

## CASE REPORT

### Mandibular Bar-Retained Tooth-Supported Over Denture: Case Report.

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#### ABSTRACT

Alveolar bone loss is an inevitable consequence of tooth loss associated with old age. Increased alveolar bone resorption in mandible will lead to prosthetic concerns such as loss of retention and stability in the mandibular denture. Conventional removable complete dentures have long been the treatment of choice for complete edentulism, but it comparatively provides compromised retention, stability and poor masticatory efficiency, at times failing to meet expectations of the patients. To overcome these drawbacks, while retaining some of the remaining natural teeth which will aid in improved retention, stability and support, the concept of overdenture is seen as a patient-friendly and more successful alternative to conventional complete dentures.

This case report discusses about the step by step procedure for the fabrication of a bar retained tooth-supported mandibular over-denture that opposes a conventional complete maxillary denture with an identification mark (Photographic method).

**Keywords:** Attachments, Denture Identification mark, Overdenture, Preventive Prosthodontics.

**How to cite this article:** Gajapathi. B, Arjun B, Shameem R, Arul Kumar S, Priyanthi.A, Nishanthini.M. Mandibular Bar-Retained Tooth-Supported Over Denture: Case Report. *J Clin Prosth Impl* 2023;5(1):14-17. <https://doi.org/10.55995/j-cpi.2023003>.

#### INTRODUCTION

Complete denture wearers encounter a number of denture problems such as loss of retention, difficulty in mastication, phonation and discomfort over the course of time. One of the ways to overcome these complaints are to preserve the remaining natural teeth.<sup>1</sup> The concept of overdenture is that of a removable complete denture which instead of overlying the maxillary or mandibular ridge, overlies either on a retained tooth, root or a dental implant.<sup>2,3</sup>

The concept of "Preventive Prosthodontics", as given by Devan's dictum states that the "Aim of prosthodontics is not only the meticulous replacement of what is missing, but also perpetual preservation of what is present" which emphasizes the significance of remaining natural teeth and its role as abutments in improving retention, proprioception and masticatory efficiency.<sup>4</sup> It is to be noted that overdenture comes under a specialized branch of prosthodontics called "Preventive Prosthodontics". It is also reiterated that bone loss was significantly lesser in patients with tooth-supported overdentures as compared to those who were wearing conventional complete dentures.<sup>5</sup>

Denture identification methods are commonly employed for easy denture identification in both living and in deceased persons wherein situations

may arise that might require denture to be identified in an accident scenario or when dentures are lost.

#### CASE DESCRIPTION

A 68-year-old male patient reported to the Department of Prosthodontics and Crown & Bridge, with the chief complaint of missing teeth in his upper and lower arch. Patient gives a history of missing teeth, difficulty in chewing and speech for the past 2 years. On intra-oral examination, in the maxillary arch the missing teeth were 11,12,13,14,15,16,17. Gingival recession was recorded Class II and Class III along with Grade III mobility in 21, 22,23,25,26. In the mandibular arch the missing teeth were : 31,32,35,36,37,41,42,45,46,47. The remaining teeth : 33,34,43,44 were found to be intact and sound without any endodontic and periodontal findings. The patient was diagnosed Kennedy's Class II partially edentulous Maxillary arch opposing a Kennedy's Class I modification 1 partially edentulous Mandibular arch. (Fig 1)

#### TREATMENT PLANNING:

The proposed treatment plan for this case scenario were as follows:

- Extraction of mobile maxillary teeth (21,22,23,25,26) followed by conventional complete denture in Maxilla.

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- Bar-retained overdenture overlying the remaining natural teeth (33,34,43,44) in the Mandible

Considering the condition of the remaining natural teeth and the financial status of the patient, it was decided to go with a Maxillary Conventional Complete Denture and Mandibular Tooth-supported Overdenture.



Figure 1: Mandibular intra-oral image.

#### CLINICAL PROCEDURE:

After extraction of the hopeless teeth and satisfactory healing, the following steps were carried out.

- A primary impression was made using impression compound for the edentulous maxillary arch and alginate was used for the partially edentulous mandibular arch.
- Diagnostic casts were poured.
- The mandibular cast was surveyed, a tentative jaw relation was done and articulated. Adequate interocclusal distance for overdenture placement was found.
- Intentional root canal therapy was carried out for the abutment teeth (33, 34, 43 and 44) followed by tooth preparation to achieve crown-root ratio and chamfer finish line for metal coping.
- Border moulding was carried out in a custom tray for Maxilla and Mandible using greenstick compound, after which a secondary impression with medium body putty impression material (Monophase)
- Working casts were retrieved from the impression and an Inlay wax pattern for the coping over 33,43,34,44 was fabricated. A prefabricated plastic bar of 2mm thick connecting the two mandibular canine wax copings was attached.
- The wax pattern was invested and cast using the Induction Casting technique.
- After divestment, the metal framework was trimmed, finished, and polished.
- Coping along with the bar retainer were checked for the passive fit on the cast and then intra-orally.

