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## CASE REPORT

### TOOTH SUPPORTED OVERDENTURE RETAINED WITH STUD ATTACHMENT- A CASE REPORT

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#### ABSTRACT

Ridge resorption is a continuous process following tooth extraction and leads to poor denture foundation. Absence of periodontal receptor after teeth loss is responsible for lack of proprioception and improper mastication. So, whenever any tooth with good periodontal support are present, tooth supported over denture can be planned to avail support for occlusal force, prevent accelerated rate of bone resorption and improved stability. These over dentures are retained by various attachment systems. So, the retention will be better than conventional complete denture. This clinical report contains a detailed description of tooth supported over denture fabrication using ball and O ring attachment.

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## INTRODUCTION

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prosthodontic problems. Overdenture is an important part of the preventive treatment modality. According to GPT 9, overdenture is "any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants". De Van stated "Perpetual preservation of what remain is more important than the meticulous replacement of what is missing". So, preservation of natural tooth not only reduces residual ridge resorption but also may translate better occlusal awareness, biting force and neuromuscular control<sup>1,2</sup>. After extraction the resorption of alveolar bone shows variation in rate of resorption with recorded faster bone loss at the first 6 months and the following 2 years<sup>4</sup>.

Crum and Rooney<sup>6</sup> conducted a 5 year study to compare the mean vertical bone loss in mandibular arch between complete denture wearer and overdenture wearer. The reduction in the height of the anterior part of the mandible in those patients wearing complete denture amounted to 5.2 mm, as compared with 0.6 mm for the overdenture patients. Denture overlying the natural teeth also improves stability and retention. Additional retention is produced by parallel vertical walls of copings or by attachments<sup>3</sup>. Different overdenture attachment designs are available i.e stud attachment, bar attachment and magnetic attachment. Among them ball and O ring attachment system is considered as an appropriate, easily constructed and good resilient attachment for overdentures<sup>7</sup>.

**CASE REPORT:** A 65 year aged male patient visited to our department of prosthodontics of Haldia Institute of Dental Sciences and Research complaining of difficulty in mastication. On thorough clinical examination it was revealed that patient had completely edentulous maxillary arch and patient had completely edentulous maxillary arch and partially edentulous mandibular arch with remaining teeth no 34, 38 and 45.

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Fig 1. Preoperative patient OPG



2



3

Fig 2 and 3. Edentulous Maxillary arch and Partially Edentulous mandibular arch



Fig. 4. Post placement done in teeth



Fig. 5. Housing created for O ring



Fig. 6. O ring placed in denture tissue surface.



Fig 7: Preoperative and post operative profile at smile.

Among the remaining teeth 34 and 45 had occlusal wear and teeth no 38 had grade 3 mobility. OPG revealed that patient had good periodontal support in 34 and 45 teeth (Fig 1).

**Treatment plan:** We planned to extract tooth no 38 followed by intentional root canal treatment in teeth no 34 and 45 then attachment retained overdenture in mandibular arch and conventional complete denture in maxillary arch (Fig 2 & 3). Whole treatment plan was explained to the patient and written consent was obtained from him.

**Selection of post:** After root canal treatment was done, teeth number 34 and 45 were reduced to a level of 1 mm above the marginal gingiva so as to provide necessary space for access ball post. Post length was measured and decided with the help

of intraoral periapical radiograph. For this case we selected the EDS' access post overdenture. These attachments come in three different sizes which are coded with different colors (red, blue and green). While the head of posts are of a constant diameter, the length and width of the shank vary. We selected red color coded post (selection was done depending upon the length and width of the roots).

