

# Regeneration of an Osseous Peri-Implantitis Lesion

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**ABSTRACT:** This case report concerns the loss of osseous tissue around two hydroxyapatite (HA) Biovent implants, placed in 1993, at sites #30 and #31. The implant in site #31 was positioned with a distal angle, resulting in an ill-fitting prosthesis. This permitted bacterial colonization to set up a peri-implantitis. The rough HA coating on the implants further exacerbated the resultant bone loss. In an attempt to rectify the pathology, surgical debridement, antibiotic therapy, bone grafting, and guided tissue regeneration with a barrier membrane were utilized. This case report documents a successful partial repair of osseous housing around these implants.

## INTRODUCTION

Since 1981, root-form implant have become an optional modality for the replacement of missing teeth [1]. Although originally placed in the edentulous mandible, implants are now used to restore a variety of sites in partially edentulous patients [2].

Lindhe et al. [3] induced experimental breakdown of peri-implant tissues in dogs. They found that the resultant peri-implantitis resulted in tissue destruction around implants and that the lesions around the implants often extended into the bone marrow.

Palacci et al. [4], in 1995, stated that it is extremely important to create proper soft tissue anatomy around implants, and it is necessary to design a superstructure that would facilitate a high standard of oral hygiene, thus providing healthy soft tissue barriers.

Clinically, lack of sufficient implant osseointegration is characterized by implant mobility, and is considered a failing implant [5,6]. On the other hand, an *ailing* implant has been defined as a clinically stable implant affected by bone loss and pocketing [2,7,8]. Peri-implantitis has been referred to as an inflammatory reaction with concomitant loss of supporting bone in the crevicular tissue surrounding a functioning implant [9].

The use of barrier membranes for guided bone regeneration (GBR) has become one of several available treatment modalities [10]. GBR procedures are not always predictable, and may result in incomplete bone regeneration within the space provided by the membrane [11]. To improve the results with GBR, autogenous bone transplants as well as allografts and xenografts have been used to provide space under these membranes [12,13].

The following case describes the therapy involved in attempting to restore the alveolar support for ailing implants.

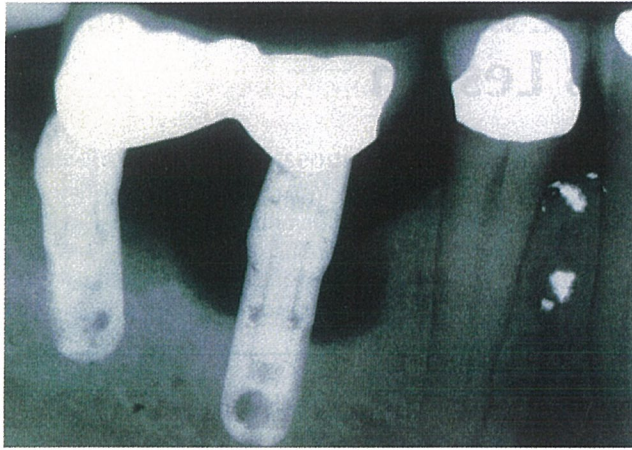
## REPORT

In December 1998, a 34-year-old Caucasian woman presented at New York University Continuing Dental

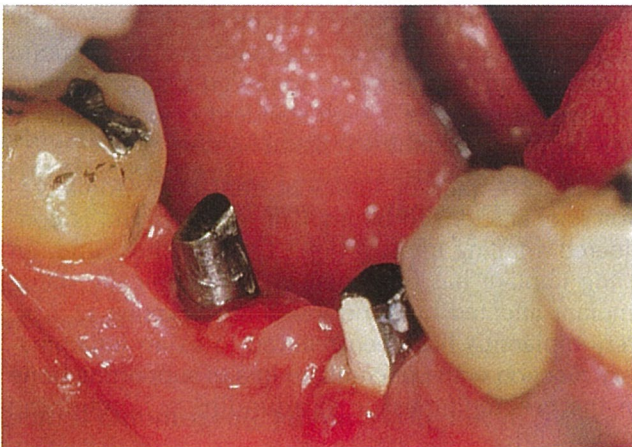
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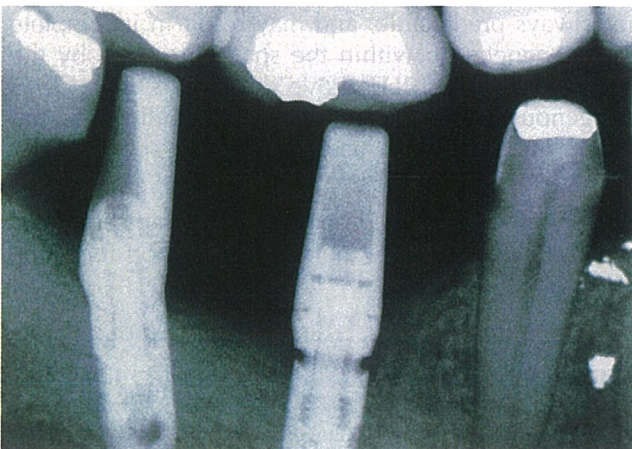
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**Fig. 1.** Note 50% bone loss around the fixtures at sites #30 and #31.



