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Case Report

Unilateral Hybrid Prosthesis for the Rehabilitation of Extensively Resorbed Maxillary Partial Alveolar Ridge: Case Report

Parsiyel Aşırı Rezorbe Krete Sahip Hastanın Tek Taraflı Hibrit Protez ile Tedavisi: Olgu Sunumu

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ABSTRACT

The rehabilitation of an edentulous patient is getting complicated if the edentulous ridge is large and excessively defective. This clinical report describes the restoration of a severely resorbed maxilla of a 49-year-old male patient with a hybrid denture. The intermaxillary vertical occlusal distance was increased due to the resorption of the alveolar ridge and tuber maxilla. An acrylic resin-based implant retained hybrid denture was fabricated to compensate for the increased vertical distance and decrease the weight of the prosthesis. After a follow-up period of 5 years, it was noticed that the patient was satisfied with the functional and esthetic functions of the denture.

Keywords: Alveolar Bone Lose; Defect; Metal Sintering

ÖZET

Dişsiz kret fazla büyük ve aşırı derecede rezorbe ise dişsiz bir hastanın tedavisi oldukça karmaşık bir hal almaktadır. Bu vaka raporunda, aşırı rezorbe maksillaya sahip olan 49 yaşındaki erkek hastanın hibrit protezle tedavisi anlatılmaktadır. İntermaksiller vertikal oklüzal mesafe, alveoler sırt ve tuber maxillanın rezorpsiyonu nedeniyle önemli ölçüde artmıştır. Artan dikey mesafeyi telafi etmek ve protezin ağırlığını azaltmak için akrilik rezin bazlı implant tutuculu hibrit protez planlanmıştır. 5 yıllık bir takip süresinden sonra hastanın protezin fonksiyonel ve estetik fonksiyonlarından memnun olduğu görülmüştür.

Anahtar Kelimeler: Alveoler Kemik Kaybı; Defekt; Metal Sinterleme

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INTRODUCTION

Implant-supported prostheses are an effective solution for complete or partial edentulism.[1,2] There are three treatment options available for edentulous patients: implant-supported fixed partial dentures, implant-supported removable partial dentures (overdentures), and implant-supported hybrid prosthesis.[2] The intermaxillary distance (over 15 mm) is the deciding factor in determining the most suitable prosthesis.[3,4,5] Hybrid prostheses are fixed removable prostheses that utilize several osseointegrated implants and resemble a flangeless denture.[3,6,7] This type of prosthesis has three categories: acrylic resin with a metal framework, monolithic zirconia screw-retained full-arch prosthesis, and porcelain fused to metal hybrid prosthesis.[8,9] All types of hybrid prostheses are screwed onto implants. The choice of method and material is influenced by several factors such as the patient's vertical dimension, aesthetic expectations, implant numbers, and positions.[9]

Patients prefer to use fixed prostheses. However, the low volume of bone is a problem for ideal treatment. Many patients have to undergo bone augmentation surgeries before implantation due to inadequate bone support.[2,5] Hybrid prosthesis is recommended for patients who are suffering from severe alveolar ridge resorption and soft tissue defects and want to have a fixed denture.[2]

Framework design is an important factor for implant-supported hybrid prostheses. When fabricating frameworks for hybrid prosthesis; the region and size of the defect, bulk for strength, adequate access for oral hygiene procedures, and strategic thinning of implant frameworks to allow for retention of acrylic resin denture teeth and bases must be considered.[3,10] Different framework fabrication techniques can be used. Computer-aided design/computer-aided manufacturing (CAD/CAM) technologies provide better prosthetic frameworks and eliminate the disadvantages of casting techniques.[3,10] With CAD/CAM, milled titanium bar-shaped frameworks can be designed to splint implants together.

Implant-supported unilateral hybrid prostheses are frequently used in the treatment of partial jaw defects. In this case report a right maxillary posterior alveolar ridge defect restored with an implant- supported, screw-retained unilateral hybrid prosthesis fabricated via CAD/CAM technology was presented.

