



Case Report

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Prosthetic rehabilitation using extra coronal attachments

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Abstract

A unique concern of a removable denture when compared to other prosthesis is retention. The component of removable denture which provides retention is called as direct retainer. A direct retainer can be either an extracoronal or intracoronal retainer [1]. One of the main drawbacks of extracoronal retainers used in partial dentures is visibility. Many patients find themselves in an aesthetically compromised state when these retainers are placed on teeth in visible area. The solution for this problem is using a Precision attachment. This assembly provides better vertical support and better stimulation to the underlying tissue through intermittent vertical massage. Although the history of intracoronal retainers goes back to 5th and 4th centuries BC, technically more sound developments began in early 20th century AD. Since then precision attachments are playing an important role in removable and fixed partial denture, conventional and implant supported overdentures [2]. In this case, an extra coronal attachment is chosen as fixed prosthesis was not possible to use everywhere and patient desired a prosthesis which had function and stability similar to fixed prosthesis. In this type of attachment, crown is made with the projecting attachment and a corresponding fitting or housing is incorporated in the removable prosthesis as a result there is a certain amount of movement between the two sections of the prosthesis that acts as a non-rigid stress breaker and helps in distributing the occlusal load without breaking the prosthesis.

Keywords: Attachments, Extra Coronal, Matrix, Over Impression, Semi Precision.

INTRODUCTION

Our ever-increasing knowledge of the oral environment, together with technological improvements and good armamentarium materials should give a restoration which is esthetically pleasing and comfortable. Today's practitioners are provided with changing techniques and a better understanding of the oral environment. This makes it all the more important to reconcile what is actually feasible with the patient's own expectations.

Fixed Restorations is definitely an apparently looking universal answer to most of the restorations replacements as they are neat, good looking and preferred by most of patients but their applications cannot be universal as because of limitations of cases with vertical loss of residual ridge structure and where extent of restoration needs to be long, we require some additional support. Cost and complexity of the prosthesis is an important point to be taken into consideration.

Then comes in our mind is Removable Prosthesis but majority of removable prosthesis activity contribute to the demise of their supporting structures. To all of these problems a good solution is removable prosthesis fabricated along with precision attachments. According to glossary of prosthodontics terms, Precision Attachment is defined as A retainer consisting of a metal receptacle (matrix) and a closely fitting part (patrix); the patrix is usually contained within normal or expanded contours of the crown on the abutment tooth and the matrix is attached or embedded to a pontic or the removable partial denture framework. An interlocking device, one component of which is fixed to an abutment or abutments, and the other is integrated into a removable prosthesis to stabilize and/or retain it. There are two types of attachments. Precision Attachments which are fabricated from milled alloys and tolerances are within .01mm and Semi-Precision Attachments which are fabricated by the direct casting of plastic, wax, or refractory patterns. They are considered "semi-precision" since in their fabrication they are subject to inconsistent water/powder ratio, burn out temperatures and other variables. The resulting components therefore, vary to a small degree [3]. From their first introduction to dental professional, precision attachments have been surrounded by an aura of mystery, implying that greater skill is required in their use. This has served as a contributing factor in discouraging their general use. From a patient's view point no other removable appliance offers more comfort, security and esthetics than the one fabricated along with

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precision attachment.

CASE REPORT

A 52 years old male patient reported to department of prosthodontics desiring replacement of broken fixed prosthesis present in maxillary and mandibular arch. Examination revealed fractured metal with acrylic facing long span fixed prosthesis in second quadrant of upper arch and a similar fallen prosthesis in mandibular anterior region. Maxillary arch had few saddle areas surrounded by teeth on either sides and mandibular arch had a unilateral distal extension space with lower left third molar present on opposite side saddle area saddle area (fig.1). There was around 2-3mm loss of vertical dimension measured using Niswonger method as teeth were attrite. To evaluate the condition of the abutment teeth, the old fractured prosthesis were removed. Upper and lower diagnostic impressions were made and casts mounted on semi adjustable articulator (fig. 2,3). After evaluation of diagnostic casts, fixed prosthesis was planned in upper arch and removable prosthesis was planned in lower arch as dental implant restoration was not feasible to the patient.



