Therapy of an infra-bony peri-implant defect

Successful regenerative treatment using modern alloplastic bone graft material

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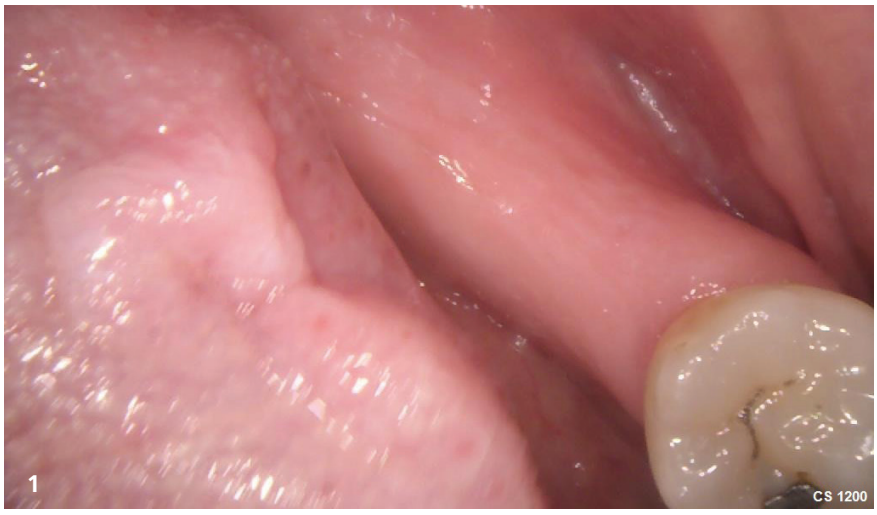
Using dental implants for restoring single or multiple missing teeth has become commonplace, owing to their high success rates (97%) and long-term durability.[10] However, the widespread adoption of dental implant therapy has also brought forth various complications, spanning from biomechanical issues to infections and inflammations.[3]

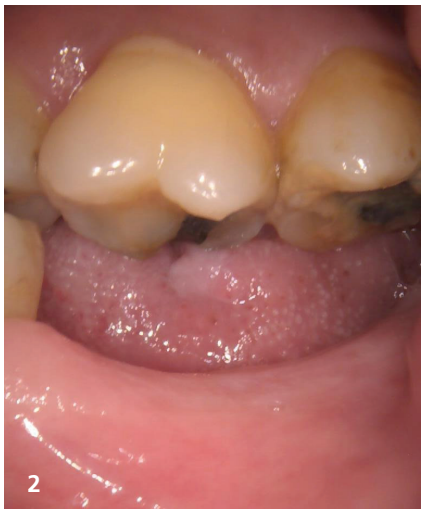
Among these complications, peri-implantitis stands out as the primary cause of late-stage implant failure and subsequent removal. A meta-analysis has estimated a substantial average prevalence of 22% for this condition.[10] According to the Consensus report from the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions, peri-implantitis is characterised by inflammation of the tissues surrounding dental implants, resulting in progressive loss of supporting bone. Clinical manifestations include inflammation, bleeding upon probing, suppuration, increased probing depths, recession of the mucosal margin, and radiographic evidence of bone loss. Diagnosis typically relies on the presence of bleeding or suppuration upon gentle probing, probing depths of ≥6 mm, and bone levels ≥3 mm apical to the most coronal part of the implant.[1]

Despite extensive research aimed at identifying optimal treatment strategies, there is currently no universally accepted protocol for effectively and predictably resolving these complications. Treatment approaches generally fall into two categories: resective or regenerative, depending on whether the defect is supra-bony or infra-bony. The choice of approach is further influenced by patient-specific factors such as smoking habits, oral hygiene, and overall medical condition.

Hydrogen peroxide has emerged as a widely used chemical agent for implant surface decontamination, owing to its availability, efficacy, and safety. Application of hydrogen peroxide on the implant surface for two minutes is a commonly employed method for chemical decontamination, although non-surgical therapy alone appears to be generally ineffective and is often used as a preliminary step before surgical intervention.[10]

The aim of the present clinical case is to describe a surgical approach for reconstructive therapy to address an intra-body peri-implant defect. This involves the use of EthOss®, a fully synthetic bone regenerative material, in a peri-implant defect





Figs. 1 & 2: Initial clinical situation.

