

MANAGEMENT OF AN IMPLANT CASE THAT REQUIRED RETREATMENT: A CASE REPORT

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KEY WORDS

Preoperative radiographs
Standard of care
Irradiated cancellous bone
Biogran

The presented case represents how the lack of a preoperative panoramic radiograph or any radiograph contributed to incorrect case planning, poor implant selection, and the careless surgical placement of an implant into or dangerously close to the lower left mental foramen, resulting in a paresthesia of 9 months duration. Two implants were surgically removed and the bone defects were grafted with a mixture of irradiated cancellous bone plus Biogran. One implant was sectioned and intentionally “put to sleep.” The case was successfully completed with a lower bar overdenture supported by 4 screw implants placed in alternate sites, opposing a custom fabricated maxillary denture with a lingualized occlusal scheme.

INTRODUCTION

It is generally accepted that preoperative radiographs are an essential aspect of implant case planning and selection as well as vital in surgical implant placement. It is also generally noted that panoramic films, although commonly taken, may result in distortions as great as 25%.¹ In addition, panoramic films may introduce horizontal errors of 30 to 70% and vertical misrepresentations of 20 to 30%.² These distortion factors require compensation in the following manner:

- (1) Periapical films give a view of higher resolution and greater accuracy and indicate medullary and cortical bone density.¹
- (2) A periapical film with a pilot drill in the initial osteotomy site preparation can be used to verify surgical depth providing sterility is not compromised. This can assist the clinician in arriving at an accurate assessment of distances.

(3) Periapical ball-bearing evaluations of known sphere diameters (5 mm) using a simple algebraic equation $RS/5 = RM/X$ will determine actual bone dimensions prior to implant surgeries.¹ (*RS* is the X-ray sphere measurement, *RM* is the X-ray bone measurement, *X* is the actual bone measurement, and 5, or 5 mm, is the actual sphere measurement.)

Three-dimensional imaging or CT scans, though highly accurate, are often impractical and rarely necessary for most routine implant cases.

Failure to take all requisite radiographs is a deviation from the standard of care and may have significant surgical and legal consequences.

CASE REPORT

A 53-year-old female presented for a second opinion regarding completion of a lower implant supported overdenture begun nearly 1 year ago. The pa-

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FIGURE 1. The preoperative panorex demonstrates the presence of 3 implants in sites #20, 25, and 27. Clearly bone loss is evident and a need for surgical intervention is necessary.

tient had lost confidence in her current treating dentist and did not wish to return to his practice.

Her medical history was unremarkable. Orally, the patient presented with a highly resorbed maxillary ridge. The patient had been using an ill-fitting maxillary denture for approximately 12 years. It was opposed by a mandibular relined partial denture clasped to a lower free-standing canine (tooth 22), which had been restored with a gold coping. Esthetics, comfort, and function were all severely compromised, with an apparent loss of vertical dimension. Tooth 22 was tender to both percussion and palpation, demonstrating a 1 to 1 1/2 mobility. There were 3 free-standing, unrestored, nonsubmerged ITI implants in sites 27, 25, and 20. The implant in site 27 was tender to palpation, with a 7-mm pocket, and had marked mobility and suppuration. The implant in site 20 demonstrated a 5- to 6-mm pocket depth but was nonsupplicative. The patient stated a history of paresthesia involving her left lip and cheek, which had persisted for 9 months duration but had recently resolved itself.

A panoramic radiograph was taken and revealed a periapical radiolucency around implant 27 as well as natural tooth 22. The implant in site 20 appeared to have been into or near the left mental foramen, and there was evidence of crestal bone loss (Figure 1). Implants in sites 20 and 25 were not mobile. Records sent by the previous dentist were incomplete and contained no preoperative radiographs.

