

Attachment Retained Tooth Supported Overdentures: A Case Series

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ABSTRACT

Present case series describes the three different types of attachments use for tooth supported overdenture for prosthetic rehabilitation. Loss of teeth causes continuous resorption of the bone leading to a compromised treatment. Retaining two or more natural teeth can be used as an abutment for prosthetic rehabilitation of partial edentulism arches. Preventive prosthodontics includes tooth supported overdentures which preserves natural teeth, roots and maintains proprioception. Depending upon the interarch distance available various types of attachments can be used to enhance the retentive factors. The first case (71-year-old female patient) describes the use of telescopic attachment overdenture on 33, 43 with available interarch space of 15 mm in mandibular arch. The second case (62-year-old female patient) describes the use of ball attachments overdenture on 34 and 35 with available interarch space of 13 mm in mandibular arch. The third case (60-year-old female patient) is about equator attachment overdenture on 33, 43 with available interarch space of 12 mm in mandibular arch. Use of telescopic, ball and equator attachments for tooth supported overdentures has enhanced the retention, stability, function and aesthetic outcome of the removable prosthesis in mandibular arch. The natural teeth provide additional support, stability and retention of the overdenture than the edentulous ridges alone which is particularly advantageous for mandibular arch.

Keywords: Ball Attachment, Equator attachment, Prosthetic rehabilitation, Telescopic

INTRODUCTION

Preventive Prosthodontics refers to treatment that prevents the factors adversely affecting the orodento facial tissues and structures such as periodontium, alveolar bone, basal bone and surrounding structures [1]. Preventive prosthodontics include overdentures which are removable partial or complete denture that covers and rests on one or more remaining natural teeth, roots, and/or dental implants [2].

Overdentures are of two types- tooth supported and implant supported. Implant supported prostheses are widely used but some anatomical, financial and medical constraints prevent patients from opting for this treatment. Tooth supported overdenture is more preventive and cost effective as it preserves the periodontium which acts as shock absorber, retains elastic modulus of teeth near to bone and maintains bone preservation [3].

Depending upon the interarch space available to enhance the retention of removable prosthesis, different types of attachments which are the mechanical device used for the fixation, retention and stabilisation of dental prosthesis can be used [4]. In this article, three cases of partially edentulous mandibular ridge rehabilitated by tooth supported overdenture using telescopic, ball and equator types of attachments have been discussed.

CASE SERIES

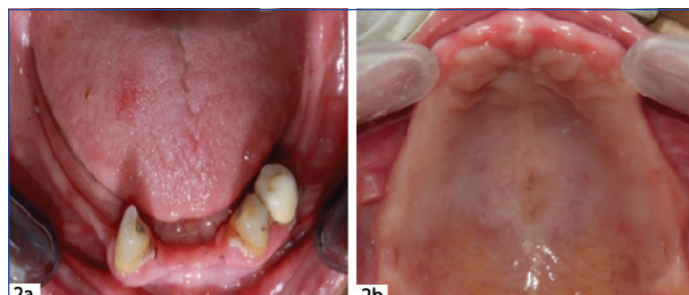
Case 1

A 71-year-old female patient reported to the Department of Prosthodontics with the chief complaint of difficulty in mastication due to missing teeth in upper and lower arch and unaesthetic appearance since four years and wants replacement for the same. On extraoral examination, facial form was ovoid, concave with sunken cheeks. The length of the lips was average [Table/Fig-1]. Intraoral examination showed presence of 11,12,13,21,22,33,34,43; Recession with 11,12,13,21,22,33,34,43; root caries with 12,13,22; grade III mobility with 11,21. Depending upon the condition of the remaining natural teeth, the maxillary teeth were extracted and planned for conventional acrylic complete denture [Table/Fig-2(a),(b)]. Adequate interarch space of 15 mm was present. Radiographic examination showed prefabricated metal post with 33, 34, 43 [Table/Fig-3]. As

the abutment teeth in lower arch were cemented with prefabricated post and had adequate interarch space of 15 mm, so went ahead with the telescopic attachment overdenture.