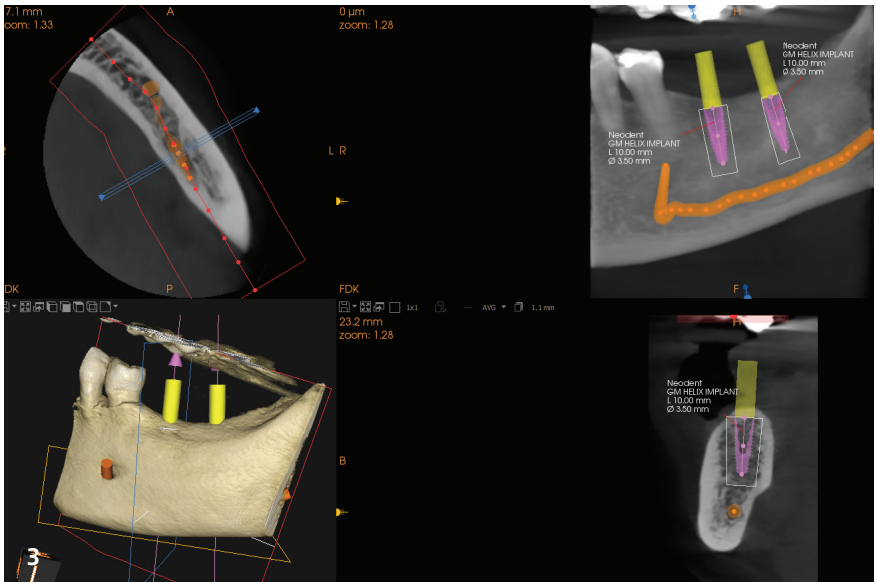
that has been thoroughly debrided and disinfected with hydrogen peroxide.

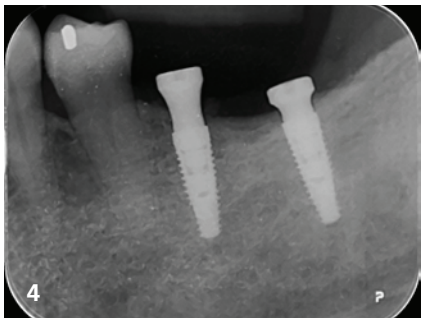
Case presentation

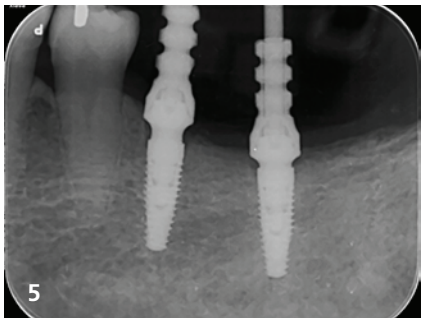
In January 2022, a 58-year-old woman presented with a long-standing concern about her inability to bite effectively on her lower left side due to the absence of her first and second molars (Figs. 1 & 2). She expressed interest in exploring dental implant options to restore her bite functionality.

Her medical history revealed high blood pressure and borderline type 2 diabetes, for which she was regularly taking amlodipine and metformin. A cone beam computed tomography (CBCT) scan was conducted for planning purposes (Fig. 3). Subsequently, implant placement was performed three months later (Fig. 4). The patient was pre-medicated with 3 g of Amoxicillin, and a full-thickness flap was raised to place two GM Helix Neodent implants, each 3.5 x 10 mm, with a torque of 45 Ncm. Healing abutments were also placed, and no grafting was necessary. The surgical procedure was uneventful, and the patient returned a week later for suture removal, with healing progressing as expected.

Four months post-implantation, multi-unit abutments (GM Mini Conical) were fitted, and impressions were taken for linked crowns (Fig. 5). The crowns were placed one month later (Fig. 6). Six weeks after crown placement, the patient was recalled for an assessment, which revealed no issues, with baseline probing depths around the implants being satisfactory.







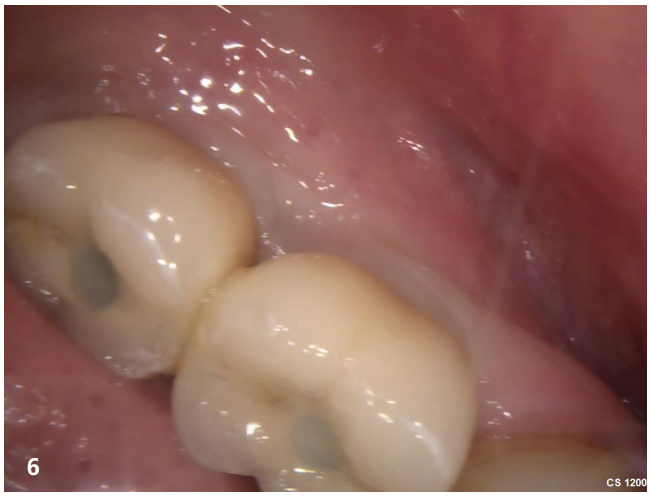


Fig. 3: CBCT scan for treatment planning.
Fig. 4: Implants at the time of placement.
Fig. 5: Radiograph taken during the impression phase.
Fig. 6: Condition of the tissues at the time of fit.

