



## All-On-4 Implant with Hybrid Prosthesis Opposing Implant Supported Overdenture- A Case Report

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### Abstract

*Implant-supported prosthetic solutions have revolutionized the field of dental rehabilitation, particularly for patients with extensive edentulism or failing dentition. Among these, the All-on-4 implant technique has gained popularity due to its ability to provide and aesthetic restoration with fewer implants and reduced surgical complexity. However, challenges such as insufficient bone volume or poor bone quality in the edentulous maxilla or mandible may necessitate alternative approaches to ensure long-term success and patient satisfaction.*

*One such approach involves the integration of a hybrid prosthesis with All-on-4 implant concept opposing an implant-supported overdenture. This hybrid solution combines the stability and support of dental implants with the comfort and versatility of removable prostheses, offering a balance between fixed and removable options.*

*Key aspects covered include the selection of appropriate candidates for this treatment modality, diagnostic imaging techniques for precise implant placement, surgical protocols for achieving optimal osseointegration and soft tissue management, prosthetic fabrication processes including material selection and occlusal considerations, postoperative care and maintenance strategies to ensure long-term success.*

*Through a comprehensive examination of current literature, clinical case studies, and expert opinions, this case report aims to provide clinicians with valuable insights into the rationale, planning, execution, and outcomes of utilizing a hybrid prosthesis with All-on-4 implant concept opposing an implant-supported overdenture. By understanding the indications, advantages, limitations, and clinical nuances of this treatment approach, dental professionals can effectively address the diverse needs and preferences of edentulous or near-edentulous patients, ultimately improving their quality of life and oral health outcomes.*

**Keywords:** All-on-4 implants, hybrid prosthesis, implant-supported overdenture, prosthetic rehabilitation, bone quality, patient satisfaction.

## Introduction

From a single tooth to complete dental implant replacement, implant-supported prosthesis are an effective treatment option. The concept of restoring a completely edentulous jaw with a fixed denture on 4 implants is called the All-on-4 procedure. In some cases with complete tooth loss, implant restoration treatment is almost impossible without complex techniques such as nerve transposition and posterior maxilla and mandible grafting. The solution to such situations is the All-on-4 concept. This method favours tilting the implant distally into the edentulous arch, allowing us to place the longer implant, providing improved prosthesis support with the shorter cantilever arm, improving spacing between implants and improved anchorage in bone. The "All-on-4" treatment concept was developed by Paulo Malo with straight and angled multi-unit abutments, to provide edentulous patients with an immediate load-bearing full arch restoration with only four implants.<sup>[1]</sup>

– Two implants are placed vertically in the anterior area and two are placed at an angle of 45 degrees in the posterior area. When used in the mandible, posterior tilt implants allow achieving good bone anchorage without affecting the mental foramen. In severely resorbed maxillae, tilt implants are an alternative to sinus floor augmentation.<sup>[2]</sup>

## Advantages

1. Angled posterior implants avoid trauma to the anatomical structures and allow longer implants anchored in better quality bone.
2. This method advocates tilting distal implants which enables us in improved prosthetic support by short cantilever arm, improved inter-implant distance and improved anchorage in the bone.
3. Eliminates bone grafts in the edentulous maxilla and mandible in majority of cases.
4. Final restoration can be fixed or removable.

5. Tedious procedures such as sinus lift and nerve transpositioning can be avoided.

## Disadvantages

1. Free hand arbitrary surgical placement of implant is not always possible as implant placement is completely prosthetically driven
2. It is technique sensitive and requires pre-surgical preparation such as CAD/CAM, surgical splint.
3. Length of cantilever in the prosthesis cannot be extended beyond the limit.

## Case Report

A 52 year old male 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 since 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 (fig. 1 and 2) to execute a treatment plan. They reported back with normal laboratory findings. Radiographic examination brought us to a treatment plan involving all on 6 implant 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 3mm of bone height in the sinus region, so to avoid the sinus augmentation, the all on 4 implant for maxillary and 2 implant 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. Midcrestal incision was given and full thickness with papilla preservation flap was reflected (fig. 3). Osteotomy was prepared in 12,

15, 22, 25 region. An implant of size 4.0X11.5mm was placed in 12 region, 4.5x11.5mm in 15 region, 4.0X11.5mm in 22 region and 4.0X11.5mm in 25 region(fig 4). Paralleling pins were used to check for the parallelism (fig. 5). 17 degree multiunit abutment was placed with 12, 22 and 30 degree multiunit abutment was placed with 15, 25 (fig. 6). Interrupted sutures were given.

