Successful Implant Placement into a Site with Two Previous Failures: A Clinical and Histological Case Report


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Implants present a predictable fixed option for patients who require tooth extraction. However, complications such as implant failure reduce the success of replacement implant restorations. A patient presented at NYUCD Department of Periodontology and Implant Dentistry with pain related to a broken implant-supported prosthesis. Two failed implants were removed, and new implants were placed. After delivery of the restoration, the patient reported soreness on implant #20, which was then removed along with a sequestrum of bone and sent for biopsy. A new implant was placed and restored
successfully at the 1-year follow-up. The purpose of this case report is to demonstrate that with proper planning, surgery and restoration a new implant can be successfully placed and restored in a site with two previous failures. *Int J Periodontics Restorative Dent 2022. doi: 10.11607/prd.5410*

**INTRODUCTION**

Although dental implants are a very predictable treatment option for patients who require tooth extraction and desire a fixed restoration replacement, the success of implant treatment depends on a variety of factors. Moreover, complications do occasionally occur. (1, 2)

Implant failure is one of the most serious complications after implant placement and can be classified as early (before loading) or late (after loading). Implant failure can be influenced by several factors (biological, mechanical, iatrogenic or poor patient compliance). (3, 4) Late implant failure occurs after occlusal loading due to failure in maintaining established osseointegration in cases of excessive loading, peri-implantitis, or inadequate prosthetic construction. However, other factors can influence the maintenance of established osteointegration such as patient medical condition, smoking, bruxism, implant location, bone quality, implant selection, surgical procedure and restoration. The prevalence of late implant failure is approximately 0-2% and attributed, in the majority of these cases, to biological or mechanical complications. Late implant failure from diagnosis to implant removal and replacement is longer, usually more costly and requires more complex procedures to replace the failed implant when compared to early implant failure. (5, 6, 7)

The purpose of this report is to demonstrate a case of multiple implant failures (with graft sequestration in a previous socket preservation site) and demonstrate that with proper planning, surgery and restoration a new implant can be successfully placed and restored. Histology of the bone sequestration that occurred with implant removal will also be presented.
MATERIALS AND METHODS:

A 67-year-old Latino female patient presented to the Ashman Department of Periodontology and Implant Dentistry at the College of Dentistry of New York University in May of 2015 with the chief complaint “My lower left implant supported bridge is broken and I have pain”. The medical, social and dental history of the patient were reviewed. It was recorded that she had high blood pressure (diagnosed in 2011) and seasonal allergies. She was currently taking lisinopril, atenolol, multivitamins, coenzyme Q10 and American ginseng. She didn’t drink alcohol or smoke and reported no parafunctional habits. The patient reported that she had teeth #18-20 extracted due to dental caries and a socket preservation procedure performed on site #20 before implants were placed in the #19 and #20 sites in private practice in 2002 (Figure 1).

The loose and fractured fixed restoration on implants #19 and #20 was removed. The patient was sent for a Cone Beam Computer Tomographic (CBCT) scan. The treatment plan was to remove implants #19 and #20, due to the broken restoration, bone loss, pocketing with bleeding on probing and pain on percussion, and place new implants in sites #18 and #20. The treatment plan was discussed with the patient and the patient agreed to proceed. Medical clearance was first obtained from the patient’s primary care physician.

In November of 2015, surgery was performed to remove implants #19 and #20. The procedure was carried out under local anesthesia (Lidocaine HCl 2% lidocaine with 1:100.000 epinephrine, Henry Schein, USA). After anesthesia was achieved, incisions were made with 15Cblade midcrestal from #18 to #21, and a full-thickness flap was reflected with a periosteal elevator. Implants #19 and #20 were then removed with the use of trephine burs. The sockets were curetted and rinsed with saline. Primary closure was achieved with 4/0 chromic gut (Ethicon, USA) interrupted sutures. Postoperative instructions were given to the patient. The patient was prescribed an antibiotic (amoxicillin 500 mg tid for one week), analgesic (ibuprofen 600 mg every 8h as needed) and mouth rinse (0.12% chlorhexidine
twice daily for 10 days). After 1 week, the patient returned for a follow-up. The sutures had resorbed. The healing process was uneventful, with no infection, inflammation or pain. After 3 months, the patient was sent for a new CBCT scan to treatment plan the placement of new implants in sites #18 and #20.

In April 2016, surgery was performed to place implants #18 and #20. The two sites (#18 and #20) were prepared following the protocol recommended by the manufacturer. Two implants (Nobel Biocare Parallel Conical Connection 4.3x10 mm and 5x8.5 mm) were placed in sites #18 and #20 respectively with a torque of 35 Ncm into the prepared osteotomies and cover screws were placed. A postoperative periapical radiograph was taken – distal to implant #20 there was a radiopacity denser than the patient’s bone which suggests graft material was still in place (Figure 2). The healing process was uneventful.

Six months later, second stage surgery was performed. Cover screws were removed, and healing abutments were placed. The healing process was again uneventful. Six months later, a porcelain fused to metal (PFM) implant supported three-unit bridge (18-20) was delivered (Figure 3).

Two months later, the patient presented to the clinic as an emergency with the chief complaint “I feel soreness in the implant areas”. The patient indicated the soreness was in the “gums” around the implants. Clinically, there was a deficiency of keratinized tissue around the implants. The treatment plan was to perform soft tissue grafts from the palate to the buccal of implants #18 and #20. The three-unit implant supported bridge was removed and healing abutments were placed (Figure 4). After anesthesia was achieved, free gingival grafts were harvested from the left palate (donor site) and hemostasis was achieved with two 4-0 chromic gut figure 8 sutures. The recipient sites were prepared with partial thickness flaps 2 mm from the gingival margin. The free gingival grafts were sutured with 6/0 polypropylene sutures (Ethicon, USA) to the periosteum and 5/0 chromic gut sutures (Ethicon,
USA) to the attached gingiva (coronally) and alveolar mucosa (apically). The healing process was uneventful, with no infection, inflammation or pain.