**Fig. 2.** Clinical presentation of the two fixtures, demonstrating inflamed, edematous tissue.

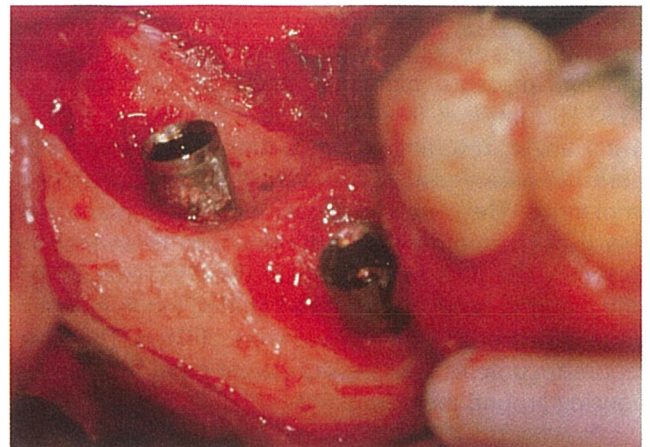


**Fig. 3.** Radiograph from the initial restorative dentist.

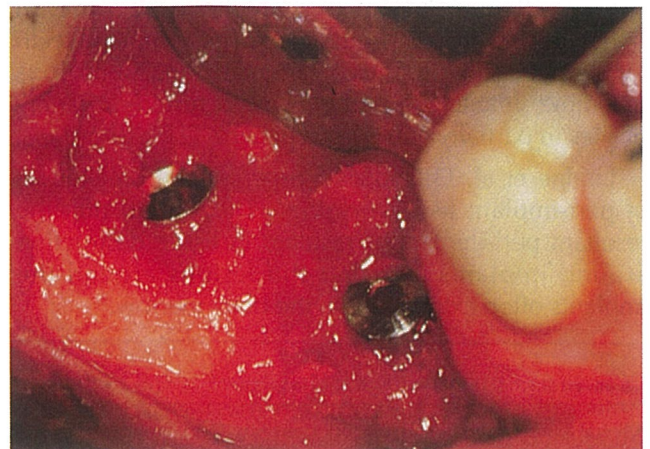
Education Clinic complaining of a loose bridge that was placed on implants in the mandibular right side, at sites #30 and #31. Her medical history was noncontributory. Radiographic examination revealed 50% bone loss around the two fixtures at sites #30 and #31 (Figure 1). An oral surgeon had placed these fixtures 3 years previously.

The two connected crown were removed. The gingival tissue around the abutments appeared inflamed, exhibiting edema, bleeding upon palpation, and supuration (Figure 2). The surgeon and the restorative dentist were contacted regarding the prior surgical implant placement. Radiographs of the surgical placement and crown insertion were provided (Figure 3).

Tooth #32 was tilted mesially and its mesial marginal ridge was flattened to aid crown insertion.



**Fig. 4.** Post-debridement photograph. Note crater-like osseous defect.



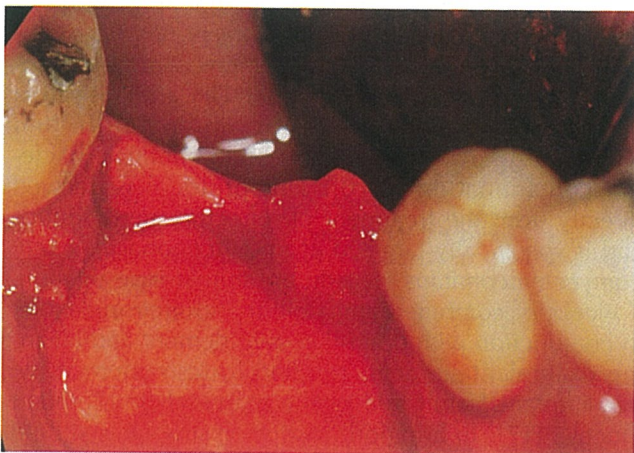
**Fig. 5.** Cancellous bone placed in the osseous defect.

