

Use of a semi-precision attachment to fabricate a removable partial denture – a case report

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Abstract

Use of attachments in providing better retention to removable prosthesis is not an outdated treatment modality. It is important for dentists to have more updated knowledge about its use and the success of such prosthesis is necessary to be able to benefit the patients. Proper diagnosis and treatment planning is necessary for selection of appropriate attachment type. This case report discusses use of an extracoronal attachment to enhance retention of a removable partial prosthesis.

Keywords: Attachment, Precision, Prosthesis, Removable, Sagix, Ceka, Crown

Introduction

The therapy for patients presenting with partially edentulous arches pose several challenges. The oral hygiene maintenance, periodontal status of the abutment teeth, supra-eruption of teeth opposite to the edentulous area of concern and esthetics play a major role in selection of treatment plan. In maxillary distal extension cases, as fixed prosthesis cannot be given owing to absent terminal abutment and difficult implant placement due to pneumatisation of maxillary sinus, rehabilitation becomes even more challenging. The use of attachments in dentistry may act as a saviour for such patients. Attachment-retained removable prosthesis is a treatment modality which can aid in aesthetic as well as functional rehabilitation of missing teeth in such situations. Studies in this regard have shown a survival rate for 5 years of upto 83.3% and for 20 years of 50%.^(1,2) Besides, this treatment plan demands more patient visits and higher clinician expertise.

Attachments are retainers comprising of a metal housing and within it a tightly fitting female matrix analogous to the male matrix component contained within the natural or extended contours of the crown of the abutment.⁽³⁾ They may be rigid/non-resilient or resilient attachments. Non-resilient attachments allow virtually no movement between the prosthesis and the abutment while the resilient attachments permit a wide range of movements. The selection of attachments can be done only on basis of knowledge of biomechanics in partially edentulous arches. The direction of forces along with leverage needs to be evaluated. Rigid attachments can be considered for Kennedy Class III and Class IV tooth-supported prosthesis while for tissue supported large Class IV and distal extension class I or II cases, resilient attachments are preferable.⁽⁴⁾

Attachments can also be classified as precision attachments which are prefabricated and machined with utmost finesse and semi precision attachments which are generally made from either wax, nylon or plastic or may be hand waxed by the technician and then casted.⁽⁵⁾ These may be intracoronal or extracoronal. Intracoronal

attachments serve as retainers in fixed prosthesis while extracoronal attachments offer stability and retention for removable prosthesis. The functional and the physiological requisites of the prosthesis influence the attachment selection. The laboratory expertise and clinician experience in handling specific attachment systems should also be considered.⁽⁶⁾

This case report discusses the use of a semi-precision, extra coronal attachment to restore missing maxillary posteriors and fabrication of a palateless denture in Kennedy's class II situation.

Case Report

This case was addressed in the Department of Prosthodontics, M.M. College of Dental Sciences and research, Mullana where a 32 year old woman complained of inability to chew due to missing upper left posterior teeth and lower left and right posterior teeth.(Fig. 1, 2) On intraoral examination, the periodontal status of all teeth was found to be favourable. The patient was advised various options for rehabilitation of missing teeth, i.e., conventional removable partial denture, cast partial dentures, attachment retained dentures or implant supported prosthesis. However, due to economical limitations, the patient chose to opt for conventional treatment.



Fig. 1: Pre-operative photograph of maxillary arch



Fig. 2: Pre-operative photograph of mandibular arch

As the patient had already got RCT done for the upper left canine, placement of a preci-sagix attachment distal to the crown which would be given to the canine was planned so as to be able to give her a palateless denture. The tooth preparation for the upper left canine was done for a PFM crown (Fig. 3) and impressions were made. The preci-sagix castable male was attached to the distal side of the wax pattern, using an insertion tool attached to the dental surveyor. The wax pattern was casted, metal trial was done followed by fabrication of the final PFM crown. (Fig. 4) The crown was cemented in the patient's mouth.(Fig. 5)



Fig. 3: Tooth preparation w.r.t maxillary left canine



Fig. 4: PFM crown with casted attachment



Fig. 5: PFM crown with attachment cemented intraorally

Impressions of the upper and lower arches were made with alginate and poured in type 2 dental stone. This was followed by making dual impressions of both the arches. Final casts were thus obtained. Base plate was adapted on the final casts and occlusal rims were fabricated. The jaw relations were recorded and facebow transfer was done. The occlusal rims were articulated on a semi-adjustable articulator and teeth setting was done. After the wax trial, the duplicating dummy/processing female part was placed on the sagix attachment and the base plate was cut out from that area to adjust the dummy. Wax up was done around the dummy and the rims and the dentures were fabricated in heat cure acrylic material.

