

Management of peri-implant bone defects – a combined regenerative and resective treatment approach

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Introduction

The following clinical case report describes a combined regenerative and resective treatment approach for implants with severe bony defects due to peri-implantitis. As the regenerative surgery had to be done without removing the crowns and therefore a full regeneration could not be expected, it was combined with an implantoplasty. Using this approach, the implant can be successfully maintained after healing even though a full reosseointegration of the exposed surfaces was not a predictable treatment outcome.

Initial situation

A 55-year-old woman was referred to our specialized periodontal office due to severe peri-implantitis combined with a general stage III grade b periodontitis (Fig. 1). The peri-implant disease had led to severe bone loss around two of three implants in the right mandible (Fig. 2). The patient was systemically healthy, but smoked 10 cigarettes per day. The peri-implant mucosa showed pocket probing depths up to 10mm with bleeding on probing and suppuration.



Figure 1: Clinical situation before therapy. Visible suppuration at implant region 46

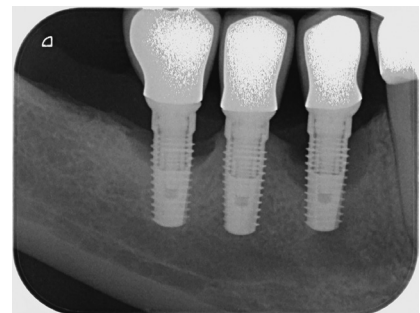


Figure 2: X-ray at the beginning of therapy: severe periodontal defects at two of the three implants

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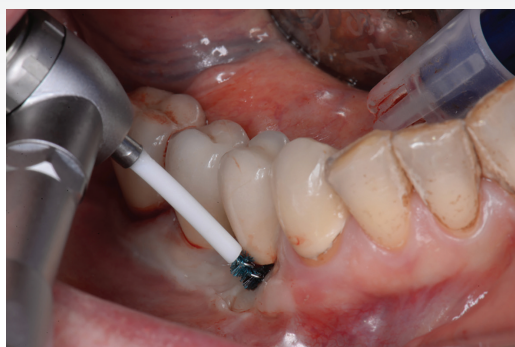


Figure 3a: Subgingival debridement of the affected implants using the Labrida Bioclean Citobrush 14 days prior to the surgical intervention

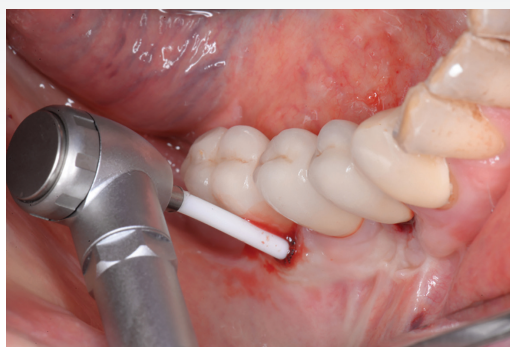


Figure 3b

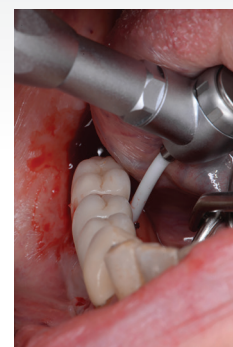


Figure 3c

Treatment Planning

The treatment was supposed to start with a systematic periodontal therapy including full mouth subgingival debridement accompanied by administration of systemic antibiotics. After reevaluation of the initial therapy following the first supportive periodontal therapy, the implants received another subgingival debridement combined with local antibiotics. After a healing period of about 2 weeks, the surgical intervention was planned as a combined regenerative-resective procedure with guided bone regeneration (GBR) and implantoplasty. After 8 months the result of the treatment should be evaluated.

Surgical procedure

After periodontal examination, a full mouth subgingival debridement was performed following the principles described by Quirynen et al.¹ and Cosyn et al.². Amoxicillin

500 mg three times a day for seven days and Metronidazole 400 mg three times a day for seven days were administered as systemic antibiotics. After 8 weeks the reevaluation was performed with another complete periodontal examination and supragingival debridement. During the same treatment session, the area of the implants in the fourth quadrant was anesthetized and, again, a subgingival debridement was performed. During this procedure, a Labrida BioClean™ chitosan brush was used to thoroughly clean the exposed implant surfaces (Figs. 3a-c).

