Bar-retained Tooth-supported Maxillary Overdenture—A Case Report

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Abstract

The maintenance of the bone anatomy requires a certain amount of daily stress/strain stimulus. Loss of teeth leads to alveolar ridge resorption, inefficient mastication, altered speech, and lowered confidence. A traditionally complete denture was the treatment of choice. Preventive prosthodontics aims at avoiding complete edentulism. Overdenture treatment is emphasized by preventive prosthodontics, which uses abutment teeth for support and hence allows the retention of remaining natural teeth. Advances in technology have introduced attachment-retained overdenture, which act as stress redirector and shock absorber and also offers several advantages over complete denture like superior retention, support, stability, psychological benefits, and proprioception. This article presents a case report that describes the steps involved in a bar-retained tooth-supported maxillary overdenture with a 2-year follow-up.

Keywords: Preventive prosthodontics; Overdenture, Attachment, Bar retained

Introduction

Alveolar ridge resorption is the usual consequence of tooth loss. The fundamental principle of bone physiology is the adaptation of the bone mass and structure according to the levels of strain. The maintenance of the bone anatomy requires a certain amount of daily stress/strain stimulus [1]. Loss of teeth also leads to ineffective mastication, altered speech, and lowered self-confidence [2]. Resorbed ridge pose a challenge to dentists. A conventionally complete denture was the choice of treatment. However, patients frequently complain about the retention and stability of the prosthesis [3]. The extraction of the few remaining natural teeth and replacement with complete dentures create a new situation for the patient to adapt [4]. Prothero, in 1916, mentioned that, "Oftentimes two or three widely separated roots or teeth can be utilized for supporting a denture" [3]. Preventive prosthodontics emphasizes on procedures that either delay or eliminate inevitable problems. Preventive prosthodontics aims at avoiding complete edentulism. It projects the overdenture as one of its treatment modality [3,5]. Moreover, many patients who seek denture treatment, present with two or more remaining natural teeth in the oral cavity. The overdenture utilizes abutment tooth for support, stability, and retention. The uses of attachment in abutment tooth is an advancement in overdenture treatment [5]. The choice of attachment is based on the number and location of the remaining natural teeth and also clinicians' experience [3,6].

Advantages of overdenture with attachment [7]

- Redirects occlusal force toward stronger abutment
- Acts as a shock absorber
- Stress redirection
- Superior retention
- Stability
- Support
- Preservation of the alveolar ridge

- Proprioceptive stimulus
- Economical
- Psychological benefits

In this case, bar and clip attachment was used in the overdenture. In addition to providing retention, bars also splint the abutment tooth spanning the edentulous ridge.

Case Report

A male patient with the age of 52 years reported to our clinic with a chief complaint of inability to chew due to missing teeth in upper front and back tooth region of jaw. On clinical examination, the maxillary arch had only five remaining teeth (15, 24, 25, 26, 27). After diagnosis, the following treatment options were explained to the patient for replacing the missing teeth:

1. Extraction of remaining teeth followed by complete denture
2. Tooth-supported overdenture
3. Implant-supported overdenture

The patient was not willing for the extraction of the remaining teeth since he wanted to retain his natural teeth. Hence, the patient chose-tooth supported overdenture as the treatment since it allowed the retention of natural teeth and was also economically feasible.

Treatment Course

Intentional root canal therapy was performed on the abutment teeth: 15, 24, 25, 26, 27. Tooth preparation was carried out on all abutment teeth with a heavy chamfer finish line. Thus, optimal crown root ratio was obtained along with adequate clearance for the overdenture prosthesis (Figure 1). Custom tray was prepared and border molding done using green stick compound. An impression was made with the two-step putty wash technique using addition silicone (Aquasil Lx Ultra, Smart Wetting Impression Material, Dentsply, Detrey Gmbh, Konstanz, Germany). After beingding and boxing, cast was poured in die stone (Ultra Rock, Kalabhai Karson Pvt. Ltd., Mumbai, India). Inlay wax pattern coping was fabricated on the abutment teeth...
with a pre-fabricated plastic bar of 2 mm thickness. Casting of the
inlay coping and bar was done, and it was finished and polished. The
metal bar and copings were initially tried on the patient. Passive fit was
verified (Figures 2 and 3). After metal try-in, the undersurface of the
bar was blocked and the whole assembly was duplicated using rubber
base impression material (Aquasil soft putty, Dentsply, Mumbai, India).
Cast was poured. After this, the metal copings were luted with glass
ionomer cement (Dentsply Aquacem, York) to their respective tooth
preparations (Figure 4). The remaining steps up to try-in were followed
similar to complete denture. In the laboratory, metal super structure was
placed on the duplicated master cast and the undersurface blocked to
avoid resin flow. The complete prosthesis incorporated with metal super
structure was fabricated. (Figures 5 and 6). The bar-retained tooth-
supported prosthesis was inserted (Figures 7 and 8). The patient was
trained to insert and remove the prosthesis. Postinsertion instructions were given. Denture hygiene protocol was discussed with the patient. A 1-week, 3-month, 6-month, 1-year, and 2-year follow-up revealed a well functional and retentive denture. The patient was satisfied with the function, esthetics, and retention.

**Discussion**

Overdenture treatment is focused under preventive prosthodontics [4]. Retaining the remaining natural tooth/tooth root prevents the ridge resorption. Tensile stimulation of the periodontal ligament fibers allows bone deposition, and hence, the chances of abutment tooth mobility are lowered [5,8]. In comparison with complete dentures, the overdenture provides better chewing efficiency, increased biting force, and controlled movement. Technical advancements and expanding knowledge have introduced the attachment-retained overdenture [9,10]. Attachments act as a stress redirector and shock absorber. In this case, bar type attachment was used. Bar attachments not only provide retention but also splint the abutment teeth [11,12]. Stud attachments are more time-consuming and relatively expensive. They also undergo rapid wear and damage. The attachment selected for retention and oral hygiene determines the success of the procedure. The following are to be considered during overdenture treatment: (a) Vertical space assessment—sufficient space should be available for the coping, denture base, and denture teeth; (b) oral hygiene status of the abutment teeth; (c) periodontal status of the remaining teeth. Overdenture obtains the dual support of both residual alveolar ridge and abutment teeth [13,14]. Mechanoreceptors of the periodontal ligament influences bone deposition and masticatory muscles. Hence, the conservation of the remaining natural teeth is valid [15].

**Conclusion**

The tooth-supported overdenture is advisable over complete denture since it offers several advantages like superior retention, stability, and proprioception. However, the choice of attachment and the oral hygiene status of the patient determines the outcome. The overdenture requires regular follow-up and maintenance. Patient education on oral hygiene plays a vital role. Thus, the retention of remaining natural teeth can either delay or eliminate complete edentulism.

**References**