

Enhancing Retention Using Bar and Clip Attachment in Overdenture: A Case Report

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ABSTRACT

Various precision attachment systems are available for tooth-supported overdenture treatment modality. The main purpose of all these systems is to provide retention and support, but bar attachment not only provides retention and support but it also helps in splinting of remaining teeth. The patient was evaluated clinically and radiographically and tentative jaw relation was recorded. The abutment teeth were prepared to receive bar attachment at 13 and 22 and dome-shaped preparation of remaining teeth 23 was done to receive metal coping. Final impressions were made using Addition silicone and zinc oxide eugenol impression material for the maxillary and the mandibular arch, respectively. Following the fabrication of the attachments, the jaw relation was recorded. Teeth arrangement was assessed and dentures were processed.

Conclusion: The patient was rehabilitated with maxillary bar and clip attachment overdenture and conventional mandibular complete denture.

Clinical significance: This technique of overdenture attachment with the Hader bar allowed splinting of the abutment teeth and stress distribution, benefiting the patient psychologically.

Keywords: Tooth-supported Overdenture, bar and clip attachment, maxillary overdenture

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INTRODUCTION

Edentulism, or complete tooth loss, is the ultimate marker of disease burden for oral health.¹

Loss of teeth will lead to rapid resorption of residual ridges and affect the retention, stability, and loss of proprioception.²

Preventive prosthodontics “emphasizes the importance of any procedure that can delay or eliminate future prosthodontic problems and overdenture is an important part of the preventive treatment modality”. De-Van’s golden statement: “Perpetual preservation of what remains is more important than the meticulous replacement of what is missing” still rings true.

An Overdenture is a “dental prosthesis that covers the natural tooth and or is partially supported by natural teeth, natural tooth roots or dental implants”.³

The prime objective behind an overdenture prosthesis is to preserve the remaining natural teeth, alveolar bone, proprioception, and the attached gingiva supporting the denture.⁴ Retention in overdentures can be increased by adding attachments which can be extra-radicular or intra-radicular. Extra- radicular attachments can be physically classified into studs and bar attachments. This case report describes a tooth-supported overdenture with the Hader bar and clip fabricated for a maxillary ridge.⁵

Case report

A 60-year-old male patient reported at the Department of Prosthodontics with a chief complaint of multiple missing teeth, inability to chew, and an unesthetic look. The patient gave a medical history of diabetes mellitus for 15 years and was under medication for the same. Past dental history revealed that the patient had undergone extraction of his upper and lower posterior teeth 7 months back. Extraoral examination revealed an ovoid facial form with a convex profile. Clinical examination revealed that the teeth present were 12, 13, and 23. Grade I mobility with 23 was seen. A square-shaped maxillary and U-shaped mandibular arch with well-rounded ridges were noted. An orthopantomogram (OPG) along with intraoral periapical (IOPA) radiographs were used to assess the endodontic and periodontal prognosis of the teeth. Oral prophylaxis was carried out and a diagnostic irreversible hydrocolloid impression was made and a tentative jaw relation was recorded at the vertical maintained by the remaining natural teeth and mounted on a mean value articulator.



Figure 1: Pre-operative intraoral Photograph

The various treatment options presented to the patient were the following:

For Maxillary arch

- Cu-Sil Denture
- Extraction of remaining teeth and a conventional complete denture
- Tooth-supported overdenture (Dome-shaped coping)
- Bar attachment overdenture
- Extraction of remaining teeth and fixed implant prosthesis
- Removable implant-supported overdenture

For Mandibular arch

- Conventional complete denture
- Implant-supported removable prosthesis
- Implant-supported fixed prosthesis

Taking into consideration the adequate inter-arch space, the good periodontal prognosis of 12, 13 and fair prognosis of 23, square-shaped maxillary arch, well-formed ridges, and financial status of the patient into consideration, it was planned to do a tooth-supported overdenture with the Hader bar attachment on 12 and 23 and metal coping on 13 for the maxillary arch, and a conventional complete denture for the edentulous mandibular arch.