CASE REPORT

A 49-year-old male patient was referred with the complaint of missing teeth. The clinical examination revealed that teeth 14, 15, 16, and 17 were extracted and two implants (Bego Semados, Bego Implant Systems GmbH § C. KG, Bremen, Germany) were placed in the 14 and 17 teeth region. The alveolar ridge and tuber maxilla were severely resorbed and because of this resorption, the inter-arc distance was considerably increased.

The dental history revealed a long process of surgical treatment, including three major surgeries performed at the right posterior maxilla. The patient reported that he lost the two implants placed in the same region respectively and a third one (Bego Semados, Bego Implant Systems GmbH C. KG, Bremen, Germany) was placed at the 17th tooth region after two sinus-lifting operations.

Before starting the treatment procedure and an informed consent form was obtained. Due to the amount of alveolar bone loss, it was considered that a cemented fixed partial denture would not be suitable, and a partial hybrid denture was opted to compensate for the hard and soft tissue losses and fulfill the esthetic and functional expectations of the patient. An acrylic resin-based hybrid denture was selected for the treatment to decrease the weight of the prosthesis.

At the prosthetic phase, implant-level impressions were made by using a close tray technique with a stock tray and condensation silicone impression material (SwissTEC, Coltene Whaledent, Switzerland). Intermaxillary vertical and horizontal relations were recorded with occlusal rims and a face-bow (Artex Facebow, Amann Girrbach, Koblach Austria). Maxillary and mandibular master casts were mounted in a semi-adjustable articulator (Artex CT, Amann Girrbach, Koblach, Austria). The proper multi-unit abutments (Bego Implant Systems GmbH § C. KG, Bremen) were attached in the master cast. The master casts and the abutments were scanned with an extra-oral laser scanner by using a CAD tool (DWOS, Dental Wings, Montreal, QC). The framework was designed (DWOS software; Dental Wings Inc, 2018) and manufactured using Ti powder (Cl41TiEli; GE

Additive Co) with a metal sintering machine (M2 Cusing; Concept Laser GmbH) and checked on the cast and in the mouth to confirm the acceptable passive fit over the abutments. The tissue surface was highly polished for optimal oral hygiene. The tooth setup of the hybrid prosthesis was performed over the framework with artificial denture teeth (SR Phonares II Typ, Ivoclar Vivadent, Fürstentum, Liechtenstein) and tried in clinically. After the final occlusal arrangement of artificial denture teeth was done in the mouth, the screw-retained hybrid prosthesis was sent to the laboratory to set a heat-polymerized PMMA (ProBase Hot, Ivoclar Vivadent, Fürstentum, Liechtenstein).

During the delivery of the hybrid prosthesis to the patient, it was shaped to have slight contact with the mucosa and finished and polished. The prosthesis was seated onto the implants, screwed, and torqued according to the manufacturer's recommendations. The accuracy of the occlusion was checked (Figure 1). The screw-access holes of the hybrid prosthesis were filled with composite resin (Kerr, Italy). The patient was instructed on oral hygiene procedures.

DISCUSSION

I Implant complications can be caused by various factors, such as inadequate implant dimensions, deficient bone quality, peri-implantitis, parafunctional habits, and prosthetic design errors.[5,11] When designing the prostheses, the amount of alveolar ridge resorption, implant locations, increased intermaxillary occlusal distance and optimal occlusal load distribution should be considered.[5] For atrophic jaws, hybrid prostheses are preferred if esthetic and phonetic requirements cannot be met with an implant-supported fixed bridge.[12]

Hybrid prostheses require multiple implants and complex laboratory and clinical procedures.[5] Metal frameworks of hybrid prostheses can be fabricated with both lost wax or CAD/CAM techniques.[3,15,14] Eliasson *et al*.[13] and Almasri *et al*.[14] reported that metal frameworks fabricated with CAD/CAM techniques offer improved passivity of fit than those fabricated from the casting technique. Passive fit is a prerequisite for implant survival and if not achieved it leads to mechanical and biological failures.[2,4,5,15] In the present case it was decided to fabricate a bar-shaped titanium metal framework with CAD/CAM technique to have a passive fit, to eliminate the dimensional changes, and to decrease the weight of the metal due to the specific gravity of titanium. The intermaxillary distance was 19 mm high and soft tissue form can not be provided with a cement-retained prosthesis.

