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Retentive Solutions For Wandering- Use of Hader Bar And Clip - A Case Report.

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Abstract

Introduction: This case report describes tale of two patients, who presented with the chief complaint of difficulty in chewing food due to loose dentures. One of the patients was interested in saving the remaining natural teeth and other patient was exploring different options with limited financial constraints, after consideration of all the factors involved, it was deemed advisable to resort to bar retained overdenture retaining the natural teeth and to completely edentulous patient it was advised for implant supported overdenture.

Discussion: A bar retained overdenture was chosen as a favourable treatment option since it overcomes many of the problems posed by conventional complete dentures like progressive bone loss, lower stability and retention, loss of periodontal proprioception and low masticatory efficiency. It also provides minimal tissue coverage and better distribution of forces. Evaluation of occlusion, aesthetics, phonetics and comfort after 24 hours, 1 week and 1 month of treatment showed that the patient was happy with the prosthesis and was able to speak and chew well.

Conclusion: Bar retained overdentures have better retention and stability as compared to conventional complete dentures. They improve the chewing efficiency, patient comfort and also decrease the alveolar bone resorption. As such they are an excellent alternative to conventional complete denture treatment.

Keywords: Overdenture, Hader Bar And Clip, Implant Supported Overdentures.

Introduction

Before the era of dental implants, complete edentulous jaws were restored with conventional complete dentures, as this was the only option available.[1] Use of conventional complete dentures is associated with several problems, such as lack of denture stability, support and retention,

these problems lead to discomfort, reduction in chewing ability and, at times, may be socially embarrassing.[2]

Implant and tooth supported overdentures offer many practical advantages over conventional complete dentures. These include decreased bone resorption; reduced or eliminated prosthesis movement; improved tooth position, including improved occlusal load direction, increased occlusal function and phonetics, as well as the patient's psychological outlook and quality of life.[3]

This case report describes the use of Hader bar and clip attached to natural teeth as well as the implant retained mandibular complete denture and explains the advantages that the Hader bar and clip has over conventional and other attachment system.

Outline of The Cases

Case Report 1

A 63-year-old male patient reported to our private practice with the chief complaint of difficulty in chewing food and poor appearance.

Diagnosis and treatment planning:

The maxillary arch was completely edentulous and the mandibular arch was partially edentulous for the past 1 year. He was facing the problem of difficulty in chewing food. The patient was diabetic from the past 3 years, a vegetarian by diet and had no abusive habits.

Intraoral examination showed completely edentulous maxillary and partially edentulous mandibular arches with intact canines (33, 43) and right third molar (48). The patient did not want his remaining tooth to be extracted, Considering the patient's desires and treatment needs, it was decided not to extract the teeth and to perform an overdenture therapy in the lower arch and a conventional complete denture in the upper arch.

A panoramic radiograph supplemented with IOPA (intraoral peri-apical radiograph) showed moderately resorbed maxillary arch and, in the mandibular arch, adequate bone support was present in relation to 33, 43, and 48. Thorough oral prophylaxis was carried out for the remaining teeth and a diagnostic set up (for tentative jaw relations) was prepared. This was performed to assess the interocclusal space, and it was found to be adequate and satisfactory. The neuromuscular control of the patient was good.

The different treatment options available for this patient were:

• Extraction of the remaining teeth followed by conventional complete denture.

• Extraction followed by implant-supported overdenture.

• Tooth-supported overdenture.

Depending on the existing condition of the remaining dentition and financial status of the patient, it was decided to use the remaining teeth as abutments and fabricate a single complete denture for maxillary edentulous arch and bar attachment supported overdenture for partially edentulous mandibular arch owing to the obvious advantages of the retention of the roots.

Clinical Procedure

- Intentional root canal therapy was carried out for the abutments (33, 43 and 48)
- Tooth preparation was carried out on both mandibular canines and right mandibular 3rd molar
- Border moulding was carried out using a green stick compound in a custom tray, final impression were made with regular body elastomer (Reprosil, Dentsply Caulk).
- Beading and boxing was carried out and the impression was poured in a die stone
- Casts were fabricated using a die stone and an inlay wax pattern coping was fabricated for the prepared mandibular canines
- The two wax copings on the mandibular canines were connected with a pre-fabricated plastic bar of 2 mm

thickness and 3 mm height and for the third molar the primary wax copings were fabricated.

- The wax pattern was cast in a Ni–Cr alloy using standard technique.

The fit of the primary coping was evaluated in the patient's mouth.

The fit of the secondary copings over the primary copings for 48 was evaluated in the patient's mouth. The secondary copings consisted of small metal projections which were known as retention beads, which helped in the mechanical interlocking of the secondary copings in the denture base.

