

**Tooth Supported Bar Retained Mandibular Overdenture- A Case Report**

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**Abstract**

Overdentures are one of the treatment option in preventive Prosthodontics and has been successfully used in the rehabilitation of patients with few remaining natural dentition. The retention of natural teeth will aid in maintaining good bone levels as well as retain the patients' tactile sensations which aids in their mastication. Splinting of teeth used for overdenture with a bar attachment improves the stability and reduces the force on individual abutment teeth. This case report discusses the rehabilitation of a patient with a tooth supported bar retained mandibular over denture.

**Introduction**

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prosthodontic problems. The overdenture is a logical

method for the dentist to use preventive prosthodontics. Retaining teeth, particularly mandibular canines, to support overdentures. Retention of the roots of one or more canines for overdentures offers the patient several advantages from a functional as well as a biologic standpoint.<sup>1</sup>

Overdentures should be considered in the event of loss of alveolar bone support and subsequent development of an unfavorable crown-root ratio. They are considered in every case as an alternative to the extraction of all natural teeth.

Extraction of all natural mandibular dentition and replacement with a complete mandibular denture is not the most desirable treatment. Problems associated with the conventional complete mandibular denture are apparent to every dentist.

Many patients desiring for complete denture therapy usually have few retained natural teeth. By applying the basic principles of “preventive prosthodontics,” a seemingly inevitable completely edentulous situation can be avoided and becomes a very successful rehabilitation by the use of the procedure called “overdenture therapy.”<sup>3,4</sup>

The ultimate objective of the prosthetic treatment is to provide the patient normal function as possible. Residual soft and hard tissue preservation is the basic concept in overdenture therapy. Incorporating attachments and retentive devices with the basic principles of complete denture design has improved mechanical stabilization. The splinting of two or more teeth with a bar produces stability similar to the rigid stud type attachment when the overdenture is in place.

Hence, overdentures are more beneficial as they provide psychological, functional as well as biological advantages for the patients.

### Case Report

A 60 year old female patient reported to the Department of Prosthodontics with the chief complaint of difficulty in chewing food and poor appearance. Intraoral examination showed generalized severe attrition and poor periodontal condition. On radiographic examination (Fig1) and considering the patient’s desires and treatment needs, it was decided to extract all the teeth except 33 and 43 and to perform an overdenture therapy in the mandibular arch and a conventional complete denture in the maxillary arch.



Figure 1: OPG

The different treatment modalities available for this patient were:

- Extraction of all the teeth followed by conventional complete denture
- Extraction followed by implant supported overdenture
- Tooth supported overdenture.

Considering the financial status and existing condition of the remaining dentition of the patient, it was decided to use 33 and 43 as abutments and fabricate a single complete denture for maxillary edentulous arch and tooth retained bar supported overdenture for partially edentulous mandibular arch owing to the obvious advantages of the retention of the roots. Thorough oral prophylaxis was carried out for the abutment teeth (Fig 2) and diagnostic impressions were made, adequate inter arch space was recorded in the tentative jaw relation.



Figure 2: Retained abutments in mandibular arch

Intentional root canal therapy was carried out for the abutments (33 and 43). Tooth preparation was done on both mandibular canines chamfer finish line was prepared, which resulted in optimal crown–root ratio and adequate clearance for overdenture prosthesis (Fig 3). Preparation for the post was done. Custom post patterns were fabricated directly in the root canal using pre-fabricated post and a pick-up impression was made using rubber base impression.



Figure 3: Tooth Preparation on 33 and 43



Figure 4: Elastomeric impression

Impression was poured using die stone and an inlay wax pattern of the coping was fabricated for the mandibular canines and the two copings were connected with a pre-fabricated plastic bar. Surveying was carried out for checking parallelism. Ni-Cr alloy was used to cast the wax

pattern. The casting was retrieved, finished and polished to avoid plaque accumulation along the bar.

The metal bar with retainer copings were tried first on the cast and intraorally to check for the passive fit. After the metal try-in, the bar and metal copings were placed intraorally and the undersurface was blocked and a plastic positioner clip was placed.



Figure 5: Trial of the bar assembly

The whole assembly was duplicated with zinc oxide eugenol impression material and the cast was poured. The bar, along with the metal copings, were then luted onto the preparations using glass ionomer cement.



Figure 6: Pickup impression

The jaw relation and try in were carried out following the conventional complete denture protocol. Dewaxing of the investment was carried out and the metal superstructure was placed on the duplicated master cast. The undersurface of the metal superstructure was blocked to avoid the flow of resin between the positioned clip and the bar.





