

Saving the implant and the prosthesis: Regenerative treatment of peri-implantitis

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The following case report presents the successful management of peri-implantitis in a 56-year-old patient affecting the implant in region #16. Despite regular maintenance and no systemic risk factors, the patient showed clinical signs of inflammation and radiographic vertical bone loss. Treatment involved non-surgical therapy, electrolytic decontamination using GalvoSurge, and guided bone regeneration with autologous and xenogeneic biomaterials. The original prosthesis was preserved and replaced after soft-tissue healing. At 12 months, the peri-implant tissue was healthy, and the implant remained stable, demonstrating effective resolution of the inflammatory process.

Introduction

Peri-implantitis is a biological complication that is affecting a growing number of patients with implants. Characterised by inflammatory changes in the peri-implant soft tissue and progressive loss of supporting bone, it poses a significant threat to implant survival if not appropriately managed. Effective treatment remains a clinical challenge, particularly owing to the difficulty in achieving thorough decontamination of the implant surface and promoting predictable re-osseointegration.

This case report presents the surgical and regenerative management of peri-implantitis in a patient with a previ-

ously restored implant in the posterior maxilla. The patient presented with clinical signs of inflammation and radiographic evidence of vertical bone loss, despite adherence to supportive periodontal care and absence of systemic risk factors. A comprehensive treatment plan was developed, combining non-surgical therapy, surgical debridement, electrolytic decontamination and guided bone regeneration (GBR).

Electrolytic cleaning offers a novel approach for implant surface decontamination, aiming to disrupt the biofilm at a microscopic level without mechanically altering the implant surface.^{1,2} In this case, it was integrated into a regenerative protocol involving autologous bone, xenograft material and a non-resorbable membrane. This approach was chosen based on evidence supporting re-osseointegration after electrolytic cleaning combined with regenerative therapy.^{3,4} The aim was to restore peri-implant health and preserve the existing prosthesis through a minimally invasive, biologically driven approach.

Initial situation

A 56-year-old female patient presented with the chief complaint of recurrent inflammation of the mucosa of region #16, accompanied by occasional bleeding and exudate. Her primary expectation was resolution of the inflammatory process and recovery of the health of the peri-implant tissue. The patient reported no systemic risk factors. Her medical and dental history included the extraction of tooth #16 in 2014, followed by implant placement in the same region that year and prosthodontic restoration in 2015. The patient had since received regular supportive implant therapy. There was no history of periodontitis or other significant dental disease.

The intra-oral examination showed localised inflammation around the implant in region #16, characterised by redness, swelling, bleeding on probing and suppuration. The radiographic evaluation revealed vertical bone loss adjacent to the implant and confirmed that horizontal bone availability and bone quality remained within acceptable

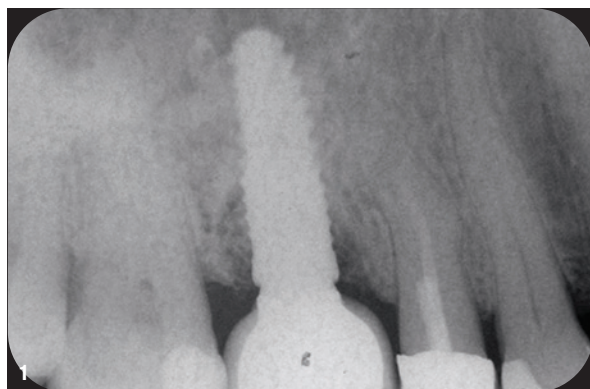


Fig. 1: Radiograph shows vertical bone loss; prognosis remains favourable.

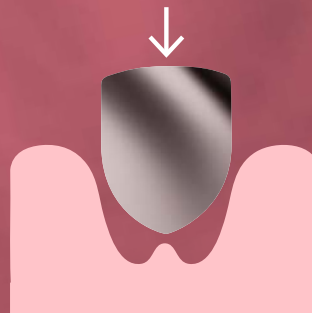
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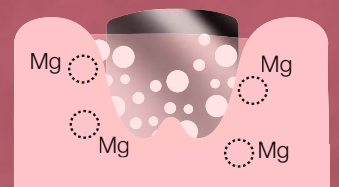
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Figs. 2–8: Non-surgical periodontal therapy with professional cleaning and oral hygiene instructions. Subgingival debridement performed using Labrida BioClean®.

limits. The prognosis of the remaining dentition was favourable based on the clinical and radiographic findings (Fig. 1). Comprehensive clinical and radiographic findings led to the diagnosis of peri-implantitis at region #16.

