

Replacement of a fractured central incisor with post-extractive BLX implant positioning and immediate prosthesis



SERGIO PIANO

Visiting Assistant at the University of Geneva (Switzerland), in the Departments of Fixed Prosthodontics, Periodontology and Oral Surgery in 1991-92

ITI Fellow

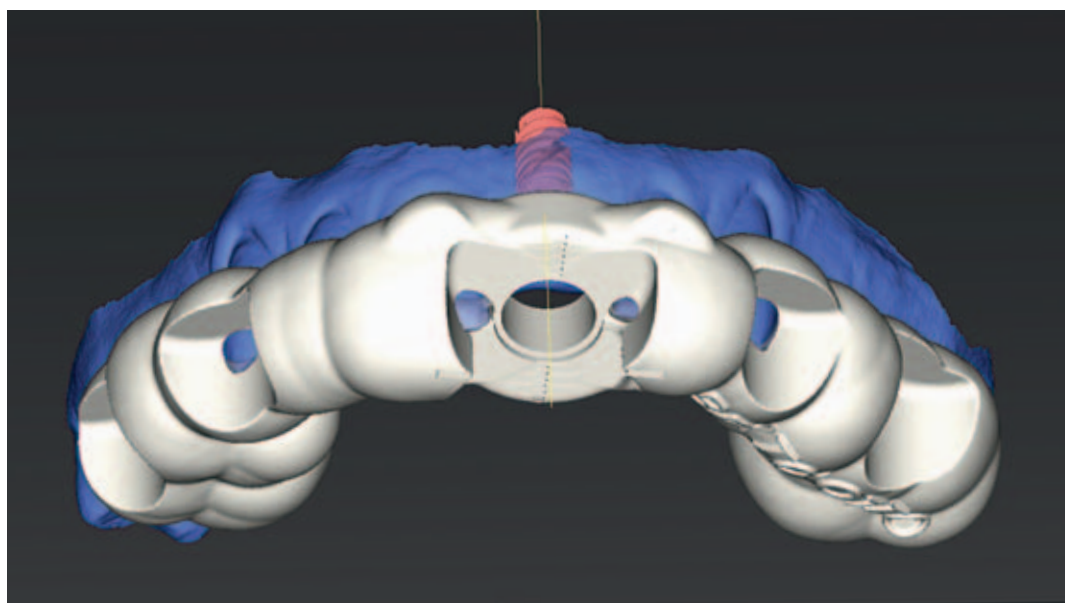
ITI Study Club Coordinator for the ITI Italian Section

Private Practitioner in Genoa, Italy

Dr. Piano is the author of several papers written in the area of Implantology.

He regularly lectures in Italy and abroad on surgical and prosthetic topics in Implantology

@ sergio.piano@tiscali.it



INTRODUCTION

A 46-year-old suffered a trauma to her left upper central incisor while swimming. The tooth was fractured under the crestal bone and it was no longer possible to restore it (Fig. 1 and 2).

As the tooth had an aesthetic impact, our goal was to investigate possibility of placing an immediate post-extraction implant with an immediate

prosthesis to ensure, in every phase of the treatment, the presence of a fixed and aesthetically-satisfactory rehabilitation.



Fig. 2 The fractured 21 tooth due to trauma.

Fig. 1 Fracture line is clearly visible in the x-ray.

DIGITAL PLANNING

To this end, a CBCT exam was requested to evaluate the bone anatomy around the teeth 21. The Dicom files were imported in coDiagnostiX planning software (Fig. 3); at the same time, an optical impression was taken with the DentalWings intra-oral scanner and the Stl file was also imported in coDiagnostiX (Fig. 4). These files were aligned to visualize and analyze the case (Fig. 5).

The data showed (Fig. 6) significantly reduced bone volume at the apical side of the tooth, making the necessary implant stability very difficult to

achieve. In addition, there was a thin bone plate at the vestibular side of the tooth.

