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IMPLANT-PROSTHETIC MANAGEMENT OF PATIENTS WITH VARIOUS DENTAL CONDITIONS

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Abstract

Dental implants have become a primary treatment modality in daily clinical practice. Due to their high long-term survival rates, they are now considered the preferred option for prosthetic rehabilitation in many clinical situations. Although they require relatively long treatment time and it comes with higher costs for patients, the overall patient perception of success and satisfaction with outcomes has made fixed prosthetic restorations on implants one of the most sought-after choices in the field of prosthodontics.

Keywords: *Fixed prosthetic restorations, dental implants, clinical examination, complications.*

Introduction

The All-on-4/6 treatment protocol was developed to optimize the utilization of the residual alveolar bone in atrophic jaws, allowing for immediate loading and avoiding bone regeneration procedures, which may increase treatment costs and are often associated with additional morbidity and complications.

This concept involves the placement of four or six endosseous implants to support a provisional, fixed, and immediately loaded prosthesis. The two anterior implants are positioned axially, while the two posterior implants are placed distally angled, to reduce the cantilever length and allow the support of a full-arch prosthesis with up to 12 prosthetic units, thus improving masticatory function. The need for enhanced retention, support, and stability, or the patient's desire to avoid removable prostheses, are common indications for full-arch rehabilitation using implant-supported fixed prosthodontics following the All-on-4/6 protocol.

Like natural tooth roots, implants can support definitive prosthetic restorations or act as anchors for removable overdentures. Today, this technique represents one of the most conservative, predictable, and long-term viable solutions in implant prosthodontics.

Aim of the study

The aim of this study is to assess the clinical and radiological outcomes of implant-prosthetic rehabilitation in patients presenting with various dental conditions, including partial and complete edentulism, advanced periodontal disease, and alveolar bone resorption. The study focuses on the application of the All-on-4 and All-on-6 protocols as evidence-based and predictable strategies for full-arch fixed pros-

thetic rehabilitation in anatomically compromised cases. By utilizing implant-supported fixed restorations, the objective is to evaluate the success of Osseo integration, prosthetic stability, esthetic outcome, and patient-reported satisfaction and long-term prosthesis function.

Objectives of the study

To evaluate the quantity and quality of residual alveolar bone in edentulous patients.

To determine the clinical indications and limitations for the use of All-on-4 and All-on-6 implant protocols. To assess the primary and secondary stability of implants placed in compromised bone conditions. To analyze the clinical performance and biological integration of fixed implant-supported prostheses. To assess patient satisfaction, esthetic perception, and functional outcomes during the follow-up period. To identify complications and prosthetic maintenance needs related to full-arch implant restorations.

Methodology

The study population consisted of patients who were undergoing implant-prosthetic treatment at the private dental clinic Shabanllari Dental in Tirana, Albania. The study sample included a total of 17 patients who began treatment in December 2024 and/or were still undergoing prosthetic rehabilitation as of May 2025.

It is important to emphasize that the study encountered several limitations:

• First, the number of patients was relatively small due to the limited time and the number of eligible patients who presented appeared at the selected clinic.

• There were also difficulties in documenting and securing clinical photographs at different stages, related to the high level of sterility required during the procedures for implant placement.

• Second, the study sample included only patients who were regular attendees of the clinic, which may limit the generalizability of the findings.

• Third, there was an inability to follow every procedure, because the time interval between the placement of the implants and the delivery of the prosthetic restoration was very long.

CLINICAL CASE

A 60-year-old female patient presented for consultation regarding full-arch fixed rehabilitation of the upper jaw. The maxillary teeth were diagnosed with periodontitis and exhibited deep intraosseous pockets. The All-on-Six implant protocol was selected, involving the placement of two pterygoid implants (20 mm × 3.75 mm) and four anterior implants: the two lateral implants were 20 mm in length, while the central implants placed at positions 11 and 21 were 16 mm (bi-cortical fixation through the alveolar crest and nasal floor).

Fig.1 pre-operative radiograph

A full thickness mucoperiosteal flap was elevated, exposing the piriform aperture.

Bone remodeling was performed, followed by osteotomy and the insertion of six implants.

During osteotomy for the four anterior implants, a subperiosteal elevator was maintained at the piriform aperture to ensure accurate drill orientation and to avoid perforation of the nasal cortical plate.