- The metal copings and bar retainer were later cemented on to the abutment teeth using Glass Ionomer Cement. (Fig 2)



Figure 2: Metal copings along with bar retainer cemented to mandibular canines

- The metal copings and bar retainer were duplicated by means of a putty impression and cast poured.
- The remainder steps up to try in was carried out similar to the conventional complete denture.
- After dewaxing, the metal superstructure was placed on the duplicated mandibular master cast and processing was done.(Fig 3)

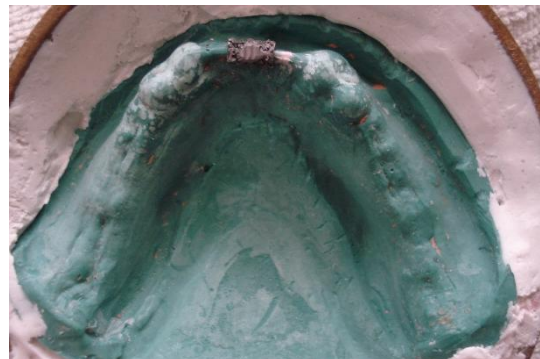


Figure 3: Metal superstructure overlying the duplicated master cast

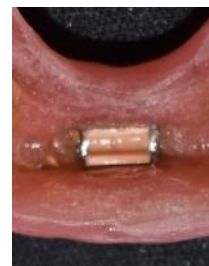


Figure 4: Tissue surface of the mandibular overdenture with the incorporated metal superstructure and soft rubber sleeves

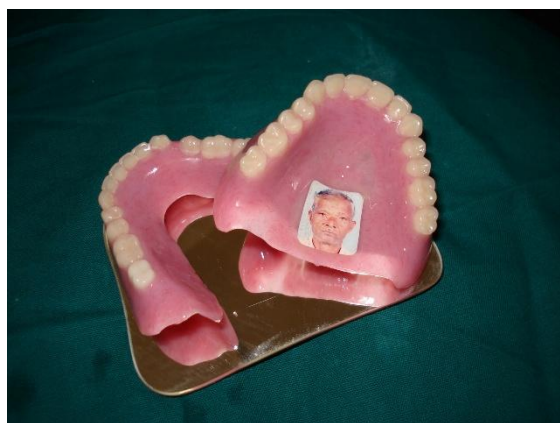


Figure 5: Finished and Polished Maxillary Complete Denture and Mandibular Overdenture

- The denture was retrieved and then trimming, finishing and polishing was done and soft rubber sleeves were placed on to the metal superstructure.(Fig 4)
- A putty index was made for the maxillary complete denture and a small window made on the palatal surface of maxillary complete denture. A layer of clear acrylic autopolymerizing resin was applied and photograph placed.(Fig 5)
- Denture was inserted and post-insertion instructions were given. (Fig 6)



Figure 6: Pre-operative and Post-operative extra-oral image

## DISCUSSION

According to GPT-9, Overdenture is any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants. Overdentures have been in use since the 1970s and have been a go-to alternative for patients who present for complete denture treatment but with few remaining teeth in the arch.<sup>6</sup> According to a study by Tallgren

comparing alveolar bone resorption following tooth extraction and complete denture placement, it was found to be 7 times more in Mandible as compared to Maxilla making it difficult for denture retention and failure of functional rehabilitation.<sup>7,8</sup>

Although the concept of overdentures is an appealing alternative to conventional complete dentures, the success of overdentures relies on various anatomic, intra-oral and prosthetic factors. Factors to be considered for the success of overdentures include

- Number, position, crown-root ratio of the remaining natural teeth.<sup>9</sup>
  - Endodontic and periodontal status of the remaining natural dentition.<sup>10</sup>
  - Inter-occlusal distance <sup>1,2</sup>
  - Maxillomandibular relations <sup>8,9</sup>
  - Space for copings, attachments and artificial teeth<sup>11</sup>
- Tooth-supported overdentures provide better retention and stability especially in the mandible which encounters disturbances from the tongue and its movements which interferes with the denture retention and stability.<sup>1</sup> Provides better chewing efficiency and comfort to patients<sup>6</sup> Improves their confidence and has an added psychological benefit of having natural teeth in the oral cavity.<sup>12</sup> Proprioception retained as a result of intact periodontium is an added advantage<sup>2</sup>

Ideal patients for tooth-supported overdentures are as follows:

- Patients with few remaining teeth<sup>13,14</sup>
- Patients requiring single complete denture<sup>1,2</sup>
- Tongue morphology which is unfavorable for prosthesis retention<sup>1</sup>
- Patients with a high palatal vault<sup>2</sup>

The retention of overdentures can further be enhanced by various attachments such as studs or bars which redirect the occlusal forces more apically towards the alveolar bone. Overdenture attachments can further be rigid or resilient amongst which the resilient ones offer better protection to weaker abutments by redirecting occlusal forces.<sup>14</sup>

Several methods such as surface methods, inclusive methods, ID-marking systems are available to mark dentures for identification. In this case, the patient's photograph was placed on the palatal surface of the Maxillary Complete denture for identification which was the most economical and appropriate denture identification method given the patient's socioeconomic and literacy status.

## CONCLUSION

Proper diagnosis and patient selection plays a pivotal role in the success of tooth-supported bar retained overdentures as a cost-effective, patient friendly alternative to implant-supported prosthesis

## CONFLICT OF INTEREST

There is no conflict of interest

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