



## Full mouth rehabilitation with maxillary equator<sup>®</sup> attachment over denture and mandibular hybrid denture - a case report

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### ABSTRACT

Implant-supported prosthodontic rehabilitation of total edentulism remains the most complex restorative challenges. The main reason being the number of variables that affect both the aesthetic and functional aspects of the prosthesis. A hybrid denture or the 'Toronto prosthesis' is one that is fabricated over a metal framework and retained by screws threaded into implants. This article presents the fabrication of implant-retained maxillary Equator<sup>®</sup> attachment overdenture opposing mandibular implant-retained hybrid prosthesis. A total of four implants (Equinox<sup>®</sup> Myriad plus) were placed the maxillary arch and six implants (Equinox<sup>®</sup> Myriad plus) in the mandibular arch. The patient's occlusal vertical dimension, centric relation, aesthetics and phonetics were determined and maintained throughout the restorative process. This case report describes the management of a completely edentulous patient with a mandibular implant-supported fixed prosthesis and maxillary implant-retained overdenture with Equator<sup>®</sup> attachment.

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lous patients after implant therapy (Yoshida *et al.*, 2016). Common treatment options for completely edentulous patients include implant-retained prosthesis, and conventional removable prosthesis (Sargolzaie *et al.*, 2017). Many innovations in attachments have increased the number of options for restorative dentists (Mijiritsky *et al.*, 2014; Mendes *et al.*, 2016). This case report describes the management of a completely edentulous patient with a mandibular implant-supported fixed prosthesis and maxillary implant-retained overdenture with Equator<sup>®</sup> attachment.

### INTRODUCTION

For many patients, being edentulous is regarded as a handicap with respect to oral function (Bottlang *et al.*, 2010). This has an impact on their overall well being and quality of life (Alzarea, 2017). With the advent of implants, this is no longer the case. The main objective of implant placement in completely edentulous individuals is to provide fixed support and improved stability for the prosthesis (Hara *et al.*, 2017). Various studies have shown significant improvement in the quality of life of edentu-

### CASE REPORT

A 60-year-old male patient presented to the Department of Prosthodontics at Saveetha Dental College, with a chief complaint of loose dentures. The patient was edentulous for 4 years and had lost most of his teeth to caries. He was wearing a set of complete dentures for the past 4 years, which was ill-fitting and uncomfortable. The patient desired improvement in prosthesis and was advised to go for an implant-retained prosthesis. No relevant medical history was observed. After an initial consultation,

a complete extraoral and intraoral examination of the patient was carried out. A diagnostic impression was recorded, and cone-beam computed tomography (CBCT) was advised. The CBCT revealed a close proximity of the right and left sinus floor to the maxillary posterior alveolar ridge. A complete medical and hematological examination revealed no absolute contraindication to any therapeutic or surgical modality.



**Figure 1: Radiograph of implant placement after Stage 1 Surgery.**



**Figure 2: Full-thickness mucoperiosteal flap elevation (Maxilla) and placement of healing abutments.**



**Figure 3: Verifications jigs made with Pattern Resin® (GC Corp, USA)**

As the patient was not willing for sinus lift due to increase in treatment time, the treatment planning was limited to 4 implants in the maxilla and 6 implants in the mandible with the present dentures being used as a radiographic stent (Greenberg, 2015). The previous dentures were also used to assess the vertical dimension and the inter arch space prior to treatment planning.

Finally, implant-retained maxillary Equator® over-



**Figure 4: Upper and lower Master open tray impression made with Monophase® material**



**Figure 5: CAD-CAM milled PolyMethyl Methacrylate verification jigs**



**Figure 6: Upper and lower occlusal rims are customised to record the centric relation**



**Figure 7: Pre operative (Left) and post operative (Right) photograph of the patient**

denture with a bar-retained hybrid prosthesis in mandibular was the treatment plan formulated. The treatment plan was divided into two phases, Surgical phase and Prosthetic phase.

Surgical phase involved the placement of endosseous implants (Equinox Myriad Plus®) after administration of local anesthesia. A crestal incision was placed with a number 15 bard parker blade. A full-thickness mucoperiosteal flap was elevated, following which Endosteal implants were placed in 11,21,13,23 regions in the maxilla and 33,35,37,43,45,47 regions in the mandible (Figure 1) (Nejad *et al.*, 2016). The flap was then sutured, and post-operative instructions were given. The delayed loading protocol was followed. Therefore the patient was called back after the 6 month healing period for the prosthetic phase.

In the prosthetic phase, an Orthopantomogram was first obtained (Figure 1) to evaluate and assess the bone to implant contact. The radiograph showed good bone to implant contact, and the patient was scheduled for stage 2 surgery. Stage 2 surgery was performed under local anesthesia, after the elevation of the flap to expose the cover screws. A full-thickness mucoperiosteal flap elevation (Figure 2) was performed to clinically assess the health of the implants. No fenestration or bone loss was observed clinically. The cover screws were then removed and replaced with healing abutments and the flap sutured was sutured back again.

After 2 weeks, the patient was recalled, and the healing was assessed (Mijiritsky *et al.*, 2014). Upon satisfactory healing, a diagnostic impression was recorded with alginate (Tulip®) and standard stock trays. Custom Light polymerised special trays (Polytray® Delta Dental) were adapted over the casts after blocking out undercuts with wax. Direct impression copings were then placed on the implants and were splinted together (Figure 3) with pattern resin (GC®, USA). Pattern resin was used because of its low polymerisation shrinkage value and ease of application. The master impression was then recorded with a medium-bodied impress (Abduo and Lyons, 2013) ion material (Figure 4) (Monophase® Dentsply, USA).

Once the master casts were obtained, they were optically scanned using a model scanner (Zirkon Zahn® USA). The implant positions were then verified with a PMMA (Poly methyl methacrylate) jig, which was designed (Afshari *et al.*, 2017) and milled via CAD-CAM (Figure 5). The jig was then verified both clinically as well as radiographically (Buser *et al.*, 2008) for any misfit. Once the fit was verified (D'haese *et al.*, 2000), occlusal rims were fab-

ricated to determine the interocclusal space. The occlusal rims were then placed into the patient's mouth, and the jaw relations (Centric and Vertical) were recorded (Figure 6). Maxillary and mandibular metal frameworks were fabricated and were verified for an accurate fit, clinically and radiographically in the patient's mouth. After evaluation, the frameworks were sent back to the lab for teeth setting. The patient's son was also called for the trial appointment to assess aesthetics (Laederach *et al.*, 2017). After the trial, the prosthesis was inserted after tightening the abutments to 25Ncm. Occlusal adjustments were made, and bilateral balance was verified. The patient was satisfied with his aesthetic appearance and restored chewing function (Figure 7). Peri implant-bone levels were assessed after two years of follow up and were found to be within a normal range (Jawad *et al.*, 2017)

## CONCLUSIONS

This case report presents a treatment option and procedure of full mouth rehabilitation involving mandibular implant-supported fixed prosthesis and maxillary implant-retained overdenture with Equator® attachment.

## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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