CLINICAL

Successful treatment of peri-implantitis using a dental implant cleaning system: A 2-year follow-up

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Introduction

In the following case report, we present a case where GalvoSurge® in combination with guided bone regeneration (GBR), successfully managed peri-implantitis with a Class I defect described by Renvert and Giovannoli⁵ in a posterior implant. The treatment achieved not only the resolution of clinical symptoms, but also the regeneration of lost peri-implant bone, leading to a favorable long-term prognosis.

Peri-implant diseases, particularly peri-implantitis, have emerged as a challenging and prevalent complication in implant dentistry.¹ As the number of dental implant procedures continues to rise, so too does the incidence of peri-implantitis. This condition is characterized by inflammation and progressive bone loss surrounding dental implants, leading to potential implant failure and significant oral health issues.²

Peri-implantitis is primarily triggered by the accumulation of bacterial biofilms on implant surfaces, subsequently leading to inflammation and alveolar bone loss. Traditional therapies, such as non-surgical mechanical debridement, antimicrobial agents, and surgical procedures, have been employed in an attempt to arrest or reverse the progression of peri-implantitis. Nevertheless, these conventional methods often exhibit limitations.³

An alternative biofilm-removal approach for peri-implantitis is the use of GalvoSurge[®]. The GalvoSurge[®] Dental Implant Cleaning System uses an innovative electrolytic cleaning method to promote aseptic conditions and facilitate tissue regeneration around dental implants.⁴

Initial situation

A 66-year-old, healthy (ASA I), non-smoking female, with no medication or allergies, came to our clinic in 2020 because of pain and food impaction around one of her posterior dental implants. She mentioned that she regularly visited her general dentist for follow-up appointments and had never undergone any peri-implant treatment.

Upon clinical and radiographic examination, implant #37 met the diagnostic criteria for peri-implantitis according to the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions.⁶ This diagnosis was based on signs such as bleeding on probing, increased probing depths, and the circumferential peri-implant bone loss around the implant.

Treatment planning

Following a comprehensive discussion of the available treatment options with the patient, and after a thorough evaluation of all associated risks and contraindications, as a first phase it was decided to start with a non-surgical treatment to reduce inflammation, followed by a surgical approach that includes GBR using GalvoSurge[®]. GalvoSurge[®] has proved to be highly effective in removing bacterial biofilm from dental implants affected by peri-implantitis, thereby ensuring a thorough cleansing of

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Fig. 1: Conservative treatment and prosthesis removed.

Fig. 2: Healing abutments installed.

the exposed implant surface and preparing the implants for re-osseointegration.

We started with conservative treatment, removing the prosthesis and installing healing abutments (Figs. 1,2). Nonsurgical mechanical treatment was carried out using regular ultrasonic instruments and an air flow device. This was followed by irrigation using CHX 0.12% and metronidazole 5mg/ml and a solution of local antibiotic and hyaluronic acid. An X-ray was taken of the implants in positions #36 and #37 after the healing abutments were screwed in place (Fig. 3).

After a couple of weeks, the prosthesis was screwed back in place, and the patient was enrolled in a maintenance program with regular follow-up visits. At every visit, the patient exhibited good compliance with no signs of plaque, bleeding on probing, or inflammation. Therefore, a comprehensive evaluation of all parameters was conducted, and it was determined that the surgical phase could proceed.

Surgical procedure

Right before the surgery, a re-evaluation was carried out (Figs. 4,5)

First, the fixed prosthesis was removed (Fig. 6), the



Fig. 4: Clinical re-evaluation before the surgery.



Fig. 3: X-ray of the implants in positions #36 and #37.

patient rinsed with chlorhexidine gluconate 0.12%, and local anesthesia was administered using lidocaine 2% with epinephrine 1:100,000. Subsequently, a full-thickness mucoperiosteal flap was elevated with an intrasulcular and crestal incision. The bone defect was classified according to the modified defect types described by Renvert and Giovannoli.⁵ It was classified as a Class I infra-bony defect, characterized by the presence of all four walls. This type of bone defect was considered suitable for guided bone regeneration (GBR) to restore both function and esthetics.

Following the removal of the closure caps, the implant cleaning and disinfection were done with CHX 0.12 %, and the GalvoSurge®, using a non-metallic suction tip. The patient was informed about the possibility of experiencing a salty taste of the harmless cleaning solution while undergoing treatment with GalvoSurge® and that a reasonable volume of liquid might flow into her mouth during the procedure, but this would be promptly suctioned out.

The electrolytic cleaning procedure with GalvoSurge® began by positioning the Spray Head over the implant, ensuring the Implant Connector was inserted into the implant's interior, and then switching on the GalvoSurge®.



