

CASE REPORT

Prosthodontic Rehabilitation with Fixed Implant-Supported Prosthesis and Implant Overdenture: A Case Report

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ABSTRACT

Implant supported prostheses, particularly the All-on-4 technique, have revolutionized dental rehabilitation for patients with severe edentulism or failing dentition. This method offers aesthetic restorations with fewer implants and reduced surgical complexity. However, challenges like inadequate bone volume may require alternative approaches, such as combining a hybrid prosthesis with All-on-4 implants opposed by an implant-supported overdenture. This hybrid solution balances the stability of implants with the flexibility of removable prostheses.

Key treatment considerations include patient selection, diagnostic imaging, surgical protocols for osseointegration, and prosthetic design. Postoperative care is also crucial for long-term success. This case report reviews the application of this hybrid approach, offering insights on its rationale, planning, and execution, and helping clinicians better address the needs of edentulous patients for improved oral health and quality of life.

KEYWORDS

- All-on-4 implants • Hybrid prosthesis • Implant-supported overdenture
- Prosthetic rehabilitation • Patient satisfaction

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INTRODUCTION

Implant supported prosthetic solutions have transformed the landscape of dental rehabilitation, particularly for patients with extensive edentulism or failing dentition. Among these, the All-on-4 implant technique has gained widespread popularity for its ability to provide full arch restorations with fewer implants and less surgical complexity compared to traditional methods. This technique offers a functional, aesthetic solution that improves both the quality of life and oral health for patients, even in cases with compromised bone volume.

However, certain clinical challenges, such as insufficient bone quality or volume in the edentulous maxilla or mandible, may require alternative approaches to ensure optimal results. One such approach involves the use of implant-supported overdentures, which offer increased stability and support compared to traditional removable prostheses. When combined with the All-on-4 implant concept, implant-supported overdentures provide a versatile and effective solution, blending the benefits of fixed and removable options for improved patient comfort, function, and aesthetics.

This article aims to explore the indications, benefits, and clinical techniques involved in All-on-4 implant rehabilitation and implant-supported overdentures. By examining current literature, case studies, and expert opinions, we will provide insights into the planning, execution, and long-term success of these treatment modalities. Through this comprehensive understanding, clinicians can better address the diverse needs of edentulous patients, enhancing their overall treatment outcomes and satisfaction.

CASE REPORT

A 52-year-old female patient reported to the department of prosthodontics with the chief complaint of difficulty in chewing due to missing teeth in upper and lower back region of jaw in the past 1 year. A detailed case history was recorded followed by a thorough intraoral examination. The patient was advised to undergo routine blood investigation, full mouth radiograph, and CBCT scan to execute a treatment plan. They reported back with

normal laboratory findings. Radiographic examination brought us to a treatment plan involving all on 6 implants for both maxilla and mandible. But due to patient's cost restraints the plan was shifted to all-on-4 concept with maxilla and implant supported overdenture with 2 implants in mandible. Radiographic examination showed only 2 to 3 mm of bone height in the sinus region, so to avoid the sinus augmentation, the all on 4 implants for maxillary and 2 implants and ball attachment supported overdenture for mandibular arch was planned. The implant site was selected according to the CBCT scan. After obtaining consent from the patient, implant surgery was planned. For maxilla, posterior superior alveolar and infraorbital nerve block was given. Mid-crestal incision was given and full thickness with papilla preservation flap was reflected. Osteotomy was prepared in 12 15, 22, 25 regions, implant placement was done and Interrupted sutures were given. For mandible, inferior alveolar nerve block was given. Implant placement in B and D region was done. Cover screws were placed and interrupted sutures were given. Postoperative instructions were given. After 4 months, a stage 2 surgery was performed. Two weeks later, the open tray technique with the splinted impression post using pattern resin, followed by the sectioning of the resin material and re-splinting was performed for the impression. After trying out the screw retaining metal framework of the multi-unit abutment in the mouth and evaluating its passive fit, jaw relation was performed and teeth arrangement was done on semi adjustable articulator. Try-in of trial record bases was done and final prosthesis was fabricated. During the insertion, the male attachment was tightened on both implants placed on mandible. Silicone separator was placed on male attachments and housing with O-ring placed above it. Sufficient relief was made on the impression surface of mandibular denture. Auto polymerizing resin was mixed and o ring with housing was picked-up. During pickup both maxillary and mandibular prosthesis were closed in centric relation. After occlusal adjustment, post insertion and oral hygiene instructions was given to patient. The patient was evaluated with radiographs periodically and after 6 months prosthetic evaluation was done.

