

Implant-supported full-arch rehabilitation of the maxilla in an elderly patient: A case report.

Pragati Goyal¹, Perna Kaushik², Abhishek Sharma², Siddharth Sisodiya³.

¹PG Student, Department of prosthodontics, crown and bridge, KD Dental College and Hospital, Mathura, Uttar Pradesh.

²Professor, Department of prosthodontics, crown and bridge, KD Dental College and Hospital, Mathura, Uttar Pradesh.

³Professor and Head, Department of prosthodontics, crown and bridge, KD Dental College and Hospital, Mathura, Uttar Pradesh.

Abstract

Rehabilitation of the edentulous or partially edentulous maxilla using implant-supported prosthesis is a predictable treatment modality that offers improved function, esthetics, and patient satisfaction. However, anatomical limitations, reduced bone density, and increased functional demands often pose challenges, particularly in elderly patients. This case report describes the clinical management of a 75-year-old female patient presenting with missing posterior teeth in both maxillary quadrants, leading to compromised mastication. After discussing all available treatment options, a fixed implant-supported prosthesis was selected. Six implants were placed in the maxillary arch following a prosthetically driven approach, with bone augmentation performed in deficient anterior regions. After a healing period of three months, prosthetic rehabilitation was completed using a fixed implant-supported prosthesis. Clinical and radiographic evaluations revealed successful osseointegration of all implants, with satisfactory esthetic and functional outcomes.

Keywords: Full-arch rehabilitation, Maxillary implants, Implant-supported prosthesis.

Address of correspondence: Dr. Prachi Bansal, Department of Prosthodontics Crown and Bridge, KD Dental College and Hospital, Mathura, Uttar Pradesh, Pin - 281006.

Email address: - pragatigoyalhmpe@gmail.com **Phone no:** 7903109716. **DOI:** 10.5281/zenodo.21877287

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Introduction

Tooth loss in the maxillary arch adversely affects oral function, facial esthetics, phonetics, and psychological well-being. Conventional removable prosthesis often fails to provide adequate retention and stability, especially in the maxilla due to poor bone quality and anatomical limitations. As a result, implant-supported prosthetic rehabilitation has become a preferred treatment modality for restoring missing teeth and improving quality of life in partially or completely edentulous patients.^[1] The maxilla presents several challenges for implant therapy, including reduced bone density, sinus pneumatization, and unfavourable ridge morphology. These factors necessitate careful preoperative evaluation

and prosthetically driven planning to ensure optimal implant placement and long-term success.^[2] Additionally, the elderly population often presents with compromised bone volume and systemic considerations, making thorough diagnosis and treatment planning essential.^[3]

Advancements in implant surface technology, bone grafting techniques, and prosthetic materials have significantly improved the predictability of full-arch implant rehabilitation in the maxilla. Studies have reported high survival rates and favourable functional outcomes when multiple implants are strategically placed to support a fixed prosthesis.^[4,5] Case reports play a crucial role in demonstrating clinical decision-making and

practical outcomes in such complex rehabilitative procedures.

The purpose of this case report is to describe the clinical management and outcome of maxillary implant-supported full-arch rehabilitation in an elderly patient, highlighting diagnostic considerations, surgical procedures, and prosthetic rehabilitation.

Case Report

A 75-year-old female patient reported to the Department of Prosthodontics, Crown & Bridge, and Oral Implantology at K.D Dental College & Hospital, with the chief complaint of difficulty in mastication due to missing posterior teeth in both right and left maxillary regions. The patient desired a fixed prosthetic solution to restore function and comfort. No relevant medical history was reported, and the patient was in good general health.

Diagnostic Evaluation and Treatment Planning

A thorough extraoral and intraoral examination was done. Intraoral examination revealed partially edentulous maxillary arch with adequate interarch space for fixed implant-supported prosthesis. Periodontal health of the remaining dentition was satisfactory. Preoperative radiographic assessment was performed using an orthopantomogram (OPG) to evaluate bone quality, bone height, and anatomical landmarks such as the maxillary sinuses and nasal floor (Fig 1).

Routine preoperative blood investigations, including complete blood count, hemoglobin levels, bleeding time, clotting time, fasting blood sugar, and serological tests for hepatitis B, hepatitis C, and HIV, were advised. All parameters were found to be within normal limits.

All possible treatment options—including removable partial dentures, fixed partial dentures, and implant-supported prostheses—

were discussed in detail with the patient, along with their respective advantages and limitations (Table No.1). After informed consent, a prosthetically driven treatment plan involving maxillary full-arch implant-supported fixed prosthesis was finalized.

Surgical Phase – Implant Placement

Following standard aseptic protocol, Implant placement surgery was performed under local anesthesia. Local anesthesia was achieved using 2% lignocaine with adrenaline (1:80,000) – (LignoxR LA, Indoco Remedies Ltd, India). A mid-crestal incision with releasing incisions were given, and a full-thickness mucoperiosteal flap was elevated to expose the alveolar ridge. Osteotomy sites were prepared sequentially using pilot and progressive drills under copious irrigation of saline.

A total of six implants were placed in the maxillary arch at the 16, 14, 12, 22, 24, and 26 regions (Fig 2). Implant positioning was guided by prosthetic considerations to ensure optimal load distribution and favourable biomechanics. Primary stability with torque of 35 Ncm was achieved in all implant sites.