Fig. 5: X-ray taken before the surgery.



Fig. 6: Fixed prosthesis removed

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Fig. 7: Sponge on the GalvoSurge[®] Spray Head to ensure that the cleaning solution is kept in maximum contact with the treated implant.



Fig. 8: Clean implant surface after electrolytic cleaning with GalvoSurge®.



Fig. 9: Closure caps inserted.



Fig. 10: Straumann[®] Membrane Flex secured in place.



Fig. 11: Autogenous bone chips collected and mixed with botiss maxgraft[®] granules.



Fig. 12: Bone chip granules mixed with PRF.



Fig. 13: Straumann[®] Membrane Flex closed using pins for soft tissue support and graft containment.

Gentle pressure was applied to the Spray Head throughout the cleaning process. The sponge on the Spray Head is designed to hold the cleaning solution in maximum contact with the treated implant (Fig. 7).

The presence of hydrogen bubbles during the cleaning demonstrated the correct application of GalvoSurge[®]. Over a 2-minute cleaning period, these bubbles form underneath the biofilm and subsequently raise the biofilm from the implant surface. Consequently, the implant is thoroughly cleaned.

On completion of the GalvoSurge® procedure, the area surrounding the implant and under the flap was rinsed with sterile saline to eliminate any remaining coagulum or solution residue.

After ensuring the implant surface was clean, the closure caps were inserted (Figs. 8,9), and the guided bone regeneration (GBR) process began. A Straumann[®] Membrane Flex was secured in place using pins (Fig. 10).

Autogenous bone chips were collected and mixed with botiss maxgraft[®] granules (Fig. 11).

The bone chip granules were mixed with PRF and placed on the defect (Fig. 12). Using pins, the Straumann[®] Membrane Flex was closed for soft tissue support and graft containment (Fig. 13).

Suturing was performed using 4/0 Vicryl and 6/0 Prolene sutures. Additionally, oral hygiene instructions were provided (Fig. 14). Ten days later, the patient returned to have the stitches removed and the wound evaluated. The woundhealing process was uneventful (Fig. 15).

After a healing time of 6 months, a control CT scan was performed. Optimal bone level was observed around the implants (Figs. 16,17). A flap was raised to remove the rest of the excess bone from the healing abutment (Figs. 18,19). To close the incision, we utilized 4/0 Vicryl and 6/0 Prolene sutures, ensuring a secure and effective closure. Next, the

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Fig 14: Suturing performed.



Fig. 15: Ten days later: clinical situation before stitch removal.



Fig. 16: Optimal bone level around the implants after 6 months.



Fig. 17: Control CT scan after a healing time of 6 months.



Fig. 18: Flap raised to remove the rest of the excess bone from the healing abutment.



Fig. 19: Situation after removal of the excess bone from the healing abutment.



Fig. 20: Prosthetic back in its designated position.

prosthetic was carefully screwed back into its designated position (Fig. 20).

Ten days later, the patient returned for a follow-up visit, where we conducted a thorough evaluation of the treatment area. During this visit, the patient's sutures were carefully removed, and a radiograph was taken to assess the progress and healing of the treated area. The patient expressed satisfaction with the outcome, indicating a successful and positive response to the procedure (Fig. 21).

Treatment outcomes

During the follow-up visits in 2021 (Figs. 22,23), 2022 (Fig. 24), and 2023 (Fig. 25), no biological or radiographic



Fig. 21: Ten days later: situation at the followup visit.

complications were noticed. The follow-up visits and the final outcome of the treatment demonstrated the outstanding health of both the hard and soft tissues, emphasizing the effectiveness of the surgical procedure enhanced by the use of GalvoSurge[®] and guided bone regeneration (GBR). This successful result highlights the significance of these advanced techniques in achieving optimal patient outcomes.

Author's testimonial

After years of failing to achieve appropriate bone regeneration in peri-implantitis defects, I initially believed this was impossible. However, a shift in perspective occurred when I incorporated GalvoSurge[®] into my treatment

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Fig. 22: Clinical situation at the follow-up visit in 2021.



Fig. 23: No radiographic complication at the follow-up visit in 2021.



Fig. 24: Stable result at the follow-up visit in 2022.

protocol. Surface disinfection is the most important factor and GalvoSurge[®] enables biofilm control. Conservative treatment, the elimination of influencing factors, the use of a GBR protocol and vertical bone augmentation are additional factors that need to be taken to consideration.

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Fig. 25: Stable result at the follow-up visit in 2023, no biological complication noticed.

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