

Maxillary Tooth Supported and Mandibular Attachment Retained Overdenture- A Case Report

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ABSTRACT

Overdenture treatment uses a removable complete denture that overlies retained teeth, tooth roots, or dental implants. Retained root abutments can give better retention, support, and stability to an overdenture and also provide proprioception which would otherwise be lost with conventional denture treatment. The success of overdenture is dependent on maintaining oral hygiene at an adequate level. The choice of attachment is an important factor and commonly used ones are bar and clip, ball and O-ring, extra coronal resilient attachment or magnetic attachments. Attachment retained overdenture has become an integral part of prosthodontic treatment as an alternative to conventional mandibular dentures to overcome the problems of retention associated with it.

Key Words –Overdenture, extra coronal, attachment, Preventive prosthodontics, mandible

INTRODUCTION

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate the inevitable problems. Preventive prosthodontics advocates use of overdenture as one of the treatment modalities by the practicing dentists. It is further emphasized that patient treated with overdenture demonstrate less vertical alveolar bone resorption in comparison to the conventional dentures and in turn preserves the residual alveolar bone.^[1,2] Overdenture treatment uses a removable complete denture that overlies retained teeth, tooth roots, or dental implants. This treatment is not a new concept and practitioners have successfully employed existing tooth structures or retained roots to assist with complete denture treatment for more than a century^[3, 4]. The presence of a healthy periodontal ligament maintains alveolar ridge morphology, whereas a diseased periodontal ligament, or its absence, is associated with variable but inevitable time-dependent reduction in residual ridge dimensions^[5]. To avoid this, two or more, coronally modified or restored retained teeth abutments are frequently endodontically prepared and used as abutments for an overdenture. The objective is to distribute stress concentration between retained abutments and denture-supporting soft tissues^[6, 7]. Retained root abutments can give better retention, support, and stability to an overdenture and also provide proprioception which would otherwise be lost with conventional denture treatment. Attachments may not be used by many dental professionals for reasons such as cost and reluctance to grasp the intricacies of their indications and applications.^[8, 9, 10] Retained healthy roots provide retention, stability, and support of the overdenture, preserves residual ridge height, and maintains proprioceptive stimulus through periodontal membrane, and has economical and psychological benefits.^[11, 12, 13]

Implant retained prosthesis is an option but is sometimes not possible due to insufficient amount of bone or for economic reasons. The success of overdenture is dependent on maintaining oral hygiene at an adequate level.^[14] The choice of attachment is an important factor and commonly used ones are bar and clip, ball and O-ring, extra coronal resilient attachment or magnetic attachments. Usually, the choice is determined according to number, distance, and location of the remaining natural teeth^[15, 16] or at the discretion of the prosthodontist on his clinical experience. Most patients are not satisfied with the retention and stability of their complete dentures.^[17]

CASE REPORT

A 68-year-old male patient reported to the Department of Prosthodontics, with the chief complaint of difficulty in mastication due to multiple missing teeth. There was no relevant medical history affecting prosthodontic treatment. Intraoral examination revealed well-formed maxillary and mandibular ridges in class I ridge relationship (Fig. 1).

Only 33 and 43 in the mandibular arch and 13, 12, 11 & 21 were present in the maxilla, radiographic examination revealed good bone support and long roots.



Figure 1- Pre operative intra oral view



Figure 2- Post endodontic treatment intra oral view

The various treatment options available for this patient's mandibular arch were— extraction of all the teeth followed by conventional complete denture, implant supported overdenture and tooth supported overdenture. The option of an implant retained prosthesis was not acceptable to the patient because of the need for an additional surgery, longer duration of treatment phase and the related expenditure. Hence the treatment plan formulated was to construct a maxillary tooth supported complete denture and a mandibular overdenture with extra coronal attachments.

