]. There are reports that show predictability similar to that of patients not suffering from AGP, however, these are studies in which the patients were subject to long-term active periodontal therapy to stabilise the disease immediately prior to the placement of implants[6]. We therefore do not know, with certainty, what the survival of implants placed directly in patients with active disease would be, however, it is assumed that this is significantly lower than in healthy patients, given the susceptibility and immunocompromised status of patients with AGP.

As a result, prior to placing implants in patients severely suffering from periodontitis, it is necessary to treat them with adequate causal therapy, assess the conditions of the residual elements surrounding the implants and decide whether elements with doubtful prognosis should be removed or whether they should be treated with periodontal therapy. To obtain the aesthetic objectives, the implant-prosthesis treatment in these patients always requires a series of interventions and measures to correct bone and tissue deficits.
From this perspective, the use of self-tapping implants able to find primary stability in bone types 3 and 4, the use of bone substitutes in addition to the CGF (Concentrated Growth Factors) obtained from the patient's blood through blood separator to help recreating the lost hard tissue, the aid of the piezoelectric surgery for the preparation of the implant site, the management of the flaps to optimize the soft tissues and the use of aesthetic anatomic abutments to compensate for any loss and optimize the angle of the emergence profile, are fundamental in achieving good aesthetic and functional results.

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