Bone Grafting Procedure

Deficient bone was noted in the anterior maxillary regions corresponding to the 11 and 21 areas. Bone augmentation was performed in these regions using a demineralized bone matrix allograft, β -tricalcium phosphate (FixossR, Synerheal pharmaceuticals Pvt. Ltd, India) to augment the alveolar ridge and ensure proper bone around osseointegrated Implants. The grafted sites were stabilized, and care was taken to ensure adequate coverage (Fig 3).

Prosthetic Phase

Healing abutments were placed on all implants, and the flap was repositioned and sutured using interrupted sutures. Postoperative instructions and medications

were prescribed. The surgical sites were allowed to heal uneventfully.

After a healing period of approximately 30 days, extraction of a few remaining compromised maxillary teeth was carried out to facilitate the final prosthetic design and ensure a favourable long-term prognosis. Adequate healing was allowed following extractions prior to proceeding with the prosthetic phase.

The patient was recalled periodically for follow-up and evaluation of healing.

After the healing period, clinical evaluation confirmed healthy peri-implant soft tissues and satisfactory implant stability. Pick-up Impression copings were connected to the implants and splinted intraorally using autopolymerizing PMMA pattern resin (Pattern Resin LSR, GC Corporation, Tokyo, Japan) to minimize distortion during impression making. Definitive impression were recorded using an elastomeric impression material with polyvinyl siloxane material (AquasilR, Dentsply Sirona, USA) following an open-tray technique. Stone models were fabricated (Fig 4).

Jaw relation records were obtained, verification of jig was tried again for accuracy to evaluate esthetics, phonetics, and occlusion. Necessary modifications were carried out at the trial stage to ensure optimal functional and esthetic outcomes (Fig 5). Bite registration was also done after the adjustment of PMMA trial.

Delivery of Definitive Prosthesis

A fixed implant-supported full-arch prosthesis of FP-3 design was fabricated replacing both the missing teeth and associated hard and soft tissue structures. The definitive prosthesis was seated, and occlusion was carefully evaluated and adjusted to achieve even and mutually protected occlusal contacts. The prosthesis was torqued to the recommended values, and the screw access channels were sealed using PTFE(Teflon) tape as a spacer, followed by

composite resin (FiltekTM Z350 XT, 3M ESPE, USA) to achieve optimal esthetics (Fig 6).

Follow-Up and Maintenance

Post-insertion instructions regarding oral hygiene maintenance and prosthesis care were given to the patient. Regular follow-up visits were scheduled to monitor peri-implant health and prosthetic function. Clinical and radiographic evaluations during follow-up revealed stable implants and satisfactory prosthetic performance.

Results

Clinical and radiographic evaluation following prosthetic rehabilitation demonstrated successful osseointegration of all implants. The definitive prosthesis exhibited satisfactory esthetics, phonetics, and masticatory function. The patient reported improved comfort and high satisfaction with the treatment outcome. No postoperative complications, implant failures, or prosthetic issues were observed during the follow-up period.

Discussion

Successful full-arch implant rehabilitation of the maxilla requires careful assessment of bone quality, implant distribution, and occlusal load management. The maxillary bone often presents with lower density, necessitating the use of multiple implants to enhance load distribution and long-term stability.^[2,4] Bone grafting procedures further aid in achieving adequate bone volume in deficient areas, thereby improving implant success rates.^[6]

The outcomes observed in the present case are consistent with previous studies reporting high survival rates and improved patient satisfaction following implant-supported full-arch rehabilitation.^[5,7] Prosthetically driven planning and accurate impression techniques

played a crucial role in achieving a favourable outcome.

This case report highlights that age alone should not be considered a contraindication for implant therapy, provided that systemic health and local conditions are favorable.

Conclusion

Implant-supported full-arch rehabilitation of the maxilla is a predictable and effective treatment option, even in elderly patients. Comprehensive diagnosis, meticulous planning, and precise execution are essential for achieving optimal functional and esthetic outcomes. This case report demonstrates the successful use of implant-supported fixed prostheses to restore masticatory function and improve patient quality of life.

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FIGURES



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6

TABLE NO. 1

Recommended Values for FP1, FP2, FP3 Implant Prostheses Parameter	FP1 (Crown only)	FP2 (Crown + partial root)	FP3 (Crown + gingival replacement)
Indication	Minimal bone & soft tissue loss	Moderate vertical/horizontal bone loss	Severe bone & soft tissue loss
Esthetics	Highest (natural emergence)	Moderate	Dependent on prosthetic gingiva
Crown Height Space (CHS)	8–10 mm	10–12 mm	12–15+ mm
Interarch Space Requirement	Minimal	Moderate	Increased (for flange + teeth)
Lip Support	Not required	Slightly required	Essential (prosthetic flange)
Phonetics Consideration	Minimal impact	Moderate	Critical (especially “F”, “V”, “S” sounds)
Hygiene Access	Similar to natural teeth	Moderate difficulty	Easier (if properly contoured)
Prosthesis Contour	Anatomic	Modified	Bulkier with gingival component
Material Choice	All-ceramic / PFM	PFM / Zirconia	Acrylic hybrid / metal-acrylic / zirconia hybrid
Load Distribution	Favorable (axial loading)	Slightly increased leverage	Higher leverage → careful implant positioning
Implant Position	Ideal positioning	Slight deviation	Can compensate for poor
Requirement	mandatory	acceptable	implant position
Soft Tissue Replacement	None	Minimal	Significant (pink prosthetics)
Maintenance	Low	Moderate	High (requires periodic review)