

THE 7th POSTER COMPETITION

The 14th Annual
MEGA'GEN
International Symposium
in LAS VEGAS

Beyond Technology
- Digital & Esthetic Dentistry : A Powerful Combination
Important numbers in implant dentistry

CR-19
Clinical case Report

5:5

Problem-based solutions for delayed implant placement in the aesthetic zone



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Introduction

Implant-prosthetic solutions have become a reliable therapy to treat missing teeth. Although the survival rate of implants has been over 95% in the first 5 years¹, treating missing teeth in the anterior aesthetic zone still remains a challenge, especially in cases where the teeth have been missing for more than 6 months. In these cases, the alveolar bone and soft-tissue can resorb over 40%². The challenge is to have gain of the hard and soft-tissue, together with implant placement in the prosthodontically correct position. In the following case report it will be presented an overview of the problems and how they can be solved.

Objectives

Present the problems and solutions in case of delayed implant placement in the aesthetic zone.

Materials and Methods

A healthy male patient (37 years old) who had previously lost tooth 21, came to the dental office looking for an implant-crown solution. Since the tooth was extracted two years ago, the problems to overcome were the following:

- Recessions at adjacent teeth 11 and 21
- 40% loss of bone
- 40% loss of soft-tissue in width and height
- 2 mm loss of vertical bone height
- Complete loss of both mesial and distal papilla 11 and 21

The treatment plan included prosthodontic and surgical phase, which was planned beforehand. The surgical plan included guided bone regeneration (GBR) with deproteinized porcine bone minerals (Gen-Oss, OsteoBio) mixed with injectable platelet rich fibrin (i-PRF) retained by an implant titanium mesh membrane and resorbable collagen membrane (Evolution, OsteoBio) on the top. Advanced platelet rich fibrin (A-PRF) membranes were placed above the collagen membrane for soft-tissue enhancement. Digital planning was applied (software planning & guided surgery) for a more accurate prosthodontic planning.

Software planning

One of the major difficulties in implant placement is placing the implant in the correct prosthodontic position, since many place the implant bone guided. The digital planning was made in advance by using a software program. In the digital planning it was possible to observe that the implant had to be placed buccally. The implant could have been placed fully in alveolus, nevertheless it would not have been in the right prosthodontic position. For that reason GBR was necessary. The titanium membrane (i-Gen, Megagen) was also virtually planned. (fig. 1a & b) A stable and accurate guide (R2gate™ MegaGen® Implant Company) was printed in order to place the implant in the correct position, following the correct sequence of drills from the R2Gate™ surgical kit (Megagen®).

Protein Rich Fibrin

For a good stability of the bone particles and improvement of the wound and soft-tissue healing, it was applied an additional method, which consisted in combining the i-PRF and A-PRF. The injectable PRF is a concentrate of growth factors and fibrin, that when mixed with the bone minerals, it makes them more biocompatible. Secondly, the fibrin membranes (A-PRF) give more stability and enhance soft-tissue growth. Before the surgical procedure, 6 blood tubes of 10 ml were drawn from the patient. 2 tubes were placed in the PRF centrifuge at 700RPM/3min and the other 4 at 1300RPM/8 min. The result was 2 tubes of i-PRF liquid and 4 A-PRF tubes to obtain membranes. The 4 A-PRF clots were placed in the PRF box for 5 minutes to fabricate membranes. Finally, the i-PRF was mixed with 1.0 grams of bone minerals³.

Surgery

Before starting the surgical procedure, the patient was given 3g Amoxicillin preoperatively. A papilla preservation flap was performed, by making an intradental incision on the missing tooth location and two vertical releasing incisions. A vertical incision in the periosteum was made to release the flap. The surgical guide was placed (fig. 2) and in 3 minutes an Anyridge Xpeed implant was placed (4.0x13 mm) with an insertion torque of 45N/cm²(fig. 3) The minerals were placed on the buccal and occlusal side and the i-Gen membrane was screwed to the implant. (fig. 4) The resorbable collagen membrane was folded over the i-Gen membrane and was fixated with periosteal tag sutures (5.0 Glycolon, Resorba). (fig. 5) Above the collagen membrane, A-PRF membranes were placed (fig. 6) and the flap was fixated with a first rigid vertical mattress suture on top. Afterwards, the flap was sutured with vertical, horizontal and single free tension sutures. Post-operative care was given to the patient such as Ibuprofen 600mg for analgesic effects and Blue M mouthwash 4 weeks for wound disinfection.

Second stage

Healing was uneventful and 4 months after surgery, a second stage performance with a roll flap technique was performed. The i-Gen membrane was removed and it was observed that the occlusal bone side of the implant was re-established. Also, the recessions at the adjacent teeth were less comparing to the baseline, especially on tooth 22. With a prefabricated temporary crown and temporary titanium abutment, a provisional screw-retained temporary crown was made.

Discussion & Conclusion

The following case demonstrates the use of many different techniques, which can overcome small problems that clinicians face when placing implants in the aesthetic zone. The first prerequisite of any implant placement is the correct prosthodontic position. The use of a stable surgical guide will ensure this fact. The second is the correct amount of bone reconstruction, especially at the coronal part of the implant. The i-Gen membrane is designed to have enough bone at the coronal part. The PRF will enhance soft-tissue growth and will counteract shrinkage of the soft-tissue, therefore in this case report it was observed the gain of soft-tissue instead of loss of soft-tissue. PRF will also prevent early and late wound exposure. Nevertheless, some soft-tissue had to be added during second stage, with a small roll flap. Finally, at second stage, it can be observed that the emergence profile and gingival line of the 11 and 21 are similar.

Problem-solution

- Correct implant position -> Use of software planning & guided surgery
- Correct amount of guided bone regeneration -> Use of i-Gen membrane
- Bone minerals not mineralized -> Use of i-PRF
- Soft-tissue shrinkage -> Use of A-PRF membranes
- Loss of papilla after surgery -> Use of a papilla preservation flap
- Early wound exposure -> Correct periosteal incision and flap mobility
- Late wound exposure -> Correct implant placement and A-PRF membrane

References

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Acknowledgements

The author would like to thank Dr. Ana Paz for her contribution to the poster.

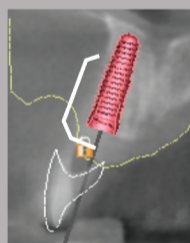


Fig. 1a & b



Fig. 2



Fig. 3

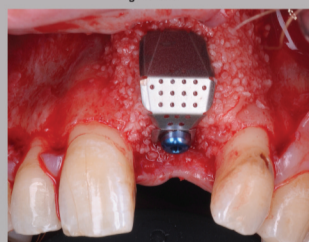


Fig. 4

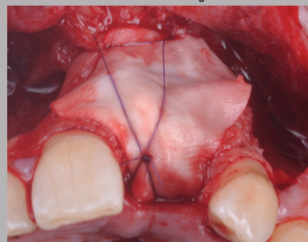


Fig. 5



Fig. 6



Initial situation



After 2nd stage and provisional crown

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