Table 1	#36	
1	4	3
1	1	1

Table 2	#37	
3	3	1
1	2	1

Table 1 and 2 showing probing depths at base line, six weeks after fit.

However, seven months post-implantation, the patient reported a strange, swollen sensation in her gum over the past six weeks. Her general dentist prescribed Amoxicillin 500 mg, to be taken three times daily for five days. Clinical examination and radiographs revealed bleeding on probing, suppuration, increased probing depths, and progressive bone loss around implant #37 only (Figs. 7 & 8).

Table 3	#36	
1	1	3
1	2	1

Table 4	#37	
5(S)	5(S)	2
3	3	3

Table 3 and 4 showing new probing depths.

To address this, the patient was instructed to follow an intense oral hygiene regimen, including interdental brushing and salt rinses, for two weeks. Following this regimen, the restoration was removed (Fig. 9), and the #37 abutment was replaced with a flat cover screw. A full-thickness three-sided flap was performed to avoid disturbing implant #36 (Fig. 10). The granulation tissue was meticulously removed using hand instruments and EthOss® degranulation burs, and the implant was cleaned with a stainless steel hand curette. After thoroughly removing the infected tissue, the implant surface was desinfected with 6% hydrogen peroxide gel for two minutes, followed by saline rinsing. This decontamination process was repeated five times (Figs. 11–16).

Four months later, the patient returned for a follow-up, reporting no pain or issues. Probing depths around implant #37 were 112/111 around the protection cylinder, and around implant #36 were 101/101 around the healing abutment. The healing abutment was replaced with the initially used MUA, and the same restoration was reattached (Figs. 17–24).

Table 5	#36	
1	1	2
1	1	1

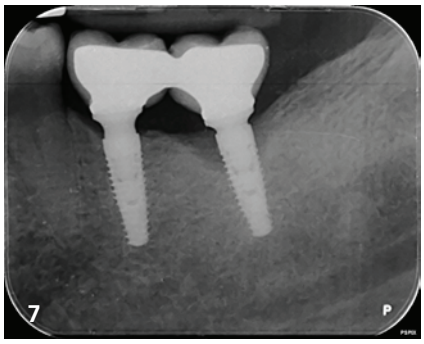
Table 6	#37	
1	0	1
1	0	1

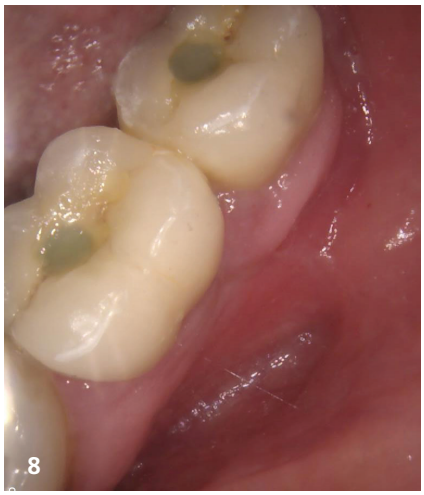
Table 5 and 6 showing probing depths at six-week-review.

Table 7	LR6	
0	0	1
1	1	1

Table 8	LR7	
0	1	0
0	1	1

Table 7 and 8 showing probing depths at six-month-review.



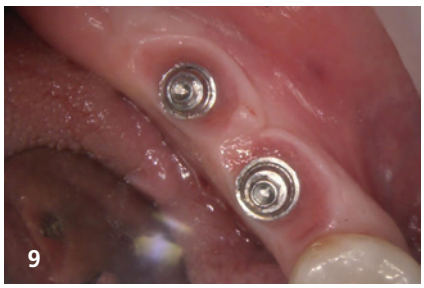


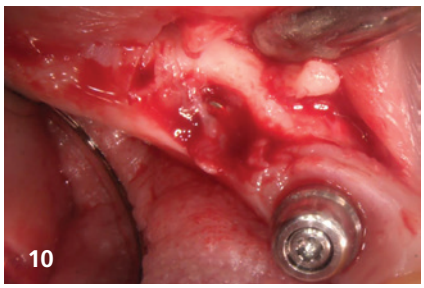
Conclusion

The regenerative approach employed in addressing the infra-bony defect with hydrogen peroxide and EthOss® has proven successful. This success is evident both from the patient's perspective, with no reported pain and restored full function, as well as from clinical observations. Significant improvements include a net gain of 3 mm in probing depth, absence of bleeding or suppuration, and radiographic evidence of bone regeneration, which has persisted for nine months post-surgery and six months after replacement of the restoration.