Radiographic examination was done to evaluate status of the roots and diagnostic casts were made. Wax rims were fabricated on diagnostic casts to determine the approximate vertical dimension of occlusion. Vertical dimension recordings were determined by phonetics and aesthetics, face bow transfer was done. The diagnostic articulation was done on a semi adjustable articulator that helped in assessing the available inter-arch space and which was found to be adequate. Proposed abutment teeth 33 and 43 were prepared on the diagnostic cast, and the ability to accommodate abutment copings and custom ball attachments was assessed. After which, it was decided to fabricate a mandibular overdenture with custom ball attachments (male component) with use of orthodontic separators (female component to be placed in denture) for attachment. The treatment plan was presented to the patient and written informed consent was obtained.

The maxillary teeth and the mandibular canines were endodontically treated and obturated leaving one-third space in the cervical portion of the root for the attachment. Once the teeth were asymptomatic, they were reduced in size to a more favourable crown root ratio. The maxillary teeth were reduced to a coronal 2-3mm for noncoping overdenture fabrication. Post- endodontic treatment and one size drill was used to prepare the radicular space for the uni-anchor attachment after removal of the gutta-percha from the root leaving one-fourth of the material in the apical portion, for the placement of the stud attachment within the root surface (Fig.3). Once adequate post space on mandibular canines bilaterally was created (Fig. 4), the uni-anchor attachments were inserted individually into each canal for evaluating the fit and parallelism. The extra radicular uni-anchor attachments were cemented in the root space after trial fitting using glass ionomer cement (Fig. 5).



Figure 3- Pre formed ball attachment



Figure 4- Post space prepared



Figure 5- Cemented attachment in the root space after trial

A primary impression of the lower arch was made with alginate and a special tray was fabricated on the primary cast after block out. Using conventional techniques border moulding was done and secondary impression was made with medium viscosity rubber base material (Aquasil™ Ultra Monophase, DECA Regular Set, Dentsply) (Fig. 6).

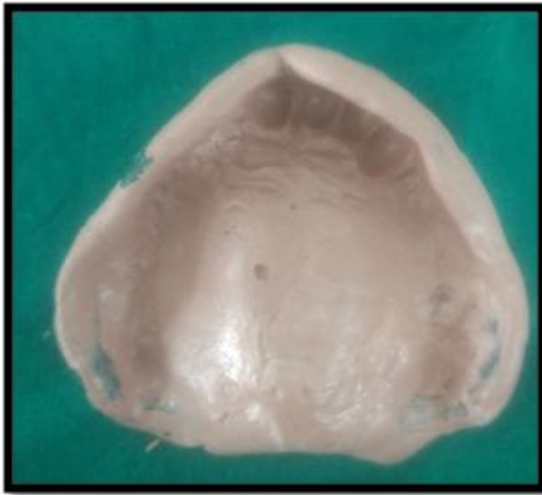


Figure 6- Maxillary and mandibular final impressions

Record rims were made and the jaw relationship was recorded with face bow transfer on a semi adjustable articulator (Fig. 7).



Figure 7- Recording of jaw relation

After a satisfactory try-in, the denture was processed using heat cure acrylic. Once the denture was ready, vent holes were created in the mandibular denture in the space maintained for the attachments. Orthodontic separators were placed over the custom ball attachments. The separators were picked up by adding autopolymerising acrylic resin (Fig. 8) in the space while maintaining upper and lower dentures in occlusion. The excess self-cure acrylic

that came out of the vent holes was trimmed. Re-polishing was done in the vent hole region. The denture was delivered (Fig. 9) and the patient was given instructions about insertion and removal, eating and speaking as well as maintenance of the denture. Periodic follow-up was carried out.

