Full mouth rehabilitation of an atrophic maxilla and mandible using all-on-4 concept with zygomatic implants: A case report.

Arindam Dalal[1], M Krishna Kumari[2].

[1]Senior Implantologist and Prosthodontist, Abita Innovations Pvt Ltd, Bangalore, Karnataka, India.
[2]Senior Lecturer, Faculty of Dentistry, AIMST University Malaysia.

Abstract
Edentulism and terminal dentition significantly compromise mastication, esthetics, phonetics, and quality of life. Rehabilitation of severely compromised arches using conventional removable prostheses often results in poor patient satisfaction. The present case report describes the successful management of a patient with terminal dentition using the all-on-4 concept in the mandible combined with anterior maxillary implants and bilateral zygomatic implants for rehabilitation of the severely resorbed maxilla. Immediate provisionalization followed by definitive direct metal laser sintering (DMLS) hybrid prosthesis fabrication restored function, esthetics, and patient confidence successfully.

Keywords: All-on-4, Atrophic maxilla, DMLS, Full mouth rehabilitation, Residual ridge, Zygomatic implants.

Address of correspondence: Dr. M Krishna Kumari, Senior Lecturer, Faculty of Dentistry, AIMST University Malaysia.
Email address: - krishnakumari@aimst.edu.my **Phone no:** +60136915962. **DOI:** 10.5281/zenodo.21877166
Submitted: 10-May-2026 **Revised**: 22-May-2026 **Accepted:** 9-Jul-2026 **Published:** 15-Aug-2026
Bibliographic details: Journal of Orofacial Rehabilitation Vol. 6(2), Aug 2026, pp. 4-8.

Introduction

Complete arch rehabilitation with implant-supported prostheses has become a predictable treatment modality for patients with terminal dentition and severe alveolar bone loss. The All-on-4 treatment concept uses four strategically positioned implants, including tilted posterior implants where indicated, to maximize the available bone and avoid vital anatomical structures while facilitating immediate function in appropriately selected patients.[1,2] In cases of severe maxillary resorption where conventional posterior implant placement is limited, zygomatic implants provide a graftless alternative by obtaining anchorage from the zygomatic bone.[3-5] This case report presents a comprehensive full-mouth implant rehabilitation using mandibular All-on-4 implants and zygomatic implant-supported maxillary rehabilitation with hybrid prostheses.

Case Report

A 50-year-old male patient reported with the chief complaint of loose upper and lower teeth associated with difficulty in mastication. The patient desired a fixed replacement with dental implants.

Clinical Examination

Intraoral examination revealed multiple periodontally compromised teeth with poor prognosis in both arches. Radiographic evaluation using panoramic radiograph (OPG) showed generalized bone loss and hopeless dentition. The patient was diagnosed with:

i. Terminal dentition in maxillary and mandibular arches.
ii. Severe posterior maxillary resorption.
iii. Generalized chronic periodontitis.

Treatment Plan

The following treatment plan was formulated:

1. Complete extraction of remaining maxillary and mandibular teeth.

2. Placement of:
   a. Four implants in mandible using All-on-4 protocol.
   b. Two anterior maxillary implants.
   c. Bilateral zygomatic implants in posterior maxilla.
3. Immediate provisionalization with acrylic removable prosthesis lined with soft liner.

4. Definitive rehabilitation using implant-supported hybrid prosthesis fabricated by DMLS framework.

Surgical Procedure Extraction and Surgical Guide Fabrication

Complete extraction of maxillary and mandibular teeth was performed atraumatically. Surgical stents were fabricated for accurate implant positioning. Radiographic markers were placed and postoperative OPG was taken for surgical planning and implant positioning verification.

Mandibular Implant Placement

Four implants were placed in the interforaminal region of the mandible following the All-on-4 protocol (Fig. 1). Two implants were additionally placed in the anterior maxilla to support the future prosthesis.

Zygomatic Implant Placement

A mucoperiosteal flap was raised in the maxilla and osteotomy preparation was performed for zygomatic implant placement. Bilateral zygomatic implants measuring 42 mm in length were inserted engaging the zygomatic bone to achieve adequate primary stability (Fig. 2). Postoperative radiographic examination confirmed satisfactory implant positioning (Fig. 3).

Immediate Provisionalization

Immediate temporization was performed using acrylic removable dentures with soft liners in both arches. The patient was instructed regarding oral hygiene maintenance and postoperative care.

Prosthetic Phase Healing Abutment Placement

After satisfactory healing, multiunit healing abutments were placed in both arches.

Impression Procedure

Custom impression trays were fabricated. Multiunit analogues were splinted using dental floss and pattern resin to ensure accurate open-tray impression making with addition silicone impression material (Fig. 4).

Jaw Relation and Framework Trial

Verification jig trial was completed followed by jaw relation recording (Fig. 5). Metal frameworks for maxillary and mandibular hybrid prostheses were fabricated using Direct Metal Laser Sintering (DMLS) technology and evaluated intraorally for passive fit (Fig. 6).

Definitive Prosthesis

Final implant-supported hybrid dentures were delivered successfully. Occlusion, esthetics, phonetics, and function were evaluated and found satisfactory (Fig. 7). The patient reported significant improvement in mastication, facial esthetics, comfort, confidence and smile satisfaction (Fig. 8).

