

## Full Mouth Rehabilitation with Hader Bar And Clip Attachment over Implants in Maxilla And Ball End Attachments over Natural Teeth in Mandible

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### I. Introduction

Edentulous patients with continuous residual ridge resorption often experience problems with their conventional dentures due to their instability and lack of retention, leaving the patient dissatisfied and insecure with functional results and aesthetics.<sup>1</sup> Over the years, implant supported overdentures have constituted a predictable and a secure therapeutic alternative affording a patient's satisfaction due to simpler hygiene and good chewing efficiency.<sup>2</sup> They represent a cheaper treatment than fixed prosthesis and in some cases with loss of lip support, with interocclusal spaces larger than 15mm; their use will prevent future aesthetic or phonetic problems.<sup>3</sup> However, rehabilitation of completely edentulous maxilla using osseointegrated implant has always tested the ability of clinician and laboratory technician due to its complex anatomy and biomechanical limitations of bone that resists implant placement in its ideal location. Therefore, it has demanded more attention for treatment planning as compared to completely edentulous mandible.

### II. Case Report

A 52 year female patient presented to the department of Prosthodontics at D.A.V Dental College and Hospital, Yamuna Nagar for replacement of her missing teeth. Past dental history revealed that patient had functional problems with both dentures due to poor retention and stability. Previously, the patient had been edentulous for the last twelve years and suffered loss of self esteem. Medical history did not show any systemic condition or disease that contraindicates dental treatment. Also, the patient did not smoke.

Clinical and radiographic examination revealed that there were three teeth i.e. 18, 27, 28 present in maxilla in which 27 had grade III mobility and thereby advised for extraction. (Fig.1) Moreover, there were two teeth present in mandible that is 33 and 43 that were quite sound so they were preserved in order to provide ball end attachment retained overdenture. Similarly, in maxilla CBCT (cone beam computed tomography) examination was done where it was found that there was no adequate bone present in desired areas for implant placement and required to undergo bone augmentation procedure in order to receive fixed prosthesis. However, patient was not willing because of financial constraints; therefore, it was planned to provide the patient with implant supported overdenture with bar and clip attachment and telescopic attachments over retained teeth in maxilla.

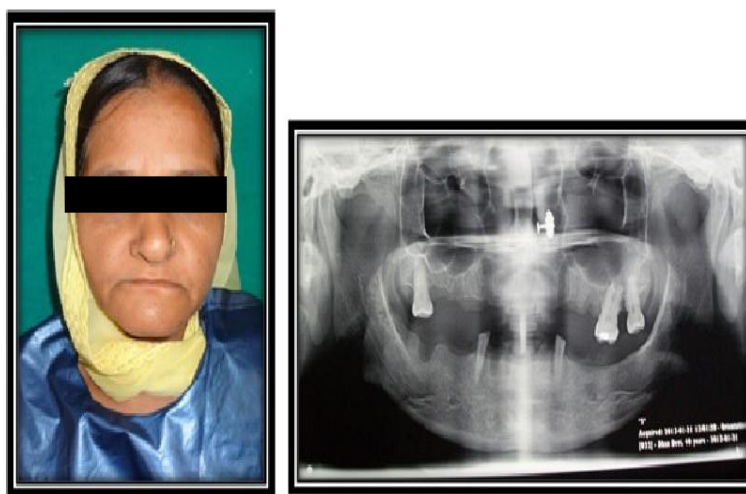


Fig.1 Pre-rehabilitative extra-oral view and Radiograph

**The patient was properly explained regarding the following treatment plan and informed consent was signed:-**

- 1) Placement of four implants in maxilla;
- 2) Fabrication of implant supported overdenture after 5 to 6 months of osseointegration period.
- 3) Endodontic treatment with respect to 18, 28, 33 and 43 were carried out. Teeth were reduced in height followed by insertion of ball end attachments with respect to teeth 33 and 43 and metal copings with respect to 18 and 28.

Two weeks after implant placement, the patient's existing prosthesis was relined with a resilient liner and patient was allowed to wear the denture. The patient was given oral hygiene instructions. Healing was uneventful and patient had no complaints.