Clinical Procedures

- Intentional root canal treatment was carried out for 12,13 and 23.
- Dome-shaped tooth preparation with chamfer margin was done for 12,13 and 23 and primary impression with irreversible hydrocolloid impression material (DPI Imprint, Fort, Mumbai) was made. (Figure 2)
- The impressions were poured into a dental stone (Kalabhai Karson Pvt Ltd., India). The distance between the two abutments was measured and a prefabricated bar of that length 25 mm was used. The bar used was 5 mm in height. (Figure 3)



Figure 2: Tooth preparations

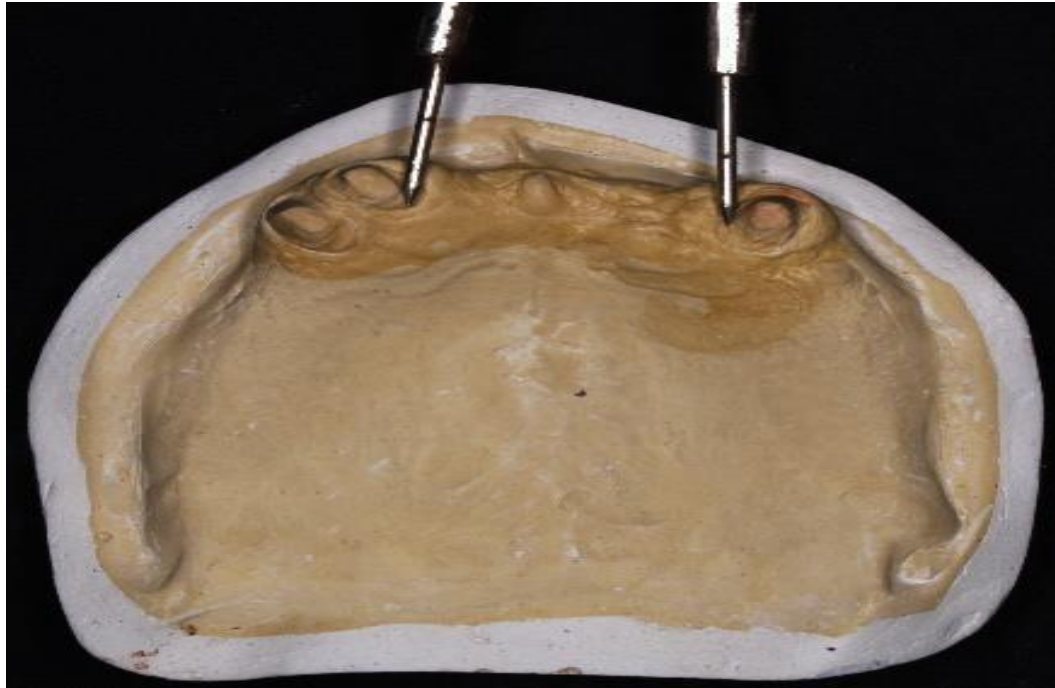


Figure 3: Measurement of length of bar

- Inlay wax pattern copings were made on 12, 13, and 23 and the prefabricated Hader bar was used to splint the copings on 12 and 23. This assembly was cast in the Co–Cr alloy. (Figure 4). The castings were retrieved, finished, and polished following a standard procedure. A well- polished surface prevents the accumulation of plaque.
- The fitting of the bar attachment and the copings were assessed on the cast as well as intraorally. A uniform space of 2 - 3mm was present between the undersurface bar and the mucosa for ease of cleaning. The casted bar and copings were cemented using glass ionomer luting cement. (Figure 5)
- Primary impressions were made for maxillary and mandibular arches, followed by custom tray fabrication using self-cure acrylic resin. Before making a custom tray for the maxillary arch, block out was done beneath the bar attachment with boxing wax. Border moulding using a low fusing impression compound followed by final impressions were made using additional silicone material and zinc oxide eugenol impression material for maxillary and mandibular arch respectively.
- Master cast was poured in die stone and dental stone for maxillary and mandibular arches respectively.

