



## BAR SUPPORTED OVERDENTURES FOR BETTER RETENTION AND GREATER PATIENT SATISFACTION: A CASE REPORT

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### **Abstract:**

Root preservation is an integral factor in reducing residual ridge resorption. It has been seen that preserving teeth bilaterally provides necessary stimulus for the bone to slow down its resorption. When the dentures are retained with the help of such roots with the help of different attachments, they are called overdentures.

A bar supported overdenture is known to have the greatest amount of retention when compared to other types of retainers available in market. Although it has demerits like need for extra interarch space, difficulty in maintaining oral hygiene etc. When the requirements are met this can be a very efficient non invasive way of providing patient with almost fixed prosthesis experience. Hence, in this case report we discuss the need of using such retaining agent and various conditions associated with it.

**Keywords:** Retention, Overdentures, Bar and clip dentures, complete dentures.

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**Introduction:**

Advancements in medical sciences have increased average life span of people. As a result the number of edentulous patients are increasing. As per the data given by the United Nations Population Division (UN 2011), India's edentulous population aged 60 and above is projected to climb from 8% in 2010 to 19% in 2050.<sup>1</sup>

For a long time conventional dentures have been serving their purpose well in establishing patient esthetics and function to some extent. However, complaints of retention and lack of stability with respect to mandibular denture are seen as mandible loses four times more bone than maxilla. Every year an average of 0.4 mm of mandibular anterior vertical resorption occurs. They cause pain while eating and chewing, and loose dentures.<sup>2</sup>

This case report describes a technique to fabricate tooth supported Hader bar and clip attachment retained mandibular complete denture and benefits of the same.

**Case Report**

**Figure 1:** Diagnostic casts

After the healing period the maxilla and mandible teeth were prepared (Figure 2 a, b) and impression was made using putty (Aquasil soft putty/regular set, Dentsply, Germany) and light body (Aquasil LV, Dentsply, Germany) polyvinyl siloxane

A 52-year-old man reported to our dental college for prosthetic evaluation. The patient had lost most of his teeth in maxilla and mandible due to periodontal reasons. He only three teeth in mandible and six in maxilla. Both the arches provided with bilaterally symmetrical dentition. He wanted a well-retained prosthesis with better chewing efficiency.

The teeth were periodontally sound with no mobility. Sufficient interarch space was present for the placement of copings, bar and clip, denture base thickness and for the arrangement of teeth. After diagnosis and taking into consideration the patient's interest it was decided to go with a bar and clip supported overdenture.

Diagnostic mounting was done to decide the type of coping and it was decided to go for short copings and overdenture with respect to mandibular arch and maxilla was planned to be rehabilitated with cast partial denture. For that extraction of remaining teeth of mandible were extracted and canines were endodontically treated. ( Figure: 1)In the meanwhile, the maxillary cast was surveyed and a cast partial denture was designed.

elastomeric impression material by double step putty wash technique and poured in die material to obtain the cast on which a wax pattern of the copings was fabricated and CPD was fabricated using CAD-CAM. ( Figure 3)



**Figure 2a,b:** Tooth preparation



**Figure 3:** Mandibular wax pattern and Maxillary cast design

The bar was cut to the desired length and attached to the wax pattern of the copings, after adjusting the length and height of the bar. The height of the bar should be adjusted according to the availability of the vertical space. The bar should either be in passive contact with ridge or there should be 2–4 mm of space between the bar and underlying mucosa for maintaining proper oral hygiene.<sup>2</sup>

The bar and wax pattern of the copings were casted with base metal alloy and the try in of the finished and polished cast bar assembly was done in the patient's mouth and the marginal fit of the copings and relationship of the bar with the underlying ridge was evaluated along with try in of metal CPD framework. (Figure 4)



**Figure 3a,b:** Metal Try in , bar with metal clip



**Figure 3c:** Jaw relation

After evaluation and required adjustments, the casted bar assembly was cemented with glass ionomer cement. Jaw relation and try in was done as per conventional methods. And denture fabrication was done on a separate cast poured from a medium body impression made of the ridge with cemented cast.

The plastic rider used for stabilisation of the metal housing during processing of denture was ordered. The retention sleeves/clips that were placed in the metal housing were then prepared to be picked up in the denture base. There should be a snap when the clip is pushed into the position. The special shape of the metal housing provides secure retention of the clips while providing leeway space

in the labiolingual direction to allow the clips/riders some flex during insertion or removal of the prosthesis.



**Figure 4a:** Pick up of clip on the denture base



**Figure 4b:** Area marked and escape hole made



**Figure 4c:** Excess acrylic released

For the pick up process the bar shaped indentation on the intaglio surface of the denture base was relieved. And the undercut below the bar was blocked with wax or putty. The bar impression was again made with medium body impression material with clip placed on the bar. The area of clip was marked on the impression with a indelible pencil.( Figure 4 a) On the marked area a relief hole(Figure 4 b) was made and the impression material was removed. The bar indentation was then applied with petroleum jelly relined with self curing acrylic

resin. The denture base was then placed on the bar and pressure was applied until acrylic was seen escaping through the hole. (Figure 4 c) The denture was then removed before the acrylic was completely set and excess was removed.