Furthermore, the ability to retain the same restoration and multi-unit abutment without any observable soft- or hard-tissue recession indicates no actual loss of tissue occurred. The favourable outcome of this case, coupled with the accessibility and effectiveness of the materials used, suggests that this approach represents a viable option for treating infra-bony peri-implant defects.

Fig. 7: Radiograph at nine months post-op. **Fig. 8:** Buccal swelling can be observed. **Fig. 9:** Removal of the restoration. **Fig. 10:** Three-sided flap revealing the defect.





References

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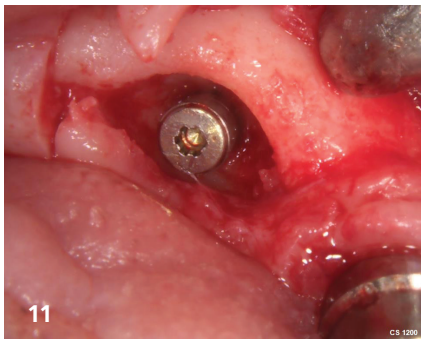
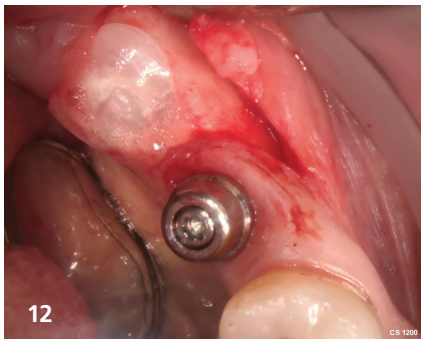
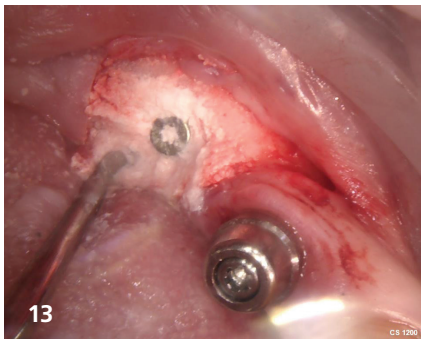
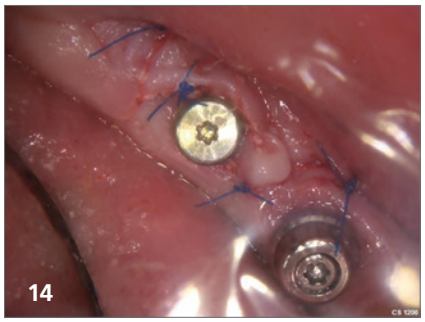
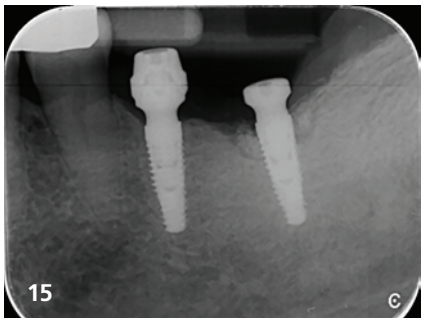