For this specific case, the use of a BLX implant was perfectly indicated, as it is possible to obtain a high level of primary stability with this type of implant, even in areas with reduced bone availability.

After accurate digital planning of the implant position from both the surgical and the prosthetic point of view (Fig. 7), a surgical stent was created (Fig. 8) for computer-guided implant positioning, outlining a partially-driven implant placement. The stent was then printed along with a



Fig. 3 CBCT exam done immediately after the trauma.

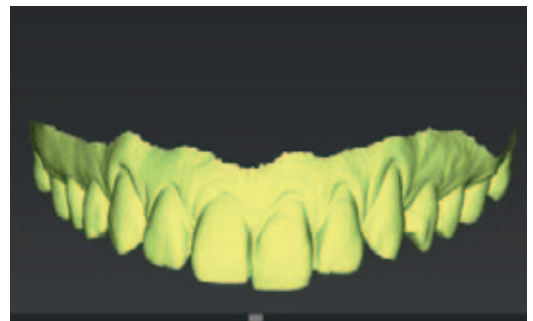


Fig. 4 Optical impression of the upper arch taken with Dental Wings® intraoral scanner.

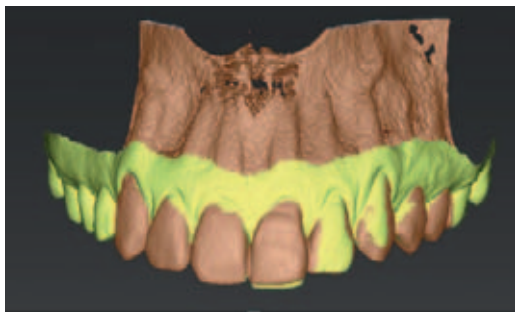


Fig. 5 Matching of the data in CoDiagnostiX planning software.

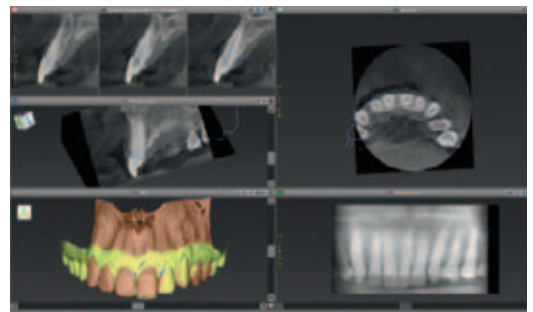


Fig. 6 Digital analysis of the case and choice of the correct implant position.

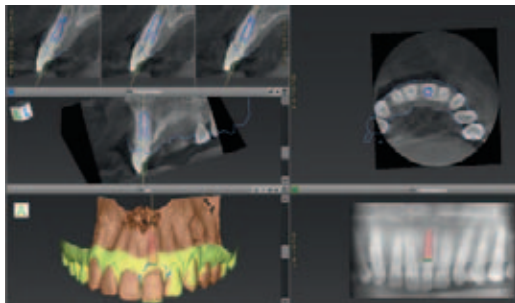


Fig. 7 Planning of the BLX implant placement in 21 post-extractive site.

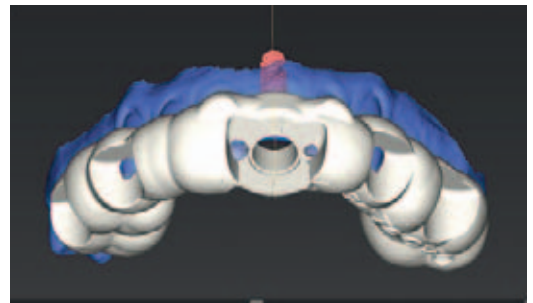


Fig. 8 Design of the surgical stent for the computer-guided implant installation.



Fig. 9 The stent and the resin model after the printing process.

