

## Bar Retained Tooth Supported Overdenture: A Case Report

Bista S,<sup>1</sup> Sapkota B<sup>2</sup>

<sup>1</sup>PG Resident, Department of Prosthodontics, Department of Prosthodontics, Dhulikhel Hospital, Kathmandu University, Dhulikhel, Nepal

<sup>2</sup>Professor, Department of Prosthodontics, Dhulikhel Hospital, Kathmandu University, Dhulikhel, Nepal

### ABSTRACT

Overdenture helps in preservation of the sensation of proprioception, maintains the border seal and provides the patient with good phonetics and chewing efficiency. The retention and stability of such prosthesis is enhanced greatly in bar-supported overdentures. This case report presents the step by step procedure for the fabrication of a canine supported hader bar mandibular overdenture that opposes a conventional complete maxillary denture. The bar was fabricated from pre-formed plastic bar, casted and female clips were attached in the mandibular denture. The mode of retention was primarily through frictional resistance.

**Key words:** Attachments, Hader Bar, Overdenture

### INTRODUCTION

Overdenture is any removable dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implants.<sup>1</sup> Tooth supported overdenture maintains teeth as part of the residual ridge, reduces the rate of resorption and improves the patient's manipulative skills in handling the denture. It leads to the preservation of the teeth and periodontal membrane which preserves the proprioceptive impulses.<sup>2</sup> The use of hader bar enhances retention and stability along with evenly distributing forces in posterior edentulous areas.<sup>3</sup> Their relatively affordable price and simple clinical management, together with substantial improvements to retention and stability, make them an attractive and realistic treatment option.

*Conflict of Interest: None*

#### \*Corresponding Author

Dr. Salina Bista, PG Resident, Department of Prosthodontics, Dhulikhel Hospital, Kathmandu University, Dhulikhel, Nepal  
Phone No: 9843281267  
E-mail: bistasalina@gmail.com

### CLINICAL REPORT

62 years old female presented to the Department of Prosthodontics, Dhulikhel Hospital with the chief complaint of difficulty in chewing foods due to missing tooth in both arches which she want replaced. Intraoral examination revealed lower incisors with Grade II mobility and periodontally sound lower canines. After studying orthopantomogram (Fig 1), diagnosis for maxillary arch was complete edentulism and for mandible was Kennedy's Class I partial edentulism (Fig 2, 3). After clinically evaluating patients periodontal status and radiographs, canines were the only teeth which were periodontally sound. The treatment options for maxillary arch included conventional complete denture, removable implant supported overdenture, fixed implant prosthesis and for mandibular arch extraction of remaining natural teeth and followed by complete dentures, tooth supported overdenture, implant supported overdenture and fixed implant prosthesis. Considering the patient's desires, cost factor and treatment needs maxillary conventional complete denture and mandibular tooth supported overdenture were planned.

After the completion of root canal treatment of lower canines treatment was started as follows. Preliminary maxillary and mandibular diagnostic impressions were made with irreversible hydrocolloid (Coltene, India) in stock plastic tray (Samit, New Delhi, India) and diagnostic casts (Kalstone, Kalabhai, Mumbai) were obtained (Fig 4).

Diagnostic mounting was done after tentative jaw relation and interocclusal space was measured at the first premolar region which was found to be suitable for hader bar attachment (Fig 5)

Tooth preparation was done of both canines and impression was made using putty and light body. Border molding was done of upper arch using low-fusing green stick compound (DPI Pinnacle Tracing Sticks, India) and secondary impression was made using zinc oxide eugenol impression paste (Prime, New Delhi) using custom tray (Fig 6). For upper arch the cast was poured using type III dental stone (Kalstone, Kalabhai, Mumbai) and lower cast using type IV stone (Kalrock, Kalabhai, Mumbai). After mandibular cast was obtained die preparation was done, coping was made of inlay wax to which pre-formed plastic hader bar was attached (Fig 7).

Now the copings with hader bar was casted (Bellabond plus, Bego, Germany) and the fit and parallel path of insertion was checked intraorally (Fig 8). After the fit was made sure the border molding was performed in lower arch, bar was luted with fit checker and pick up impression was taken with heavy body polyether (Fig 8).