Fig.2) Placement of healing abutments



Fig.3a) Open tray placement checked with impression copings in position;  
3b) Final impression with implant analogs

After 6 months of healing period, the prosthetic procedures were initiated. Healing abutments were placed (Fig.2) and preliminary impressions of upper and lower arches were made using stock metal trays with irreversible hydrocolloid material. The impressions were poured with Type IV dental stone and diagnostic casts were obtained. Open tray technique was carried out in order to take the final impressions. A custom acrylic resin impression tray was fabricated with openings for screw retained impression copings. The impression copings were placed on the implants and attached with the integral positioning screw. The tray was placed over the impression copings and any contact between the copings and the tray was eliminated to allow the tray to rest firmly on the denture bearing mucosa with positioning screw exiting through an opening in the tray. (Fig.3a) The final complete arch impression was made with polyether impression material. The impression material around the impression copings was uncovered to facilitate removal of impression. After removal of the tray, the copings were connected to implant analogs (Fig.3b) and the impression was poured to obtain definitive cast in type IV dental stone. In this way, the implant location and the denture bearing area were reproduced. Simultaneously, after completing the endodontic treatment, teeth were reduced in height followed by insertion

of ball end attachments with respect to teeth 33 and 43 (Fig 4b) and cementation of metal copings with respect to 18 and 28.

Record basis with wax occlusal rims were used to determine the occlusal vertical dimension and to record the maxillomandibular relation. The wax rims were articulated and acrylic artificial teeth were selected and arranged on record basis for trial. After completion of teeth arrangement, the trial dentures were evaluated and corrected as required. A balanced lingualized occlusion was developed with the ceramic teeth. The aesthetics, phonetics, centric relation, occlusion and occlusal vertical dimension were verified and the final arrangement was approved by the patient. The dental laboratory technician digitized the casts and the teeth arrangement, and designed an ovoid bar on the implants analogues with the computer. A refractory duplicate maxillary cast was sent to a superstructure milling company with a digital file to mill the maxillary hader bar from nickel chromium metal alloy. After receiving the milled nickel chromium bar, they were placed on the original caste.<sup>4</sup>



Fig.4a) Cementation of tooth supported ball attachments; 4b) Milled bar placed on the implants and abutment screws were tightened

The retention clips were placed under the intaglio surface of the denture. The prosthesis was processed and finished. The milled bar was placed on to the implants and abutment screws were tightened to 35 N/cm<sup>2</sup>, and the prosthesis was inserted.(Fig.4a) (Fig.5) The patient was instructed regarding the hygiene procedures associated with dentures and bar attachments and scheduled for routine maintenance recalls. After 2 years, patient was satisfied with his implant supported prosthesis. (Fig.6)



Fig.5 Final Prosthesis



Fig.6 Post-Rehabilitative extra-oral and intra-oral view

### III. Discussion

Retention and stability are important factors for success of complete dentures in edentulous patients. Improved denture retention and stability facilitates the restoration of oral function such as mastication and speech, as well as increased patient comfort and self confidence.<sup>5</sup>Overdentures have become a simple, predictable and cost effective treatment for partially edentulous patients with few remaining teeth. Moreover, they provide the benefit of aesthetics, phonetics, bone preservation, increased comfort, better psychological state and enhanced nutrition, all resulting in an improved quality of life and increased life expectancy. Especially, in case of new denture wearers/ those with low gagging thresholds implant supported overdenture is considered advantageous as it reduces the amount of soft tissue coverage and extension of the prosthesis.<sup>6</sup> According to assessment by Chewing Ability Questionnaire and the structured interview following a chewing test, it was seen that masticatory function in patient appears to improve following treatment with an implant supported overdenture. Moreover, significant reduction in pain during chewing and increased retention of lower denture was seen.<sup>7</sup> It was found that bone loss in any part of mandible in those patients wearing complete upper and lower dentures amounted to 5.2mm as compared to 0.6mm for the overdenture patients. (Crum and Rooney)<sup>8</sup>

Since the evidence based guidelines for design and selection of maxillary implant overdenture treatment modality are few, therefore, emphasis on patient mediated considerations should direct treatment planning decisions. Maxillary overdenture implants tend to show slightly high risk of failure than observed in mandible, therefore, it is important as a general rule that minimum 4 implants are placed in maxilla with partial palatal coverage. Moreover, fabrication of a bar is considered advantageous as it allows the laboratory to correct significant implant misalignment which is often seen in maxilla because of resorptive pattern of the basal bone. It provides common path of insertion and helps in distribution of forces among the osseointegrated implants, thereby, sharing the load.<sup>9,10,11</sup>

On the other hand, in mandible root supported ball end attachment systems were used as it is easier to place. They are less costly, less technique sensitive, there is less marginal bone stress and help to maintain correct hygiene. Moreover, they provide better retention and stability to the denture as well as allow slight hinge and rotation movements.<sup>3,12,13</sup> Long term function and survival of free standing implants with attachments in the mandible are well established. Although, there has been fewer studies supporting the same treatment concept to the maxilla. However, in the above case, after 2 years the patient was satisfied with her implant supported prosthesis.<sup>11</sup>

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