TREATMENT PLANNING

An initial treatment plan was presented to the patient. The plan included the surgical removal of the failed implant in site 27 with subsequent bone grafting of the defect.³ A screw-type implant would be surgically positioned in the alternate site of 26, and at this point, the asymptomatic implant in site 25 would be included in the restorative treatment plan. The nonmobile implant in site 20 would be degranulated, detoxified, and grafted.³ The lower arch would then be restored by a cast bar overdenture supported by 4 lower implants at sites 26, 25, 22, and 20, or an RP-5 design.³

Maxillary and mandibular dentures of acceptable vertical dimension, esthetics, phonetics, and function would be the final prostheses of choice.

The treatment plan was accepted by the patient, but unfortunately the patient was lost to followup. In the interim, records were requested by an attorney.

The patient returned to my office after 28 months in the same nonrestored state with continued discomfort of all remaining implants. Generalized pocketing of 10 to 12 mm was noted on implants in the 27, 25, and 20 sites. All were now supplicative. The implant in site 20 demonstrated continued bone loss but was nonmobile (Figure 2). Implants in sites 27 and 25 were mobile. The patient was placed on amoxicillin (500 mg qid) for 10 days. Tooth 22 was extracted. The lower partial denture was converted to an immediate transitional denture (Figure 3).

SURGICAL PROCEDURE

Informed consent was obtained. The patient was orally premedicated with 2 g of amoxicillin 1 hour prior to the procedure and given oral sedation of 10 mg Valium and 50 mg Demerol. The patient was surgically draped in the appropriate manner and the operatory was prepared in a surgically sterile condition.

The patient was anesthetized with

bilateral mandibular blocks. A midcrestal incision was extended distal to the 27 implant and extended to the mesial surface of the implant in site 20. A full thickness mucoperiosteal flap was reflected to gain access to failing implants in sites 27 and 25, revealing the extent of the bony defects (Figure 4). Both implants were mobile and were removed by gentle luxation (Figure 5). After degranulation, the bony defects were grafted with a mixture of irradiated cancellous bone (Rocky Mountain Tissue Bank) and Biogran (Implant Innovations) in a 1:1 mixture (Figure 6). The remaining ridge was widened to 5 mm by osteoplasty to accommodate the surgical placement of 4 endosseous threaded implants (3.5 × 17.0 mm); (Implantatum-Uniport, Sun Coast Dental). Implants were now securely positioned in sites 26, 24, 23, and 22. Interproximal bone defects were grafted (Figure 7). The area was sutured by continuous cross suturing using a 3-0 Vicryl material (Figure 8). The patient tolerated the procedure well. She was given written postoperative instructions, ice was applied to her face, and prednisone (40 mg po) was given to be followed by a Medrol dosepak, taken as directed. The antibiotic regimen was followed for 9 days. Suture removal occurred on postoperative day 14. At that time, the patient was healing well without complication.

Surgical exposure and removal of the implant in site 20 was completed in a separate procedure after consultation with a colleague. The patient was prepared as in the previous surgery. After a left mandibular block injection, a midcrestal incision with small vertical release was extended from site 22 to just distal to site 20 to gain access. A saucerized bony defect surrounding implant 20 was thoroughly degranulated. The implant itself was not mobile and the apical 25 to 30% was firmly affixed in bone. The supra-bony portion of the implant was sectioned with a carbide bur using copious sterile saline irrigation. The remaining 25% of the implant in bone



FIGURE 2. An intraoral view of implants in sites #27, 25, and 20 illustrating 10 mm pocketing on the implant in site 25.

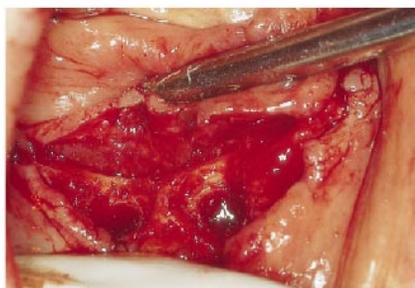


FIGURE 6. An intraoral view of the bony defects after implants in sites #27 and 25 were removed. Sites were grafted with irradiated cancellous bone plus Biogran.