Figure 7: Intaglio surface of the finished mandibular prosthesis

Completed prosthesis consisted of metal superstructure incorporated in complete denture. Positioner clips were replaced with yellow-colored medium retention clips. Patient was trained for the placement and removal of the dentures. Home care instructions were given.



Figure 8: Post-operative follow-up of the patient after a week was done. The patient reported high satisfaction with the amount of retention and stability of the tooth supported bar retained mandibular over denture.

## Discussion

DeVan stated that “Perpetual preservation of what remains is more important than the meticulous replacement of what is lost”.

The overdenture therapy is basically a “preventive prosthodontic concept” as it preserves the remaining tooth/roots and prevents a completely edentulous condition. The earliest reference to the use of roots for providing support was by Prothero “Oftentimes two or three widely separated roots or teeth can be utilized for supporting a denture”.<sup>5</sup>

Crum and Rooney graphically demonstrated in a 5 years study an average loss of 0.6 mm of vertical bone in the anterior part of the mandible of overdenture patients through cephalometric radiographs as opposed to 5.2 mm loss in complete denture patients<sup>6</sup>. In a 4 years study by Renner et al., it was found that 50% of the roots used as abutments in overdenture therapy remained immobile.<sup>7</sup>

Rissin et al. in 1978 compared masticatory efficiency in patients with natural dentition, conventional complete denture and over denture. It was found that chewing efficiency in overdenture patients was one-third higher than the complete denture patients.<sup>8</sup>

According to Robert L Defranco, three important goals are achieved by tooth supported overdenture therapy. It preserves the abutment as a part of the residual ridge which provides more support than a conventional complete denture. Alveolar bone integrity is maintained by retaining the teeth as they support the alveolar bone.<sup>9</sup> With the preservation of the teeth there is also preservation of the periodontal membrane and this in turn preserves proprioceptive impulses resulting in better occlusal awareness, biting forces and consequent neuromuscular control.

Increase in retention of the overdentures can be achieved by using different attachments available. Overdenture

treatment requires careful assessment of vertical space, especially with the attachments, i.e. there must be sufficient room for roots, copings and possible attachments, together with an adequate thickness of denture base material and artificial teeth, without affecting the strength of the denture. The bar joint denture offers a transitional solution between the clasp-retained removable partial denture and the complete denture.<sup>10</sup>

In this case the preservation of two lower canines for mandibular overdenture provided adequate support, retention, stability and comfort superior to conventional complete mandibular denture. A metal bar was used. The abutments splinted together with a bar are more beneficial than using individual abutments separately. Due to the splinting effect of the bar both teeth become firm. It also reduces torquing of the remaining root structure because the crown root ratio is decreased.

Direct and indirect technique are the two methods used for clip insertion. A direct technique is a chair side procedure using autopolymerizing resin, whereas the indirect technique is a laboratory procedure where heat-cure acrylic resin is used. Indirect technique for clip insertion was used in this case. The direct technique is most commonly practiced and has got several disadvantages of auto polymerizing acrylic blocking out all undercuts during the clinical procedure, the retention clips that will not hold if free monomer is present, shrinkage, water sorption and voids within the auto polymerizing resin.<sup>11</sup>

Clip attachment with indirect technique has several advantages like minimal damage to the final prosthesis, wherein the final prosthesis will have adequate strength, clips can be easily incorporated into the receptacles of the metal superstructure with an accurate fit, patients can easily replace the retention clips, future relines and repairs will not compromise the prosthesis and risk of denture base fracture is minimized. The only disadvantage of this

technique is the extra steps during fabrication and limited application in patients with decreased interarch space.

### **Conclusion**

The mandibular tooth-supported overdenture is one of the best treatment modalities of for the edentulous patients with few remaining teeth. Retention of the overdenture prosthesis can be increased by use of different attachments available but is usually limited by the insufficient interarch space available and cost factors. A wide variety of treatment options are enabled due to different types of attachments available. The practitioner must consider use of overdentures whenever possible. This case report describes the clinical and laboratory steps for fabricating a tooth-supported overdenture with a castable bar and clip attachment by the indirect technique to help the clinician adequately select, plan and deliver a bar overdenture to their patients. This procedure is simple and cost-effective provides good stability and excellent retention. Although the suggested method involves additional laboratory procedures during fabrication, it offers several advantages of the indirect techniques.

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