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## **Implant retained overdenture using OT equator attachments: A case series**

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**Abstract**--The aim of this clinical report is to demonstrate the technique used with OT-Equator attachment with chair side incorporation of housings in pre-fabricated denture. Implant retained overdentures are evolving as an optimum and cost-effective treatment modality for patients with edentulism and the evolution of attachments have led to their increased use. The Article Describes a Series of Cases where implant retained overdentures dentures were given to the patient using OT EQUATOR attachments to improve the retentive properties of the dentures thus elevating their chewing efficiency and also the quality of speaking and boosting the overall confidence of the patient. The treatment described in the article should be advocated and used wherever possible as it preserves both hard and soft tissues. The OT EQUATOR attachment is specially

indicated in cases of compromised inter-arch space and where retention is of utmost priority as described in this case report. The advantage of the attachment is that it is very easy and convenient to use and also offers a chair-side fabricating process.

**Abstract**--Implant Retained Overdenture, equator, low-profile, case series.

## Introduction

Edentulism can have a substantial impact on the look and operation of mandibular dentures. It can also have an impact on the devices' stability and lifetime. Mandibular overdentures with implants give better retention, masticatory efficiency, and psychological advantages.<sup>1</sup> Several attachment systems are recommended in the literature to help in the retention, stability, and support of overdentures.<sup>2</sup> The goal of this paper is to show how to use the new low-profile OT-Equator attachment<sup>3</sup> and to describe a direct method of incorporating the housing in fabricated denture prosthesis using self-cure acrylic resin and retaining the denture prosthesis to the OT – Equator attachment over implants.

## Case Description

Case 1:

A 61-year-old woman presented to the Department of Prosthodontics and Crown and Bridge, Postgraduate Clinic, Bharati Vidyapeeth Dental College and Hospital, Pune, India, with a major complaint of multiple missing teeth associated with chewing and speaking difficulties (FIG 1,2). The patient revealed no significant medical issues throughout the case history that might jeopardise the prosthodontic treatment strategy.



Figure 1



Figure 2

Clinical examination revealed multiple missing teeth in both upper and lower arches. Patient had an upper Cast Partial Denture replacing the missing teeth. According to the diagnostic jaw relation, the patient had an inter-arch space of 18 mm. Teeth present were 11,12,14,17,21,22,24,25,34,44. Teeth no. 34 and 44 were grade three mobile and endodontically treated. The prognosis of the teeth was hopeless. Patient displayed mild generalized periodontitis in the upper arch Treatment Plan.

After the clinical examination, radiographs, preoperative photographs, and upper and lower alginate impressions for diagnostic models were taken. All treatment alternatives were explored, including conventional complete denture, tooth supported overdenture,<sup>4</sup>full-arch implant-supported fixed prosthesis<sup>5</sup> and implant-retained overdenture for the lower arch to address the patients' problems explaining the advantages and disadvantages of each option. Due to the hopeless prognosis of 34 and 44 they were advised for extraction and hence tooth supported overdenture was ruled out as the treatment option. From the remaining options patient chose implant supported overdenture. The patient, however, chose the implant supported overdenture over fixed implant supported prosthesis due to financial concerns and over conventional denture due to limitations of the latter. Diagnostic models were analysed to evaluate the occlusion and inter arch distance for determining the type of attachment being used over implants for overdenture.

Using conventional method final casts were made followed by jaw relation and teeth arrangement. Try in was done considering all the factors including aesthetics and phonetics of the patient and the final denture was fabricated. Two endosseous implants (Alpha-Bio Tec, 4x8mm) were placed in the inter-foraminal area of the mandible, according to the clinical protocol. Post implant placement Cover screws were placed and the site was sutured. Two months later after osseointegration of the implants, patient was recalled for second stage surgery and gingival former were placed for optimum healing around the implants. Two weeks after the placement of gingival former, cuff height was measured using graduated probe and the equator (OT Equator, Rhein83 Srl, Bologna, Italy) attachment with cuff height 3mm were screwed on to the implants with a 0.05-in (1.28mm) hex driver (FIG 3). After the attachments were placed, a postoperative radiograph was taken to ensure that the fit was accurate.



