Case Report

REHABILITATION OF DISTAL EXTENSION EDENTULOUS CASE WITH CLASPLESS EXTRA-CORONAL ATTACHMENTS- A CASE REPORT

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ABSTRACT

Kennedy's class I and class II situations are at times very challenging to rehabilitate especially when opposing a complete denture. The tooth and tissue are supported and hence the retention of the prosthesis may sometimes be compromised due to the nature of the residual tissues. Ideally implant supported prosthesis are considered to be the most favorable treatment option for these patients but their systemic health status may not be suitable for the same. A conventional cast partial denture with clasps can be given, but they are unaesthetic and hence not accepted by patients. An alternative to this is the extra-coronal attachment retained prosthesis. They are combined fixed and removable prosthesis that are an easier alternative as compared to implant supported prosthesis and more aesthetic compared to clasp retained cast partial dentures. This current case report involves rehabilitation of Kennedy's class I situation opposing a complete denture using extra coronal attachments.

Key words: Distal extension, Semi-precision, Attachments, Cast partial dentures, Precision.

Introduction

Rehabilitation of distal extension conditions is sometimes very difficult because these are supported by tooth and tissue and require sound abutment teeth. This becomes more critical when a completely edentulous arch opposes it. Usually, a fixed prosthesis cannot be given for a distal extension condition due to long cantilever length, which may be deleterious [1]. An implant-supported prosthesis may exploit the patient financially. Nevertheless, a conventional clasp retained cast partial denture compromises the aesthetics due to exposure of the metallic components. This can be overcome by using extra-coronal attachments (precision or semi-precision) [2, 3].

Semi-precision attachments are those in which the wax pattern for the attachment is made manually in the wax pattern and cast conventionally. In contrast, precision attachments are prefabricated alloys that can be incorporated directly into the restoration. It is due to this reason that the retention with precision attachments is superior to those of semi-precision attachments. The extra-coronal attachments retained cast partial dentures to enhance both esthetics and are better in function. The survival rates of such prostheses are also satisfactory, 83.35% for five years and up to 50% for 20 years [4, 5].

This case report describes the management of Kennedy's class I modification in one situation in maxillary arch using semi-precision attachments retained cast partial denture opposing a completely edentulous mandibular arch.

Case report

A 68 years old male patient reported to the Department of Prosthodontics with the chief complaint of difficulty in chewing food since the last one month when he got multiple extractions of his natural teeth as they were mobile. On clinical examination, 13 to 23 were the only natural teeth remaining. Grade III mobility was seen with 12 and 11 and hence were indicated for extraction. OPG revealed a generalized bone loss in the maxilla and mandible. Following extraction, the maxillary arch was Kennedy's class I modification, and the mandibular was completely edentulous **(Figure 1)**. After the required periodontal treatment and primary analysis of the diagnostic casts, treatment was planned, which consisted of a tooth-supported fixed prosthesis from upper right canine to left canine and semi-precision attachments distal to the abutments with a cast partial removal denture in the maxillary arch and a conventional complete denture in the mandibular arch. The implant-supported prosthesis could not be planned due to his systemic condition- uncontrolled diabetes and undergoing antiplatelet therapy. The most non-traumatic treatment was chosen for the patient taking into account his systemic condition.

Figure 1. Preoperative view

Denture bases with self-cure acrylic resin (DPI dental products, Mumbai, India) were made on the diagnostic casts, followed by occlusal rims using modeling wax (Hindustan Dental Products, Hyderabad, India). The patient's vertical dimension and a tentative centric relation were recorded and articulated using these. Tooth preparation was done atraumatic with supragingival margins irt 13,21,22, and 23. Following this, impressions were made using monophase impression material (Dentsply Aquasil Monophase, Dentsply Sirona, India) for the maxillary arch **(Figure 2)**. Border molding and wash impressions were done using low fusing impression compound (DPI Pinnacle Tracing Sticks, DPI Dental Products, Mumbai, India) and zinc oxide eugenol impression paste (DPI Impression paste, DPI Dental Products, Mumbai, India) for the mandibular arch. On the master cast, wax patterns for metal copings were made, and distal to the abutments, prefabricated castable OT cap Rhein 83 Inc, USA attachments were added **(Figure 3)**. These are extra-coronal attachments with elastic retention. These also act as a stress breakers and absorb the excess stresses. The male portion is attached to the wax pattern of the FPD, and the female portion is present on the cast partial denture.

