CASE 61

Assisted Implant Rehabilitation in the esthetic zone using TI-Base on narrow diameter implants (NICE)

About the author

Dr. Stuardo Valenzuela Manfredi DMD, Oral & Maxillofacial

surgery, Chile

Dr. Stuardo Valenzuela Manfredi received his DMD from

Universidad Mayor, Santiago, Chile (2005). 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. He

is the clinical director of the Alpha-Bio Tec. Chile Training Center, in

which he is the lead speaker for introductory courses in surgery

and prosthetics. Dr. Valenzuela manages VM Dental Studio, a private

practice in Santiago, Chile, dedicated to implantology and aesthetic

dentistry. 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 major challenges in assisted implant rehabilitation. This clinical case presents a tooth rehabilitation of young female patient with high esthetic expectations. The missing tooth was rehabilitated with AlphaBio 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 the esthetic zone to achieve acceptable esthetics for the patients.

After tooth 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 covers the socket entrance.
3. Delayed implantation, 12 to 16 weeks following tooth extraction, after substantial amounts of new bone have formed.
4. Late implantation, six months following tooth extraction, after complete bone healing.

There are several indications for each treatment type, depending on the initial clinical situation (2,3,4).

 While implantation in fresh sockets with immediate implant loading has become increasingly 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 the implants
* Oclussion.
* 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 implant installation after soft tissue healing is a treatment option 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 predictable guided bone regeneration (GBR) in the vestibular area. This GBR is performed using a slow resorption collagen membrane and graft material with a low resorption rate to compensate for changes in the ridge following tooth extraction (3).

The advantagesof this technique are:

* Highly predictable esthetic results.
* Lower risk of poor vestibular implant position.
* Higher amounts of keratinized gingiva at the surgical site.
* The surgeon clearly sees the extent of the facial bone defect

Limitations **/** disadvantagesof 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 correct selection of the surgical treatment plan, as well as the correct selection of restorative materials and abutment types, are the key to a successful outcome.

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

There are different types of abutments, types of materials (metal or ceramic) and shapes (prefabricated or custom) available on the market. The selection of the material to be used for the abutment, as well as the type of prosthesis (screwed or cemented), 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).

The benefit of TiBase is having a metal-free screw-retained crown in the esthetic zone, keeping the metal-to-metal prosthetic connection. The TiBase, enables to avoid the use of ceramics in the connection area where there is the greatest stress. Short term studies have demonstrated similar biomechanical and biological behavior for both conventional techniques and new CAD/CAM ones (10), the latter having better aesthetic behavior.

CASE OVERVIEW

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

MATERIALS USED

AlphaBio's graft collagen fleece, 20x20mm

NICE implant L11.5mm

1 healing abutment, D3.8 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

3mm titanium tacks, Salvin, to attach membranes

Nylon 5-0, Johnson

Multilink hybrid abutment, Ivoclear.

TREATMENT PLAN

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

After three months, the implant connection provisionalization was performed, followed by the final rehabilitation of the implant with a fixed, screw-retained lithium disilicate prosthesis unit, with the new AlphaBio Ti-base.

LEGEND

Fig 1: Initial Situation

Fig 2: Occlusal view of defect.

Fig 3: Pre-surgery CBCT.

Fig 4: Occlusal view of bone volume.

Fig 5: Occlusal view of the implant installed.

 (NICE L11.5mm), CHC platform.

Fig 6: GBR, in two layers of regenerative material, the first FDBA (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.

Fig 7: Post-surgery checkup CBCT.

Fig 8: Occlusal view prior to connection.

Fig 9: Connection of implant, occlusal view healing abutment.

Fig 10: Provisionalization and connective graft (CTG) to improve gingival biotype.

Fig 11: Provisional screwing of resin.

Fig12: Checkup three months following connection

Fig 13: Occlusal view, emergency profile.

Fig 14: Open tray printing, personalized transfer with acrylic resin.

Fig 15: View of virtual working model and TiBase with 3Shape D750 Scanner

Fig 16: Crown design

Fig 17: TiBase and lithium disilicate crown.

Fig 18: Lithium disilicate acid etching for 20 seconds with hydrofluoric acid.

Fig 19: Lithium disilicate silanization for 60 seconds.

Fig 20: Protection of prosthetic screw during cementing outside of the mouth.

Fig 21: Cementing outside of the mouth with self-cured resin cement.

Fig 22: Screw-retained crowns cemented outside of the mouth.

Fig 23: Checkup one month after installation.

BIBLIOGRAPHY

1) Araujo MG, Sukekava F, Wennstro ̈m JL, Lindhe J. Ridge alterations following implant placement in fresh extraction sockets: An experimental study in the dog. J Clin Periodontol 2005;32:645-652.

2) Buser, Julia Wittneben Michael M. Bornstein, Linda Gru ̈tter, Vivianne Chappuis, and Urs C. Belser; Stability of Contour Augmentation and Esthetic Outcomes of Implant-Supported Single Crowns in the Esthetic Zone: 3-Year Results of a Prospective Study With Early Implant Placement Postextraction, J Periodontol • March 2011

3) Buser D, Chen ST, Weber HP, Belser UC. Early implant placement following single-tooth extraction in the esthetic zone: Biologic rationale and surgical procedures. Int J Periodontics Restorative Dent 2008;28: 441-451.

4) Buser D, Chen ST. Implant placement in postextraction sites. In: Buser D, ed. 20 Years of Guided Bone Regeneration in Implant Dentistry, 2nd Edition. Chicago: Quintessence Publishing Co.; 2009:153-194.

5) Chen ST, Beagle J, Jensen SS, Chiapasco M, Darby I. Consensus statements and recommended clinical procedures regarding surgical techniques. Int J Oral Maxillofac Implants 2009;24 (Suppl):272-278.

6) Frank Higginbottom, Urs belser, Prostethic Management of Implants in the Estethics Zone, JOMI, Vol 19, 62-71, 2004

7) Svanborg, Skjerven, Carlsson (2014), Marginal and Internal fit of cobalt - chromium fixed dental prostheses generated from digital and conventional impressions. International Journal of Dentistry 2014, 534382

7) William C. Martin, Robert A. Levine, Daniel Buser, Consensus Statements and Recommended Clinical Procedures Regarding Optimizing Esthetic Outcomes in Implant Dentistry, JOMI, Volume 29, Supplement, 2014

8) Wismeijer, Urs Brägger Christopher Evans, ; Consensus Statements and Recommended Clinical Procedures Regarding Restorative Materials and Techniques for Implant Dentistry, JOMI, **2** Volume 28, Supplement, 2013

9) Julia-Gabriela Wittneben, Robert F. Wright, Hans-Peter Weber, German O. Gallucci, ; A Systematic Review of the Clinical Performance of CAD/CAM Single-Tooth Restorations, The International Journal of prosthodontics, Vol 22, Number 5, 2009

10) Theodoros Kapos, Christopher Evans; CAD/CAM Technology for Implants Abutments, Crowns, and superstructures, JOMI, Vol 29, 2014