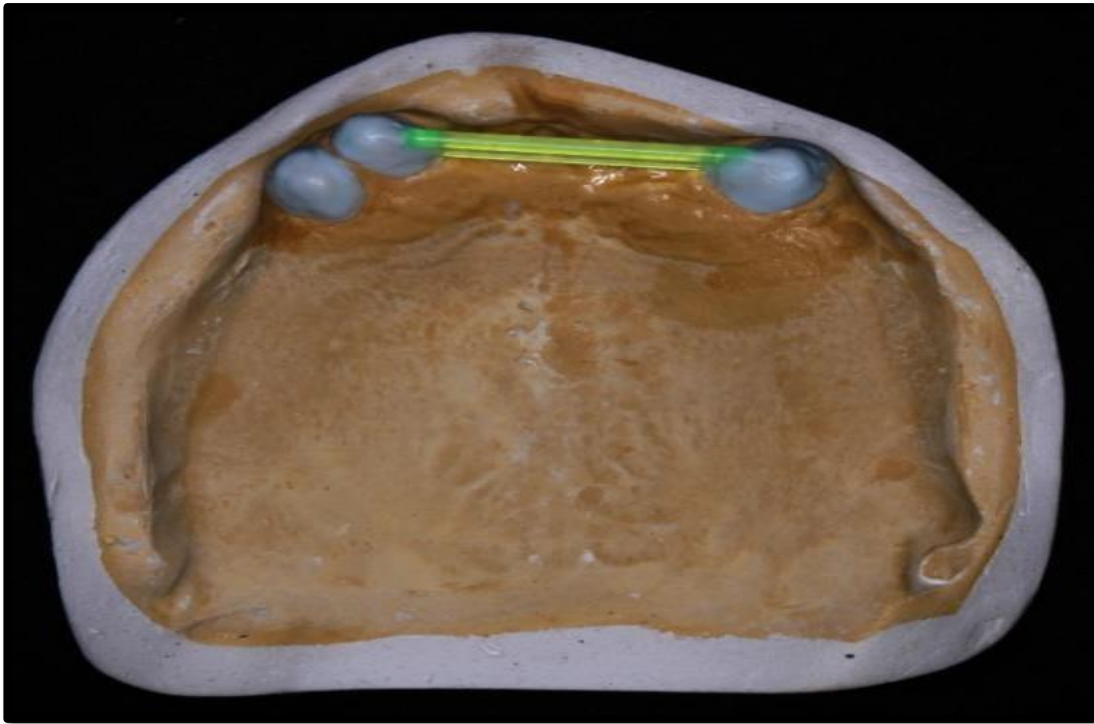


Figure 4: Wax pattern

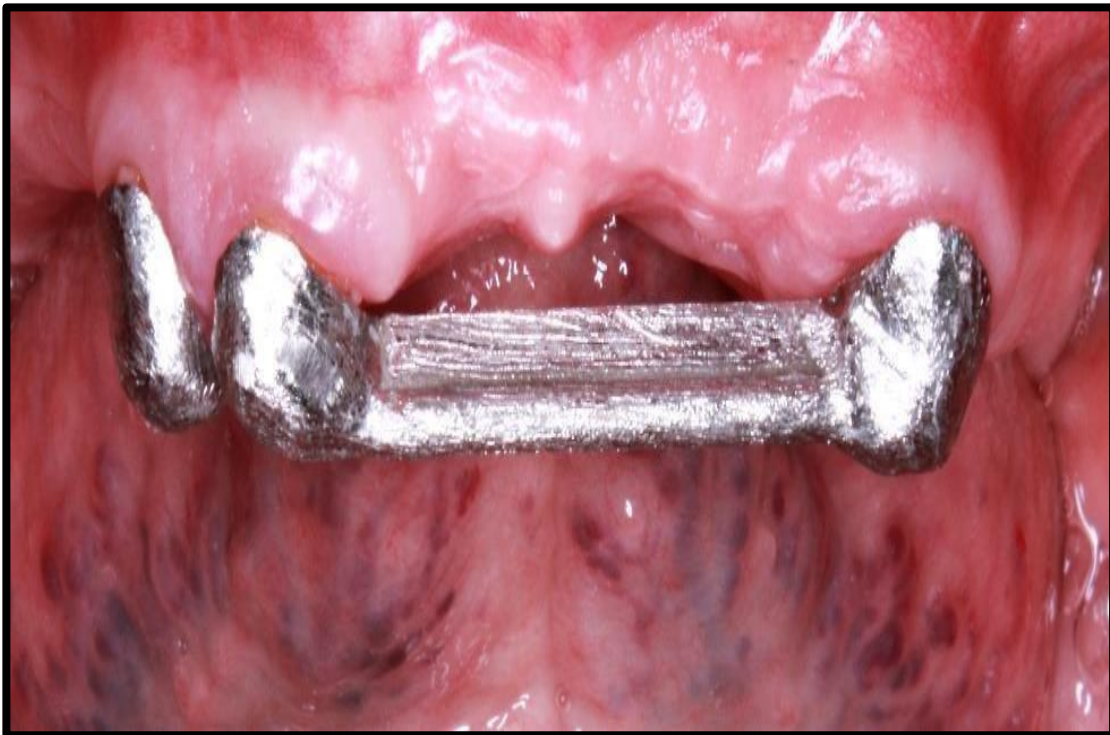


Figure 5: Co-Cr bar intraorally

- Final Jaw relation record was made and laboratory mounting was done on Mean Value articulator.
- After evaluating vertical height availability teeth size selection was done followed by the arrangement of teeth. Intra-oral try-in of waxed-up maxillary and mandibular dentures done.
- Flasking of maxillary and mandibular try-in dentures done in metal flasks (Varsity No.9- Niyazan products) followed by dewaxing.
- Green fabricating riders for stabilization of metal housings were attached at the centre of the bar and packing was done with heat-cure acrylic resin (Naisha dent premium, heat cure resin, Roorkee, India). Dentures were cured, retrieved, finished, and polished. (Figures 6)
- Retention clips placed in the metal housing with the help of a handling tool.
- The maxillary and mandibular dentures were assessed for retention, stability, support, comfort, and aesthetics. (Figure 7)
- The patient was requested to follow-up the next day and the following week for any adjustments. 3-month follow-up was advocated.
- The patient was prescribed fluoride mouthwash and a Proxabrush to clean the undersurface of the bar.



Figure 6: Finished and Polished Denture



Figure 7: Postoperative extraoral

DISCUSSION

Tooth & implant-supported over-dentures are a “step in the direction of preventive prosthodontics”. They Preserve the residual ridge, provide support and stabilization to the denture base, and thus give 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 the remaining mandibular anterior teeth because it aids in conserving the ridge against resorption from “masticatory stress”.³

The treatment option of saving the remaining natural teeth and constructing an overdenture has the advantages of enhanced stability retention and positive support of the denture as well as psychological benefit to the patient over the conventional complete denture.⁵

Franco has classified overdenture as non-coping, with copings, and with attachments. Adequate inter- arch is a prerequisite in planning an overdenture with attachments.⁵