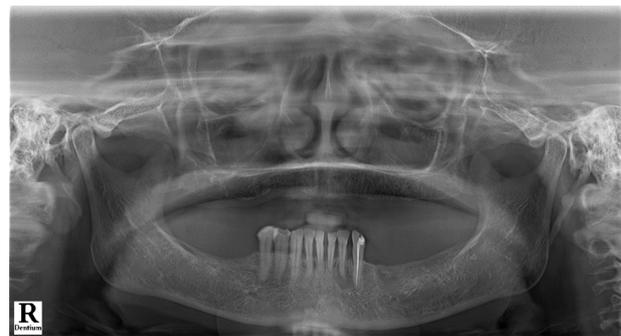
Wax block out was carried out in the obtained cast, spacer was placed for sleeve, duplicated and poured with investing material. After the completion of dipping, wax pattern was made and casting was carried out for metal framework (Fig 10).

The metal framework trial was done in patients mouth (Fig 10). After obtaining horizontal

and vertical maxillomandibular records with record bases and occlusion rims, the casts were transferred to a semi-adjustable articulator (Hanau Wide-View Articulator) using a face-bow transfer (Fig 11).

Artificial teeth (Acryrock) were selected and arranged on the record bases for a trial denture arrangement. The trial arrangement was evaluated intraorally for esthetics, phonetics, occlusal vertical dimension, and centric relation. A protrusive record was made to set the articulator's condylar elements, and a balanced occlusal arrangement was achieved.

Fabrication of the dentures was done using conventional technique. After all the required adjustments of dentures, maxillary dentures were inserted in usual manner. For mandibular dentures at first the hader bar attached unit was placed in patient's mouth and picked up with mandibular prosthesis with female plastic rider (fig 14) so that the path of insertion of bar with attachment would be the same as desired before cementation. Lubrication with vaseline around bar and coping was done and final cementation of bar and coping with type I GIC (GC Corporation, Japan) was carried out (fig 15). The final prosthesis was delivered to the patient (Fig 16). Home care instructions were directed to the patient and she was then trained for insertion and removal of her new denture. The patient was scheduled for follow-up visits after 24 hours and every 3 months and reported no symptoms during 6 months of follow-up.



