



Immediate Implants Placement with Simultaneous Bone Regeneration



Dr. Rafael Romer

D.D.S. since 1994. Teaching for five years at the Emergency Unit of Facultad de Odontología (Dentistry University)

Started training in immediate load implantology, at national and international courses; Post-graduate degree in Surgery and Implantology Restorations at Facultad de Odontología Universidad de la República (Dentistry Faculty at Republic University); Post-graduate Degree in Periodontics at Universidad Católica del Uruguay (Catholic University of Uruguay).; Internship in 2001 with Professor José Ma. Martinez Gonzales, Universidad Complutense de

Madrid (Complutense University of Madrid); Attended ITI Educational week, 2010, Berna University, Professor Daniel Buser; Member of ITI, Director of Study Club since 2011; Active member of EAO; Lecturer in Uruguay, Brazil and Argentina; Director of Training Course in Surgical-Prosthetic Implantology.

Immediate Implants Placement with Simultaneous Bone Regeneration

Introduction

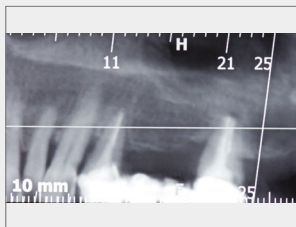
The replacement of lost teeth through the use of osseointegrated implants is a well-documented practice. By using certain protocols, predictable and stable results can be obtained. Fifty years of modern implantology development have revolutionized the design, the surface and the prosthetic connections of the implants. Likewise, the gained knowledge about the alterations that the maxilla undergoes as a consequence of edentulism, have led to the possibility of preventing and reversing the atrophy of alveolar ridges, obtaining better functional and aesthetic results in its rehabilitation.

Clinical Case

A sixty-year-old woman consulted due to mobility in a bridge between teeth 24 to 27. Additionally, she reported that teeth 22 and 23 have migrated, generating a noticeable aesthetic defect (**fig. 1,2**).



1
Pre-surgical clinical view



2
Panoramic view obtained from the CBCT

She has been treated for the past fifteen years for periodontal disease. The patient was a heavy smoker, but quitted the habit 6 years ago.

It was concluded that removing the teeth that support the bridge, as well as the lateral incisor and canine, is the best solution. Additionally, during the same surgical procedure, three implants were placed after the extraction, along with bovine bone filling for alveolar ridge preservation not only in the implant zone, but also where the future pontics will be. For the provisionalization, a transitory implant in the 25 position was installed, which allowed to later fix a provisory bridge anchoring it to this implant and adhering it to tooth 21. Other teeth were not included in the treatment due to the patient's request.

A surgery on study models was carried out, manufacturing the provisional restoration through CAD/CAM, where a veneer was made to adhere to the central incisor, which is in a palatine version (**fig. 3**).



3
Studying cast with provisional bridge for the surgery

Materials Used

- 2 NeO Ø 3.5 x 10mm implants
- 1 SPI Ø 3.75 x 10mm implant
- Arrow Ø 2.4 x 10mm implant (as transitory implant)
- Alpha-Bio's GRAFT natural bovine bone
- Alpha-Bio's GRAFT collagen membrane
- Straight titanium abutments-
(ETLASP2-CHC + ETLASP3-CHC TLAC-R Non-Engaging)
- CAD/CAM bases
CCTB-R 5025 + CCTB-CHC-R 5025

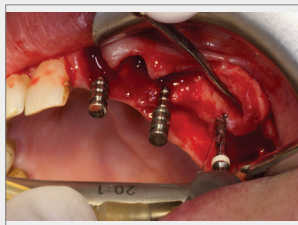
Surgical Description

The extraction was carried out in the least traumatic way using adequate techniques and instrumentation. It is of utmost importance to preserve the integrity of the vestibular plate, which is usually very thin (**fig 4**).



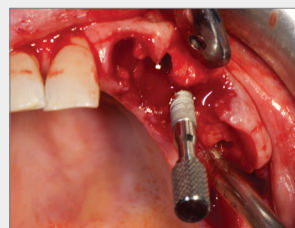
4
Extractions and flap design

After the extractions, a flap was raised to access the alveolar ridge. The primary stability, and the prosthetically guided position and orientation were taken under consideration for the drilling (**fig 5**).

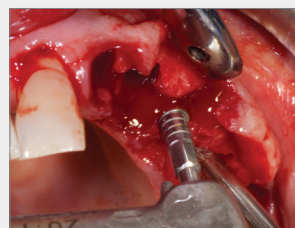


5
Direction control for the
implant drilling

It is essential to place the implant 3mm apical towards the beginning of the clinical crowns and towards the palatine, leaving 2mm of vestibular bone width. The correct three-dimensional position will allow the preservation and development of adequate peri-implant tissues, generating predictable aesthetic and functional results. Among the challenges of installing immediate implants, one difficulty lies in their trend towards vestibular orientation. Therefore, special care should be taken when drilling the bone, seeking to overcome the resistance towards the alveolar palatine wall. Likewise, when inserting the implant, special care should be taken that it should not deviate from the chosen orientation (**figs.6, 7**).