Fig 1: Preoperative Frontal



Fig 4: Tooth Preparation & Retraction Maxillary



Fig 2: Diagnostic Casts - Right



Fig 5: Tooth Preparation & Retraction Mandibular



Fig 3: Diagnostic Casts - Left



Fig 6: Fixed Prosthesis with Patrx of OT- Attachments

Patient was insisting on fixed prosthesis in the lower arch like the one planned for the upper arch. But due to lack of sufficient abutment teeth, it was not possible to fabricate fixed prosthesis. Using a semi-fixed prosthesis was a viable option. It was planned to use extra coronal attachment in lower arch but evaluation of the existing space for the extracoronal resilient attachment was required. For this, a diagnostic wax-up was done on the mounted casts and a putty index was made over the completed diagnostic wax-up for evaluation of space for the attachment to be used. Proposed treatment plan to the patient for upper arch was replacement of the old prosthesis with new ceramometal prosthesis in upper arch. Final ceramometal prosthesis were planned from 12-14,21-24,25-28 in maxillary arch and 43-45,32-33 and single crowns on 42,42,31,38. Lower cast partial denture was planned to replace 46-47, 34-37 along with bilateral semi precision attachments. The semi precision attachment which was selected as per available

space was OT CAP, Rhein 83 Inc. USA. Teeth like the upper right and left canines which had poor prognosis were extracted.

Indicated teeth were prepared for ceramo metal prosthesis in upper and lower arch (fig. 4,5). Teeth 14-17 were reduced occlusally to correct the occlusal plane. Lower anterior incisor teeth looked short after preparation and cervical margins of the teeth were not in a line. Patient was advised gingival contouring for lower incisors for esthetic purpose but patient insisted more on function of final prosthesis rather than esthetics. The planned new restored vertical dimension was maintained constant by a putty index made after preparation of each side. Gingival retraction was done and final impression made in silicone material. Provisional prosthesis were fabricated as per the diagnostic wax up and luted with temporary cement. Two-part rigid extra-coronal precision attachments OT CAP with a vertical freedom of movement and an activation portion were cast on the distal prosthesis surface of the lower right second premolar and lower left canine. Extra coronal OT CAP is castable attachment with elastic retention. With its elasticity it is possible to control the flexure and construct a resilient and shock absorbing prosthesis. The patrx portions were positioned during the fabrication of the crown wax patterns using a dental surveyor. The casting procedures were executed normally to obtain a rigid connection between the FPD and the patrx. Additional care was taken during the finishing and sandblasting procedures of the casted prosthesis to avoid abrasive wear of the attachment. Metal trial was done for the casted copings to verify the fit and occlusal clearance for layering ceramic. Bisque trial was done for the prosthesis.



Fig 7: Cast Partial Denture Framework with Matrix in Place



Fig 9: Lower Final Prosthesis



Fig 8: Bite Registration for Cast Partial Denture



Fig 10: Post Operative - Occlusion in Protrusion

Keeping the bisque prosthesis in the mouth, an over-impression was made using putty light body to fabricate cast for cast partial denture. Dental surveyor was again used to check the previously established insertion/removal path for the cast partial denture. An OT POSITIONING PLASTIC burnout cap of the attachment was placed on the patrx and the fixed dental prosthesis / cast assembly was duplicated to make a refractory cast. OT BOX castable was placed on the patrx on the duplicated model. A lingual bar Cast partial framework was fabricated on this cast. After the framework was ready, the OT RETENTIVE CAP was inserted in the cast partial framework against the position of the patrx. The framework was then fitted on the original cast with the bisque crowns along with patrx attachment in place (fig.6). The crowns were glazed and luted with GIC. New alginate impression was made for upper arch after cementation of final prosthesis and facebow transfer was done. The cast partial framework of the mandibular arch was evaluated for fit in the mouth (fig.7). Bite registration was done by adding wax in the saddle area on the framework and patient was guided to close in centric occlusion (fig.8). Lower cast was mounted using this bite registration on the semi adjustable articulator. Teeth were arranged, Try

in was done and the cast partial denture was acryliced. Final processed cast partial denture was inserted in patient's mouth and deflective contacts were checked and corrected (fig.9). Occlusion was verified in centric and lateral excursions(fig.10). Patient was kept under observation for subsequent periods. Patient was given oral hygiene instructions and periodic recall was done.