*Figure 1: Orthopantomogram*



**Figure 2:** Frontal view



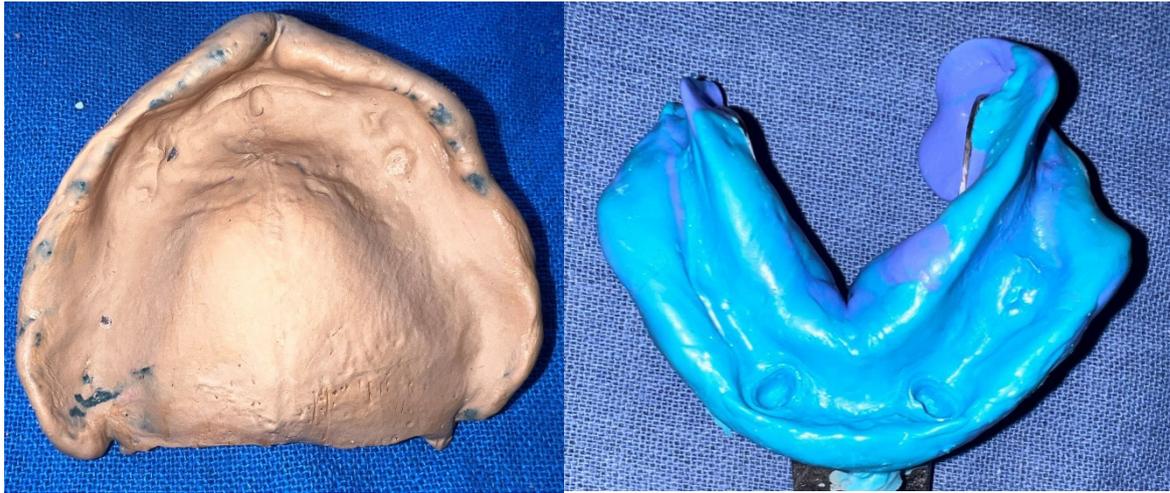
**Figure 3:** Occlusal View



**Figure 4 :** Preliminary diagnostic impression of maxillary and mandibular arch

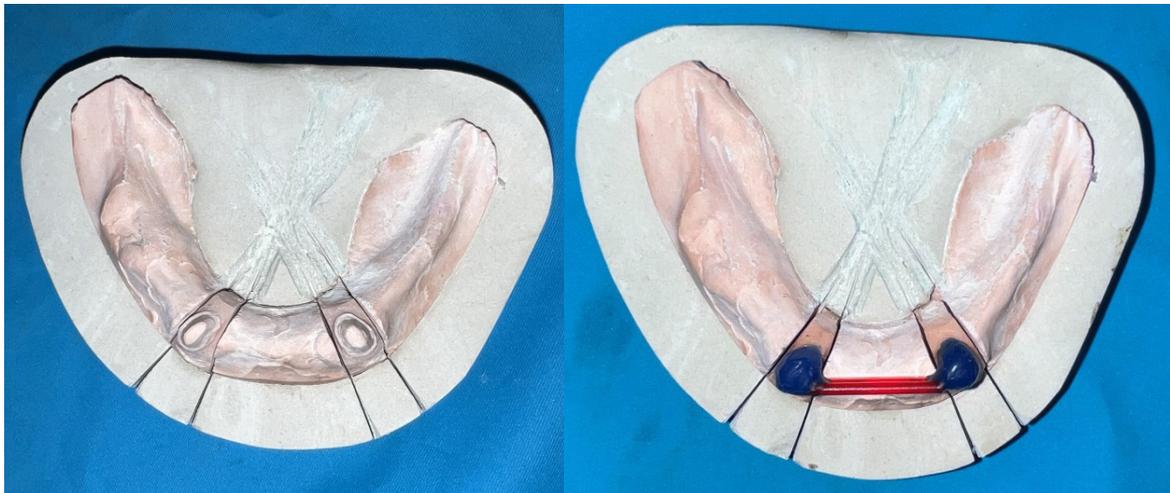


**Fig 5:** Tentative jaw relation and interocclusal distance measured at first premolar area



*Figure 6 : Final impression of maxillary arch and mandibular arch*

after



*Figure 7: Die preparation done and attachment of Hader bar inlay wax coping*



*Figure 8: Casted attachment with bar, fitted and pick up impression with polyether*



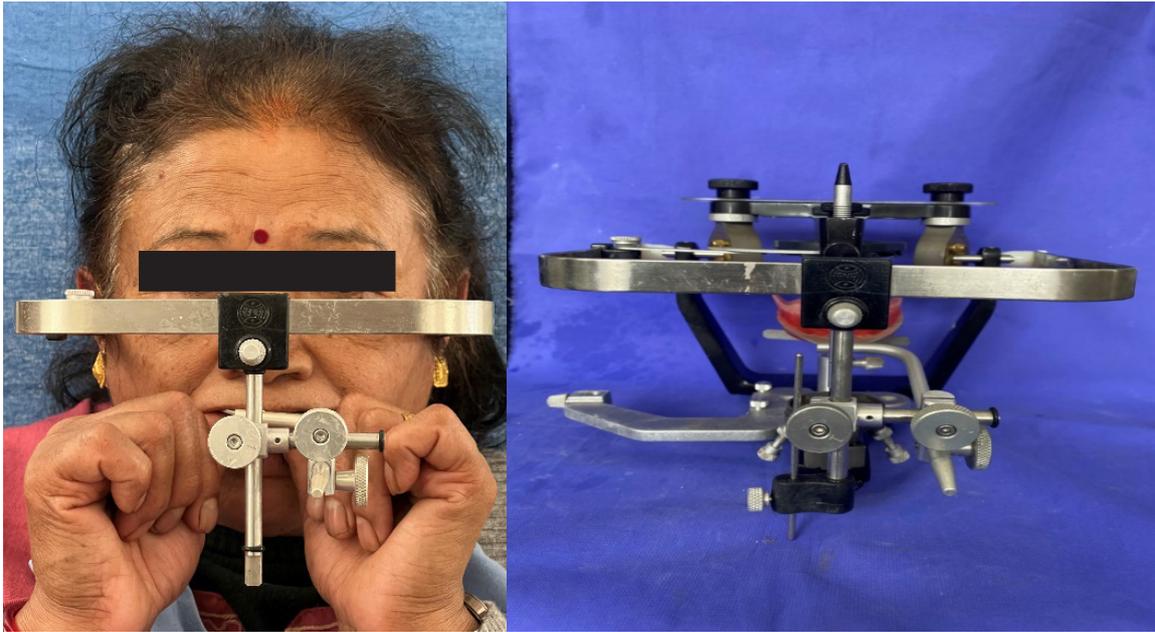
*Figure 9: Master cast of maxilla and mandible*