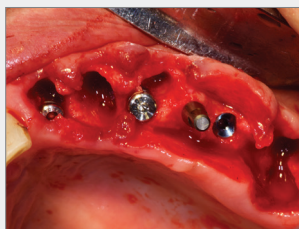


6
Implant placement



7
Implants are placed in
their final position with the
motor

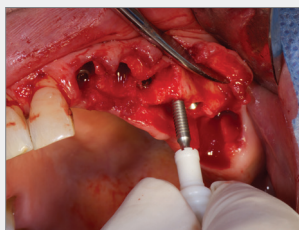
When a subcrestal implant placement is performed, it is recommended to use healing screws that exceed the level of the bone margin, facilitating the second surgical stage (**fig. 8**).



8

Observe the position of the implants in relation to the alveolus, using 3mm height healing caps, facilitating their uncoverage during the second stage of surgery

After the implants are in place, the implant bed for the transitional implant should be prepared, attempting to obtain enough primary anchoring so as to be able to fix the provisional restoration (**fig. 9**).



9

Placement of the Arrow implant

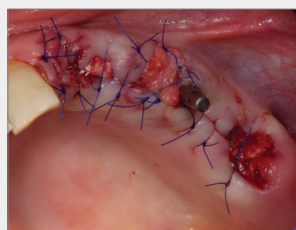
The use of a transitory implant, lets us in some cases to provide a better provisional restoration during the treatment. In this particular case, avoiding the use of a removable denture, that can jeopardize the results. This implant combined with a natural tooth provide enough support for this interim bridge.

After the implants and their corresponding healing caps are placed, a xenograft is used to fill the extraction socket, and increase the bone profile to compensate for the loss generated by the dental extraction. The biomaterial should be covered with resorbable collagen membranes, and then proceed with the flap closure. In this particular case, the closure was complemented with a palate connective tissue graft, allowing the membranes to be covered and avoiding their exposure in the mouth (**figs 10, 11**).



10

After connecting the healing caps, the regenerative material is put in place



11

Wound closure with connective tissue graft for the complete sealing of the membranes

The provisional restoration was cemented to the transitional implant and to tooth 21, leaving it separated from the surgical wound (**fig 12**).



12

Provisory bridge in the immediate post-operative stage

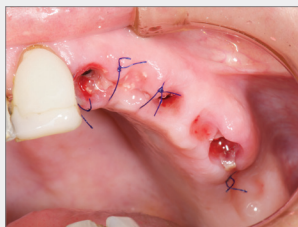
The stitches were removed ten days later, and the implants were left for three months to complete the osseointegration period (**fig 13**).



13

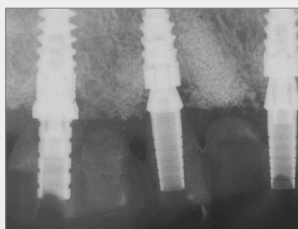
Clinical image 3 months after surgery for the implant uncoverage

At the second surgical stage, the implants were uncovered, and the transitional implant was removed. The provisional restoration on the implants was fixed with straight titanium abutments, allowing the healing of soft tissues, and at the same time creating a correct emergency profile. The correct implant location allowed the dental surgeon to work with a screwed provisional restoration, which facilitated the addition of material in future appointments (**figs 14, 15, 16**).



14

One week after the second stage of the surgery, the soft tissues modelling through the implant supported restoration begins to show visible changes



15

Radiographical view with provisional restauration, bone level is obtained through the implant placement and the bone regeneration becomes evident



16

Provisional restorations in place and the soft tissue profile can be seen

Prosthetic Procedures

The use of provisional restorations in aesthetically compromised sites is essential, allowing the possibility of generating harmonious profiles in both abutments and pontics, which will be reproduced in the impressions and in the final restoration.

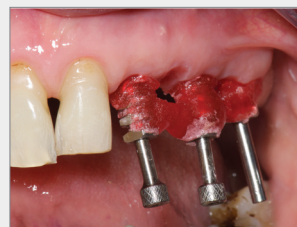
This procedure should be carried out at least two months after the implants are uncovered, ensuring tissue stability (**fig. 17**).



17

Soft tissue evolution becomes evident, guided by the provisional restoration and it is ready for the definitive impression

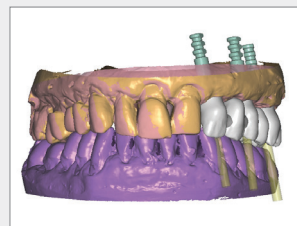
At the moment that the impressions are taken, impression copings should be personalized and splinted, assuring the exactness of the working cast (**18**).