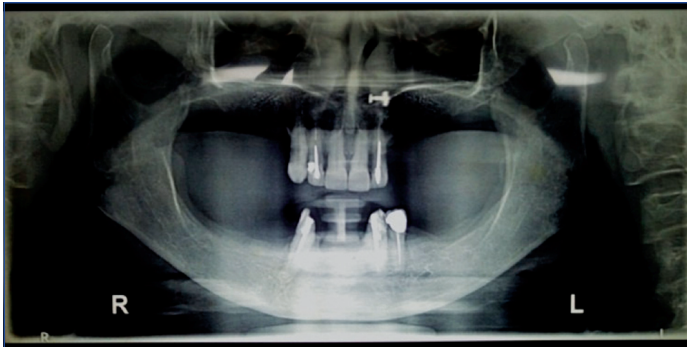


[Table/Fig-1]: Extraoral preoperative pictures.



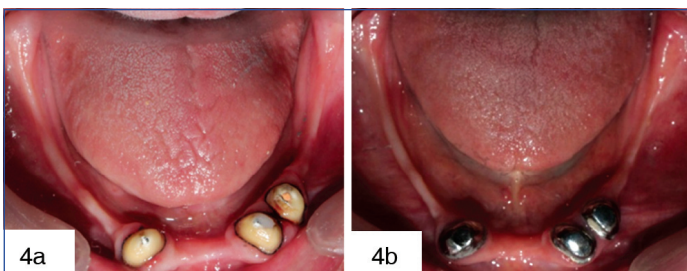
[Table/Fig-2]: (a) Intra oral preoperative pictures of mandibular arch (b) Intraoral picture of maxillary arch after extraction.

A primary impression for maxillary arch was made with impression compound (Y-Dent) in a metal stock tray and for mandibular arch was made in irreversible hydrocolloid. The abutment teeth were prepared with diamond rotary bur producing chamfer margins keeping 4 mm of height and 6 degree tapering [Table/Fig-4a].



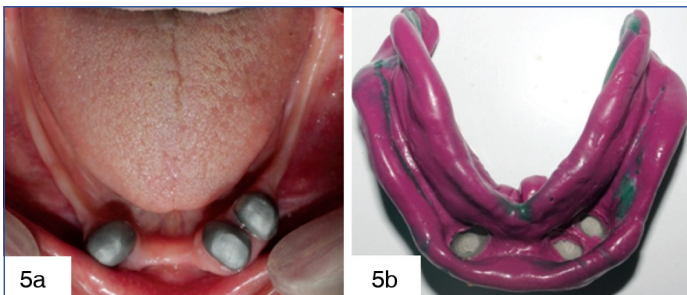
[Table/Fig-3]: Orthopantomogram (OPG) showing prefabricated metal post with 33, 34, 43.

Impression for fabrication of primary coping was made with addition silicone (Flexceed). On poured cast wax patterns were fabricated for primary coping producing chamfer margin of 0.5 mm all around for secondary copings which was then checked on surveyor for parallelism. The primary copings were cemented using glass ionomer cement [Table/Fig-4b].



[Table/Fig-4]: a) 33, 34, 43 teeth preparation; b) Cementation of primary coping.

Secondary copings with 0.5 mm chamfer margin were fabricated on primary coping and were sandblasted [Table/Fig-5a]. The sectional border moulding was done for maxillary arch with low fusing impression compound (DPI-Pinnacle). The lower arch impression was made using medium fusing elastomeric impression material (Reprosil dentsply Sirona) and pick up of secondary coping was done [Table/Fig-5b].



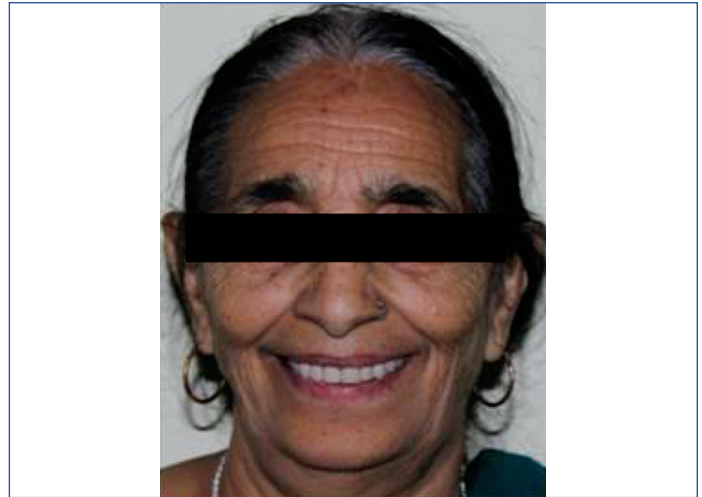
[Table/Fig-5]: a) Trial of secondary coping; b) Pick up of secondary coping in medium body impression.