DISCUSSION

Preiskel first reported the invention of attachment in early 20th century. A simple classification based on location and attachment shape is presented.

Classification Of Attachments-^[4]

Precision attachments can be classified in to four main groups ^[5].

1. Intra-coronal attachments --are mainly used in connecting units of fixed partial prostheses, retaining restorations with distal extension or bounded removable prostheses.

2. Extra-coronal attachments—this type of attachment provides stability and retention for removable distal extension prostheses.

3. Stud attachments—usually in the form of ball and socket, this attachment serves primarily for over denture stabilization and retention of the prosthesis. Swiss logic, ZAAG, Zest anchor is example of stud attachments. One of the advantages of stud is that they promote better oral hygiene and crown-root ratio is improved with low profile stud attachments.

4. Bar attachments—originally used for splinting groups of teeth, currently used for over denture retention and stabilization ^[6].

Despite the fact that FPD is better tolerated by the patients in comparison to RPD, the latter is still prevalent in partially dentate people^[7].

Contemporary treatment in patients with distal extension ridges involves use of implants but in this patient removable dental prosthesis (RDP) in mandibular arch was an apt option because of anatomic, as well as economic factors. Retention in intact caries-free tooth intended to be used as retentive abutment is best provided with a clasp or adhesive attachments ^[8].

A drawback of clasp retained RDP is that it is often associated with extensive

treatment planning and design related complications. Rates of unsuccessful treatment for clasp retained cast RPDs range from 3% to 40% with mean being 26% ^[9].

Another major disadvantage of clasp retained RDP is that the visible component jeopardizes the esthetics ^[10].

Though survival rate of vital tooth as telescopic abutment in retaining RDP is 89%, root canal treatment increases the risk factor of abutment loss ^[11].

Hence, RDP fabricated with precision/semi precision attachments for retention and support are the best prosthesis available to dentistry where fixed restorations are contraindicated ^[12].

Precision attachment offers considerable advantages in dentistry because of their flexibility. Extra-coronal attachment is preferred over intra coronal attachments as the latter obviate the risk for over contouring of distal portion of the crown, which could result in periodontal breakdown as a result of increased plaque retention.

To minimize the stress on distal abutment in this case, 32-33 were splinted by providing crowns on them as a study has suggested that most distal abutment splinted to the tooth anterior to the abutment significantly reduces the stress transmission to the supporting structures in these type of cases ^[13].

There are a few criteria that help to decide the selection of appropriate attachment based on the individual need of the case. When selecting an attachment, dentist wishes to use the best attachment in specific cases. There is probably no such thing as 'best attachment' but there may be several attachments that will work equally well. So one should not select an attachment by name but should select rather by understanding basic principles, which never change. Selection Principles are Based on;

- a) Crown Root ratio desired
- b) Type of copings
- c) Vertical space available
- d) Number of teeth support
- e) Amount of bone support
- f) Location of abutments
- g) Location of strongest abutment
- h) Type of opposing dentition
- i) Maintenance problems
- j) Cost ^[14]

The main purpose of each precision attachment besides retention is its concealment within or under a restoration as an aesthetically better alternative to a visible clasp retainer. Precision attachments have been constructed into two halves, a matrix and a patrix, the halves being so arranged that they articulate with one another

to form a precise but separable joint ^[15]. There are numerous attachments available. Among them Rhein 83 system are simple and offer spherical retention. The versatility of applications to many restorative solutions offered by the spherical retention is widely recognized in the treatment of the partially dentate and totally edentate patients ^[16].

indications-

Indicated for use in restoration of multiple deficiencies of partially edentulous mouth, more specifically used as,

- 1) Movable joint in Fixed-Removable Bridgework.
- 2) To provide movable joint in Removable Bridgework, semi removable bridges, semi removable pontic section.
- 3) To stress break, free end saddles.
- 4) To retain hybrid dentures.
- 5) To stabilize unilateral saddles.
- 6) As contingency devices for extension or conversion of existing fixed appliances.
- 7) Pier abutments.
- 8) Titled molars. F.P.D's in severely misaligned abutments.
- 9) Used in Over dentures (different forms of retainer are bare, telescopic, use of auxiliary attachments).