18

Definitive impression is taken with splinted impression copyings

The final restoration is made on porcelain with a zirconia framework obtained by CAD/CAM (**fig. 19**), using bridge titanium bases.



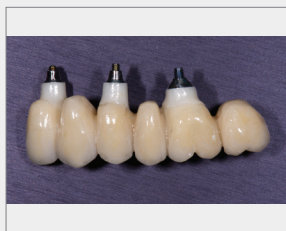
19

CAD/CAM restoration planning

This type of restoration allows the easy reproduction of emergency profiles along with obtaining an optimal aesthetic result (**figs 20-21**).



20 Final restoration is made on porcelain with a zirconia framework obtained by CAD/CAM, using bridge titanium bases



21 Clinical result obtained with definitive bridge and lithium disilicate veneer in 2.1

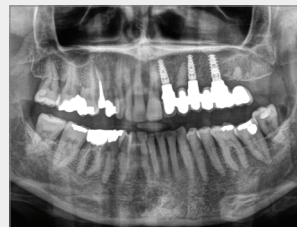
Being able to cement the abutments outside of the mouth assures the easy removal of any excess cement, diminishing the risks of any biological complications. At the same time, the screw retained restoration ensures an easy recovery, this being an old but valid principle in implant retained restoration (**fig. 22**).



22 A week after the final restoration is installed, the bridge is removed and healthy tissues are observed

During the radiographical control, posterior to the finalization, the correct bridge fit can be observed, as well as the correct bone behaviour around the NeO implants (teeth 23 and 24), in maintaining the tissue level.

This reflects the effect generated by the change of platform the implant and the abutment. The use of low resorption rate bone graft also helped to maintain bone and soft tissues levels, both around the implants and in the pontic sites (**fig. 23-24**).



23 Radiographical control, six months after the uncoverage and implant loading.



24 Final restoration, 6 months follow up.

Conclusions

The use of immediate implants with bone regeneration techniques helped in maintaining and creating a better tissue profile, as well as obtaining bone walls with enough thickness around the implants.

The NeO implant design facilitates its placement, obtaining a good primary anchoring, without compressing the tissues. The change of platform, along with the high stability of the prosthetic components, helps preserve an optimum bone level for good aesthetic results. Keeping a correct data transfer between the clinic and laboratory facilitates the restoration design ultimately giving the desired results.

References

Abrahamsson, I., Berglundh, T., Linder, E., Lang, N.P. & Lindhe, J. (2004) Early bone formation adjacent to rough and turned endosseous implant surfaces. An experimental study in the dog. *Clinical Oral Implants Research* 15: 381–392.

Araujo, M.G., Sukekava, F., Wennstrom, J.L. & Lindhe, J. (2005) Ridge alterations following implant placement in fresh extraction sockets: an experimental study in the dog. *Journal of Clinical Periodontology* 32: 645–652.

Calvo-Guirado, J.L., Ortiz-Ruiz, A.J., Lopez-Mari, L., Delgado-Ruiz, R., Mate-Sanchez, J. & Bravo Gonzalez, L.A. (2009) Immediate maxillary restoration of single-tooth implants using platform switching for crestal bone preservation: a 12-month study. *The International Journal of Oral & Maxillofacial Implants* 24: 275–281.

Stephen T. Chen and Ivan Darby. The relationship between facial bone wall defects and dimensional alterations of the ridge following flapless tooth extraction in the anterior maxilla. *Clinical Oral Implants research*, Version of Record online : 8 JUL 2016, DOI: 10.1111/clr.12899

Evans CDJ, Chen ST. Esthetic outcomes of immediate implant placements. *Clin. Oral Impl. Res.* 2008; 19:73–80.

Hämmerle, C.H., Chen, S.T. & Wilson, T.G., Jr (2004) Consensus statements and recommended clinical procedures regarding the placement of implants in extraction sockets. *The International Journal of Oral & Maxillofacial Implants* 19(Sup- pl.): 26–28.

Tarnow D, Chu SJ, Salama MA, et al. Flapless postextraction socket implant placement in the esthetic zone: part 1. The effect of bone grafting and/or provisional restoration on facial-palatal ridge dimensional change – a retrospective cohort study. *Int J Periodontics Restorative Dent* 2014; 34:323–331.

Tortamano, P., Camargo, L.O., Bello-Silva, M.S. & Kanashiro, L.H. (2010) Immediate implant placement and restoration in the esthetic zone: a prospective study with 18 months of follow-up. *The International Journal of Oral & Maxillofacial Implants* 25: 345–350.