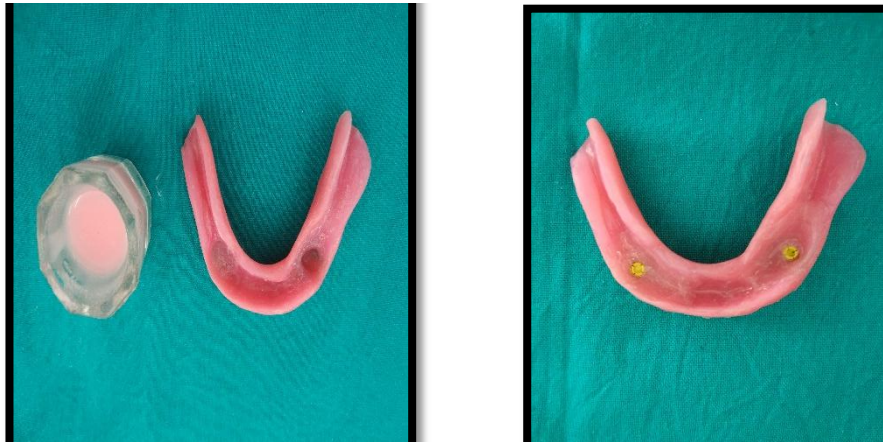


Figure 8-Female component of the attachment luted on the tissue surface of the mandibular denture with autopolymerising resin



Figure 9- Post operative view after prosthesis insertion

DISCUSSION

According to the reports in literature, it is common to observe mutilated dentition due to periodontal disease and dental caries in the elderly population. In most situations, the patient is limited to being rehabilitated with complete dentures due to the fact that other options are unsuitable. However, the use of selected teeth in strategic positions can greatly improve the final treatment result in terms of overdenture stability and retention.^[18] Progressive alveolar atrophy after tooth extraction can be prevented by retaining teeth or tooth root beneath an overdenture. To keep a few teeth and use them or their roots for a tooth or root supported overdenture has been shown to substantially reduce the bone loss in the mandible.^[1]

There are relatively few studies on the survival of tooth and root supported overdentures, but those available have demonstrated a wide range of survival rates, from very good to relatively poor results, and a great need for prosthetic maintenance.^[19] The considerable reduction in crown root ratio and the dome-shaped configuration of tooth abutment along with careful adjustment of contiguous denture base facilitates an axial resolution of occlusal forces. The tensile stimulation of periodontal fibres results in the deposition of bone followed by a concomitant decrease in abutment mobility.^[12] The support provided by the abutment teeth is in addition to that supplied by the residual alveolar ridges. Stability and support are enhanced by the vertical vector component of the teeth retained in the alveolar ridge. Preservation of natural teeth for an overdenture preserves sensory inputs from the periodontal mechanoreceptors and which is superior to that achieved by the oral mucous membrane. These periodontal receptors by their proprioceptive feedback mechanism actively influence muscles of mastication and thereby the cyclic temporomandibular joint movements.^[20]

Various types of attachments are available and they have been widely used with removable partial/complete denture prosthesis, segmented fixed prosthesis, and implant supported prosthesis. Yet, no single attachment is perfect for every case, so it is critical that the appropriate attachment should be selected for each individual situation. By

analysing study models and radiographs, the clinician can make several important assessments, each of which will influence the final attachment selection. This is a viable alternative for the patients with some retained teeth and who are not prepared to undergo surgical procedure involved with implant placement.^[21]

Among possible roots to be used to support the overdenture, the canine is a tooth that better exhibits characteristics associated with the support. This is because of its large root with a greater periodontal area for attachment and also due to its localization in the transition area between anterior and posterior teeth. Another advantage of such an attachment is dual retention and the retention.^[20] design of the pivoting male, which allows a resilient connection for the prosthesis without any resulting loss of

CONCLUSION

Attachment retained overdenture has become an integral part of prosthodontic treatment as an alternative to conventional mandibular dentures to overcome the problems of retention associated with it.^[20] However, patient cooperation is the prime factor for maintaining substantial oral hygiene to avoid caries and periodontal disease of the retained teeth. Pre-fabricated ball attachments are a relatively simple and cost effective treatment modality in cases of tooth supported overdentures that may be incorporated in prosthetic rehabilitation cases.

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