Various extra-coronal attachment systems that are easily available in the market are used for the fabrication of overdenture. Among all, Dolder and Hader bars are the most commonly used extraoral attachment systems for overdentures. Overdenture with attachments can redirect the occlusal forces away from the weak supporting abutment teeth and onto a soft tissue or redirect them toward stronger abutments thereby resulting in superior retention.⁶

Rissin et al. in 1978 compared masticatory performance in patients with natural dentition, complete denture, and overdenture. They found that the overdenture patients had a chewing efficiency one-third higher than the complete denture patients.⁷

One of the major concerns for bar-supported overdenture is that meticulous oral hygiene is pertinent to prevent caries and periodontal diseases.^{8,9} The bar in this study maintained no contact with the underlying tissue. Any contact between the bar and the mucosa causes compression leading to hyperplasia. The patient was educated to perform a proper oral hygiene regimen including the use of proxabrush to clean the undersurface of the bar. Another disadvantage of using a bar attachment is the bulk of the denture and loss of retention of the retentive clip culminating in the replacement of the clip.¹⁰

The success of the tooth-supported overdenture treatment depends upon the proper attachment selection for the particular case.

The takeaway message from this article is understanding the limitations and benefits of attachments in overdenture. The patients fulfilling all the criteria for attachment should be treated with attachment retained overdentures. Hence, patient selection is critical to the success of the treatment.⁷

CONCLUSION

Maxillary or mandibular tooth or implant-supported overdentures are a viable treatment option to preserve the remaining alveolar bone and maintain proprioception, masticatory efficiency, and psychological benefit to the patient.

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