Discussion

The All-on-4 concept combined with zygomatic implants provides an effective graftless solution for rehabilitation of severely atrophic arches. Evidence from systematic reviews supports the use of the All-on-4 concept as a treatment option for edentulous patients with resorbed ridges, although long-term outcomes and complications remain

important considerations.[2] Zygomatic implants are principally indicated when maxillary bone atrophy or deficiency limits conventional implant rehabilitation.[3-7] Systematic reviews have reported high implant survival rates for zygomatic implants, while also emphasizing that complications such as sinus-related problems, soft-tissue complications, and prosthetic complications should be considered during treatment planning.[5-7] In the present case, bilateral zygomatic implants were used to obtain posterior anchorage in the severely resorbed maxilla, avoiding the need for extensive grafting procedures. The use of DMLS frameworks was intended to provide an accurately fabricated metal substructure; studies of additively manufactured implant frameworks have evaluated their dimensional precision and passive fit.[8] This multidisciplinary approach allowed restoration of function and esthetics with a reduced treatment duration and without extensive grafting procedures.

Conclusion

Full-mouth rehabilitation using mandibular All-on-4 implants combined with zygomatic implants in the maxilla is a reliable treatment option for patients with terminal dentition and severe maxillary atrophy. Immediate provisionalization and definitive hybrid prostheses can restore esthetics, function, and patient confidence successfully with reduced treatment duration and morbidity.

References

1. Malo P, Rangert B, Nobre M. “All-on-Four” immediate-function concept with Brånemark System implants for completely edentulous mandibles: a retrospective clinical study. Clin Implant Dent Relat Res. 2003;5(Suppl 1):2-9.
2. Soto-Peñaloza D, Zaragozí-Alonso R, Penarrocha-Diago M, Penarrocha-Diago M. The all-on-four treatment concept: systematic review. J Clin Exp Dent. 2017;9(3):e474-e488.
3. Brånemark PI, Gröndahl K, Ohrnell LO, Nilsson P, Petruson B, Svensson B. Zygoma fixture in the management of advanced atrophy of the maxilla: technique and long-term results. Scand J Plast Reconstr Surg Hand Surg. 2004;38(2):70-85.
4. Ramezanzade S, Yates J, Tuminelli FJ, Keyhan SO, Yousefi P, Lopez-Lopez J. Zygomatic implants placed in atrophic maxilla: an overview of current systematic reviews and meta-analysis. Maxillofac Plast Reconstr Surg. 2021;43(1):1.
5. Gutiérrez Muñoz D, Obrador Aldover C, Zubizarreta-Macho Á, González Menéndez H, Lorrio Castro J, Peñarrocha-Oltra D, et al. Survival rate and prosthetic and sinus complications of zygomatic dental implants for the rehabilitation of the atrophic edentulous maxilla: a systematic review and meta-analysis. Biology (Basel). 2021;10(7):601.
6. Solà Pérez A, Pastorino D, Aparicio C, Pegueroles Neyra M, Khan RS, Wright S, et al. Success rates of zygomatic implants for the rehabilitation of severely atrophic maxilla: a systematic review. Dent J (Basel). 2022;10(8):151.
7. Roccuzzo A, et al. ITI consensus report on zygomatic implants: indications, evaluation of surgical techniques and long-term treatment outcomes. Clin Oral Implants Res. 2023;34(Suppl 26).
8. Effect of repetitive firing on passive fit of metal substructure produced by the laser sintering in implant-supported fixed prosthesis. J Adv Prosthodont. 2020;12(3).

FIGURES

Figure 1

Figure 2

Figure 3

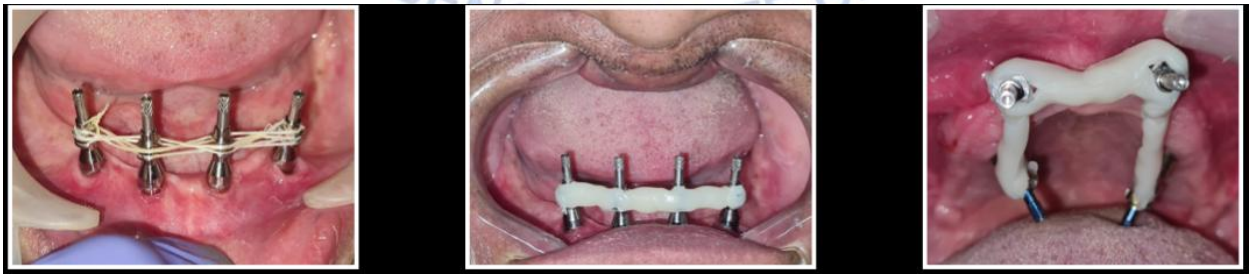

Figure 4

Figure 5

Figure 6

Figure 7

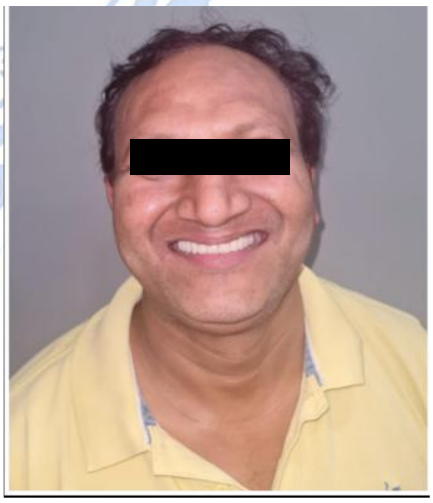

Figure 8