Surgery All at Once™: Socket preservation and immediate placement of an implant in an infected site in the anterior region – a Case Report

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Tooth extraction followed by socket preservation and immediate placement of an implant in the esthetic zone are now a part of everyday clinical practice. The following case illustrates this technique with a Trabecular Meta[™] Dental Implant (Zimmer Dental Inc., Carlsbad,CA) immediately placed in an infected site in the maxillary anterior accompanied by guided bone regeneration with a combination with allogenic (Puros[®] Cortical Particulate Allograft, Zimmer Dental Inc.) and autogenous bone.

Keywords: Alveolar Ridge Augmentation, Immediate Implant, Immediate Restoration.

INTRODUCTION

The traditional implantology of the 1980s has given rise to modern techniques that focus on shortening surgical times, limiting costs, and providing immediate esthetics. Numerous studies have reported that survival rates of dental implants immediately placed in tooth extraction sockets were similar to delayed implantation in healed extraction sites.^{1,2}

The increasing importance of immediate esthetics has made the irreversible loss of a tooth in the anterior jaw something that needs to be solved as quickly, conveniently and esthetically as possible for our patients.

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Correspondence: W.P. van der schoor Paleisweg 5 - 3886LC Garderen The Netherlands E-mail: wpvanderschoor@gmail.com The extraction of a tooth in the anterior jaw, followed by approximately six to eight months³ of waiting before implant placement, then subsequent rehabilitation of the implant three to six months¹ later can have a significant anatomical effect on the area due to the inevitable remodeling of hard and soft tissues,^{4,5} as well as a psychological effect on the patient. The combination of a socket preservation technique with immediate placement of an implant might help to limit, resorption of the buccal wall.⁶

Resorption⁷⁻⁹

The use of a Trabecular Metal[™] monoblock acetabular component with a partial purous tantalum surface has been shown to have the potential to bridge gaps between bone and the implant surface of 5 mm or less in orthopedic applications,4 but this has never been demonstrated with Trabecular Metal[™] dental implants (Zimmer Dental Inc.) placed in human jaws.

MATERIALS AND METHODS

A 42-year old woman with no relevant disease history or known allergies presented with recent loss of the maxillary lateral right incisor and a periapical lesion on the maxillary right central incisor (Fig. 1).

A post-and-crown restoration served for more than 10 years without detectable endodontic treatment. The patient had no complaints about the esthetics of her dentition, despite the pronounced difference in gingival outline between the right and left central incisors (Fig 2).

After discussing the case and alternative treatment options, the patient chose to have a fixed 2-unit bridge supported by 1 implant placed in the right central incisor location, and a cantilevered pontic to replace the left central incisor. The treatment plan included the option of immediate or delayed implant placement following extraction of the central incisor, provided primary fixation could be achieved in the prestine apical bone.

After extraction of the central incisors and thorough debridement of the sockets, the right socket would be sequentially enlarged to receive an implant. If that were not possible due to an inadequate volume of available bone, then a socket preservation technique would be performed, followed by delayed implant placement 3 months later. Antibiotic prophylaxis with clamoxyl 3gr, 1 hour prior to surgery and 750mg every 8 hours seven days after surgery and chlorhexidine mouthwash five days prior at two rinses per day were prescribed up to 1 week after surgery. Only on the first 2 days after surgery instead of chlorhexidine mouthwash, a warm water salt-solution was prescribed.



Fig. 1 Panoramique pré-opératoire.

Fig. 3 Extracted tooth # 8.



Fig. 2 Pre-op situation.

Fig. 4 Unprepared alveolus.



Fig. 5 Esthetic Buccal flap: periapical lesion.

The following surgical procedure was used:

- Anesthesia via infiltration with 4% articaine containing 1:100 adrenaline in the vestibular and palatine front areas.
- Extraction of the root (Fig. 3).
- Curettage of the socket and bone integrity assessment of the cervical buccal plate (Fig. 4).
- Buccal esthetic flap incision5 to access a fenestration in the apical area (Fig.5).
- After thorough debridement of the apical area, initial drilling was performed with a 3,2 Ø mm bone collecting/crushing trephine drill to uncover pristine palatal/apical bone a in the site (Fig. 6).

