# Customized Facial Support Restoration with Angulated Zygomatic Implant Bar Overdenture

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## Introduction

This case report describes the management of angulated zygomatic implants to restore facial support in a patient with severe alveolar bone deficiency. The anatomic limitation of the relationship between the zygoma and the planned prosthetic tooth positions may necessitate placement of zygomatic implants at pronounced angulations, creating challenges in establishing well-defined and stable soft tissue contours. Computer-aided design computer-aided manufacturing (CAD-CAM) techniques were used to fabricate the prosthesis.

## Case History

A 53-year old female presented with severely atrophic maxillary ridge and a moderately resorbed mandibular arch with 2 implants. Past dental history revealed failures of maxillary implant therapy and augmentation procedures, which were consistent with significant loss of alveolar bone volume. As a result, zygomatic implants were planned. An initial denture setup and dual scan protocol were used to facilitate planning of 4 zygomatic implants. 2 additional dental implants were planned in the mandible as the patient request for a prosthesis that feels rigidly fixated intra-orally. Given the anatomical relationship between the zygoma and the planned prosthetic tooth positions, the zygomatic implants exhibited divergent intraoral emergence profiles. The greatest divergence between 2 multi-unit abutments was approximately 45°.

To manage the differing angulations of these implants, a bar overdenture was planned as the final prosthesis in the maxilla.



Fig 1. Extra-oral photos of patient without prosthesis

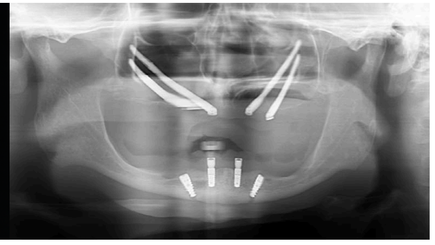


Fig 2. Panoramic radiograph

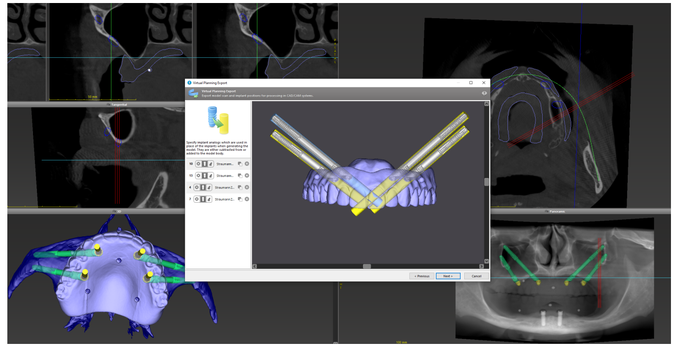


Fig 3. Digital surgical plan and guide for zygomatic implant placement. 55° implant head incorporated into design of zygomatic implant

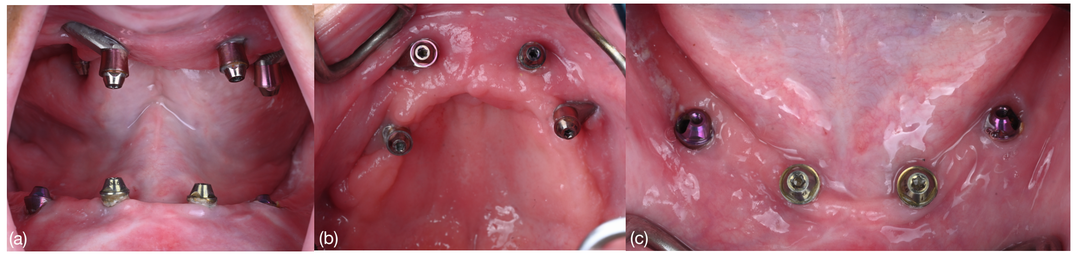



Fig 4(a). Intra-oral frontal view; (b) Occlusal view maxilla; (c) Occlusal view mandible

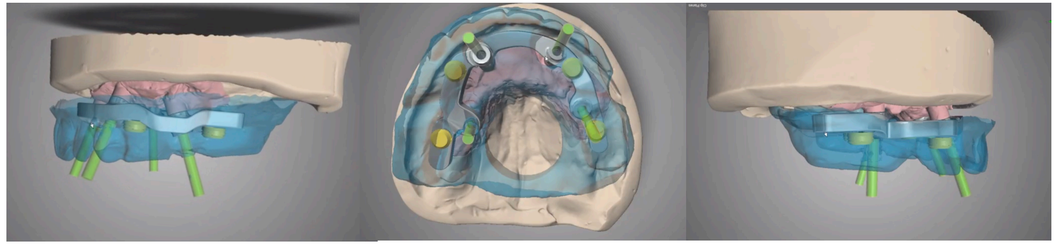


Fig 5. Digital design of milled titanium bar demonstrating implant angulation relative to prosthesis and bar

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## Case History

Splinted open tray impressions were made in both the maxilla and mandible. In the maxilla, a free-formed bar with locator attachments was used to retain the denture, whereas a Hader bar was fabricated in the mandible. Following anterior wax denture teeth try-in, the prosthetic workflow was transitioned to a fully digital process.