In the next step, a local antibiotic was administered as a sustained delivery device (Ligosan®, Haereus Kulzer, Germany) (Figs. 4,5). The peri-implant soft tissues were allowed to heal while the local drug acted on the bacteria in the peri-implant pocket for 14 days.

The surgical intervention was performed after intravenous sedation using Midazolam combined with Novaminsulfon



Figure 4: Application of a local antibiotic after finishing the subgingival debridement



Figure 5: The local delivery device is slightly overfilled and supragingival remnants removed



Figure 6: Clinical situation 14 days later before starting the surgical intervention. Clinical parameters are already improved

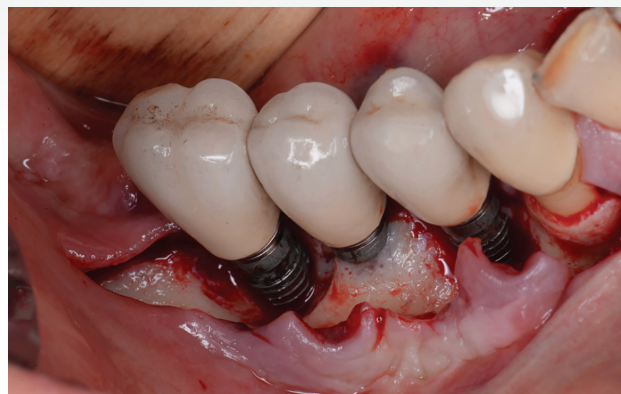


Figure 7: Access flap in the area of the implants using sulcular incisions and avoiding any soft tissue loss.

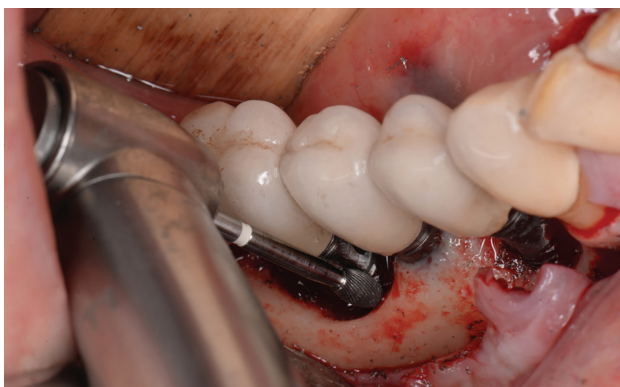


Figure 8: Smoothing the coronal part of the exposed implant surface using hard metal burs.



Figure 9: Cleaning the implant surface in the apical area using a titanium brush.



Figure 10: Clinical situation after implantoplasty and thorough cleaning of the apical surfaces



Figure 11: Harvesting of autologous bone chips in the retromolar area utilizing a Safescraper

as a painkiller. After anesthetization, a mucoperiosteal buccal and lingual flap was raised using a sulcular incision, while avoiding the removal of any keratinized mucosal tissue.

Once all granulation tissue was removed, the implant surfaces were smoothed using hard metal burs up to 1 mm

underneath the edge of the bony defect (Fig. 8). The more apical parts of the exposed implant surfaces were thoroughly cleaned using a titanium brush (Figs. 9, 10).

Utilizing a Safescraper, autologous bone chips were harvested from the retromolar area (Fig. 11). The



Figure 12: Components used as filling materials for the peri-implant defects: Straumann® Xenograft®, Straumann® Emdogain® and autologous bone chips.



Figure 13: Xenograft is mixed with Straumann® Emdogain® and autologous bone chips added.



Figure 14: Straumann® Emdogain® and Straumann® XenoGraft mixture is combined with autologous bone chips

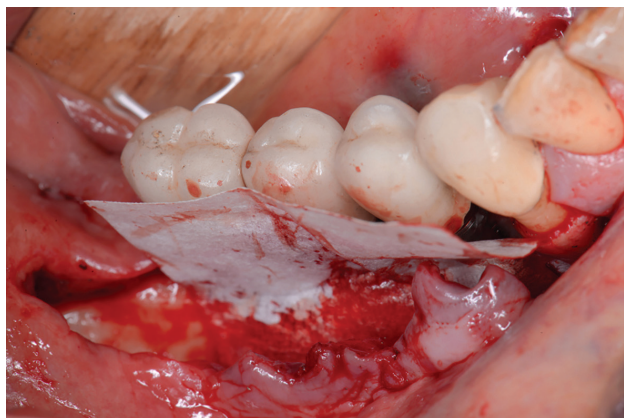


Figure 15: After periosteal slitting, the Jason® collagen membrane is fixed to the apical part of the periosteum by resorbable sutures



Figure 16: Intrabony defects are carefully filled with autologous-xenogeneic-Emdogain® bone chips mixture



Figure 17: Collagen membrane is sutured lingually, taking care to close all spaces between implants

demineralized bovine biomaterial (Straumann® Xenograft®) was mixed with enamel matrix proteins (Straumann® Emdogain®) and was subsequently combined with the autologous particles (Figs. 12-14).