Figure 3

Once the attachments were in position, a barrier was placed over the attachments and this was done to avoid the chair side reline resin to get logged on to the attachments and also to avoid its direct contact with the mucosal tissues. Following that, registration material was inserted in the denture, and an "imprint" was taken to ensure that the female housings would sit quietly once they were permanently attached to the denture. After this the imprint on the intaglio surface of the denture was relieved with a bur and micromotor and holes were made so as to pick up the metal housings on to the denture using self-cure acrylic resin material (DPI RR COLD CURE). Following the preparation of holes in the denture, metal housings were placed on to the attachments along with the retentive caps (pink colour, soft retention). The self-cure acrylic resin was then mixed in a silicone cup, and was filled in a 5ml syringe for controlled flow. Following this, the acrylic resin was injected in a flowable stage into the holes prepared in the intaglio surface of the denture and then placed over the attachments and patient was asked to bite for complete seating of the prosthesis and for constant application of pressure and also to check for change in vertical dimension if any. The denture was left in place till the resin had passed its setting reaction and finally hard. Once it was hard and the material was set, the denture was removed and checked whether the metal housings were picked up into the denture (FIG 4). The area was then finished and any excess acrylic resin was trimmed off and the denture was polished and again tried in patient's mouth to check for occlusion and retention (FIG 5,6). The patient was asked to try the wearing and removing of denture herself and patient was given post-insertion instructions.



Figure 4



Figure 5

Figure 6

## Case 2:

A male patient, 58 years old reported to the Department of Prosthodontics and Crown and Bridge with a chief complaint of constantly falling dentures, which were not retentive and patient had difficulties in speaking, chewing and was not comfortable wearing the dentures.

### Clinical examination

On clinical examination and interaction with patient, it was noted that patient had undergone a surgery one year back for Oral Submucous Fibrosis and intra oral carcinoma and had skin graft transplants in the buccal mucosa. Post healing, the patient had got dentures fabricated as he was edentulous for past two years. On intraoral examination it was seen that patient had a limited mouth opening and was advised physiotherapy for the oral submucous fibrosis and limited mouth opening.<sup>6</sup> On examination it was seen that the interarch distance was around 12mm.

### Treatment plan

According to the clinical findings of the patient, due to restricted mouth opening and limited interocclusal space the implant supported Fixed Prosthesis was ruled out.<sup>8</sup> The only option that could satisfy patient demands for increasing the retention of the denture was giving an implant retained overdenture in the upper and the lower arch.<sup>9</sup> The patient was advised a CBCT (Planora, Lullanagar, Pune) radiograph for evaluating the existing bone conditions and further planning of implant placements (FIG 7).

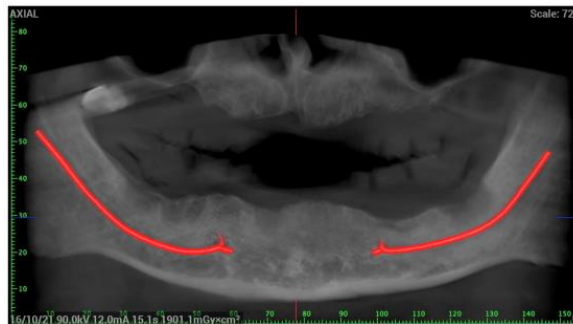


Figure 7

After the evaluation of the radiographs and the existing dentures, it was decided to place three implants in the upper arch at B, C and D position and two implants at B and D position in the lower arch.<sup>7</sup> The implants (AlphaBio-Tec, 5x12mm) were placed in the pre-determined position, and cover screw were placed and the site was sutured. The patient was asked to wear the existing denture 7 days post-surgery. After the implants were osseointegrated (FIG 8), the patient was called after 3 months and the second stage surgery was performed and healing abutments were placed over the implants and the site sutured. Two weeks after the healing was complete, the patient was re-called and the cuff height was measured using a graduated probe (FIG 9, 10).

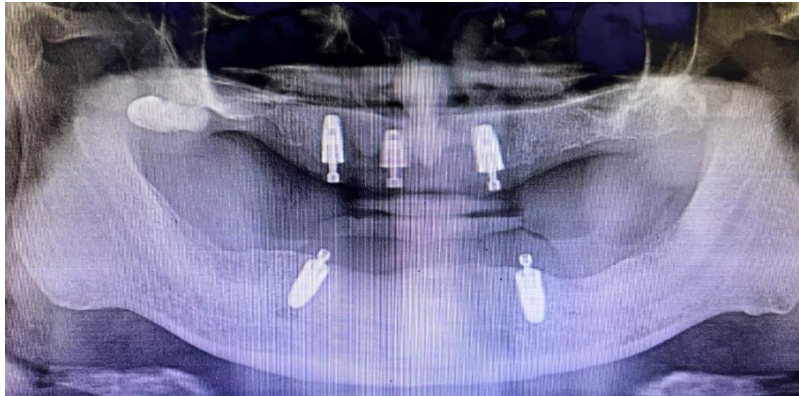


Figure 8



Figure 9



Figure 10

The cuff height of 2mm was noted and equator attachments (OT Equator, Rhein83 Srl, Bologna, Italy) were used for the overdenture prosthesis (FIG 11). The attachments were screwed over the implants with (0.05-in (1.28mm) hex driver) after removing the healing abutments (FIG12).