The implant in position #31 was distally placed. Radiographic examination revealed the closeness of the mandibular canal to the implant site. The two implants were of standard diameter and coated with hydroxyapatite (Biovent-Paragon, Encino, CA). They were not aligned and were placed in a non-parallel direction. The crown and the abutment appeared ill fitting. This may have led to the creation of a bacterial niche.

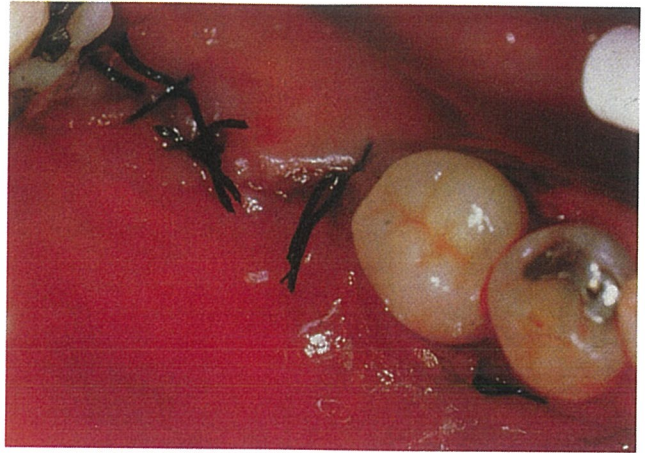
A full-thickness flap was elevated and debridement of the granulation tissue was performed. The osseous defects around the two implants both exhibited crater shapes (Figure 4). The implant surface was treated with rotary instruments and citric acid was applied for 37 seconds. The two defects were filled with irradiated freeze-dried cancellous bone, 500 mesh (DFBD-US Red Cross Bone Bank, Washington DC) (Figure 5). The area was then covered with an Epi-Guide (Epiguide-Calcitek, San Diego, CA) membrane (Figure 6). The flap was sutured with 4.0 black-silk interrupted sutures (Figure 7). The patient was placed on amoxicillin 500 mg, 1 tid for 10 days.

Seven days later the patient came in for a postoperative visit, with uneventful healing. She was instructed to rinse with a chlorhexidine solution (PerioGard: Colgate-Palmolive, Canton, MA).

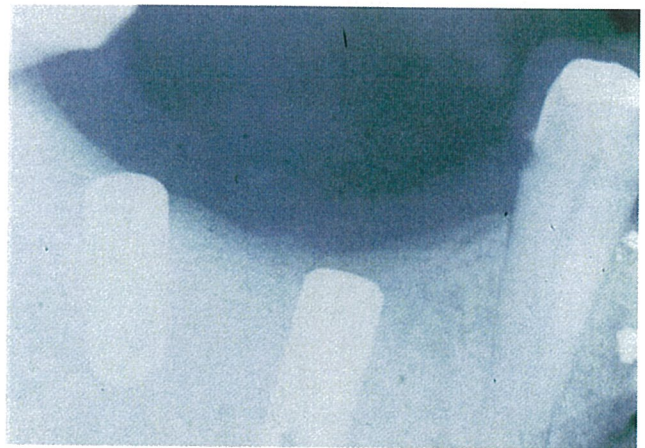
After 6 months, a second-stage procedure was performed. At this time, tooth #32 was removed to allow a proper path of insertion, and a periodontally maintainable anatomy. There appeared to be clinical and radiographic bone fill around the implants (Figures 8–11). A provisional prosthesis was placed on the implants (30 and 31) for a 2-month period. The final prosthesis was made of porcelain fused to metal and



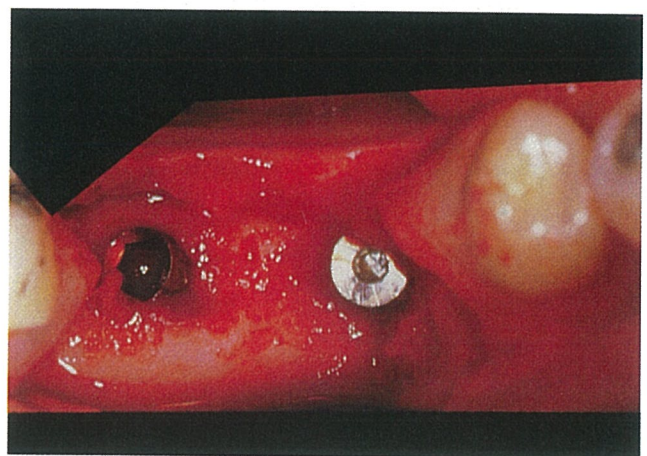
**Fig. 6.** Epi-guide layered over the graft.