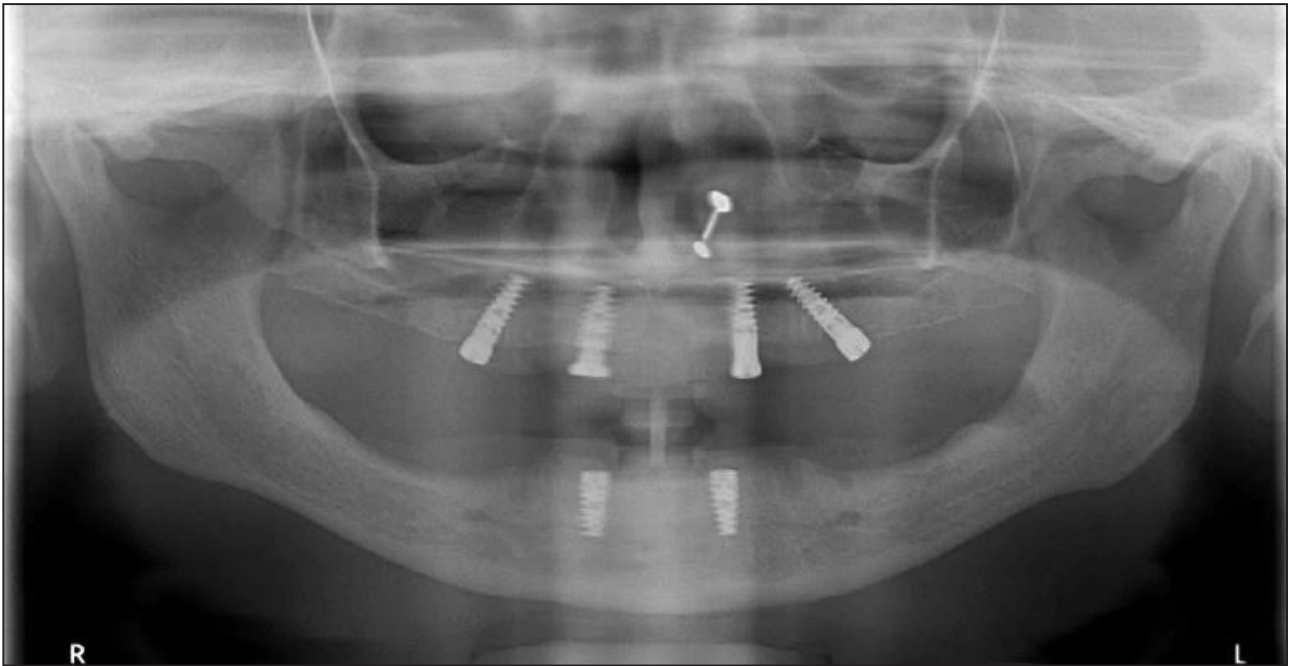


Figure 1: OPG after 3-months



Figure 2: Pre-op photograph



Figure 3: Multiunit copings



Figure 4: Intraoral copings splinting



Figure 5: Open tray pick-up impression



Figure 6: Jig trial for verification



Figure 7: Jaw relation



Figure 8: Try in - intraoral view



Figure 9: Try in - extraoral view



Figure 10: Ball attachment



Figure 11: Attachment separators



Figure 12: Metal housing pick-up



Figure 13: Final prosthesis

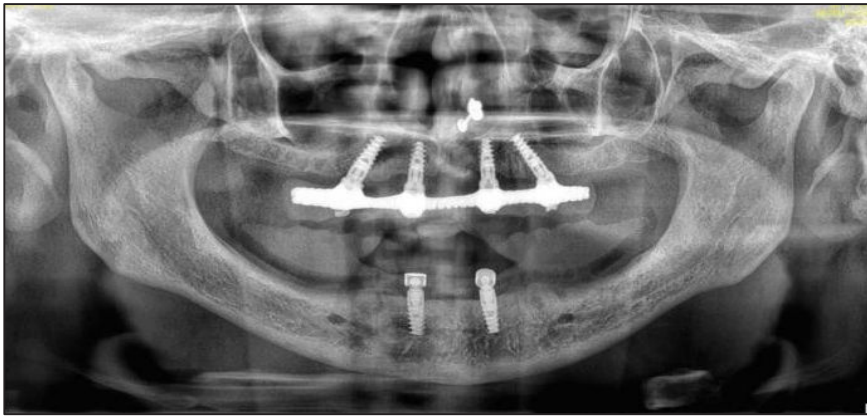


Figure 14: Post-op OPG



Figure 15: Post-op photograph

DISCUSSION

The misfit of removable complete dentures can lead to significant pain and discomfort for the patient, often resulting from severe bone resorption or atrophy in the jaw. This condition negatively impacts the patient's quality of life and requires careful consideration during treatment planning. The extent of bone changes plays a crucial role in decision-making, especially when considering implant-based restorations. The All-on-4 treatment concept was developed as a solution to offer full arch restoration using implants, providing an efficient and cost-effective approach for edentulous patients with jaw atrophy, while delivering predictable outcomes and reducing treatment time and complexity.

Understanding the biomechanics of implant-supported prostheses is crucial for long-term success. While natural teeth have a unique feedback system for occlusal awareness, implants differ in biomechanics. The load produced by four implants is found to be higher than that produced by six implants, with no discernible difference between angled and non-angled implants in clinical outcomes. Optimal occlusal schemes are critical for positive outcomes in All-on-4 applications, considering the impact of occlusal loads on implant prosthetic components, similar to other implant therapies. This concept improves cortical anchorage and primary stability, allowing the use of longer implants. The results obtained in various studies show a survival rate for more than 24 months of 99.8%.

CONCLUSION

Full arch implant rehabilitation is particularly challenging in cases with significant residual

alveolar ridge resorption. To meet the cosmetic demands and patient expectations, simplifying treatment procedures is essential. In this case, the All-on-4 concept effectively addressed the patient's needs by using angled distal implants and a hybrid prosthesis design, eliminating the need for complex bone augmentation or multiple graft surgeries. This approach has also improved communication between clinicians and laboratory technicians during the fabrication of frameworks and prostheses, reducing the time and complexity of the process.

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