For mandible, inferior alveolar nerve block was given. Extraction with 44, 45 46,47 was done followed by Implant placement in B and D region with implant of 4.5X11.5mm size (fig. 10). Cover screws were placed (fig. 11) and interrupted sutures were given (fig. 12). Postoperative instructions were given.

After 4 months, a stage 2 surgery was performed (fig. 13). Two weeks later, the open tray technique with the splinted impression post using pattern resin, followed by the sectioning of the resin material and resplinting was performed for the impression (fig. 15). After trying out the screw-retaining metal framework of the multi-unit abutment in the mouth and evaluating its passive fit (fig. 22), jaw relation was performed (fig. 23) and teeth arrangement was done on semi-adjustable articulator (fig. 24). Try-in of trial record bases was done (fig. 25) and final prosthesis was fabricated. (fig. 26)

During the insertion, the male attachment was tightened on both implants placed on mandible. Latex glove 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. Autopolymerizing 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.

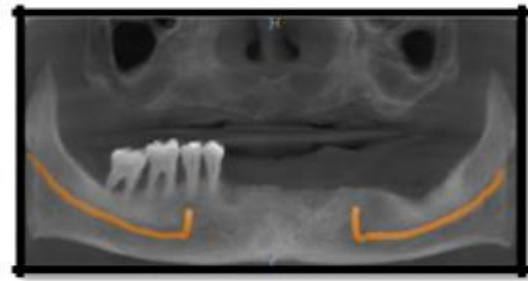


Fig 1: Pre-op OPG

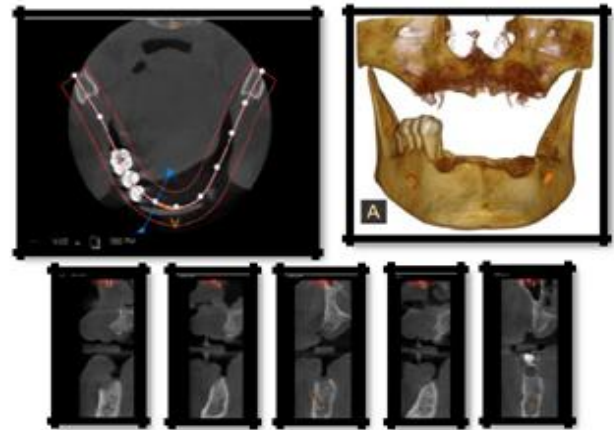


Fig 2: CBCT

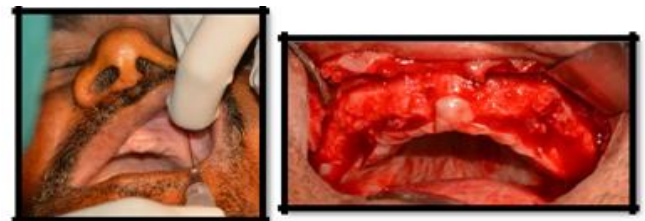


Fig 3: Under local anesthesia, midcrestal incision given and full thickness with papilla preservation flap reflected



Fig 4: Osteotomy prepared in 12, 15, 22, 25 region followed by implant placement



Fig 5: Paralleling pins

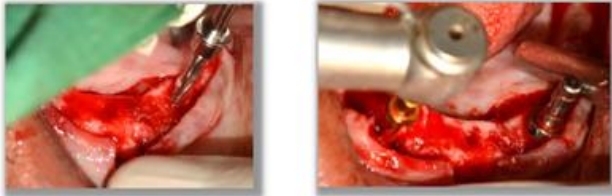




**Fig 6:** Multiunit abutments placed



**Fig 12:** Interrupted sutures placed



**Fig 7:** Osteotomy site preparation in the B and D region



**Fig 13:** Stage 2 surgery done after 4 months



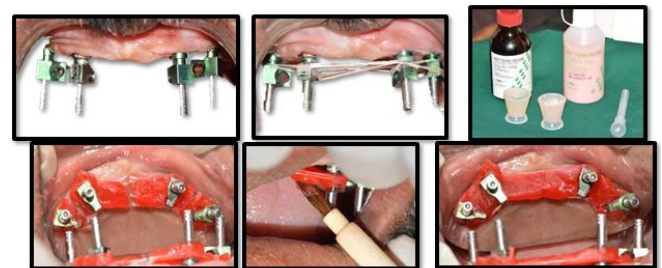
**Fig 8:** Mid crestal incision given and full thickness flap reflection