Multi-unit abutment (MUAs) and healing caps were placed onto the implants.

The flap was sutured using resorbable synthetic sutures (Polyglecaprone USP 4-0), and the patient was prescribed Augmentin® 625 mg for 7 days postoperatively. The next day One day later, the patient returned for follow-up, and an impression was taken using putty-type silicone, which was used to fabricate a provisional prosthesis.

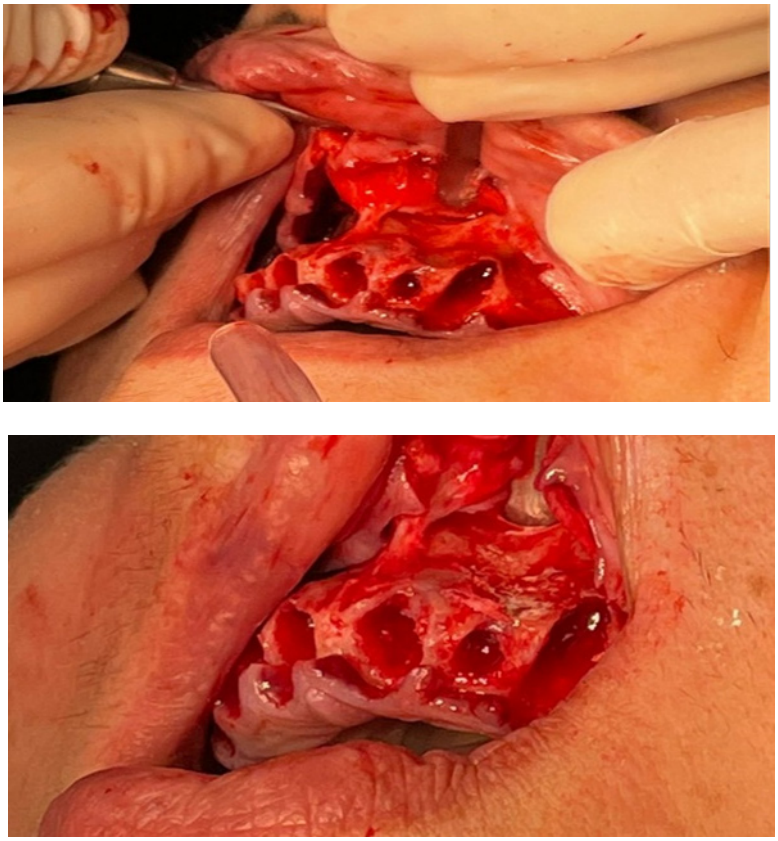


Fig.2 Bone remodeling and bi-cortical fixation

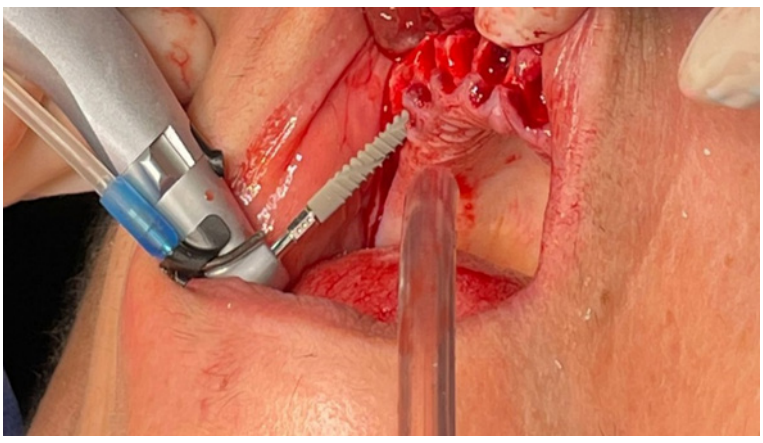


Fig.3 Implant placement

Fig.4 try-in of the provisional resin prosthesis

Fig.5 Final fixed zirconia prothesis

Results

The outcomes obtained from the fabrication of fixed implant-supported prostheses were evaluated based on two main parameters:

