



**THE RESTORATION OF MANDIBULAR POSTERIOR EDENTULOUSNESS
WITH LIMITED INTEROCCLUSAL SPACE WITH SCREW-RETAINED
CUSTOM MADE ABUTMENTS: TWO CASE REPORTS[‡]**

**SINIRLI İTEROKLÜZAL MESAFEYE SAHİP MANDİBULAR POSTERİOR
DİŞSİZLİĞİN VİDA TUTUCULU KİŞİSEL ABUTMENT İLE RESTORASYONU:
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ABSTRACT

The present two case reports aim to describe the prosthetic treatment of two different partial edentulous cases having limited interocclusal space with use of screw-retained custom made abutments.

A 35-year old female patient whose implants inserted in another clinic was referred to our clinic for the prosthodontic treatment. The clinical and radiographic examination of the patient demonstrated that there were two osseointegrated implants in the left mandibular posterior region. Due to the limited interocclusal space for a cement-retained implant supported fixed partial denture, it was fabricated a screw-retained custom made abutment for each implant. At the second case 67-year-old male patient was treated with screw-retained custom made abutments for the same reason.

At the end of the treatment, the functional and aesthetic deficiencies of the patients were fully compensated.

Nine months follow-up showed no problem in restorations and implants.

Keywords: Implant-Supported Dental Prosthesis, Implant Abutment, Fixed Dental Prosthesis Retention

Öz

Burada sunulan iki vaka raporunun amacı; sınırlı interoklüzal boyuta sahip iki farklı parsiyel dişsizliğin vida tutuculu kişisel abutment ile protetik tedavisinin tanımlanmasıdır. İmplantları başka bir klinikte yerleştirilen 35 yaşında bayan hasta, protetik tedavi için kliniğimize yönlendirilmiştir. Klinik ve radyografik muayenede sol mandibular posterior bölgede iki adet osseointegre implant tespit edildi. Siman tutuculu implant destekli sabit bölümlü protez yapımı için yeterli interoklüzal mesafe olmadığından her bir implant için vida tutuculu kişisel abutment üretildi. İkinci vakada da 67 yaşında erkek hastaya aynı sebeple vida tutuculu kişisel abutmentler yapıldı.

Tedavi sonunda hastaların estetik ve fonksiyonel eksiklikleri tamamen giderildi.

Dokuz ay sonra yapılan kontrollerde restorasyonlarda ve implantlarda problem görülmedi.

Anahtar Kelimeler: İmplant-destekli diş protezi, İmplant desteği, Sabit protez retansiyonu

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INTRODUCTION

Restoration for the partial edentulism with an Implant Supported Fixed Partial Denture (ISFPD) has become a valid alternative to conventional prosthodontic treatment¹. 3-dimensional oral space resulting from the extraction of the tooth in the mouth is defined as dental restorative space². This space is bounded by the occlusal plane, edentulous jaw, facial tissues (cheeks and lips), and the tongue². Two parameters of dental restorative space (a horizontal interdental space and a vertical interocclusal space) must be examined carefully before fabrication of ISFPD^{2,3}.

Reduced interocclusal or interarch spaces are often encountered in patients who lost their teeth and did not have any rehabilitation and this situation is a challenge for clinicians⁴. Attempts to fabricate an ISFPD with inadequate dental restorative space may result in physiologically inappropriate contours, structurally weak prostheses, esthetic compromise, and/or suboptimal retention and stability of the treated result⁵. The interocclusal space for the ISFPD is measured from the platform of the implant to the opposing occlusion⁶. This space is necessary to create room for implant components, metal framework, and the ceramic material⁶. According to the Misch⁷ this space should be at least 8-12 mm vertically. Philips and Wong⁸ are suggested that this space should be 12-15 mm.

Traditionally, ISFPDs can be attached to implants with screws or can be cemented to abutments, which are secured to implants with screws⁹. Cement-retained restorations are frequently preferred because of their advantages such as being suitable for passive fit, being aesthetic and low-cost, easiness of repair of the denture they carry and similarity of their laboratory procedures with conventional fixed partial denture¹⁰.

Screw-retained restorations have some disadvantages; such as lack of passivity, complex laboratory procedures and higher cost^{11,12}. On the other hand, screw-retained restorations offer several advantages, including retrievability, ease of maintenance, not containing the risk of cement residue in gingival pocket, and have a decreased interocclusal space requirement^{11,13}. In screw-retained restorations, abutment height and surface area required for retention are not important as cement

retained restorations¹¹.

There is a need for a certain interocclusal space in using of prefabricated screw-retained abutments, despite the known advantages¹⁴. The prefabricated screw-retained abutments can be secured to implants with as little as 4 mm of space from the surface of the implant to the opposing occlusion¹⁴. If the interocclusal space is less than 4 mm in the cases, the custom-made screw-retained abutment may be an alternative treatment method.