Post-surgically, demarcating the maxillary anterior vestibular borders was difficult due to the presence of a severely resorbed ridge. During the bar try-in visit, a prototype of the final denture was digitally printed. The maxillary prototype was modified chairside using thermoplastic compound to ensure satisfactory facial support was restored. This prototype was then scanned and replicated into the definitive milled monolithic denture. Pick-up of the locator attachments in the maxilla and Hader clips in the mandible was done clinically.

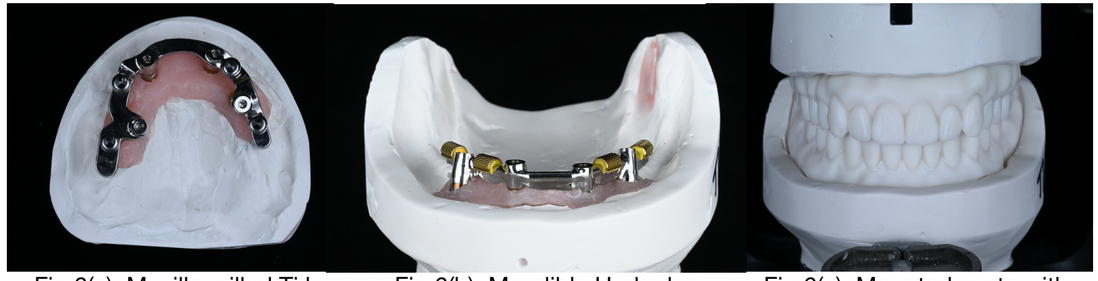


Fig 6(a). Maxilla milled Ti bar with locator housings

Fig 6(b). Mandible Hader bar with Hader clips

Fig 6(c). Mounted casts with printed try-in prototype




Fig 7(a). Extra-oral profile view without prosthesis;
(b) Extra-oral profile view with printed try-in;
(c) Extra-oral lateral profile with modified prototype



Fig 8(a) Occlusal view of maxilla bar with locator abutments; (b) Intra-oral view; (c) Occlusal view mandible Hader bar

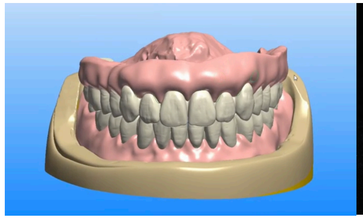


Fig 9(a). Full digital denture



Fig 9(b). Printed prototype with greenstick compound

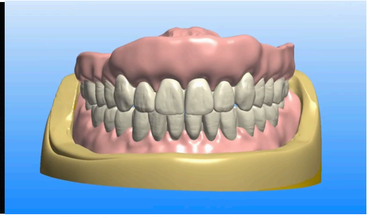


Fig 9(c). Full digital denture

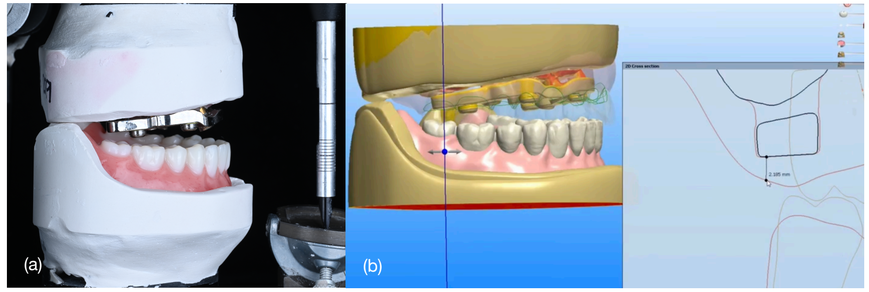



Fig 10(a). Mounted casts with bar prosthesis;
(b) Digital design phase exhibiting limited amount of prosthetic space

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Fig 11(a). Intaglio of final maxillary denture; (b) Final frontal view of final denture; (c) Occlusal view of maxilla denture; (d) Lingual view of final mandible denture, (e) Left lateral view of final denture, (f) Intaglio of final mandibular denture

## Results

The combination of digital and analog workflows can be used to fabricate a customized bar overdenture to restore facial and lip support. A verified passively fitting titanium bar effectively compensated for implant angulation discrepancies, ensuring a stable and precise prosthetic fit.




Fig 12(a) Intaglio view of maxilla denture with locator housing picked up; (b) Intra-oral frontal view; (c) Occlusal view mandible denture after pick-up



Fig 13 Extra-oral view of patient with final prosthesis

## Conclusion

Zygomatic implants provide a predictable treatment option for the severely atrophic maxilla. When combined with a bar-supported overdenture, it can help to replace tissue volume that was lost and restore adequate lip and facial support.