The final prosthesis was delivered to the patient (Figure 5). The patient was scheduled for follow-up visits every 3 months and reported no symptoms during 3 years of follow-up.



**Figure 5a:** Try in



**Figure 5b:** Insertion

### Discussion

Bar and clip attachments are a reliable answer to denture retention and stability problems.<sup>3,4</sup> Bar and clip attachments when effectively used with periodontally sound abutments and copings can increase retention significantly. Here distal extensions are given with the bar which further increase the horizontal stability of dentures. Two abutments, one in each quadrant must be present for bar attachments.<sup>2</sup>

Plenty of attachment systems are available in market nowadays and few studies have compared them with bar attachments. Cakarar *et al.*<sup>5</sup> reported that solitary ball attachments appear to be less costly and less technique sensitive. However, ball

attachments seem to be less retentive than the bar design. Naert *et al.*<sup>5</sup> reported that single attachments provide lower retention than bars for the fixation of overdentures. On the other hand, Karabuda *et al.*<sup>5,6</sup> reported that there were no differences in prosthetic complications for the ball and the bar attachment systems.

Hader bars can serve as retainers for implant- as well as tooth-supported prosthetics. The bar is offered in the form of prefabricated plastic patterns that are customised on the master cast before being cast in the desired alloy. The Hader bar system differs from the competition because it has a plastic sleeve instead of metal. The majority of other bars have metal sleeves. When their retention has loosened, the plastic sleeve can be simply replaced on the chair side. The bar should be positioned on the crest of the ridge to make it easy to clean the bar and fabricate the prosthesis. Lingual placement can cause tongue interference whereas labial placement can interfere with speech and aesthetics.<sup>2</sup>

Sufficient buccolingual and vertical space is necessary as providing 2–4 mm or more space between the bar and mucosa will allow easy passage of saliva and food particles as well as oral hygiene aids. In majority of the patients, however, the bar needs to be placed in even/passive contact with the mucosa due to lack of space. Any compression of the mucosa by bar will result in hyperplasia of the mucosa.<sup>2</sup>

Comparing Hader bar systems to other bar attachments, they are more affordable and accessible.<sup>2</sup> If necessary, the retention plastic sleeves are readily replaced. The area with the most space should be where the retention sleeves are put.

The fundamentals of complete denture fabrication must take priority over mechanical attachment during the fabrication of bar attachment retained prostheses. As the major goal must be to secure support from the largest area possible in order to minimise or reduce any displacement loads placed on the denture.<sup>2,3</sup>

### Conclusion

According to Fernandes *et al.* [14], there are three main attachment systems for implant-supported overdentures: ball, bar-clip, and magnet attachments. The selection of the attachment system is related to the quality of bone support, ease of hygiene, adaptation to and removal of the prosthesis by the patient, and maxillary arch shape. Authors report that magnets provide the lowest retention strength when compared to other attachment systems

[15]. Moreover, the magnet system requires ongoing maintenance visits and may possibly interfere with the use of vital devices such as a cardiac pacemaker. The ball (O-ring) and bar-clip attachments provide for a higher degree of retention and they are recommended in cases of advanced atrophy of the alveolar ridge and in cases requiring higher retention and stabilization. According to Fernandes *et al.* [14], there are three main attachment systems for implant-supported overdentures: ball, bar-clip, and magnet attachments. The selection of the attachment system is related to the quality of bone support, ease of hygiene, adaptation to and removal of the prosthesis by the patient, and maxillary arch shape. Authors report that magnets provide the lowest retention strength when compared to other attachment systems [15]. Moreover, the magnet system requires ongoing maintenance visits and may possibly interfere with the use of vital devices such as a cardiac pacemaker. The ball (O-ring) and bar-clip attachments provide for a higher degree of retention and they are recommended in cases of advanced atrophy of the alveolar ridge and in cases requiring higher retention and stabilization. By minimising the stress to the underlying supporting tissues and reducing the forward sliding of the mandibular denture, these attachments increase the patient's comfort and chewing efficiency.<sup>7,8</sup>

There are three primary attachment systems for implant-supported overdentures: ball, bar-clip, and magnet attachments, according to Fernandes *et al.*<sup>9</sup> The degree of bone support, ease of hygiene, patient adaptation to and removal of the prosthesis, and the geometry of the maxillary arch all factor into the choice of attachment mechanism. According to authors, when compared to alternative attachment techniques, magnets have the weakest retention.<sup>10</sup> Additionally, the usage of essential devices like a heart pacemaker may be hampered by the magnet system's ongoing maintenance requirements. In cases of advanced alveolar ridge atrophy and in situations needing more retention and stabilisation, the ball (O-ring) and bar-clip attachments are advised since they offer a higher level of retention.

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