*Figure 10: Wax blockout with spacer for sleeve and wax pattern for framework*



*Figure 11: Metal framework and its trial*



*Figure 12: Face bow transfer and its mounting on Hanau wide view articulator*



*Fig 13: Try in dentures (Frontal view, Right and left lateral view)*



**Figure 14:** Hader bar attachment picked up with mandibular prosthesis



**Figure 15:** Cemented hader bar attachment unit



**Fig 16:** Finished dentures in frontal, left lateral and right lateral view



**Figure 17:** Pre and Post- insertion

## DISCUSSION

In the past years when the patient presented themselves with severely decayed tooth or periodontally compromised tooth, the first priority of treatment was complete dentures leading to many drawbacks like ill-fitting dentures, inflammation and bone resorption<sup>2</sup>. These denture designs have been modified to gain additional support and stability from a few retained and suitably prepared natural teeth as affirmed by study of Mericske-Stern et al<sup>9</sup>. Roots maintained under the denture base preserves the alveolar ridge, provide sensory feedback and improve the stability of the dentures<sup>8</sup>. In this case, mandibular canines are retained in tooth-supported overdenture because the mandibular canines are usually amenable to endodontic treatment, have strong roots, main concern for alveolar bone preservation particularly in mandibular anterior segment and are strategically located at the corner of the arch as discussed by Renner and Langer et al<sup>10,11</sup>.

Morais et al. reported that implant supported overdenture treatment has become popular for edentulous elderly patients. The oral function with overdentures supported by roots or implants is comparable and does not seem to depend on the presence of a periodontal membrane. They are a preferable alternative to treatment with conventional complete denture, the main advantages are decreased resorption of the residual ridges; psychological benefits for the patients and maintenance of masticatory efficiency<sup>8</sup>.

Overdenture therapy constitutes essentially a preventive prosthodontic concept as it aims to preserve few remaining teeth and supporting structure. The Hader Bar provided more desirable effects to the abutments and remaining structures than did the other tissue bars.<sup>3</sup> In the study done by Chhabra A et al, where post-procedural problems were evaluated, the most common problems were gingival inflammation

(69%) and root caries (36%) because of poor oral hygiene (41%) and loss of metal copings (34%), followed by overdenture base fracture over abutment teeth (34%).<sup>6</sup> Dental implants present several advantages over questionable teeth like standardized structural durability as abutments, not subjected to caries and may be used successfully used even in caries-prone individuals.

However, the major objective in the choice of an overdenture attachment should be the consideration of how the stress is transferred from these attachments through the abutments and other structures, not the retention and stability<sup>3</sup>. The muscle activity is more after placement of attachment than conventional overdenture with copings signifying improvement in chewing effort with attachment<sup>7</sup>. So using the hader bar attachment has improved the patient's acceptability to the treatment.

## CONCLUSION

Tooth supported overdentures which have several advantages have been providing a last line of defense to patients from becoming completely edentulous. The use of attachments can escalate the retention of the overdenture prosthesis, but is usually limited by the insufficient space available and cost factors. This case report describes the clinical and laboratory steps for fabricating a tooth-supported overdenture with a castable bar attachment. This procedure is cost-effective and provides an exceptional stability and excellent retention.

## REFERENCES

1. The Glossary of Prosthodontic Terms, 9<sup>th</sup> Edition, e65
2. Winkler S, Essentials of complete denture prosthodontics, 3<sup>rd</sup> edition, A.I.T.B.S. Publishers, India, 384-402.
3. Thayer HH, Caputo AA, Photoelastic stress analysis of overdenture attachments. J Prosthet Dent 1980;43(6):611-617.

4. McGarry TJ, Nimmo A, Skiba JF, Ahlstrom AH, Smith CR, Koumijan JH, Classification System for Complete Edentulism. *J Prosthodont* 1999;8:27-39.
5. Carr A.B. and Brown D.T. McCracken's Removable Partial Prosthodontics. 12<sup>th</sup> edition.
6. Chhabra A, Chhabra N, Jain A, Kabi D. Overdenture Prostheses with Metal Copings: A Retrospective Analysis of Survival and Prosthodontic Complications. *J Prosthodont*. 2019;28(8):876-82.
7. Barabde AS, Barabde SM, Bhagat A, Thakare A. Mandibular Hader bar attachment overdenture wearers: A five-year longitudinal clinical evaluation by electromyographic analysis. *J Pierre Fauchard Acad*, 2013;27:81-89.
8. Shah FK, Gebreel A, Elshokouki A, Habib AA, Porwal A, Comparison of immediate complete denture, tooth and implant-supported overdenture on vertical dimension and muscle activity. *J Adv Prosthodont* 2012;4:61-71.
9. Mericske-Stern R, Steinlin Schaffner T, Marti P, Geering AH. Peri-implant mucosal aspects of ITI implants supporting overdentures. A five-year longitudinal study. *Clin Oral Implants Res* 1994;5:9-18.
10. Renner RP. The overdenture concept. *Dent Clin North Am* 1990;34:593-606. 23.
11. Langer Y, Langer A. Root-retained overdentures: Part II Managing trauma between edentulous ridges and opposing dentition. *J Prosthet Dent* 1992;67:77-81.