In January 2018, following soft tissue healing, the abutments were removed, and the PFM 3-unit implanted supported bridge (18-20) was placed back. One month later, the patient presented at the clinic as an emergency with the chief complaint that she felt pain around implant #20. A periapical radiograph was taken (Figure 5), which showed evidence of bone loss. There was also clinical pocket depth of 6-8 mm with bleeding on probing, on the mesial and buccal aspects of implant #20. The treatment plan was to remove implant #20. The 3-unit implant supported bridge was removed and a healing abutment was placed on implant #18. Implant #20 was removed using a reverse torque procedure. A bone sequestrum was also removed with the implant. The area was thoroughly curetted and irrigated with saline. A postoperative periapical radiograph was taken (Figure 6). The bone specimen was sent for histological evaluation (Figure 7). The histological results (Figures 8a-8d) included a sequestrum of graft material showing fragments of acellular bone surrounding bone graft particles (Figure 8a) and fragments of vital bone surrounding bone graft particles (Figure 8b) exhibiting fibrous connective tissue encapsulation (Figure 8c). There was also an associated dense inflammatory infiltrate of lymphocytes, plasma cells and neutrophils (Figure 8d).

In May 2018, the patient was sent for another CBCT scan. Surgery was performed to place implant #20 using a surgical guide fabricated from an ideal wax-up. The site was again curetted, and decortication of the bone was performed to elicit bleeding of the healed bone. Implant site #20 was then prepared following the protocol recommended by the manufacturer. An implant (Straumann Bone Level Straight 4.1x8 mm) was placed with 35 Ncm of torque in the osteotomy approximately 1.5 mm lingual to the previous one and a cover screw placed. An autogenous bone graft was harvested with bone scraper from the posterior left mandible and placed around the implant into the defect. The healing process was again uneventful.
Six months later, second stage surgery on the implant #20 was performed to place the healing abutment. A postoperative periapical radiograph was taken (Figure 9). The healing process was again uneventful (Figure 10).

Five months later, a new PFM 3-unit implant supported bridge (18-20) was delivered with a posterior crossbite occlusion (as the patient previously had). The occlusion was checked and adjusted. A night guard was also delivered and adjusted. The patient was told to use the occlusal guard and insert it every night before she went to sleep. The patient returned every 3 months for maintenance, monitoring, and oral hygiene reinforcement for 1 year. The patient reported being “very comfortable” with the restoration. Clinical and radiographic evaluation 1-year post restoration revealed the implant supported restoration functioning well with stable levels of marginal bone (Figures 11-13).

DISCUSSION

According to the criteria of Albrektsson et al. 1986, in the present case, a diagnosis of late implant failure of implants #19 and #20 was made and it was decided to remove them after 13 years in function, due to the broken restoration, pockets depths of 6-8 mm around the implants, bleeding on probing, radiographic bone loss and pain on percussion. The implants, however, had no mobility. There were several possible causes for the failure of these two implants. However, the presence of the broken restoration suggested that the most probable cause was occlusal overload complicated by a bruxing habit as diagnosed by the wear of the porcelain material of crowns on her other teeth. (8, 9, 10, 11)

In the case report presented, following the second implant failure it was decided to slightly change the position of the implant site (according to the CT scans and surgical guide) to gain better initial stability, change the implant system, and use an autogenous bone graft for bone augmentation at the time of placement in order to try to decrease the risk of a third implant failure. Adjustment of the final
restoration and delivery of a night guard were also performed to avoid implant overload. Therefore, changes were made in the placement protocol and implant success ultimately achieved. Thorough evaluation of the etiology of a failed implant and changes in the placement protocol in this case resulted in a successful placement and restoration. (12) Long-term data with more cases are needed to verify the protocol used and results obtained in this case.

CONCLUSIONS

When implant failure occurs on a replacement implant evaluation of the etiology as well as changes in the implant site and protocol were made to avoid a third failure. In this case these changes resulted in a successful outcome. Nevertheless, more research is needed to validate the results of the present case report.

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The authors declare no conflicts of interest.

REFERENCES


FIGURES LEGENDS
Figure 1 – Preoperative periapical radiograph of restored #19 and #20 (note radiopaque area of graft on the distal of implant #20) after the broken restoration was removed.

Figure 2 – Postoperative periapical radiograph after implants placement (#18 and #20) on the lower left posterior mandible.

Figure 3 – Periapical radiograph after delivery of 1st final implant supported prosthesis on the lower left posterior mandible.

Figure 4 – Periapical radiograph after removal of the implant prosthesis and replaced of healing abutments.

Figure 5 - Periapical radiograph of failing implant #20.

Figure 6 - Periapical radiograph after removal of implant #20.

Figure 7 – Specimen sent to biopsy.

Figure 8 – Histological slides of the specimen sent to biopsy (8a – 100x, 8b, 8c and 8d – 200x): BGP – Bone Graft Particles, AB – Acellular Bone, VB – Vital Bone, FCT – Fibrous Connective Tissue, II – Inflammatory Infiltrate.

Figure 9 – Periapical radiograph after second stage surgery of implant #20.

Figure 10 – Intraoral picture of occlusal view after second stage surgery on implant #20.

Figure 11 – Periapical radiograph after delivery of 2nd final implant supported prosthesis on the lower left posterior mandible.

Figure 12 – Intraoral picture of occlusal view of the final implant supported prosthesis on the lower left posterior mandible.

Figure 13 - Intraoral picture of lateral view of the final implant supported prosthesis on the lower left posterior mandible.