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Assisted Implant Rehabilitation in the Esthetic Zone Using TI-Base on Narrow Diameter Implants (NICE)

Dr. Stuardo Valenzuela Manfredi

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Author

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In 2011, he completed his specialty in Oromaxillofacial Implantology at the Universidad de Chile (cum laude), and since 2012 he has been a member of the Oral Implantology Society, Chile. In 2015, Dr. Valenzuela received a Diploma in Digital Dentistry, Universidad de los Andes, Chile.

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During his career, Dr. Valenzuela has participated in numerous rehabilitation and implant surgery courses and is a frequent guest speaker at industry seminars and conferences worldwide.



Abstract

Implants in the aesthetic zone is one of the main challenges in assisted implant rehabilitation. This clinical case present a tooth rehabilitation of young female patient with high esthetic expectations. The missing tooth was rehabilitated with Alpha-Bio Tec's NICE narrow diameter implants and screw-retained crowns using the new CAD/CAM TiBase.


Background

Implant-supported prostheses need to replicate both soft and hard tissues in order to achieve acceptable esthetics for patients.

After the teeth extraction, clinicians have several time points for implantation:

1. Immediate implantation in the fresh sockets following tooth extraction.
2. Early implantation - 4 to 8 weeks following tooth extraction – after soft tissue healing and after the mucosa is covering the socket entrance.
3. Delayed implantation - 12 to 16 weeks following tooth extraction - after substantial amount of new bone has formed.
4. Late implantation - 6 months following tooth extraction – after complete bone healing.

There are several indications for each treatment, depending on the initial clinical situation [2, 3, 4].



While implantation in fresh sockets with immediate implant loading has become more common in recent years, it is not always possible due to various factors such as [4, 5]:

- Insufficient bone volume for dental implant stability
- Insufficient bone volume for the ideal 3D guided placement of our implants
- Oclusion
- Psychological profile

Additionally, the installation of dental implants in fresh sockets is associated with greater esthetic complications than implant installation in healed sockets. The most common of these complications is recession of the gingival margins (20% to 40%). This complication may be associated with the following factors [1]:

- Thin vestibular bone plate
- Facial malposition of the implant
- Fine periodontal biotype

Early installation of implants after soft tissue healing is an optional treatment when there is no ideal situation for post-extraction sockets (presence of thick vestibular bone plate, absence of gingival recession, absence of infections). Early installation is performed after the soft tissue has healed, from 4 to 8 weeks after the extraction [6].

The objective of this treatment option is to have intact mucosa tissue during implant installation in order to perform a predictable Guided Bone Regeneration (GBR) in the vestibular area. This GBR is performed using a slow resorption collagen membrane and a graft material with a low resorption rate to compensate for changes in the ridge following tooth extraction [3].

The advantages of this technique are:

- Highly predictable esthetic results
- Lower risk of poor vestibular implant position
- Higher amounts of keratinized gingiva at the surgical site

Limitations / disadvantages of this technique are:

- Two surgeries, traumatic extraction without flap and implant installation with GBR
- A longer healing time is required when there are large periapical lesions

The right choice of the surgical treatment plan, and the restorative materials and abutment types, are the key to a successful outcome.

The increased demand for metal-free restorations in recent decades, has prompted the search for new materials with improved mechanical properties and esthetics. This, coupled with the introduction of CAD/CAM technology (computer-aided design/computer-aided manufacturing) in implantology, has begun to compete with the traditional way of making dental prostheses [9, 10].

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There are different types of abutments materials (metal or ceramic) and shapes (prefabricated or custom) available on the market. The material and the prosthesis type selected, have a high impact on the treatment plan, especially when working in the esthetic zone [8].

Carved prostheses using CAD/CAM processes have demonstrated a performance similar to those made by conventional methods, showing an acceptable marginal fit [7, 9, 10].

Using Ti-Base provides several benefits: a metal-free screw-retained crown in the esthetic zone, keeping the metal-to-metal prosthetic connection intact and avoiding the use of ceramics in the area where there is large concentration of stress. Short studies have demonstrated that the biomechanical and biological behavior are similar in both the conventional and the new CAD/CAM techniques [10].

Case overview

Female patient, 21 years of age, attends clinic consultation regarding tooth 22. The patient has no systemic diseases, is a nonsmoker, has no significant extraoral or intraoral findings.

Materials used

- NICE implant L11.5mm
- 1 Healing abutment, Ø 3.8 H5mm CHC
- 1 Esthetic simply straight abutment H 2mm CHC as a temporary abutment
- 1 CAD/CAM Titanium Base - CHC
- 0.5cc of Alpha-Bio's GRAFT natural bovine bone (0.5-1.0mm) 1cc
- 0.5cc Corticocancellous granules 0.5cc syringe
- AlphaBio's GRAFT Collagen membrane 20*30mm

Treatment plan

Following rigorous clinical examinations and complementary examinations (X-rays and CBCT), the decision is to install a narrow diameter 3.2mm implant (NICE, Alpha-Bio Tec.) plus horizontal guided bone regeneration of the defect with two layers of regeneration material (allograft and bovine xenograft), and a slow resorption collagen membrane Alpha-Bio's GRAFT, attached with titanium pins.

