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Clinical Report

A Safe Haven After Failed Implant-Supported Fixed Partial Dentures: Hybrid Prostheses - A Clinical Report

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A Safe Haven After Failed Implant-Supported Fixed Partial Dentures: Hybrid Prostheses - A Clinical Report

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Abstract

Despite the over 90%10-year survival rate of the dental implants, clinicians frequently encounter challenging cases with failed implant therapy. The vast majority of these cases are associated with poor treatment planning, and poor administration of the chosen treatment. In this case report, treatment procedures of a patient with the complaints of severe pain and nasal discharge which diagnosed to relate with the unsuccessful implant treatment was presented. The endoscopic examination revealed a fistula formation at the base of the nasal cavity generated from the implants placed in the premaxilla. The restorations were removed, the implants were explanted, and the surgical site was grafted. 6 months after the procedure, 6 implants were placed, and the patient was treated with a metal-porcelain hybrid prosthesis following the osseointegration phase.

Keywords: Dental Implant, Implant Supported Fixed Partial Denture, Failure, Esthetic Complications, Collapsed Lip Support, Implant Supported Hybrid Prosthesis

Introduction

Edentulism is a challenge that the search for its rehabilitation methods and materials has been ongoing since ancient times. The term "osseointegration", used by Branemark[1] to describe the histological evidence of successful results of implants placed in the bone, has opened a new era in contemporary dental practice.

Along with the definition of osseointegration, it was proposed in the late 1970s to use implants made of pure titanium (99.7%). Due to the titanium dioxide (TiO2) covering the surface, titanium has become superior as an implant material.[2,3] Branemark[1] has observed that with implant design and a strict implantation protocol, the TiO2 layer can provide direct bone-implant contact.

The term osseointegrated dental implant describes the biological and mechanical attachment of the implant to the bone under normal clinical function. Immediately after implantation, reactions of bone and inflammatory cells take place at the bone-implant interface. This physiological process is followed by the bone regeneration process around the implant, regulated by various biological factors.[4,5]

Although it has been reported that the 10-year survival rate of implants is over 90%[6], clinicians frequently encounter challenging cases involving failed implants. Many of these failures are associated with poor planning, and poor implementation of the treatment plan.

Case

A 36-year-old Caucasian female patient referred to the clinic with complaints of severe pain at the base of the nose for 2 weeks and discharge from the nasal cavity. From the patient's history, it was learned that she underwent a full mouth fixed prosthodontic rehabilitation 6 months ago. The patient reported that her upper lip had lost its volume despite the prosthetic treatment, she could not fulfill her chewing functions and that she started to feel pain, especially in the premaxillary region.

Intraoral examination of the patient revealed that; teeth 6,17,24,25,26 and 27 were present, and 5 endosseous implants had been placed in the regions 11,12,15,21 and 22 (Figure 1). Periodontal and periimplant tissues show severe inflammatory symptoms.

Figure 1. Radiographic image of the initial stage.

In the radiographic examinations the implants in the 11, 12, 21, and 22 regions were in contact with the nasal cavity and the nasal mucosa seemed elevated. The endonasal endoscopic examination of the nasal cavity revealed that a fistula was formed at the level of implants 11, 21, and 22 and pus drainage was observed under finger pressure on the nasal cavity mucosa. In the extraoral examination, the philtrum was indistinct, the nasolabial angle increased, and the upper lip lost its support.

It was decided to explant the 5 failed osseointegrated implants with periimplantitis, to fill the cavities to be formed with allograft, and to restore the adherent gingival defects that may occur after the operation with a soft tissue graft. One hour before the surgical operation, 1x2 g amoxicillin-clavulanic acid combination and 500 mg Ornidazonal (1x2gr) were given orally. Local infiltrative anesthesia (5 ml. Ultracaine DS Forte) was applied to the premaxilla region. The natural tooth and implant-supported metal-fused-to porcelain fixed partial denture (FPD) was removed with a crown/bridge remover. It was observed that all 5 implants remained within the removed FPD. Following the curettage, collagen membrane (Bio-Gide, 25x25 mm) was placed in the cavities of the implants, which was in contact with the nasal mucosa. Then the cavities were filled with morphogenic allograft and autogenous graft particles. The keratinized gingival epithelium in the palatal region of the explanted implants was mobilized toward the

buccal region with a horizontal incision. It was sutured to the buccal mucosa with 4.0 monofilament nylon. One week later, the sutures were removed. After 3 months, the remaining teeth were extracted, and an immediate complete denture was made.