Facebow record was made to orient maxillary cast on the articulator (Hanau). Vertical and Centric Jaw relation was done. Trial Dentures were evaluated to verify the previous steps and then dentures were processed. Secondary copings were picked up in denture using autopolymerising acrylic resin and were polished [Table/Fig-6a].

Dentures were inserted and evaluated [Table/Fig-6b]. The patient was recalled after 24 hours, once in a week and monthly. Patient was happy and satisfied [Table/Fig-7].



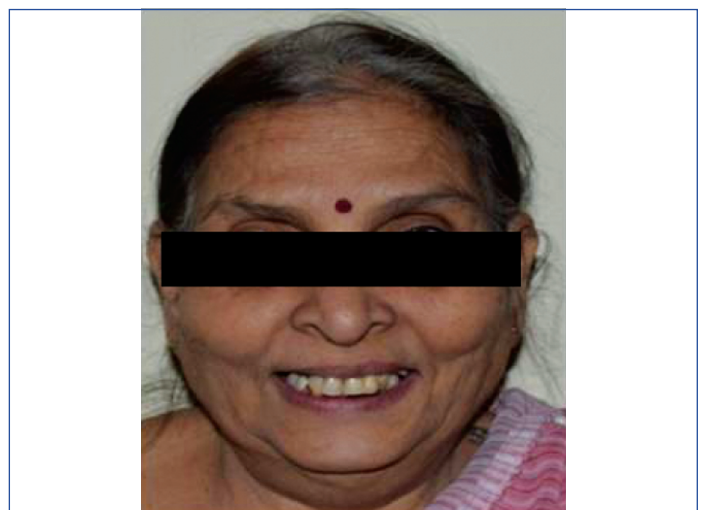
[Table/Fig-6a-b]: a) Pick up of secondary coping in denture; b) Final dentures.



[Table/Fig-7]: Postoperative extra oral picture.

Case 2

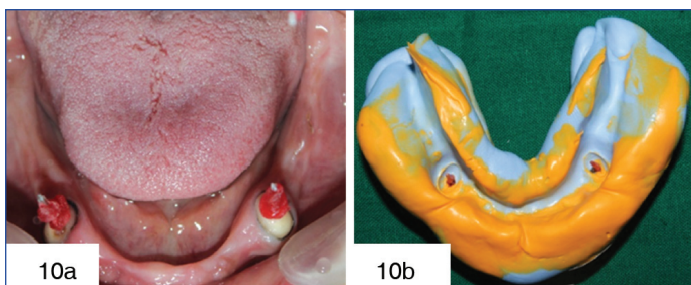
A 62-year-old female patient reported to Department of Prosthodontics with the chief complaint of poor aesthetics due to missing teeth and difficulty in mastication since two years. Extra oral examination showed ovoid facial form, straight facial profile [Table/Fig-8]. Intra oral examination shows presence of 11,21,22,23,25 present in upper arch [Table/Fig-9(a)] and 34,44 present in the lower arch [Table/Fig-9(b)]. The maxillomandibular relation showed adequate interarch distance of 13 mm in the region of 34 and 35. The type of attachment decided were ball attachment followed by mandibular overdenture and maxillary complete denture. The crown root ratio was altered and post space preparation was done. The post space impression was made using pattern resin and was picked up in elastomeric impression [Table/Fig-10a,b]. Parallelism of ball attachment (1 mm) on wax pattern was done using surveyor [Table/Fig-11a]. The copings were cemented using glass ionomer cement [Table/Fig-11b]. Other steps for conventional denture were followed. Denture insertion was done [Table/Fig-12a,b]. The patient was recalled after 24 hours, once in a week and monthly. Patient was happy and satisfied.