Figure 11



Figure 12

Once the attachments were secured in place, chair side technique of picking up the stainless-steel housings in the dentures was carried out. Bite registration paste was used to get an imprint of the equator attachments on the intaglio surface of the dentures. Once the position was recorded, holes were made sufficiently big to accommodate the stainless-steel housings. Barrier was placed

on the attachments to prevent the acrylic resin from flowing beneath the neck of the attachments and also to prevent the direct contact of the Self cure acrylic resin to the mucosal surface (Figure 13,14).



Figure 13

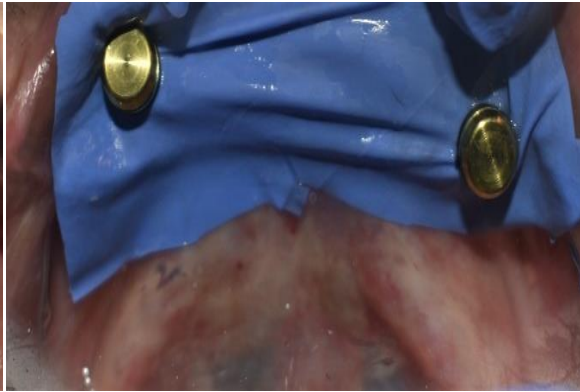


Figure 14

One the holes were created on the intaglio surface of the denture, Self-cure acrylic resin (DPI RR COLD CURE) was mixed in a silicone cup and loaded in a 5ml syringe. Following this, stainless-steel housings (FIG 15,16) along with the retentive caps (pink color, soft retention)<sup>3</sup>were placed on the attachments.



Figure 15

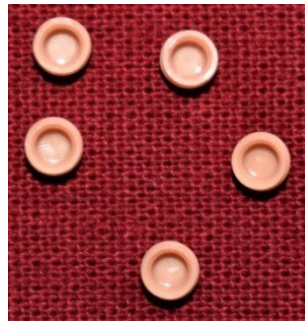


Figure 16

After this acrylic resin was flown in the holes on the intaglio surface of the denture, it was placed over the attachments and the patient was asked to bite and keep mouth closed and apply pressure in occlusion till the material is set and hard. Once the material was hard enough and completed its setting reaction, the dentures were removed and checked for any excess resin which was then trimmed and polished. After the finishing of the prosthesis was complete, it was inserted in patient's mouth and checked for occlusion and the improved retention of the denture by means of phonetics and also the existing vertical dimension, and aesthetics were checked (FIG 17,18,19). The patient was taught the insertion and removal of the prosthesis and post-insertion instructions were given to the patient



Figure 17

Figure 18

Figure 19

## Discussion

A Unique Treatment Strategy for Rehabilitating an Edentulous Patient with A Resorbed Mandibular Ridge is presented in this Case Report. The Implant-Supported Overdenture Has Proven to Be a Better Treatment Option than the traditional Overdenture Denture. As a result, this therapy option should be considered whenever the situation calls for it. It will last for a long time and heal the Patient's Soft and hard tissues, as well as provide Psychological Support. The primary goal of implant-retained overdentures in the rehabilitation of totally edentulous patients is to improve retention, stability, and masticatory function. Especially in the edentulous ridges of the mandible. The psychological status of edentulous patients treated with mandibular implant retained overdentures is significantly improved as a result of improved function. The great certainty of osseointegration and beneficial impact on the preservation of alveolar bone around the implant are the key reasons for the predictable success rate of implants in the anterior mandible. The overall vertical height and diameter of the OT Equator low profile direct implant overdenture attachment (2.1mm height and 4.4mm diameter) are greatly reduced. It was created by removing the sphere's head and neck in OTCAP Normo (Rhein 83) When Compared to the various other attachment systems, the equator attachment has several features that make it a superior alternative. This attachment's biological benefit is that it maintains fibromucosal adhesion while emphasising the building of a gingival barrier, which prevents inflammation and peri-implantitis. Implant divergence of up to 30° can be compensated by OT Equator attachments, which may be useful in severe mandibular atrophies and where axial implant placement is compromised without bone repair. Furthermore, because of the low profile, prosthetic space may be well handled, resulting in superior aesthetic outcomes. Oral hygiene maintenance can be carried out on a daily basis.

## Conclusion

The evolution of the low-profile OT EQUATOR attachment has led to improvement in retention, stability and overall functioning of the prosthesis. The attachments have proved to be of significance clinically in cases where there is restricted inter-arch space and in cases of severely resorbed ridges where retention is of utmost priority. The attachment system is easy to use and has various sizes compatible with maximum implant systems available in market.

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