CASE REPORT

Mandibular tooth supported overdenture retained with attachments: A case report

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ABSTRACT

Loss of alveolar bone is a great entity after loss of natural teeth. Preservations of remaining surrounding tissues is of utmost importance. Tooth-retained overdentures are a simple and cost-effective treatment than the implant-supported overdentures. When few teeth are present which are periodontally strong, they can be used as abutments for overdenture fabrication. Roots maintained under the denture base preserve the alveolar ridge, provide sensory feedback and improve the stability of the dentures. The most common problem of mandibular complete denture is retention & stability due to excessive residual ridge resorption as compared to maxilla. So, mandibular tooth supported overdentures not only provide retention and stability to the denture but also prevents bone loss and provide proprioception. Overdenture attachments can also be used to enhance retention of mandibular complete denture. The present case report describes a technique to fabricate ball attachment retained mandibular tooth supported overdenture.

Keywords: overdenture, tooth supported denture, overlay prosthesis, ball attachment, stud attachment This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

Preventive prosthodontics involves procedure that can delay or eliminate future prosthodontic problems and Overdenture is an important part as the preventive treatment modality. DeVan stated "Perpetual preservation of what remains is more important than the meticulous replacement of what is missing." This statement still rings true and Tooth-supported overdenture has been recommended by preventive prosthodontics for preserving the remaining natural teeth as well as providing stability and additional retention to the prostheses, especially in mandible.

An overdenture may be defined as a removable prosthesis that covers the entire occlusal surface of a root or implant.According to GPT-9, Overdenture is defined as "any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implant."Overdentures are of two types- tooth supported and implant supported.

A complete denture patient goes through a sequel of events like loss of discrete tooth proprioception, progressive loss of alveolar bone, transfer of all occlusal forces from the teeth to the oral mucosa and the most depressing sequel is the loss of patient's selfconfidence. The preservation of supporting teeth as an overdenture abutment provides a simple, cost effective and efficient prosthetic treatment for the patients with few remaining teeth which are periodontally sound. Depending upon the interarch space available to enhance the retention of removable prosthesis, different types of attachments can be used for overdentures. The present case report describes the rehabilitation of mandible using tooth supported overdenture with ball attachments for enhanced retention.

CASE REPORT

A 63-year-old female patient reported to the Postgraduate Department of Prosthodontics and Crown & Bridge, Indira Gandhi Governmental Dental College and Hospital, Jammu with a chief complaint of difficulty in chewing food due to missing teeth in her upper and lower jaw since6 months. The medical history of the patient was not significant. On extraoral examination, the facial form was found to be ovoid with a Class I facial profile and lip length was found to be average. Intraoral examination revealed completely edentulous maxillary arch and partially edentulous mandibular arch with only two teeth remaining i.e., 34 and 44. The remaining teeth were non-carious and had good periodontal support.The maxillomandibular relation was Class I with adequate interarch space present in the premolar region.

Based on the clinical and radiographic findings, it was decided to fabricate a conventional maxillary complete denture and a mandibular ball attachment retained tooth supported overdenture. The patient was informed about the proposed treatment plan and a consent was obtained.

PROCEDURE

- 1. Elective endodontic treatment was carried out for the teeth 34 and 44 and the teeth were prepared in a dome-shaped contour with approximately 2-3mm projecting above the gingiva.
- 2. Access post overdenture attachment system having drills for post space preparation and countersink along with the ball attachment was used in this case. First drill was used for the post space preparation and the second drill was used to prepare the countersink. The ball attachments were then luted in the post space using resin cement.
- 3. Maxillary and mandibular preliminary impressions were made using impression compound and casts were poured.
- 4. Custom trays were fabricated on the primary casts using auto polymerising resin. Border moulding of the maxillary and mandibular arches was performed using low fusing impression material and final impression was made using zinc-oxide eugenol impression paste for the maxillary arch and light body consistency of the addition silicone impression material for the

mandibular arch to avoid the distortion of the final impression due to the presence of undercuts in the mandibular arch.