- Final preperation was performed with a final Ø 3,8 mm drill (Figs 8-10).
- A bone pusher from a osteome set (Figs 11-12) was used to guide placement of Puros[®] Cortical Particulate Allograft (Zimmer Dental Inc.) along the shank into the socket, thus creating a canal for the final placement of the implant (Figs 13-15).
- After condensing the particulate allograft, the bone pusher was gently withdrawn (Fig 16).
- The collected, crushed autogenous bone was returned into the canal before inserting the Trabecular Metal[™] Implant (Zimmer Dental Inc.) (Figs 17-19).



Fig. 6 Initial drill: Trephine collecting drill.



Fig. 7 Collected bone inside drill.



Figg. 8,9 First preparation after trphine collecting drill.





Figg. 10,11 Final drill preparation.

Fig. 12 Boneconden- **Figg. 13,14** input Puros[®] particulate **Fig. 15** Gentle resor as spaceholder cortical bone. moval placeholder. in position.

- After placement, the emergence profile of the im-• plant was not parallel with the adjacent dentition, and initial stability of the implant could not be determined tactilly. A surgical screwdriver handle was used to press the implant mesially into a more appropiate position, and then was used to slightly tap in the implant to try to accomplish a higher primary stability (Figs 20-23).
- After placement of a healing abutment, the soft tissue gap was filled in with a compressed collagen plug (Collapug®, Zimmer Dental Inc.). A retainer (Essix®, Dentsply, York, PA) served as a provisional prosthesis (Figs 24-27).

- Healing was uneventful after 7 days (Fig 28). •
- Healing was unremarkable after 3 months (Fig 29). • Soft and hard tissues healed uneventfully without signs of excessive resorption.
- The final restoration was delivered 3 months after surgery (Figs 30-31).



Fig. 16 Gentle removal placeholder.



Fig. 17 Excess of Puros® .



Figg. 18,19 Return autogenous bone Figg. 20,21 Insertion Trabecular Metal Figg. 22,23 Correction angulation iminside preparation. Implant. plant.





Fig. 24 Implant in position, Note trabecular midsection.



Fig. 25 Healingcollar screwed in position, surrounded with compressed collagen CollaPlug.



Fig. 26 Primary closing.



Fig. 27 Temporay essix-retainer.



Fig. 28 Healing after 2 weeks. Note mucosal ingrowth transformed Collaplug.



Fig. 29 Healing after 8 weeks.



Fig. 30 Final restoration after 3 months.



Fig. 31 RadiographFinal restoration after 3 months.

RESULTS

After treatment, optimal mesial and distal marginal bone stability was observed from the time of the surgery until the three-month post-loading check-up, without apparent remodeling. In regard to the soft tissues, from the surgery to placement of the final prosthesis, no recession occured. Preoperative (Fig 2) and post-treatment (Fig 31) images showed a slight improvement. The final esthetic and functional results fulfilled the patient's expectations.

DISCUSSION

The whole treatment took only 3 months. Since it was impossible to create adequate initial stability, immediate loading of the implant was not indicated. The application of pressing and some tapping to bring the implant into a favorable position for a good prosthetic result did not appear detrimental in the present case. The 13mm Trabecular Metal[™] implant (Zimmer Dental Inc.) was the longest implant length available at the time of placement. Perhaps placement of a longer (16 mm) implant might have achieved adequate primary stability for immediate loading.

Puros[®] Cortical Particulate Allograft (Zimmer Dental Inc.) was selected because it was felt that its resorption rate, which is slower than than cancellous particulate, might provide the healing site with a longer period of support.

CONCLUSIONS

The combination of socket preservation with Puros® Cortical Particulate Allograft (Zimmer Dental Inc.) and a Trabecular Metal[™] implant (Zimmer Dental Inc.) resulted in almost complete maintenance of the hard and soft tissues 3 months after treatment.

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