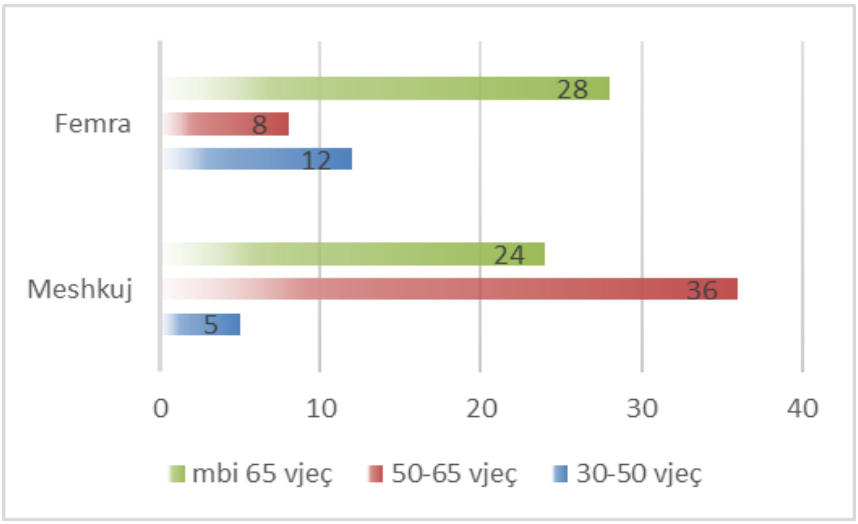
• Subjective data

• Clinical data

Subjective data were obtained directly from the patients, who reported any discomfort or issues related to the implants or prosthetic restorations.

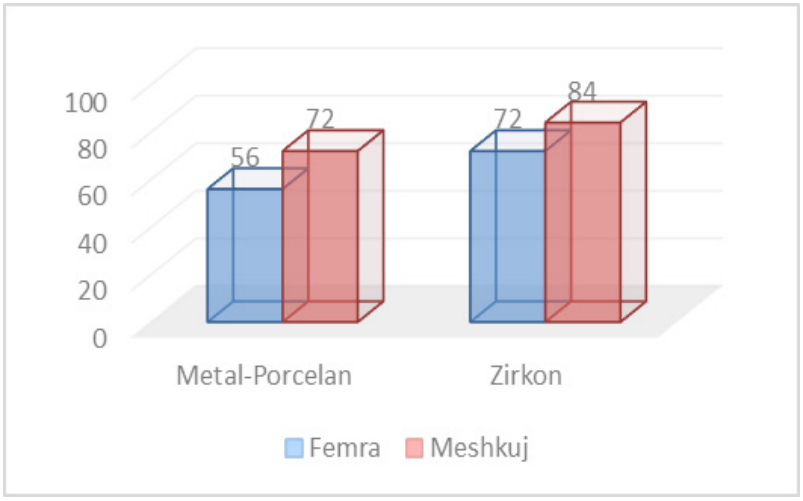
Clinical data were collected during follow-up appointments after the completion of prosthetic rehabilitation.

-Graph1 illustrates the distribution of patients according to gender and age group. The study included 17 patients of various age categories. The data indicates that patients over the age of 50 represented the majority—accounting for 86% of cases, or 12 out of 17 participants.



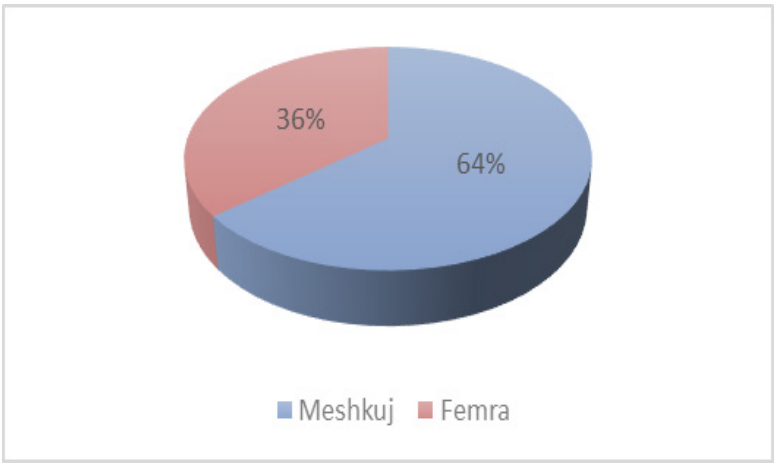
Graph 1. Gender distribution

- Graph 2 shows that male patients in the 50–65 age group were more frequently treated with implant-supported rehabilitation.