**Post space preparation and post placement:** At first guttapercha was removed upto an adequate length leaving 3 to 5 mm of the apical end of roots. There should be minimum of 0.5 mm remaining lateral root structure at the most apical placement of post. Primary reamer (EDS' access post overdenture) was used to prepare full length of post. After that countersink drill was used to cut two preparation in one step. It prepares the seat for second tier as well as the seat for flange of the post. Post length was adjusted by cutting the apical end until the post was fully seated. In trial insertion the fitting of access post was checked and confirmed with intraoral periapical radiograph. Lastly self-adhesive dual cure resin (solocem) was placed in the post hole and on the post. Post was inserted and light curing was done (Fig 4).

**Routine prosthodontic procedures:** The next procedure involved the fabrication of complete dentures for both maxillary and mandibular arches. Primary impressions were made by irreversible hydrocolloid (DPI algitex, alginate impression material), special trays were fabricated by autopolymerizing acrylic resin (DPI-RR Cold Cure), border moulding were performed with the help of low fusing impression compound (Dental Kerr impression compound), final impressions were made by medium body addition silicone material (Reprosil) followed by face bow transfer, recording of jaw relation, transferring in semiadjustable articulator (Hanau wide vue), try in and processing of denture.

**Incorporation of O ring:** It was done by chairside technique. Rubber bands (provided with the attachment kit) were placed on the ball so that it covered the height of contour of the post head and blocked the undercut. O rings were placed on the post and marked with marking paste. Denture was seated on the cap and marking was transferred to the intaglio surface of the denture. Then housings for caps were made by trimming the acrylic from denture intaglio surface (Fig 5). The same procedure was repeated until the denture was fitted passively over the O rings. Petroleum jelly was applied to the surrounding mucosa of balls. Pink colored self-cure acrylic resin (DPI-RR Cold Cure) was placed on the housing and denture was seated on the O rings. Patient was instructed to bite in centric occlusion and hold it until the acrylic hardened. Denture was removed and O rings were picked into the denture Fig. 6.

**Denture insertion:** Lastly after the removal of excess acrylic around the attachment cap the denture was finished and polished. Then Dentures were inserted in the patient's mouth and post insertion instructions were given regarding use and aftercare of the prosthesis. Periodic recalls were scheduled.

**Post insertion follow up:** A postoperative radiograph was taken after 6 month to evaluate the condition of abutments. They were found to be satisfactory.

## DISCUSSION

Surveys in most of the civilised world have shown that the percentage of those over 65 years of age is increasing. There are various types of treatment modality for rapidly increasing elderly population with partially and completely edentulous arches<sup>8,9</sup>. Common treatment options are conventional complete denture, tooth supported and implant supported overdenture. Implant supported overdenture or implant supported fixed prosthesis are excellent treatment option in terms of masticatory efficiency and patient satisfaction. But they have their own limitations like systemic health, unavailability of adequate quantity or quality of bone and financial issues. In case of tooth supported overdenture proprioception is maintained. So this treatment option is still popular among the patients. Overdenture attachments are classified either as studs, which connect the prosthesis to the individual tooth or as bars which connect the prosthesis to the splinted abutment teeth. Bar attachments compared to stud attachments require more amount of interocclusal space. They are unesthetic due to the bulkier denture base and anterior teeth arrangement is difficult. In this case interocclusal space was 12 mm. Due to limited interocclusal space in this case stud attachment was used here<sup>10</sup>. This attachment occupy a small vertical space and the male units on the different roots do not require parallelism<sup>11</sup>. The ball and O ring attachment of access post allows rotation of the denture attachment. Small head of the attachment limits the amount of material that has to be removed from the denture and thus the strength of the denture is not jeopardized. The technical work can be carried out easily at chairside. Overdenture is indicated in patients with few remaining retainable teeth in an arch. It is also preferred in patients with abnormal ridge conditions, patients needing single denture, patients with unfavorable tongue positions, muscle attachments, and high palatal vault, which render the stability and retention of the prosthesis difficult. Overdentures are contraindicated in patients with questionable oral prophylaxis, systemic complications and inadequate interarch distance.

## CONCLUSION

Stud attachments are a simple and cost effective treatment option in tooth supported overdenture for enhancing retention of the denture.

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