- 5. Temporary record bases and wax rims were fabricated followed by jaw relations and facebow transfer to the semi-adjustable articulator. Teeth arrangement was done to achieve bilateral balanced occlusion.
- 6. After try-in verification, maxillary and mandibular complete dentures were processed in a conventional manner.
- 7. Maxillary complete denture was inserted in a conventional manner. The mandibular tooth supported overdenture was placed intraorally and the intaglio surface of the denture was marked in the area of ball attachment using pressure indicating paste.
- 8. This area was trimmed in the shape of a circular cavity using tungsten carbide trimmers to accommodate the female component (nylon housings) of the attachment system.
- 9. The female components were secured on the ball attachments and a pink coloured auto polymerising resin was mixed and placed the cavity created in the mandibular denture. The mandibular denture was then seated intraorally on the attachments and the auto polymerising resin was allowed to set.
- 10. Once set, the female components were picked along with the mandibular denture from the oral cavity. The excess flash of resin was trimmed and the dentures were finished and polished followed by insertion. The postinsertion instructions were given to the patient and follow up recalls were done after 24hours, one week and one month intervals.



Fig. 1. Maxillary and mandibular edentulous ridges



Fig. 2. Elective endodontic treatment was done for teeth 34 and 44



Fig. 3. Access post overdenture attachment system



Fig. 4. Post space preparation in 34 and 44







Fig. 5. Ball attachment luted and radiographically examined



Fig. 6. Border moulding performed and final impression made with light body addition silicone



Fig. 7. Intaglio surface of mandibular denture marked and trimmed





Fig. 9. Nylon housings picked in the mandibular denture

the ball attachments



Fig. 10. Excess trimmed and mandibular denture finished and polished



Fig. 11. Maxillary complete denture and mandibular tooth supported overdenture inserted



Fig. 12. Pre and post frontal view of patient

DISCUSSION

Edentulism is defined as the complete loss of all dentition and is a worldwide phenomenon.¹ Edentulism has a series of deleterious consequences on oral and general health of an individual.1 According to the World Health Organization criteria, edentulous patients are considered physically impaired, disabled, and handicapped because of their inability to properly masticate and speak.¹The prospect of losing all the teeth can be very disturbing for a patient, bringing down patient's morale as it is an in direct reminder for being dependent on others and losing senescence.² In such conditions, overdenture option as preventive prosthodontic treatment modality should be regularly imbibed in our dental practices because of its innumerable advantages such as Maintaining the integrity of the ridge, Improved retention and stability of the denture and improved proprioception. All these factors add to the psychological benefits of the patient along with improved self confidence in complete denture wearers. Shortening of the over denture abutment teeth, creates adequate space for overlying artificial teeth and denture base and it also reduces oblique forces on abutment teeth.³

Chen et al. observed that the patients treated with tooth-supported overdentures had significantly more comparative masticatory efficiency than those withconventional complete dentures, while there was an insignificant difference in comparative masticatory efficiency between tooth-supported overdentures and implant-supported overdentures.⁴Crown and Rooney 1975 in their study found that retention of mandibular canine for overdenture led to preservation of alveolar bone.⁴

Various types of attachments are available and they havebeen widely used with removable partial/complete dentureprosthesis, segmented fixed prosthesis, and implant supported prosthesis. Yet, no single attachment is perfect forevery case, so it is critical that the appropriate attachmentshould be selected for each individual situation.⁵Attachments are broadly categorized into three types: stud attachment, Bar attachment and Magnet attachments. In the above-mentioned case, ball or stud attachments were used. 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.⁶ It is the simplest of all types of attachments. "The Stud" (Male part)usually attached to metal coping cemented overthe prepared abutment and it projects from theroot surface of the preparation. The female partis attached to the denture. Attachment of malecomponent to female component provides retention.⁷ Tooth & implant-supported overdentures are a "step in the direction of preventive prosthodontics". They Preserve the residual ridge, provide support and stabilization to the denture base, and thus gives the patient a sense of security in

knowing that teeth aid in support of their prosthesis. The maxillary overlay denture is of great value when it opposes remaining mandibular anterior teeth because it aids in conserving the ridge against resorption from "masticatory stress."7The ball and socket 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.8 The amount of retentive force provided by the stud attachments are not likely to be detrimental to the abutments and at the same time provides sufficient amount of retention to the denture.⁸ Patient cooperation is also necessary for the success of the treatment by maintaining the oral hygiene to eliminate any chance of periodontal disease or secondary caries.

CONCLUSION

Mandibular tooth supported overdentures are a viable treatment option to preserve the remaining alveolar bone and maintain the proprioception, masticatory efficiency, and psychological benefit to the patient.Various attachment systems are available to further aid in improved retention and stability of dentures.Proper attachment system for the particular individual case directs the success and long-term clinical longevity in the treatment of tooth retained overlaid dentures.

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