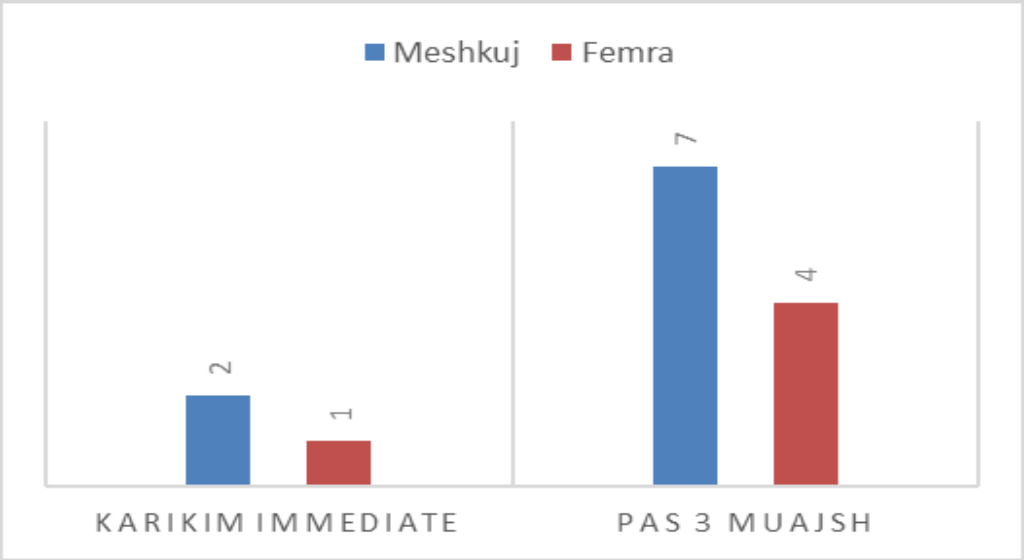
Graph 2. Frequency of extractions by age group

-Graph 3 demonstrates that zirconia was the preferred prosthetic material among most patients, due to its superior esthetics, natural appearance, and high biocompatibility.



Graph 3. Overall distribution of prosthetic restorations by gender

-Graph 4 indicates that immediate loading was applied in only 3 patients, all of whom gave informed consent for this protocol.



Graph 4. Distribution of study patients according to loading protocol

Discussion

The methods used in this study for most cases included the recording of follow-up results by the same dentist responsible for the treatment. Most of the records were obtained from the clinical documentation, and around 40% of the patients were recalled for a follow-up visit to update their records for the purpose of this investigation. The radiographs that were analyzed were generally of good quality, although the exposure geometry varied as expected in routine clinical imaging. These factors reduce the scientific validity of the results. [2]

The quality and quantity of the alveolar bone are essential for the application of prosthetic loading and are evaluated using panoramic radiography (OPT), intraoral radiographs, and computed tomography scans (CT-scans). Bone density reflects the degree of mineralization. To describe the quality and type of bone, the classification proposed by Lekholm and Zarb (1985) was used, identifying four types of bone: D1, D2, D3, and D4.[3]

Peri-implant bone resorption is measured mesial and distal for each implant using either panoramic radiographs or periapical X-rays. These radiographs are typically taken immediately after implant placement.

Professional oral hygiene visits are especially important and depend on each patient's level of hygiene maintenance. When fixed prosthetic restorations are placed over implants, it is necessary to assess marginal fit, the condition of the attached gingiva, and any potential porcelain fractures.

Diagnosis, preoperative preparation of the patient, implant placement, prosthetic rehabilitation, and postoperative follow-up are all essential elements for long-term success in implant-supported prosthodontics.

Conclusions

The integration of All-on-4 and All-on-6 protocols with advanced CAD/CAM digital planning represents a modern and effective approach to the prosthetic management of patients with total edentulism and severely atrophic jaws. This methodology optimizes the use of the remaining bone volume, enabling immediate loading and stable implant anchorage.

Treatment outcomes are significantly influenced by:

• Systematic radiographic evaluation,

• Strict adherence to oral hygiene protocols,

• and regular post-prosthetic follow-up visits.

This rehabilitative strategy constitutes a predictable solution with long-term functional stability, high esthetic value, and favorable patient acceptance, contributing substantially to the improvement of patients' overall quality of life.

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