There are four different fabrication techniques for the custom-made abutments; (1) "add-to" abutments, premachined abutments to which gold or porcelain is added, (2) "preparable" abutments, referring to the preparation of abutments that have been manufactured in a bulk material, such as porcelain or titanium, (3) computer-assisted design and computer-assisted manufacturing (CAD-CAM) abutments, using a computer program to custom mill an abutment, and (4) copy milling, using a scanner and computer assisted manufacturing¹. One of the most commonly using method for the fabrication of the custom-made abutments is CAD/CAM technique¹⁵. In addition to use in the limited interocclusal space, the custom-made abutments have several advantages such as providing a natural emergence profile, desired soft tissue contours and proper angulation¹⁶. The excellent aesthetics can be achieved with the use of ceramic custom-made abutments in the anterior region. Zirconium is the most preferred material for the fabrication of the ceramic custom-made abutments. The principal disadvantage of the ceramic custom-made abutments compared to metal custom-made abutments is fragility of the ceramic¹⁷. To overcome the fragile properties of zirconium at the implant-abutment interface, the 2-piece hybrid titanium-zirconium abutment was developed with a titanium base attached to a zirconium abutment¹⁸.

The aim of this article was present to restore two partial edentulous posterior mandibles with limited interocclusal space using screw-retained custom made abutments.

CASE REPORTS

CASE 1

A 35-year old female patient whose implants inserted in another clinic was referred to our clinic for



the prosthodontic treatment. The clinical and radiographic examination of the patient demonstrated that there were two osseointegrated implants (IDI - Implants Diffusion International, Montreuil, France) in the left mandibular posterior region and limited interocclusal space for a cement-retained ISFPD (Fig 1a). The patient's medical history presented no contraindications to dental treatment. Due to the limited interocclusal space for a cement-retained ISFPD, it was decided to fabricate a screw-retained custom made abutment for each implant.

The definitive impressions were made with condensation silicone impression material (Optosil Comfort Putty and Xantopren L blue, Heraeus Kulzer GmbH, Germany) using standard the closed tray technique. The master casts were obtained that incorporated a soft tissue gingival mask (Gingitech, Ivoclar Vivadent, Schaan, Liechtenstein) with a Type IV dental stone (Fuji rock, GC, Leuven, Belgium). Occlusal vertical dimension and intermaxillary relationship record was made using occlusion rims. The master casts were mounted on an articulator (Hanau Wide Vue II, Buffalo, NY) using this occlusion rim.

The screw-retained custom made abutments were fabricated individually and modifications were made to the anatomic contours with CAD/CAM milling system (Avamill Chrome, MayDental, İzmir, Turkey) using Co-Cr block (Magnum Ceramic Co, MESA, Travagliato, Italy). The screw-retained custom made abutments were tried intraorally (Fig. 1b-c). After try-in, screw-retained custom made abutments send to the laboratory for ceramic application (Fig. 1d). Once the definitive restoration was returned, evaluate it intraorally for esthetics and occlusion. The seat of the abutments was confirmed with periapical radiograph.

At delivery, abutment screws were tightened with controlled torque (30 N/cm, respectively) and the screw holes were filled with a composite resin (3M Z100 Restorative Dental Composite; 3M Dental Products, St Paul, MN, USA). (Fig. 1e-f). Oral hygiene instructions were provided to the patient. After the delivery of the prosthesis the patient was clinically and radiographically examined at 3rd, 6th and 9th months. The nine months follow-up period of the patient did not reveal any vehement complication.



Fig 1. a: Preoperative clinical view of the Case 1, b-c: The screw-retained custom made abutments intraorally, d: The ceramic applied screw-retained custom made abutments, e-f: Clinical view of the final restoration Case 1

CASE 2

A 67-year old male patient whose implants inserted in another clinic was referred to our clinic for the prosthodontic treatment. The clinical and radiographically examination of the patient revealed that there were 3 osseointegrated implants (Medical Instinct Germany GmbH, Bovenden, Germany) in the left posterior part of the edentulous mandibula (Fig. 2a). The patient's medical history presented no contraindications to dental treatment.

The diagnostic cast analysis demonstrated limited interocclusal space for a cement-retained ISFPD, thus it was decided to fabricate a screw-retained custom made abutment for each implant.

The impressions were obtained and the screw-retained custom made abutments were fabricated by the method described in the Case 1 (Fig. 2b-c) and tried intraorally. After try-in, porcelain was applied on the custom-made screw-retained abutments in the laboratory (Fig. 2d). Once the definitive restoration was returned, evaluate it intraorally for esthetics and occlusion. The seat of the abutments was confirmed with periapical radiograph. The restoration was delivered as described in Case 1 (Fig. 2e-f). The patient was clinically and radiographically examined at 3rd, 6th and 9th months. The restoration has been in place for 9 months without complications.



Fig 2. a: Preoperative clinical view of the Case 2, b-c: The screw-retained custom made abutments, d: The ceramic applied screw-retained custom made abutments, e-f: Clinical view of the final restoration Case 2

DISCUSSION

Limited interocclusal space is often encountered in patients who lost their teeth and did not have any rehabilitation^{4,19}. The use of prefabricated screw-retained abutment requires additional interocclusal space to accommodate both abutment screws and the metal framework of the ceramic crown²⁰⁻²². The adequate retention was obtained with screw-retained custom made abutments in the technique presented in this article due to the use of intermediate abutment was eliminated. Similarly, the passive fit was obtained, as the use of the intermediate abutment was eliminated.

Another one of the most important disadvantages of screw-retained restorations is the decrease of fracture resistance of ceramic due to impairment of structural integrity of the restoration, caused by screw hole¹². Lowness of fracture resistance of ceramic, and unaesthetic appearance caused by screw hole can be considered as disadvantage of the technique presented in this case report. However, in both restorations, there are not any ceramic fractures observed in clinical controls.

The screw-retained custom made abutments described in this article may be a valid treatment choice in the rehabilitation of partial edentulous mandible with limited interocclusal space.

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