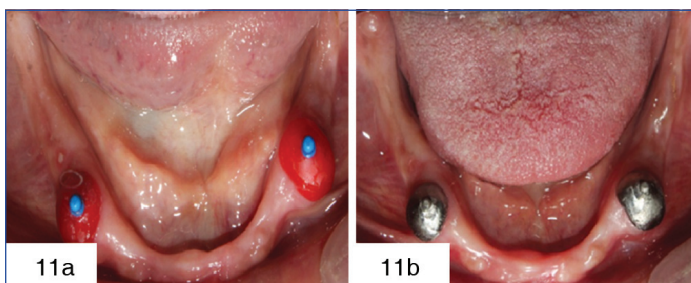
[Table/Fig-8]: Preoperative extra oral picture.



[Table/Fig-9]: Intra oral preoperative pictures (a) Maxillary arch; (b) Mandibular arch.



[Table/Fig-10]: a) Post space impression with pattern resin; b) Pick up of post space impression.



[Table/Fig-11]: a) Trial of wax pattern & ball attachment intra orally; b) Cementation of casted copings.



[Table/Fig-12]: a) Pick up of female retentive cap in final denture; b) Postoperative extra oral picture.

Case 3

A 60-year-old female patient reported with chief complaint of multiple missing teeth, inability to chew and unaesthetic look since 3 years. Extra oral examination revealed ovoid facial form, convex profile [Table/Fig-13a]. Intra oral examination revealed presence of 33, 43 [Table/Fig-13b]. The interarch space was 12 mm. Depending upon the existing condition of the abutment and interarch space available mandibular overdenture with equator attachment was planned. All steps were similar to ball attachment except use of equator attachment which is the smallest dimensional dental attachment with vertical height of 2.1 mm [Table/Fig-14a,b]. Denture insertion was done [Table/Fig-15]. The patient was recalled after 24 hours, once in a week and monthly. Patient was happy and satisfied.



[Table/Fig-13]: a) Preoperative extra oral picture; b) Preoperative intra oral picture.



[Table/Fig-14]: a) Trial of wax pattern and equator attachment intra orally; b) Cementation of casted copings.



[Table/Fig-15]: Postoperative extra oral picture.

DISCUSSION

Due to various advantages such as preservation of alveolar bone, maintenance of proprioception, improved retention, stability and support, enhanced psychological comfort and increased masticatory efficiency. Tooth-supported overdentures are preferred preventive treatment option over conventional complete dentures and implant supported overdentures [5]. To enhance the retention and prognosis of overdentures, various attachments are used.

Telescopic overdentures use telescopic crowns as attachments on few remaining natural teeth [6]. It works on the principle of frictional fit. According to studies done, it states that for better results, the abutment tooth should be periodontally sound, evenly distributed in arch for better stress distribution, and with interocclusal space of at least ≥ 13 mm for copings, denture base, teeth and freeway space. The height and taper of primary coping should be at least 4 mm and taper of 6 degrees determine path of insertion and amount of retention [7].

Arnold C et al., compared the retentive forces of different types of crown attachments and found that telescopic crowns had the highest retention forces [8]. So in first case depending upon existing condition of abutment teeth and interarch space telescopic attachments were used for overdenture in mandibular arch. In case two ball attachments were used for mandibular overdenture as the arch was ovoid, abutment teeth were non vital, evenly distributed and periodontally sound, interarch space present was 13 mm. According to a study by Scherer MD et al., it states that retentive forces of ball attachment are more compared to other attachment system. Ball attachment shows increased retention, anteroposterior and vertical movement of the denture [9].

In case 3, OT equator attachments for mandibular tooth supported overdenture was used. Equator attachment is used in cases where interarch space is reduced and retentive properties are maintained without compromising the prosthetic outcome [10]. For all three patients, follow-up appointments were planned after 24 hours, once a week and once in a month. All the patients reported with good satisfaction, improved appearance and function after using the prosthesis with no discomfort.

CONCLUSION(S)

This series presented three cases, where the treatment plan was primarily decided by the amount of interarch distance present. It can be observed that pleasing aesthetics was achieved in all the cases. Retained healthy teeth with compromised periodontal status can be used as the abutment and bio-mechanical, aesthetical advantages can be achieved by preventive prosthodontics.

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