After retrieval, finishing and polishing of the denture, the dummy was removed and the preci-sagix female attachment was inserted in its place. The denture was placed in patient's mouth and premature occlusal contacts adjusted. The upper denture was palateless and had satisfactory retention. Denture maintenance instructions were given to the patient and recalled after two weeks for adjustments. (Fig. 6, 7, 8)



Fig. 6: Female part of the attachment inside the intaglio surface of the denture



Fig. 7: Denture insertion



Fig. 8: Post insertion photograph of the patient

Discussion

In the early 20th century, Dr. Herman Chayes⁽⁷⁾ first documented the invention of attachments. Till date, their use has not been explored to a great extent. Attachments in combination with removable prosthesis render a better retention, better aesthetics, higher level of patient satisfaction and confidence.⁽⁸⁾ Especially in distal extension cases, where fixed prosthesis cannot be given due to lack of terminal abutment, use of attachments can be highly beneficial and cost saving for the patient. In this case, it was only possible to give a palateless denture due to the additional retention provided by the attachment used. Thus, long term success of such prosthesis can be multifactorial and reasonably predictable if properly planned. The use of these attachments has three prerequisites—oral hygiene maintenance, periodontally sound abutment tooth/teeth and presence of sufficient interarch space. In the case discussed above, all the prerequisites were met and thus, the patient could benefit from the use of this attachment.^(9,10)

The preci-sagix attachment is a sagittal ball attachment with segmented female component useful for removable prosthesis. Its advantages include patented snap mechanism, low cost, easy replacement of female component and long lasting retention.⁽¹¹⁾ It has a castable male component which is available in two sizes – 1.7mm and 2.0 mm. For anterior teeth, lesser diameter abutment is useful and for posterior

abutments, a 2 mm male attachment may be used. A processing female is available which acts as a spacer for the final female part and can withstand high curing temperatures. The female component is available in 1.7 and 2mm sizes in three different colors – white, yellow and red (in increasing order of retention).

The use of attachments in removable prosthesis increases its retention, which directly influences the confidence and satisfaction of the patient. The chewing efficiency is better for a more stable prosthesis and these factors overall increase the patient satisfaction. Owall⁽¹²⁾ stated that these type of dentures have a longer life span and don't incur significant amount of maintenance problems. Treatment failure only occurs due to loss of abutment tooth due to secondary caries or periodontal disease.

The patient had a severe gag reflex and would have been unable to wear the prosthesis continuously due to presence of trigger zones in area of soft palate. She was highly satisfied by the insertion of a palateless denture which was easy to maintain and rehabilitated her missing teeth at a reasonable cost.

Conclusion

Attachment retained removable prosthesis are a viable treatment modality for patients who cannot afford or are contraindicated for implant supported fixed prosthesis. However, lack of proper knowledge of the use of these attachments and inadequate training in this field leaves patients devoid of this treatment option.

References

1. Burns DR, Ward JE. A review of attachments for removable partial denture design: part 1. Classification and selection. *Int J Prosthodont* 1990;3:98-102.
2. 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.
3. Rudd KD, Morrow RM, Eissmann HF. Dental laboratory procedures- Removable Partial Dentures. St. Louis, Missouri: CV Mosby; 1986.
4. Makkar S, Chhabra A, Khare A. Attachment retained removable partial denture: a case report. *Int J Clin Dent Sci* 2011;2(2):39-43.
5. Renner RP. Semiprecision attachment-retained removable partial dentures. *Quintessence Dent Technol* 1994;1:137-44.
6. Preiskel HW. Precision attachment in prosthodontics.1&2. London: Quintessence Publishing Co Ltd,1995 .
7. Preiskel HW. Precision Attachments in Prosthodontics: Overdentures and Telescopic Prosthesis. Volume 2. Chicago, IL: Quintessence Publishing Co, Ltd; 1985.
8. Wagner B, Kern M. Clinical evaluation of removable partial dentures 10 years after insertion: Success rates, hygienic problems and technical failures. *Clin Oral Investig* 2000;4:74-80.
9. Zajc D, Wichmann M, Reich S, Eitner S. A prefabricated precision attachment: 3 years of experience with the Swiss Mini-SG system. A prospective clinical study. *Int J Prosthodont* 2007;20:432-4.

10. Studer SP, Mader C, Stahel W, Scharer P. A retrospective study of combined fixed-removable reconstructions with their analysis of failures. *J Oral Rehabil* 1998;25:513-26.
11. Banerjee S, Bera A, Gupta T, Banerjee A. Attachment retained removable prosthesis – a case report. *Clin Dent* 2012;2:30-5.
12. Owall B. Precision attachment-retained removable partial dentures - part 1. Technical long term study. *Int J Prosthodont* 1991;4:249-57.