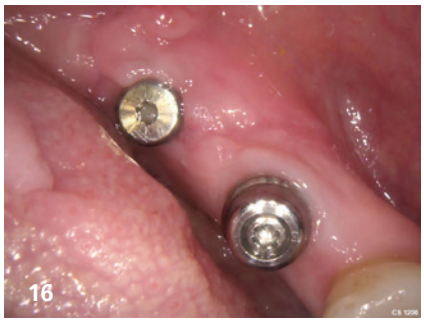
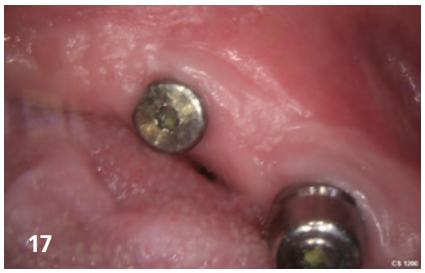
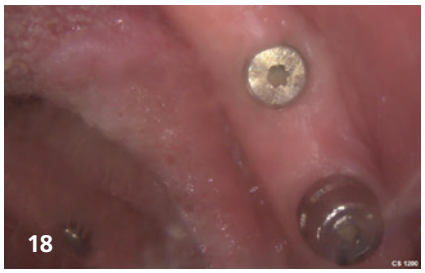
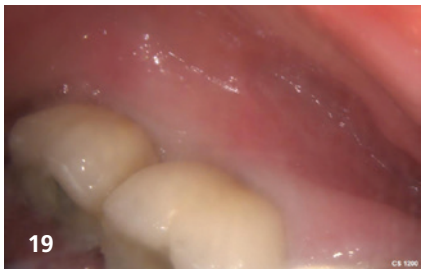
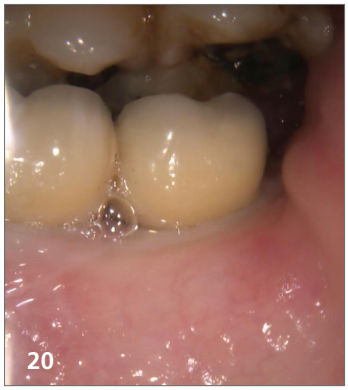


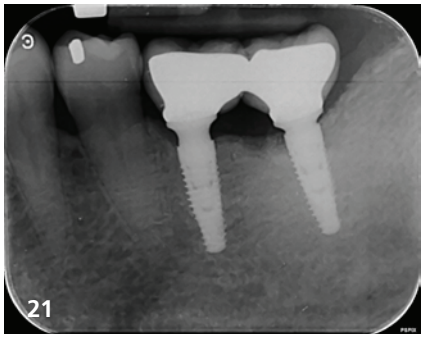
Fig. 11: Infra-bony elliptical circumferential defect fully exposed. **Fig. 12:** Disinfection of the implant using H_2O_2 gel. **Fig. 13:** Filling the infra-bony defect with EthOss®. **Fig. 14:** Placement of the healing abutment and closure of the site with 5/0 Prolene sutures. **Fig. 15:** Radiograph following peri-implant surgery. **Fig. 16:** One-week post-op showing initial healing.

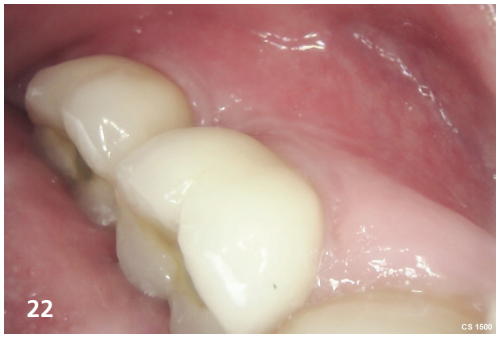


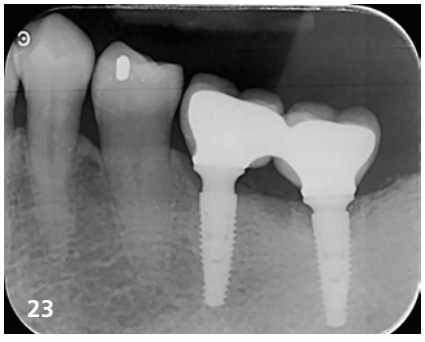


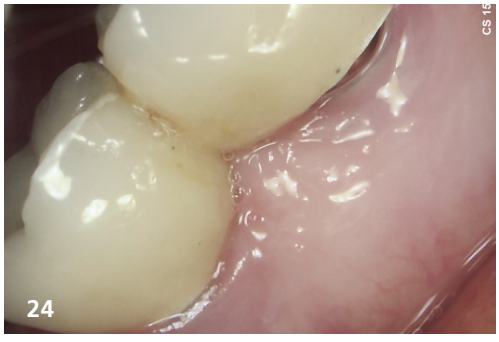












Figs. 17 & 18: Healing progress around the healing abutment. **Fig. 19:** Placing of the original restoration. **Fig. 20:** Condition of the tissues at the time of re-fit. **Fig. 21:** Radiograph taken at re-fit. **Fig. 22:** Condition of the tissues at the six-month review. **Fig. 23:** Lingual tissue condition at the six-month review. **Fig. 24:** Radiograph taken at the six-month review.