The frictional contact between the primary and secondary copings helped in the retention of the prosthesis

After the metal try-in, the bars, with their respective copings, were again placed intraorally and the under surface was blocked on the mid-surface of the bar and a plastic positioner clip was placed

The whole assembly was duplicated with the rubber base impression material and cast was poured

After this step, the bar, along with the metal copings, were luted onto the respective preparations with the help of glass ionomer cement

The remainder of the procedures up to try-in was carried out as the conventional method for complete denture

After dewaxing of the investment, the metal superstructure was placed on the duplicated master cast.

The under surface of the metal superstructure was blocked to avoid flow of resin between the positioned clip and the bar, Complete prosthesis consisted of metal superstructure incorporated in complete denture

Positioner clips were discarded and yellow-coloured medium retention clips were used at their place.

Figure 1: Prepared teeth

Figure 1 casted bar and coping assembly

Figure 2 finished denture with retentive clips attached, bar with copings ,and secondary coping of telescopic attachement

Case Report 2

A 55-year-old male patient, reported to our private practice with the chief complaint of difficulty in chewing food and loose mandibular denture, patient was dissatisfied with the conventional lower denture and was exploring different options with financial constraints.

Diagnosis and treatment planning Intraoral examination showed completely edentulous maxillary and mandibular arches, Medical history was non-contributory with patient not on any medication.

Based on the OPG supported with computed tomography scan and keeping financial conditions and patient desire for improved retention of lower denture it was decided to provide implant supported overdenture.

Three root form endosteal implants of following dimensions i.e. 4.3mm in diameter and 11mm in length dentium implants were placed following surgical protocols,

three months after placement OPG was taken to confirm the osseointegration, the implant fixture site was located and cover screw was replaced with healing screw, patient is recalled after a week.

Open tray impression technique was followed, castable abutments were utilised to fabricate the jig, Hader bar metal frame work, which was fabricated with Co-Cr alloy was attached to the implant fixture, the remainder of the procedures up to try-in was carried out as the conventional method for complete denture

The clip was attached to denture base by direct method using cold cure acrylic resin.

Figure 4: Castable abutments placed

Figure 5: Casted framework

Figure 6 finished denture with clips attached

Discussion

overdenture \o´var-dĕn´chur\ n: any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implants; nonstand/syn, GPT9 [4]

The overdenture therapy is basically a “preventive prosthodontic concept” because it endeavours to prevent a completely edentulous situation and preserves the last remaining tooth/roots and also their associated supporting structures.

Hader Bar

The Hader bar and clip is a type 2 attachment and may be used for PM-0 or PM-2 treatment plans.

Helmut Hader developed the Hader bar and rider system in the late 1960s, and this system was unchanged for almost 30 years. English, Donnel, and Staubli modified the system in 1992 to form the Hader EDS system. Whereas the EDS bar is only 3 mm high, the original was 8.3 mm in height. The total height of the Hader bar and clip assembly may be as low as 4 mm.

The standard or EDS Hader bar has a round superior aspect and an apron toward the tissue below.

Round bar designs flex in relation to X^4. In other words, a bar twice as long flexes $|2| \times |2| \times |2| \times |2| = 16$ times more. Other bar shapes flex to X^3 or $|2| \times |2| \times |2| = 8$ times more. This is a considerable improvement.[5]

Bidez et al. performed a finite element analysis of Hader bars, the recommendation is that when a cantilever is used

with a Hader bar system, it should be less than 10 to 12 mm with a stiffener height of 3 mm, an apron or stiffener often is added to the tissue side of the Hader bar to limit metal flexure,[6]

Application of anterio-posterior distance rule : applicable in determining the lenghth of cantilever bar extension,a line is drawn through the centre of most posterior and most anterior implant on each side of the arch.the distance between these two lines is known as A-P spread.in general the distal cantilever should not exceed more than half of the ap distance.

The ideal length of single bar should be minimum of 20-22mm to accommodate two clips. Hence, while placing implants one should keep this aspect in mind. Shorter bar attachment cannont provide adequate retention and support[6,7,9]

Attachment Clip

1 Clips have three different retention strengths

Yellow Standard Retention = Approx. 800g

White Reduced Retention = Approx. 600g

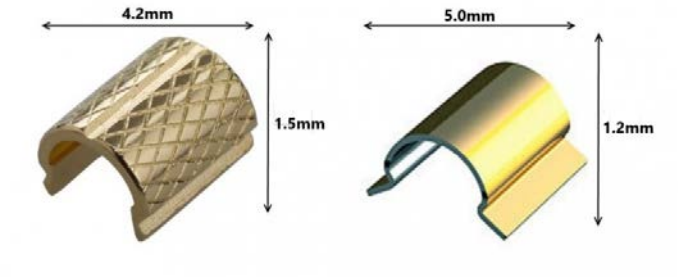
Red Increased Retention = Approx. 1000g

Blue Decreased Internal Diameter, For Worn Bars

2 20-degree clip rotation, which greatly improves the flexibility of the system The clip rotation compensates for the resilience of the posterior soft tissue, which is usually 0.5 to 1 mm in the mandible.