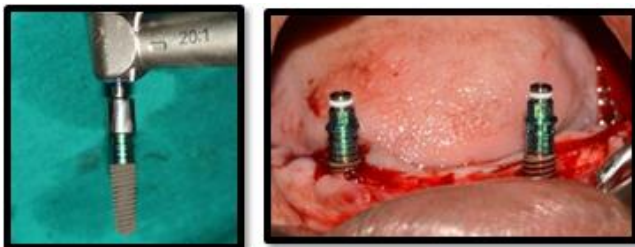
**Fig 14:** Post surgical OPG



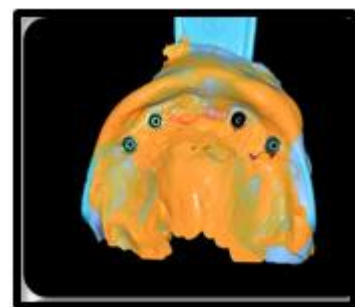
**Fig 9:** Parallel guide pins placed



**Fig 15:** Open tray abutment level impression for multiunit impression coping



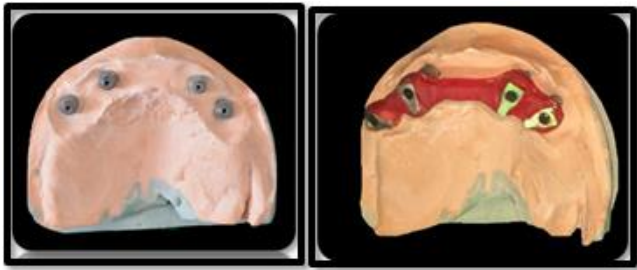
**Fig 10:** Implants placed in B & D region



**Fig 16:** Final impression



**Fig 11:** Cover screw placed



**Fig 17:** Master cast



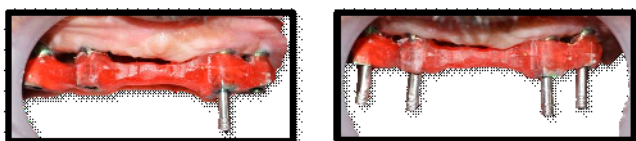
**Fig 18:** Mandibular primary impression



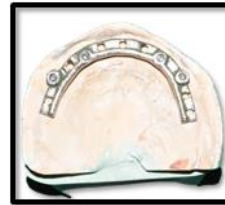
**Fig 19:** Mandibular border molding and final impression



**Fig 20:** Mandibular master cast



**Fig 21:** Jig trial for verification of impression



**Fig 22:** metal Jig trial



**Fig 23:** Jaw relation recorded



**Fig 24:** Teeth arrangement on semi-adjustable articulator



**Fig 25:** Try in of trial denture



**Fig 26:** Final prosthesis



**Fig 27:** Pre- op photograph



**Fig 28:** Post- op photograph

### Discussion

Misfit of removable complete dentures can cause pain and discomfort to the patient and is a result of severe bone resorption/atrophy in the jaw, which directly impacts the patient's quality of life. The extent of these changes is important for decision-making and comprehensive treatment planning and has significant implications for alternative dental treatments, especially when implant-based restorations are planned. The concept of all-on-four treatment was developed as an attempt to provide restoration with implants at an affordable time and cost, providing relatively easy and predictable treatment for edentulous patients with jaw atrophy.<sup>(3)</sup>

This case report focuses on the therapeutic indications, surgical procedures, prosthetic protocols and patient satisfaction associated with

the all-on-four treatment concept with an aims to improve and clarify its application. Support protocols in a variety of clinical situations and improve understanding and decision-making in daily clinical practice.

### Conclusion

Rehabilitation of full arch implants is difficult due to severe residual resorption of the alveolar ridge. In order to meet current cosmetic dentistry standards and patient expectations, consideration should be given to simplifying treatment procedures<sup>[4]</sup>. In this case, the All-on-4 concept meets the patient's needs. By using an angled distal implant and a hybrid prosthesis design, patients no longer need to undergo complex bone augmentation or multiple graft surgeries. It is also now much easier for clinicians to communicate with laboratory technicians during the fabrication of frameworks and prostheses, which previously took time. This case demonstrated successful complete oral rehabilitation using the All-on-4 concept.

No complications occurred during the 1-year recall.

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