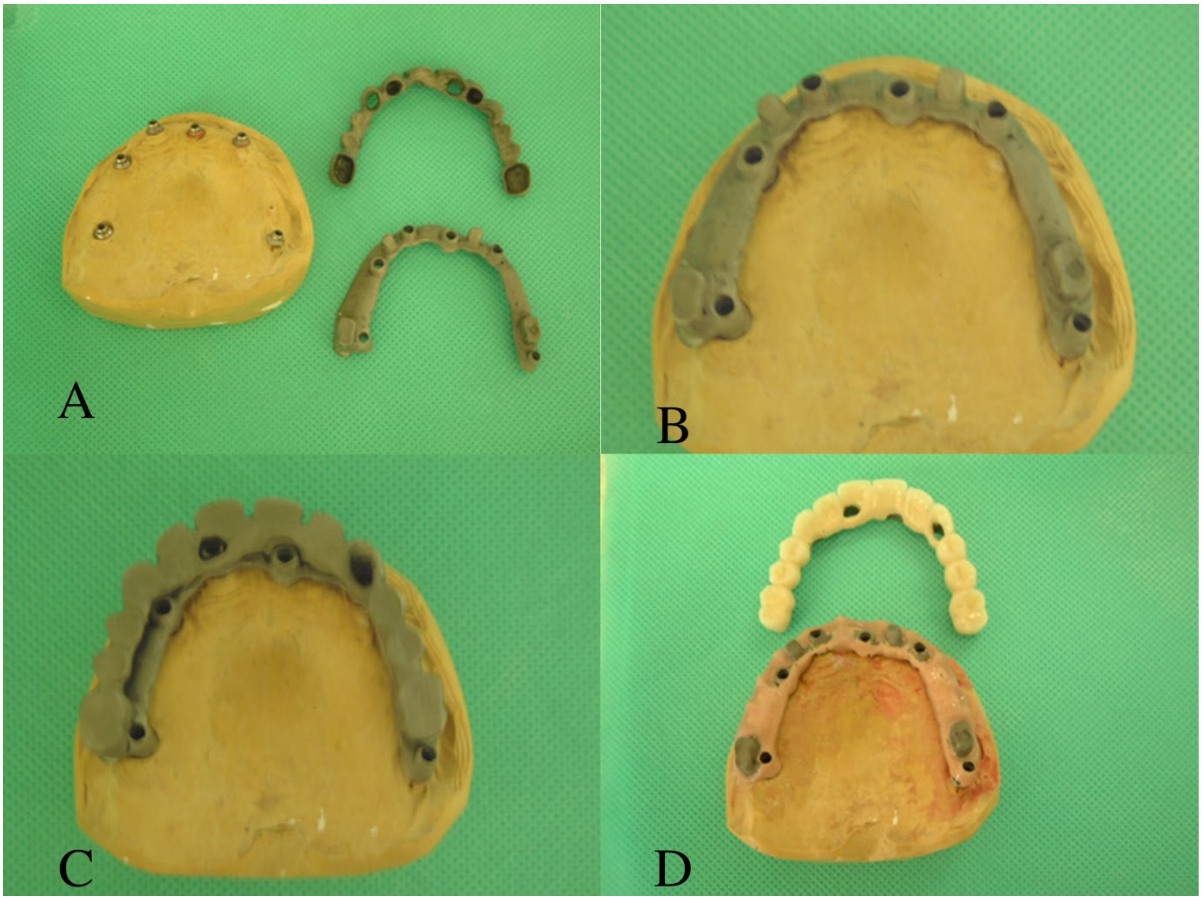
At the end of the post-op 6-month, new bone formation in the bone cavities and the development of attached gingiva were observed. Impressions were made and diagnostic models were obtained. With the help of a facebow, the mandibular and maxillary relations were transferred to the semi-adjustable articulator. Due to the amount of the lost vertical dimension, it was planned to treat the patient with a hybrid prosthesis supported by 6 implants.