Treatment planning

The treatment workflow included:

1. non-surgical periodontal therapy in the form of professional tooth cleaning and oral health instructions, as well as local antibiotic treatment with doxycycline for 14 days before surgery, in combination with subgingival debridement using Labrida BioClean (Figs. 2–8);
2. surgical treatment involving the use of GalvoSurge and GBR with autologous bone, Straumann XenoGraft, hyaluronic acid and a permamem membrane (botiss biomaterials);
3. second-stage surgery for prosthetic restoration of implant #16; and
4. follow-up visits for clinical review.

Surgical procedure

The surgical procedure took place under local anaesthesia combined with intravenous sedation using midazolam to ensure anxiety control and patient comfort. A full-thickness flap was raised to allow access to the peri-implant defect and to enable augmentation, followed by meticulous debridement of inflamed granulation tissue and mechanical decontamination of the implant surface (Figs. 9–13). After removal of the prosthetic screw, the GalvoSurge system was applied for implant surface decontamination (Figs. 14–16).

Local autologous bone was harvested using a Safe-scraper (Geistlich Pharma) and combined with a xeno-graft (Straumann XenoGraft) and hyaluronic acid to perform GBR (Figs. 17–19). A synthetic PTFE membrane (permamem) was used to stabilise the graft (Figs. 20–22). The flap was advanced and closed primarily without tension (Fig. 23). Upon completion of the first-stage surgery, a follow-up

radiograph was taken, revealing the membrane fixation screws and confirming correct positioning. (Fig. 24).

Four months after the surgical procedure, a second procedure was performed to remove the fixation screws and membrane and to improve the soft-tissue contour. A partial-thickness flap was raised for soft-tissue management. After reflection of the periosteum, the screws and membrane were extracted, and the previously removed prosthesis was reinserted (Figs. 25–28). A small graft of palatal tissue was then harvested to improve the soft-tissue conditions around the implant, and the flap was sutured (Figs. 29+30). Postoperative care included appropriate antibiotics, analgesics and chlorhexidine mouthrinses, and the patient was enrolled in a 12-month follow-up programme to monitor wound healing, tissue stability and prosthetic function.

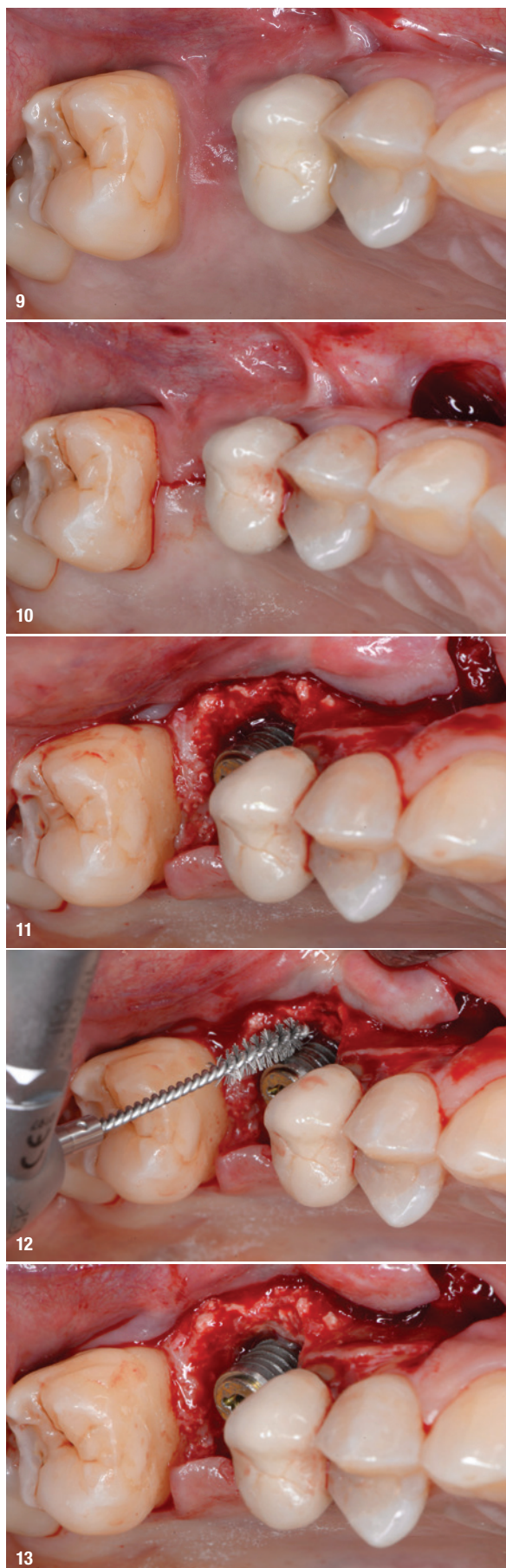
Treatment outcomes

At the 12-month follow-up, the implant in region #16 showed healthy peri-implant tissue with no signs of inflammation, bleeding on probing or suppuration (Figs. 31+32). Probing depths remained within normal limits, and radiographic evaluation confirmed stable marginal bone levels (Fig. 33). The reinserted prosthesis functioned without complication, and the occlusal parameters remained stable. Both the patient and the clinician were highly satisfied with the outcome, particularly the resolution of symptoms, preservation of the original prosthesis and regeneration of lost bone.