After 3 months, the implant connection provisionalization was performed, followed by the final rehabilitation with a fixed, screw-retained lithium disilicate prosthesis unit, and a Ti-Base (Alpha-Bio Tec).

Conclusion

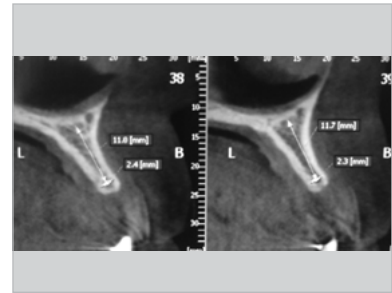
This article describes a case of a single tooth implantation and restoration. As shown, the use of a narrow implant (NICE, Alpha-Bio Tec) and the CAD/CAM restoration technique enabled to receive a better aesthetic result for the patient.



1 Initial situation



2 Occlusal view of defect



3 Pre-surgery CBCT



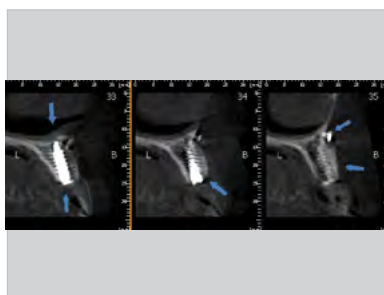
4 Occlusal view of bone volume



5 Occlusal view of the implant installed. (NICE L11.5mm), CHC platform



6 GBR, in two layers of regenerative material, the first FDDB (AlphaBio's GRAFT) and a second layer of Bovine Xenograft (AlphaBio's GRAFT), plus a slow resorption collagen membrane (AlphaBio's GRAFT) attached with tacks and sutures



7 Post-surgery checkup CBCT



8 Connection of implant, occlusal view healing abutment



9 Provisionalization and connective graft (CTG) to improve gingival biotype



10 Provisional screwing of resin



11 Checkup 3 months following connection

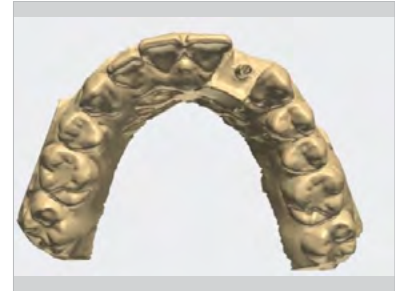
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12 Occlusal view, emergency profile



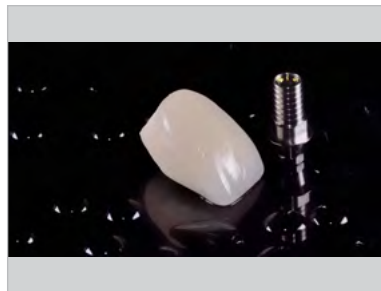
13 Open tray printing, personalized transfer with acrylic resin



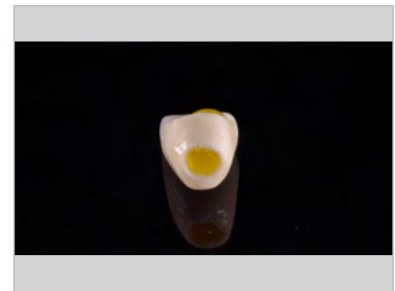
14 View of virtual working model and Ti-Base with 3Shape D750 Scanner



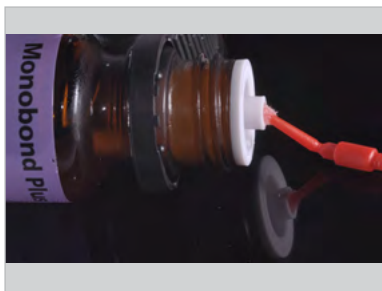
15 Crown Design



16 Ti-Base and lithium disilicate crown.



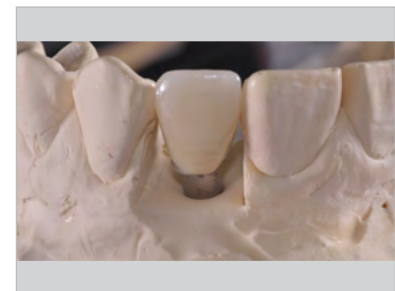
17 Lithium disilicate acid etching for 20 seconds with hydrofluoric acid



18 Lithium disilicate silanization for 60 seconds



19 Protection of prosthetic screw during cementing outside of the mouth



20 Cementing outside of the mouth with self-cured resin cement



21 Screw-retained crown cemented outside of the mouth



22 Checkout one month after installation

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