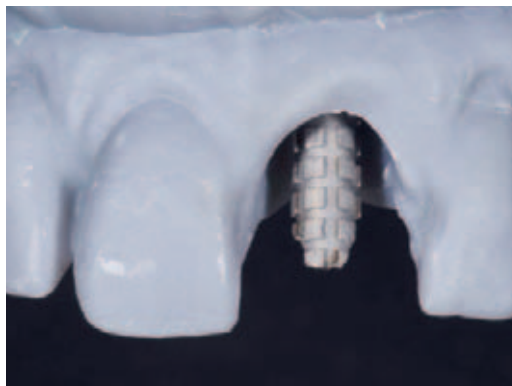


Fig. 10 The temporary abutment is modified in line with the crown shape.



Fig. 11 Provisional crown to be connected to the abutment after the implant placement.

resin model simulating the clinical situation after extraction and implant installation (**Fig. 9**). Using this approach, the dental technician was able to produce a very precise provisional resin crown on tooth 21, to be finally connected to the temporary abutment after the placement of the implant (**Fig. 10 and 11**).

SURGICAL PHASE

During the surgical phase, the first step was to remove the fractured crown. As shown (**Fig. 12**), the next challenge was the extraction of the root: it is crucial not to damage the thin vestibular wall of the socket if the implant is to be immediately placed. For this reason, a special device (Exomed, Medesy, Italy) was used to pull out a screw previously placed into the root (**Fig. 13**). By slowly turning the device wheel connected to the screw (**Fig. 14**), the root was gently extracted (**Fig. 15**).

At this point, the guide was placed in the correct position (**Fig. 16**) and the drilling procedure was



Fig. 12 The remaining root after the extraction of the dental crown.



Fig. 13 Positioning of the dedicated screw for the extraction.

performed, driven by the guide, until the bur was at a diameter of 2.8mm (Fig. 17). The BLX implant was then placed without a strictly guided protocol, instead using only the stent as a reference

point (Fig. 18). The remaining space between the implant and the vestibular bone wall was finally filled with bone substitute material.



Fig. 14 The special device at work for the pulling out of the root.

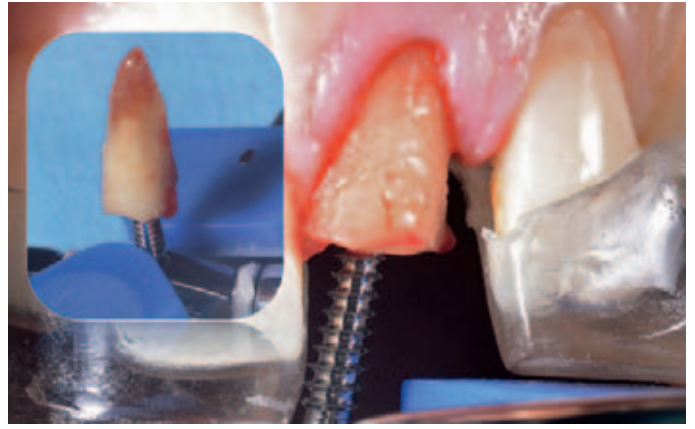


Fig. 15 After the slow traction, the root is gently extracted.



Fig. 16 The tooth-supported surgical stent is seated with great precision.



Fig. 17 The drilling procedure: the implant bed is prepared till the bur diameter 2.8.



Fig. 18 The BLX implant is placed not strictly driven by the stent.



Fig. 19 Connection of the provisional crown to the abutment.



Fig. 20 Clinical situation at the end of the procedure.

PROSTHETIC PROTOCOL AND PROVISIONALISATION

The resulting implant stability was very high (greater than 50 nw/cm), a pre-requisite for the placement of a temporary crown.

After screwing in the temporary abutment, the temporary crown was then connected to it; a small piece of dental dam kept the field dry in order to ensure optimal adhesive conditions (Fig. 19).

The provisional crown was screwed on with a torque of 20 nw/cm; the screw hole was protected with Teflon and closed with temporary filling material. The crown was not in contact with

the opposite jaw, either in centric occlusion or during disclusion movements.