Graft treatments are usually applied to excessively resorbed jaws before implant.[4,5,8] However, acute, or chronic infections may frequently cause implant losses.[4] With unsuccessful treatments and unexpected complications, the destruction in the jawbone increases, and the defects become larger. If the bone volume on the defect area is sufficient for implant placement, unilateral hybrid prostheses should be considered as a treatment option. The present case also had a history of previously failed implants due to surgical interventions. Clinical observations revealed that there was massive bone destruction on the right maxillary posterior alveolar ridge. Therefore an unilaterally acrylic resin-based screw-retained implant-supported hybrid denture was designed in this patient to replace soft tissue defects and reduce the weight of the denture.

At the end of the treatment, functional, phonetic, and esthetic deficiencies were fully compensated. The treatment outcomes for the present case are

Figure 1. (A) Intraoral locations of implants. (B, C) Intraoral view of hybrid prosthesis

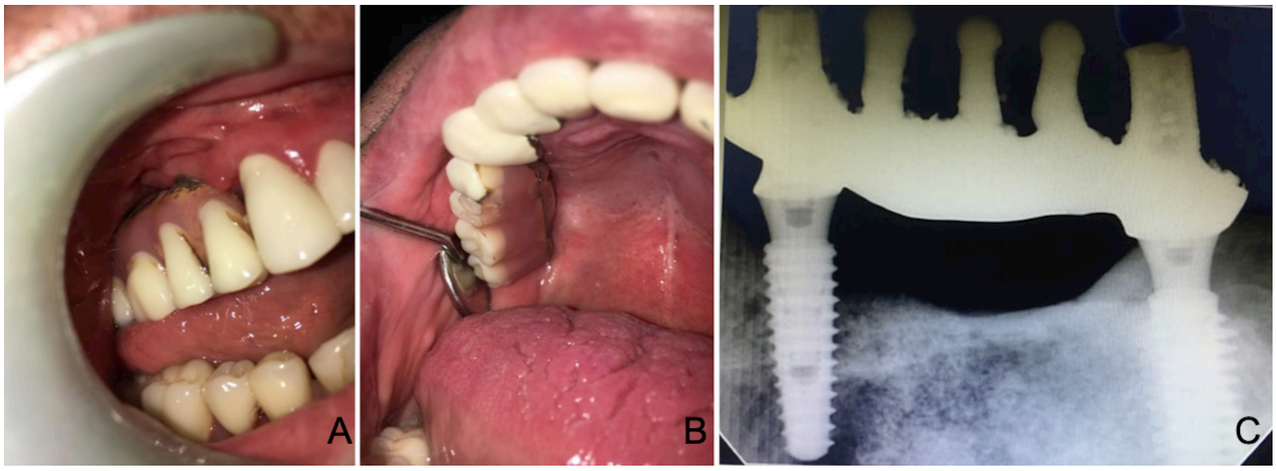

Figure 2. A and B intraoral view of the hybrid prosthesis at 5-year follow-up. C periapical radiographs at 5-year-follow-up

in agreement with the result of similar studies.[3,11] After 5-year follow-up period, no biological or other complications related to the use of prosthesis were encountered clinically and radiographically (Figure 2). Patient satisfaction was extremely high. It can be concluded that hybrid prostheses can be useful treatment alternatives for patients with excessive alveolar defects.

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