FIGURE 9. This post-operative panorex demonstrates implants in positions #26, 24, 23, and 22 allowing a portion of implant #20 to remain passively in place.



FIGURE 3. This panorex demonstrates three remaining implants in sites #27, 25, and 20 after extraction of the lower left cuspid #22.

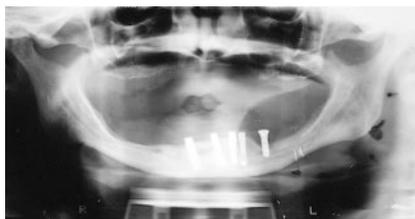


FIGURE 7. The post surgical panorex demonstrates implants in alternate sites #26, 24, 23, and 22 as well as interproximal grafted defects.



FIGURE 10. This intraoral view demonstrates post-operative healing.

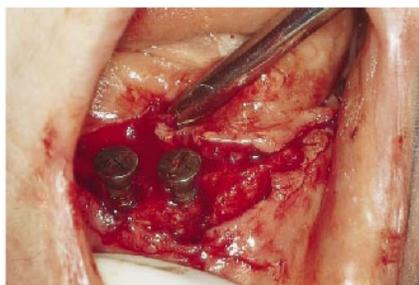


FIGURE 4. This intraoral view demonstrates the extent of bone loss around failing implants in sites #27 and 25 after elevating a mucoperiosteal flap.



FIGURE 8. The intraoral post-operative view illustrates continuous cross suturing. The implant in site #20 has not been removed yet.



FIGURE 11. This view demonstrates the articulated centric relation record.

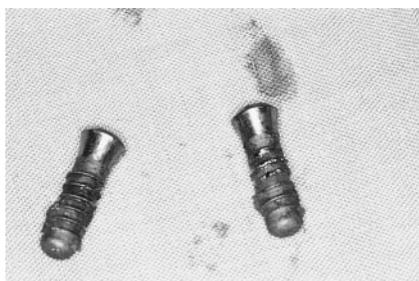


FIGURE 5. The failed implants in sites #27 and 25 after surgical removal.

was permitted to remain passively in place. Any further attempt at removal by trephination or other surgical manipulation could have resulted in a permanent dysesthesia. All bony and metallic irregularities were smoothed. After thorough irrigation, the remaining site was grafted over with Biogran (Figure 9). The site was sutured with continuous cross suturing using 3-0 Vicryl material. The patient tolerated the procedure well. Postoperative instructions were reviewed and the previous regimen was prescribed. A 24-hour fol-



FIGURE 12. A full arch denture set-up in a posterior lingualized occlusal scheme to verify an accurate centric relation.

low up revealed no postoperative discomfort or paresthesia. Sutures were removed in 2 weeks. Healing was uneventful (Figure 10).

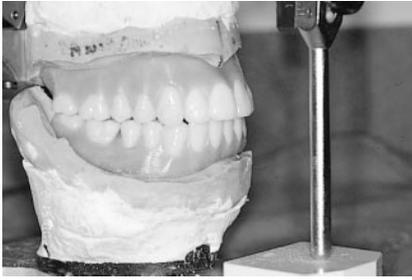


FIGURE 13. A refinement of anterior tooth positioning assured the patient's proper phonetics and lip support.

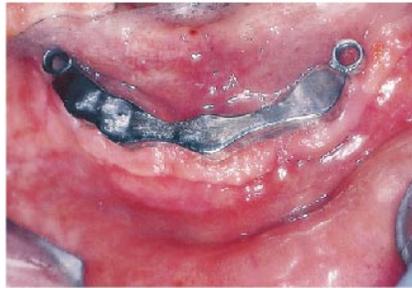


FIGURE 17. This intraoral view demonstrates the cast bar with bilateral distal ERA attachments.

