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Rehabilitation of Mandibular Edentulous Arch with an Implant-Supported Prosthesis: A Case Report

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ABSTRACT

This case report describes the effectiveness of dental implants for rehabilitating fully edentulous mandibular arch of a patient using an implant-supported prosthesis. Thorough clinical and radiographic assessments were conducted, followed by planned implant placement and fabrication of a screw-retained prosthesis. The definitive prosthesis provided greater retention, stability, normal speech, masticatory efficiency, and improved aesthetics compared to conventional complete dentures.

Implant-supported fixed restorations, particularly those supported by six implants, offer a reliable and economical solution for the timely rehabilitation of edentulous patients, frequently avoiding the necessity for bone grafting. Subsequent evaluation confirmed effective osseointegration, satisfactory prosthetic function, and elevated patient satisfaction.

INTRODUCTION

Implant-supported prostheses are reliable treatment modalities for the replacement of a single missing tooth as well as for comprehensive full-mouth rehabilitation. In completely edentulous patients, the prosthesis can be fabricated as either removable or fixed, based on the number of implants placed.[1,2]

Mandibular All-on-6, involves the placement of six strategically positioned implants to support a fixed full-arch prosthesis, providing enhanced stability and reduced cantilever compared to All-on-4 particularly in patients with high occlusal forces or atrophic ridges. Secondary stability, is achieved over the first two

weeks as bone remodels around the implant surface, either through new bone formation or the remodeling of existing bone within the implant's thread chambers, contingent on the degree of contact between the implant body and bone tissue. [1,2,3]

This case report outlines the surgical placement of multiple implants in a completely edentulous mandible, followed by comprehensive mandibular rehabilitation with a screw-retained prosthesis.

CASE DESCRIPTION

A 58-year-old male patient presented with complaints of impaired mastication, unclear speech, and poor retention of her existing mandibular complete denture. The patient is edentulous in the mandibular arch and was dissatisfied with the instability and limited functional efficiency associated with the removable prosthesis. Her medical history was non-contributory, and no systemic contraindications for implant therapy were identified.

Clinical examination demonstrated a completely edentulous mandibular arch with moderate residual ridge resorption and inadequate denture stability. Radiographic assessment using panoramic radiography and cone-beam computed tomography (CBCT) revealed adequate bone height and width in the interforaminal region to facilitate implant placement. Based on the clinical and radiographic evaluation, treatment with implant-supported fixed prosthesis was planned to enhance retention, stability, masticatory function, and overall patient comfort.

Following preliminary diagnostic procedures and comprehensive treatment planning, six endosseous implants were surgically placed in the mandibular arch under local anesthesia using a conventional flap approach under strict aseptic conditions **(Figure 3)** The implants were strategically distributed within the interforaminal and posterior regions to achieve optimal anteroposterior spread and satisfactory primary stability. Cover screws were secured, and the surgical site was sutured appropriately **(Figure 5)**. Postoperative medications and instructions were provided, and healing progressed uneventfully.

After a healing period of approximately three to four months to allow for osseointegration, second-stage surgery was performed, and healing abutments were connected **(Figure 6)**. Definitive impressions were subsequently made using an open-tray impression technique. Maxillomandibular jaw relations were recorded, and a trial prosthesis was assessed for aesthetics, phonetics, and occlusal harmony.

A definitive screw-retained implant-supported hybrid prosthesis was then fabricated and delivered. Occlusal refinements were carried out to establish a mutually protected occlusal scheme with balanced force distribution. The patient was instructed regarding maintenance of oral hygiene and the importance of regular follow-up visits.

During subsequent follow-up evaluations, the peri-implant soft tissues appeared healthy, with no signs of inflammation, implant mobility, or prosthetic complications. The patient reported considerable improvement in masticatory efficiency, speech, comfort, and overall satisfaction when compared with the previously worn conventional mandibular denture.

DISCUSSION

Implant-supported hybrid prostheses provide a predictable and effective solution for rehabilitating completely edentulous arches. Conventional removable dentures often lack adequate retention, stability, and masticatory efficiency, especially in cases of advanced ridge resorption.

The All-on-4 concept is a cost-effective solution for rehabilitating completely edentulous patients with limited bone volume. However, complications such as prosthetic fractures, screw loosening, and cantilever-related stress may affect long-term success. The All-on-6 approach overcomes these limitations by using six implants, providing enhanced prosthesis stability and more favorable stress distribution across the mandibular arch.[1,2]

The absence of cantilevers in All-on-6 prostheses contributes to higher survival rates compared to All-on-4 restorations. Reducing cantilever length through the use of additional implants improves prosthetic support and minimizes biomechanical complications such as screw loosening and implant overload.[2,3,5]

Screw-retained hybrid prostheses provide numerous advantages, including easy retrievability, better maintenance of oral hygiene, elimination of cement-associated peri-implant complications, and improved control over passive framework fit. The long-term success of full-mouth implant rehabilitation is influenced by factors such as adequate implant number and distribution, meticulous prosthetic planning, accurate passive fit of the framework, regular maintenance protocols, and effective oral hygiene practices.[3,4,5]

This case demonstrates that rehabilitation of the mandibular arch with an implant-supported prosthesis is a predictable and effective treatment modality for completely edentulous patients, resulting in enhanced function, improved aesthetics, and greater patient satisfaction.

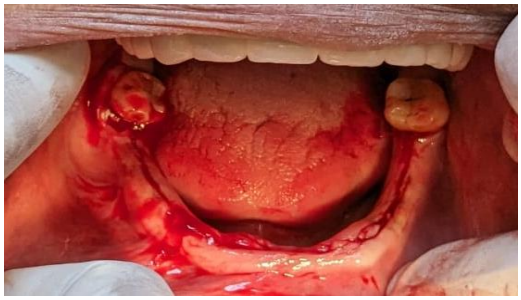

Figure 1

Figure 2

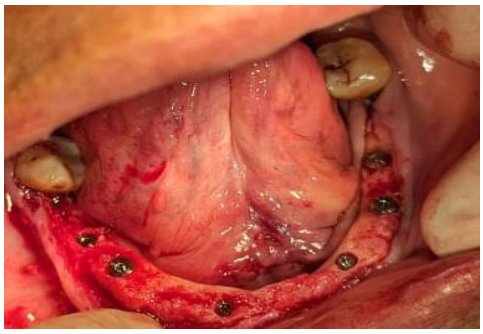

Figure 3

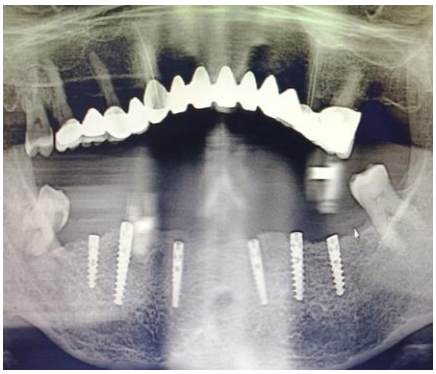

Figure 4

Figure 5

Figure 6

figure 7

Figure 8 & 9

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