Discussion

The treatment of peri-implantitis remains a clinical challenge owing to its complex aetiology. In this case, a combined non-surgical and surgical approach was used to achieve re-osseointegration and soft-tissue stability. Initial non-surgical therapy included subgingival debridement with Labrida BioClean, an instrument with fibres of chitosan, which is a material with documented bacteriostatic and anti-inflammatory properties. This instrument has shown promising results in improving outcomes in peri-implant therapy owing to its biocompatibility and antimicrobial action,⁵ along with local doxycycline to reduce inflammation and improve tissue handling during surgery.

Subsequently, GBR in combination with GalvoSurge decontamination, autologous bone, xenograft, hyaluronic acid and a non-resorbable membrane was performed. At four months, a second intervention optimised the soft-tissue contours using a partial-thickness flap and palatal grafting. Soft-tissue refinement through palatal grafting



Figs. 9–13: Flap elevation enabled peri-implant defect access, surface decontamination.



Figs. 14–16: Implant surface decontamination with GalvoSurge® after prosthetic screw removal.



Figs. 17–19: Guided bone regeneration using autologous bone, Straumann® XenoGraft, and hyaluronic acid.



Figs. 20–22: Permamem® membrane was used to stabilise the graft.

has been identified as a key factor in achieving long-term soft-tissue stability and aesthetic integration.⁶

The combination of decontamination using GalvoSurge and of biological regeneration reflects established strategies that recognise the critical role of surface decontamination prior to grafting procedures to achieve successful re-osseointegration.^{7,8} An *in vitro* study demonstrated that electrolytic cleaning was significantly more effective at inactivating bacterial biofilms compared with a powder spray system.⁹ This case highlights the effectiveness of combining electrolytic decontamination with GBR to achieve favourable functional and biological outcomes in the treatment of peri-implantitis, even in complex cases.

Author's testimonial

The combination of GalvoSurge with GBR and a non-resorbable membrane greatly improved my defect filling results. In my clinical practice, complete re-osseointegration is no longer unpredictable.

The patient stated, "I am happy that all my inflammatory problems have been completely resolved. I was afraid of losing the implant after I saw the defect on the X-ray. It is amazing that it could be completely regenerated."

Literature



Patent™ Session

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Prof. Dr. Dr. Anton Sculean
(Bern, Switzerland)



Dr. Roland Glauser
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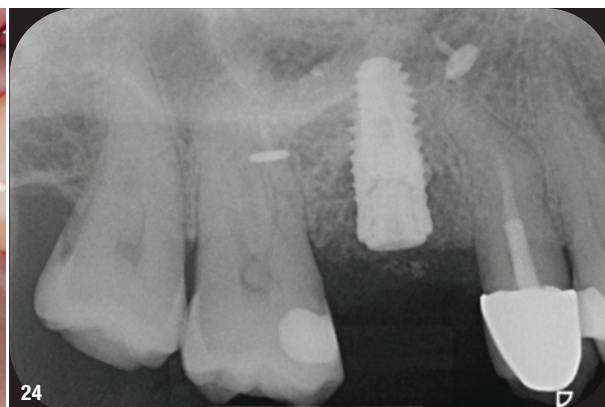
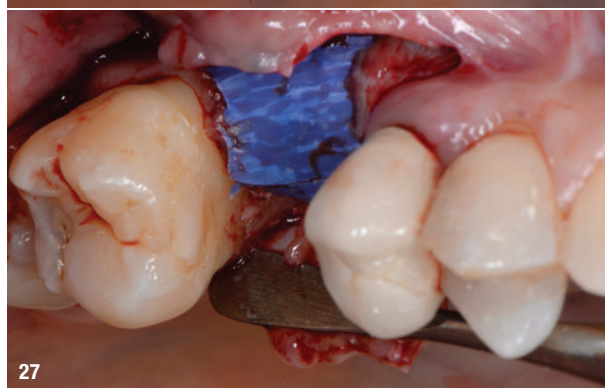