3 gold-plated stainless-steel housing maintains the clip, which reduces the need to cold cure new attachments in place.

4 The gold plating minimizes the colour bleeding through the prosthesis.



Hader Green Processing Spacer

- Full length of 5.0mm
- Reduce height to fit the vertical height of the bar
- The width of the “tail” tail of the spacer matches the widest part of the Hader clip. This allows easy insertion and removal of the actual clip. More importantly, it also provides a “tunnel” that is wide enough for removal and insertion of the prosthesis without damage to the clip.

Figure 7: green processing spacer

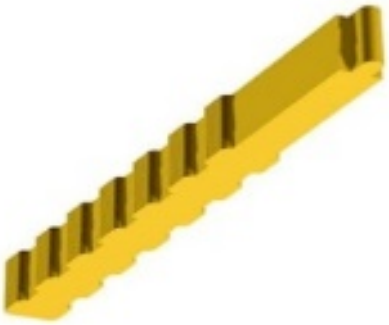


Figure 8: clip insertion tool

Hader Clip Placement: Hader clips can wear out prematurely due to improper bar design and overloading. The denture base should sufficiently contact the top of the bar and avoid concentrating force on the clips. To achieve this contact, the denture base should be relined precisely. Hader clips can be replaced chair side using the following steps.

- Remove the worn clip with a hand instrument. The clip usually comes out very cleanly and in one piece.
- Place a new Hader clip on the insertion tool. Place the clip into the undercut area of the recipient site and gently roll until it snaps into place. Do not push straight down into the recipient site because clip insertion has a rotational path.
- The clips should hold their properties for at least 6 to 9 months if they are well designed.[9]

Prosthesis Movement: The dentist determines the amount of PM the patient desires or the anatomy may tolerate.

A hinge like PM permits movement in two planes (PM-2) and most often uses a hinge like attachment. For example, the Dolder bar and clip without a spacer or Hader bar and clip are the most commonly used hinge like attachments.

It should be noted that for these systems to function efficiently, the hinge attachment needs to be perpendicular to the axis of prosthesis rotation, so the PM also will be in two planes (i.e., PM-2). If the Hader or Dolder bar is at an angle or parallel to the direction of desired rotation, the prosthesis is more rigid and may resemble a PM-0 system. As a consequence, the implant system may be overloaded and cause complications such as screw loosening, crestal bone loss, and even implant failure.

A Hader bar-clip system is an ideal low-profile attachment for a RP-4 prosthesis.[8]

Troubleshooting [9]

Problem	Possible Cause	Solution
Failure of abutments and bar to be a complete casting.	Plastic bar pattern was not adhered well to the abutment wax patterns or broke loose during investing.	Use adequate wax to adhere plastic bar pattern to abutment wax patterns. Invest carefully without excessive vibration.
Failure of nylon riders to stay in receptacle in the resin.	The fabricating riders were placed over the bar prior to taking the impression rather than the nylon retention riders. This causes the gingival extension of the fabricating riders to expand and cause an oversize receptacle to be processed in the resin.	Position the nylon retention riders, NOT the fabricating riders, on the cast bar prior to taking the impression for the processing model.
insufficient retention of the nylon riders on the bar.	a) The round bar was reduced in size due to over finishing. b) The nylon riders are worn.	a) Do not use stones or rubber wheels on the round bar when finishing. Polish only. b) Replace plastic riders, or use gold alloy riders that have retention adjustment capability.
The prosthesis is difficult to insert and remove.	a) The nylon retention riders have been processed into the resin incorrectly. The denture acrylic is preventing the flanges of the riders from flexing. b) The prosthesis was designed to engage a severe labial undercut. This causes the prosthesis to be positioned labially at time of insertion thus the nylon riders are not properly aligned to snap onto the bar.	a) Use rebasing procedure to replace riders. b) Remove the labial flange area which engages the severe undercut from the prosthethis.

Conclusion

The overdenture is a good prosthetic option for patient who seeks prosthesis stability and retention but do not mind that the prosthesis is removable, the use of Hader bar and clip and adherence to basic principles of complete denture design drastically improves the level of satisfaction, Hader bar can be used as retainer for both tooth as well as implant supported prosthesis.

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