**Fig. 7.** Flap sutured in place.



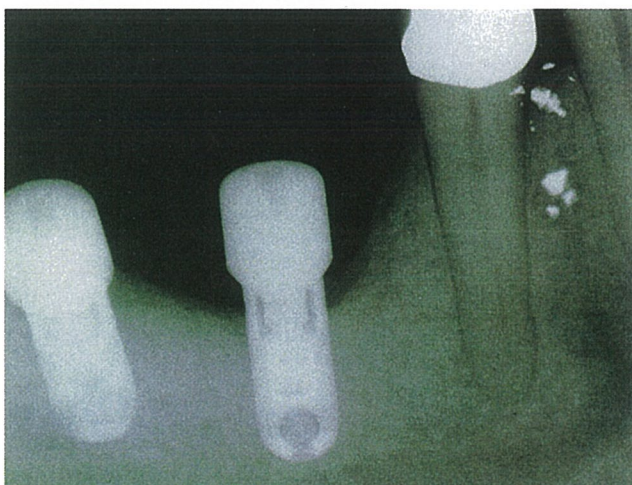
**Fig. 8.** Radiograph demonstrating healing after 6 months.



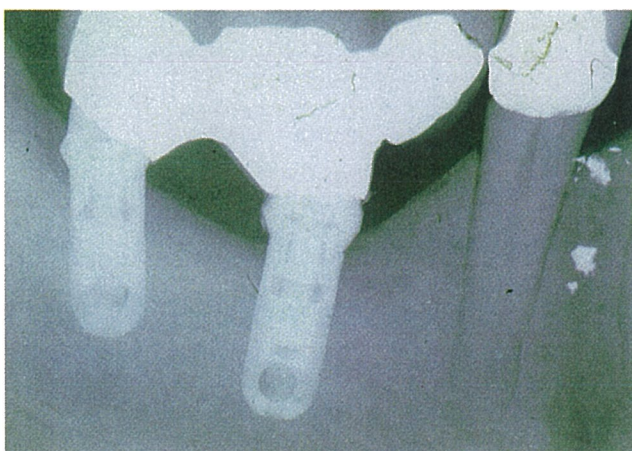
**Fig. 9.** Photograph suggesting clinical bone fill.



**Fig. 10.** Following extraction of #32 and placement of healing abutments.



**Fig. 11.** Radiograph of healing abutments in place.



**Fig. 12.** Radiograph of the final bridge in place.



**Fig. 13.** Clinical slide of permanent bridge in place.

was inserted at New York University College of Dentistry (Figures 12 and 13).

## DISCUSSION

If implants are not inserted in the proper angulation during the surgical phase, future prosthetic considerations may be compromised. In this case, the implants were placed at an improper angle. This positioning may have precluded an accurate impression transfer; the abutment did not fit the implant hex properly. The resultant micromovement of the superstructure made the implant compromised. Furthermore, the rough surface of the implant design facilitated the development of a peri-implantitis.

There is complete consensus that bacteria should be eliminated from the surfaces of failing implants [7,14,15]. Furthermore, if endotoxins or other contaminants are permitted to remain, there cannot be biologic repair or reosseointegration. The administration of a combination of antibiotics (amoxicillin and metronidazole) has been proposed to eliminate bacterial contamination [9,10]. This protocol is derived directly from the treatment of refractory periodontitis and is specifically targeted against *Actinobacillus actinomycetemcomitans* [16]. In an animal investigation, 3 weeks of combined amoxicillin and metronidazole, in conjunction with open-flap debridement and cleaning of implant surfaces, resulted in resolution of the peri-implant lesion and of the marginal peri-implant mucosa [17]. In addition, rotatory instruments should be used to smooth rough surfaces [10]. Chemical

placement on mechanically cleaned implant surfaces has been suggested; chlorhexidine 0.12% for 1 minute has been used [18], and citric acid for 60 seconds has also been recommended. However, it appears that the application of citric acid for 60 seconds with a pH of 1 may significantly degrade and weaken the hydroxylapatite coating [19].

Animal studies have produced contradictory results regarding guided bone regeneration (GBR) around failing implants, ranging from no reosseointegration to clinically significant reosseointegration (20–24). In later studies and in clinical studies [25,26], premature barrier exposure led to poorer results.

In the present case report, empirical choices of therapy regarding the use of amoxicillin alone, plus the citric acid application for a certain time combined with surgical intervention that included debridement of the defects and GBR led to a successful result. The first-stage therapy alone will not be as successful without a prosthetic treatment that respected the anatomical environment, allowing a better fit of the prosthesis and a more cleansable and maintainable gingiva.

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