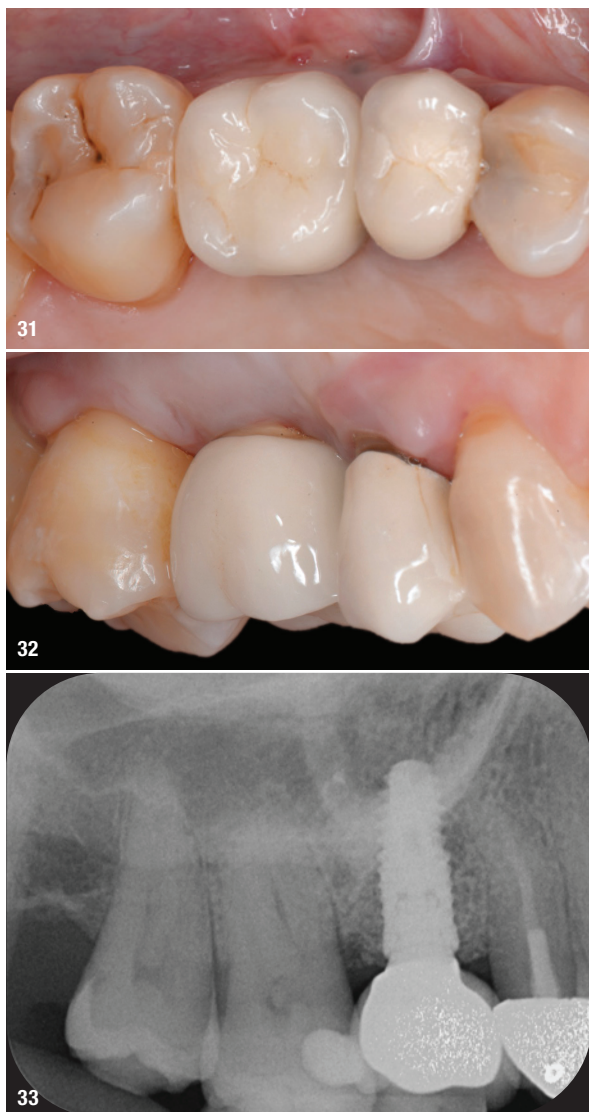
Fig. 23: Tension-free primary closure achieved after flap advancement. – **Fig. 24:** Radiograph after first-stage surgery confirmed proper positioning and stability of pins.



Figs. 25–28: Second-stage surgery at four months: screws and membrane were removed, soft-tissue management performed, and prosthodontic restoration reinserted.



Figs. 29+30: Palatal graft harvested to enhance peri-implant soft tissue; flap sutured.



Figs. 31–33: 12-month follow-up: clinical and radiographic examination demonstrates stable tissues and restored function.

about the author



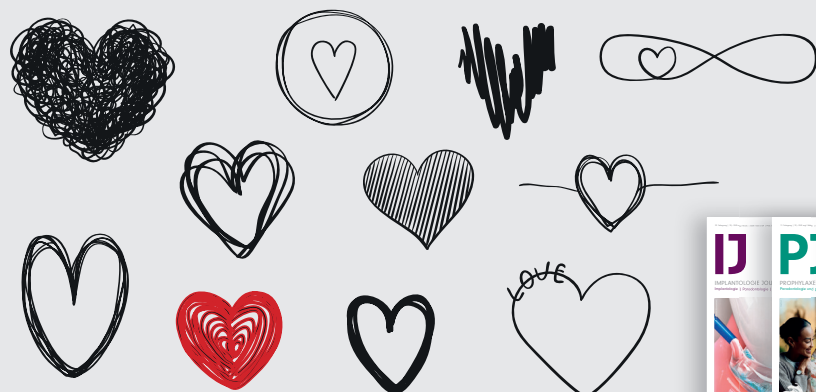
Dr Jochen Tunkel completed his dentistry degree at the University of Würzburg in Germany and then gained certification in periodontics through the Zahnärztekammer Westfalen-Lippe (dental chamber of Westphalia-Lippe) and the German Society of Periodontology. He qualified in implantology through the German Association of Oral Implantology and the European Association of Dental Implantologists and thereafter completed a Master of Oral Medicine in Implantology at the International Medical College, then affiliated with the University of Münster, and was certified in oral surgery by the Zahnärztekammer Westfalen-Lippe. He is in private practice in Bad Oeynhausen in Germany. His practice has been designated a Straumann Emdogain training centre and a competence centre for allogeneic bone plates in bone regeneration and is accredited by the European Centers for Dental Implantology. Dr Tunkel is a fellow of and speaker for the International Team for Implantology. He also shares his expertise in periodontics and implantology as a visiting and supervisory consultant for the German Association of Oral Implantology, German Society of Periodontology, and Akademie Praxis und Wissenschaft (the continuing education arm of the German Society of Dentistry and Oral Medicine).

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