10) Fixed removable implant restorations.

Advantages:

1. Cosmetic appearance
2. Maintain periodontal health
3. Longevity of abutment teeth
4. Patient comfort
5. Natural tooth /implants can be used

These dentures can be adapted to compensate for future changes in mouth.^[1]

CONCLUSIONS

The acceptance of removable partial dentures has increased when used along with precision attachments. Such prosthesis is viable option for patients in whom any type of fixed prosthesis is not possible. Adherence to precision techniques, proper diagnosis will result in successful treatment and preservation of the patient's existing dentition.

Conflict of Interest

The author reports no conflicts of interest in this work.

REFERENCES

1. Carr AB, McGivney GP, Brown DT. McCracken's Removable Partial Prosthodontics. 11th ed. St. Louis, Missouri: Elsevier Mosby; 2005.
2. Graber G. Colour Atlas of Dental Medicine vol 2 Removable Partial Dentures. Stuttgart, Germany: Georg Thieme Verlag; 1988.
3. Krishna Prasad D. , Archana Ashok Swaminathan . A Simplified Approach to Semi-Precision Attachment.NUJHS Vol. 6, No.3, September 2016, ISSN 2249-7110
4. Mensor MC. Classification and selection of attachments. J Prosthet Dent 1973; 29: 494-97.
5. Preiskel HW. Precision attachment in prosthodontics.1&2.London: Quintessence Publishing Co Ltd 1995:69-78.
6. Merrill C. Mensor JR .Classification and selection of attachments..J prosthet dent 1973; 29(5): 494-497
7. Zitz mann NU, Hagmann E, Weiger R. What is the prevalence of various types of prosthetic dental restorations in Europe. Clin Oral Implants Res 2007;18(Suppl 3:20-33.
8. Zitz mann NU, Rohner U, Weiger R, Krastl G. When to choose which retention element to use for removable dental prostheses. Int J Prosthodont 2009; 22:161-7
9. Frank RP, Milgrom P, Leroux BG, Hawkins NR. Treatment outcomes with mandibular removable partial dentures: A population-based study of patient satisfaction. J Prosthet Dent 1998;80:36-45
10. Ku Y, Shen Y, Chan C. Extracoronar resilient attachments in distalextension removable partial dentures. Quintessence Int 2000;31:311-7.
11. Ditt mann B, Rammelsberg P. Survival of abutment teeth used for telescopic abutment retainer in removable partial dentures. Int J Prosthodont 2008;21:319-21
12. Feinberg E, Feinberg EM. Attachment-retained partial dentures. N Y State Dent J 1984; 50: 161- 4
13. El Charkawi HG, Wakad MT. Eff ect of splinting on load distribution of extracoronar attachment with distal extension prosthesis in vitro. J Prosthet Dent 1996 ; 76: 315-20.
14. Burns DR, Ward JE. A review of attachments for removable partial denture design: part 2. Treatment planning and attachment selection. Int J Prosthodont 1990; 3: 169-74.
15. Jenkins G. Precision Attachments: A Link to Successful Restorative Treatment. Quintessence books; Illinois, USA 1999. p. 11
16. Alsabeeha NH, Payne AG, Swain MV. Mandibular two-implant overdentures: A review of in vitro investigations on retention and wear features. Int J Prosthodont 2009; 22:429-40. H. W. Preiskel, Precision Attachment in Prosthodontics, vol. 1-2, Quintessence Publishing, London, UK, 1995.