The intrabony defects were completely filled with the combined autologous-xenogeneic bone chips up to

the crest of the defect. Care was taken not to overfill. The guided bone regeneration was completed by inserting a collagen membrane (Jason® membrane, botiss, distributed by Straumann Biomaterials), fixed by resorbable sutures to the buccal periosteum, and to the apical parts of the flap on the lingual site (Fig. 15). After, periosteal slitting, care was taken to ensure wound closure was tension-free (Fig. 16).

Postsurgical Treatment

Post surgically, ibuprofen 400 mg was administered up to four times per day for pain control. The patient was advised to rinse with 0.2% chlorhexidine solution for 10 weeks. Professional supragingival plaque control was performed every week for the first four weeks. 8 weeks after the augmentation, a complete supportive periodontal therapy was performed, avoiding any subgingival instrumentation in the area of the GBR procedure. The SPT was repeated after 3 months and then again after 6 months, when radiographic pictures and pocket probing depths were taken to assess the radiographic and clinical outcome of the procedure.

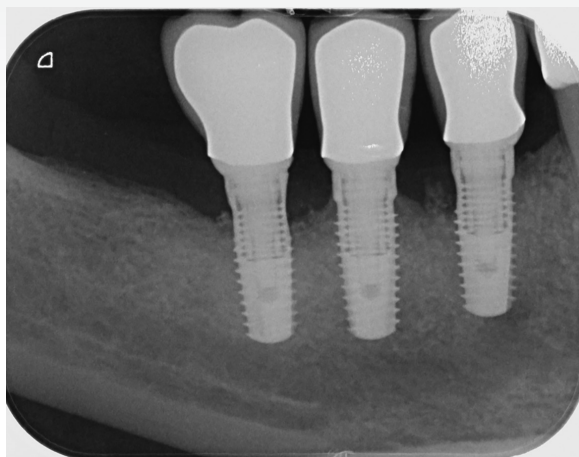


Figure 18: X-ray 8 months postsurgical. Almost complete filling of the intrabony defects. Supragingival surface areas with smoothed windings



Figure 19: Clinical situation 8 months after the surgical intervention

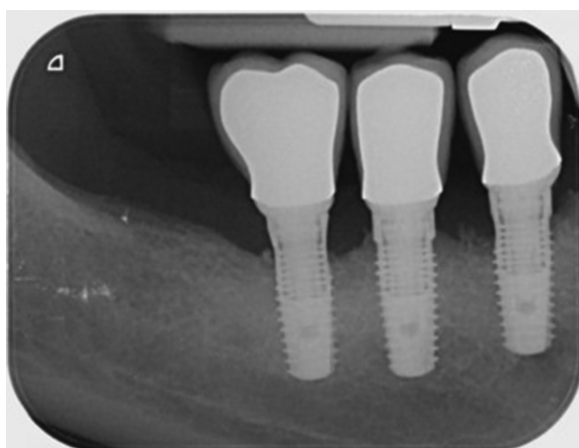


Figure 20: X-ray taken 1 year after the regenerative-resective treatment



Figure 21: Clinical situation 1 year after finishing the surgical intervention

Treatment Outcomes

The surgical site recovery was uneventful and signs of inflammation could be successfully reduced. Pocket probing depths which were up to 10 mm in the beginning could be reduced to 5 mm without bleeding on probing. No suppuration occurred after the initial periodontal treatment. Almost complete bone fill of the intrabony defects could be observed radiographically (Fig. 18). The patient is in a three-month regular supportive periodontal therapy program and, so far, no recurrence of inflammation was observed.

References

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surface roughness for bacterial plaque retention: a review of the literature. *Dent Mater.* 1997 Jul;13(4):258-69. doi: 10.1016/s0109-5641(97)80038-3. PMID: 11696906.

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