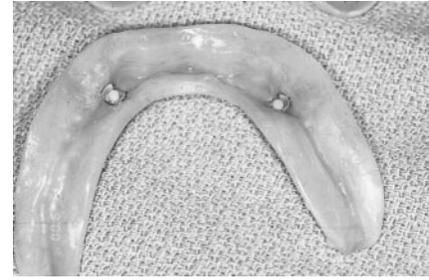


FIGURE 21. The tissue surface of the mandibular overdenture was modified with processed male ERA retentive attachments as seen in this view.



FIGURE 14. This intraoral view demonstrates 4 uniposts after alignment and cementation.



FIGURE 18. Occlusal indicator wax is used to verify bilateral balance.



FIGURE 22. The patient's right profile view demonstrates adequate lip support.



FIGURE 15. This intraoral view demonstrates the shortened slotted uniposts prior to custom bar fabrication.



FIGURE 19. Bilateral occlusal balance can be easily verified on the lower denture assuring denture stability.



FIGURE 23. Adequate lip support, as seen from the patient's left profile.



FIGURE 16. This intraoral view demonstrates the low profile custom fabricated gold bar.



FIGURE 20. The tissue surface of the maxillary denture was treated with Hydro-cast, an impression recording material, assuring superior tissue adaptation.



FIGURE 24. This postoperative frontal view illustrates a natural looking smile line and a good prosthetic result.

PROSTHETIC RECONSTRUCTION

After a 4-month healing period, osseointegration of all 4 implants was confirmed clinically. A full arch maxillary and mandibular denture set-up in a lingualized occlusal scheme was completed. Particular attention was taken to satisfy the patient's desire for proper mold and shade selection. Anterior tooth positioning was completed chairside, assuring acceptable lip support and proper phonetics (Figure 11). A centric relation record was captured and a full arch set-up was used to verify all of the stated requirements (Figures 12 and 13). The mandibular alignment would now dictate bar design and fabrication.

Four uniposts (3.5–10°; Implantatum, Suncoast Dental) were tried in, aligned, and permanently cemented with Panavia 21 (JP Morita) (Figure 14). Angulations were previously determined at the time of surgical placement. The 4 posts were reduced occlusally, slotted, and a final impression taken using Reprosil (Dentsply) in a custom tray (Figure 15). A cementable, one-piece, cast gold bar with low profile, distal ERA attachments was fabricated and returned for verification to assure a passive fit (Figures 16 and 17).

The wax tooth set-up was tried in once again. Minor modifications were



FIGURE 25. This post-operative panorex demonstrates the final bar position supported by implants in sites #26, 24, 23, and 22 as well as the portion of the implant in site 20 allowed to remain passively in place.

made prior to final processing. A provisional maxillary denture was returned and Hydro-cast (Kay See Dental) functional impression material was added to record accurate tissue representation. The lingualized occlusion was checked with occlusal registration wax (Kay See Dental) to assure bilateral stability (Figures 18 and 19). The maxillary denture was precision processed and returned for patient delivery. The finished mandibular bar was permanently cemented with Panavia 21. Routine postoperative care, including the use of a Hydrofloss Oral Irrigation (HFI) device, was reviewed. Routine postoperative checkups were scheduled (Figures 20 through 25).

DISCUSSION

This case is an example of a straightforward mandibular bar overdenture

supported by 4 endosseous threaded implants that was unnecessarily complicated by the failure of a previous practitioner to make appropriate records. This led to faulty case diagnosis and poor patient management, improper implant selection, gross surgical error in placement, needless patient suffering, multiple corrective surgical interventions with their own risks, and unfortunate legal intervention. As the demand for implant-supported dentistry increases, the frequency of second opinions and the possibility of surgical complications will increase. Practicing within the accepted standard of care will not only offer our patients more predictable and favorable case outcomes but will also render dental practitioners feelings of satisfaction with the results.

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