After radiographic and clinical evaluations, 6 implants with the dimensions of 4.1x 8.0 mm, 4.8x12 mm, and 4.8x8 mm were placed in the positions of 11-21, 13-23, and 18-27, respectively. After 4-months the ISQ values obtained with the RFA technique were found to be between 58 and 75 (Figure 2).

Figure 2. The OPG image of the six dental implants.

Following the multiunit abutment selection, impressions were made using the open-tray impression technique. Implant working models were obtained and Cr-Co substructure was cast. In the try-in session, passive fit of the metal substructure was checked with the one-screw technique and panoramic radiographic evaluation (Figure 3).

Figure 3. Hybrid prosthesis laboratory stages. **A:** Master casts and substructure, **B:** Screwed substructure, **C:** Metal superstructure, **D:** Porcelain superstructure



Whereas the substructure was veneered with pink porcelain to simulate gingiva, the superstructure was veneered with the selected porcelain shade. During the porcelain try-in, occlusal relations, the smile-line, and lip support were evaluated and the necessary adjustments were made. Following the patient consent on the aesthetic appearance and glazing procedure, the substructure was screwed in place, then the access holes were isolated and the superstructure was cemented (Figure 4).

Figure 4. End of the treatment, frontal (**A**), lateral (**B**) and palatal (**C**) intraoral view of hybrid prosthesis on 6 implants.

The profile face view of the patient at the beginning and end of the treatment is given in Figure 5.

Figure 5. Sagittal view of the patient at the beginning of the treatment (**A**) and at the end of the treatment (**B**).

Discussion

In today's dentistry, the use of osseointegrated implants for prosthetic rehabilitation of edentulism is a highly successful treatment method. However, the restoration of the missing teeth in the maxillary anterior region with implants is a challenging task due to high aesthetic necessities, and biological limitations.[7,8] Implant placement in the premaxillary region may cause complications including bleeding, swelling, pain, hematoma, cross-contamination, implant displacement, rhinitis, and sinusitis due to the elevation of the nasal floor.[9] Bone grafting procedures are commonly performed in the management of patients to be treated with dental implants during implant surgery.[10,11]

Performing dental implant surgery in patients with active infection is one of the substantial issues which present a threat to the success of the treatment. Traditionally, implant surgery to be performed in the infected extraction socket is postponed until healthy bone tissue is formed. Current studies indicate that immediate implant placement in infected areas is a risk factor.[12] Appropriate protocols should be followed to debride and disinfect inflammatory cells in areas at risk, or implant surgery should be postponed until full recovery is achieved to ensure the success.[13]

In this case, post-operative infection developed due to dental implant surgery, and the patient presented to the clinic with the complaint of pain. Because of the unsuccessful osseointegration and the infection at the base of the nasal cavity, the implants were explanted. Following the removal of the implants,

The status of the anterior maxillary alveolar crest affects the location of the dental implant, the position of the lip, and the free gingival margin.[14] Misch[15] reported that the distance between the arches, the relationship between the jaws, and anatomical factors should be considered in the selection of the prosthesis indicated. It was also stated that rehabilitation should be performed with implant-supported hybrid prostheses or overdentures in cases where adequate lip support and an aesthetic smile-line cannot be provided.[16]

In this case, considering parameters such as the condition of the alveolar ridges, the relationship between the jaws, periodontal tissues, amount of vertical dimension loss, smile-line, and lip support, it was thought to be impossible to restore the hard and soft tissue loss with an FP-1, or FP-2 implant-supported fixed partial prosthesis. For this reason, rehabilitation was carried out by making an implant-supported hybrid prosthesis and the patient's insufficient lip support complaint was resolved.

The majority of the failures after implant surgery are associated with poor planning, inappropriate case selection, and poor implementation of the treatment plan. Additional radiographic examinations with computerized tomography and a multidisciplinary approach should be performed if necessary, during the planning phase to minimize failure.

With implant-supported hybrid prostheses, aesthetic results can be obtained in cases with excessive tissue loss.

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