OUTCOME

The final outcome, at the end of the procedure, was absolutely aesthetically-pleasing and the patient was more than happy to have obtained such a satisfactory result with such a comfortable approach (Fig. 20). The post-operative X-ray confirmed the success of the procedure (Fig. 21).

What was truly impressive was the way in which the soft tissue surrounding the implant was healthy just one week after placement (Fig. 22).



Fig. 21 X-ray image at the end of the procedure.



Fig. 22 Clinical situation after 7 days.



Fig. 23 Clinical situation after 90 days.

CONCLUSION

The photo shot after 90 days (Fig. 23) demonstrates the high quality of the restoration whilst the corresponding x-ray taken at the same time (Fig. 24) shows the perfect integration of the implant, ready for the final prosthesis. The pleasant smile of the patient (Fig. 25) has been guaranteed during

all the phases of the treatment till the complete implant healing.

Acknowledgements

I would like to thank Alessandro Giacometti DT, Genoa, Italy for his precious lab work and Guido Prando DDS, Genoa, Italy for his considerable support and help.



Fig. 24 X-ray image after 90 days.



Fig. 25 The smile of the patient after the implant integration.

REFERENCES

- Chen ST, Buser D. Esthetic outcomes following immediate and early implant placement in the anterior maxilla--a systematic review. *Int J Oral Maxillofac Implants.* 2014;29 Suppl:186-215. doi: 10.11607/jomi.2014suppl.g3.3.
- Buser D, Chappuis V, Belser UC, Chen S. Implant placement post extraction in esthetic single tooth sites: when immediate, when early, when late? *Periodontol 2000.* 2017 Feb;73(1):84-102. doi: 10.1111/prd.12170.
- Blook MS, Mercante DE, Lirette D, Mohamed W, Ryser M, Castellon P. Prospective evaluation of immediate and delayed provisional single tooth restorations. *J Oral Maxillofac Surg.* 2009 Nov;67(11 Suppl):89-107. doi: 10.1016/j.joms.2009.07.009.
- De Rouck T, Collys K, Cosyn J. Single-tooth replacement in the anterior maxilla by means of immediate implantation and provisionalization: a review. *Int J Oral Maxillofac Implants.* 2008 Sep-Oct;23(5):897-904.
- Chen ST, Buser D. Clinical and esthetic outcomes of implants placed in postextraction sites. *Int J Oral Maxillofac Implants.* 2009;24 Suppl:186-217.
- Greenstein G, Cavallaro J. Implant Insertion Torque: Its Role in Achieving Primary Stability of Restorable Dental Implants. *Compend Contin Educ Dent.* 2017 Feb;38(2):88-95; quiz 96.
- Esposito M, Barausse C, Pistilli R, Jacotti M, Grandi G, Tuco L, Felice P. Immediate loading of post-extractive versus delayed placed single implants in the anterior maxilla: outcome of a pragmatic multicenter randomised controlled trial 1-year after loading. *Eur J Oral Implantol.* 2015 Winter;8(4):347-58.
- Weigl P, Strangio A. The impact of immediately placed and restored single-tooth implants on hard and soft tissues in the anterior maxilla. *Eur J Oral Implantol.* 2016;9 Suppl 1:S89-106.
- Fürhauser R, Mailath-Pokorny G, Haas R, Busenlechner D, Watzek G, Pommer B. Esthetics of Flapless Single-Tooth Implants in the Anterior Maxilla Using Guided Surgery: Association of Three-Dimensional Accuracy and Pink Esthetic Score. *Clin Implant Dent Relat Res.* 2015 Oct;17 Suppl 2:e427-33. doi: 10.1111/cid.12264. Epub 2014 Oct 27
- Pozzi A, Polizzi G, Moy PK. Guided surgery with tooth-supported templates for single missing teeth: A critical review. *Eur J Oral Implantol.* 2016;9 Suppl 1:S135-53.