Figure 2. Preliminary impression

Figure 3. Wax trial with attachment

The casting for the metal copings of the FPD was done conventionally using the lost wax technique. These copings were checked intraorally for the marginal fit and accuracy **(Figure 4)**. Then a pick-up impression was made with the metal copings intraorally using elastomeric impression material- polyvinyl siloxane (Photosil Impression Material, DPI Dental Products, Mumbai, India).

Figure 4. Intraoral metal try-in

The ceramic build-up was done over the metal copings, following which the FPD was placed on the master cast and mounted on a dental surveyor to check the path of insertion of the cast partial denture. The wax pattern for the CPD was made using pattern resin which was then routinely invested and cast. Denture bases were made on the maxillary and mandibular master casts. A definitive jaw relation was recorded and articulated. Then, teeth arrangement was done, followed by a wax trial to evaluate the occlusion, phonetics, and aesthetics. Then, the maxillary cast partial denture and the complete mandibular denture were processed **(Figure 5)**. O-rings were placed in the maxillary denture base with the help of a metal ring so that its replacement in the future in case of wearing off is possible. During cementation of the FPD, the cast partial denture was attached extra-orally after applying petroleum jelly to the attachments and cemented using glass ionomer cement. This was done to ensure the

correct insertion path of both the fixed and removable prostheses. After which, the maxillary and removable mandibular prostheses were inserted **(Figure 6)**.

Figure 5. Prosthesis with extra coronal claspless attachment

Figure 6. Postoperative view

Results and Discussion

Kennedy's class, I and II situations, can sometimes be quite challenging during rehabilitation due to the nature of the supporting tissue. Implants are considered the best treatment option in such cases but may not be feasible due to the underlying systemic conditions [6-8]. Conventional cast partial dentures may be given, but the metallic clasps are highly unesthetic. Therefore, the use of semi-precision attachments will improve the aesthetics and, at the same tie, act as stress breakers. These attachments combine the advantage of fixed and removable prostheses. The type of attachments may be used based on the amount of interocclusal space. This type of treatment protocol will improve the aesthetics, the retention, stability and support of the prosthesis and hence the acceptance of the patient is much higher [9-12]. These are completely non-surgical approaches.

The fabrication of these attachments may be technique sensitive. The correct placement of the matrix and patrix components along the determined insertion path is critical [13, 14]. Denture processing with such attachments may sometimes become cumbersome. When made manually, the wax pattern for the attachments can lead to loss of friction between the two components, leading to a poorly retentive prosthesis [15, 16]. Rhein 83 OT cap attachments are prefabricated castable attachments that can just be attached to the wax pattern of the coping and conventionally cast, thereby improving the accuracy.

Conclusion

When rehabilitated using cast partial denture precision or semi-precision attachments, distal extension cases provide both fixed and removable prosthesis advantages. They are aesthetic, and hence patient acceptance is better. Although it is technique sensitive in fabrication, the unsightly appearance of the clasps can be prevented, and the retention can be upgraded from time to time by replacing the retentive caps. It also proves to be a cost-effective alternative to surgical treatments with implants.

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References

1. Vermeulen AH, Keltjens HM, Van't Hof MA, Kayser AF. Ten-year evaluation of removable partial dentures: survival rates based on retreatment, not wearing and replacement. J Prosthet Dent. 1996;76(3):267-72.
2. Viennot S, Dalard F, Malquarti G, Grosgogeat B. Combination fixed and removable prostheses using a CoCr alloy: a clinical report. J Prosthet Dent 2006;96(2):100-3.
3. Zinner ID, Miller RD, Parker HM, Panno FV. Prefabricated metal intracoronal semi-precision attachments for removable partial dentures. Int J Prosthodont. 1989;2(4):357-64.
4. Weaver SM. Precision attachments and their advantages in respect to underlying tissues. J Am Dent Assoc. 1938;25(8):1250-9.
5. Wagner B, Kern M. Clinical evaluation of removable partial dentures ten years after insertion: success rates, hygienic problems, and technical failures. Clin Oral Investig. 2000;4(2):74-80.
6. Nigam A, Singh A, Shekhar A, Gupta H. Precision Attachments: an overview. J Dent Facial Sci. 2013;2(4):41-4.
7. Bambara GE. Precision and Semi-Precision Attachments. In Freedman, GA. Contemporary Esthetic Dentistry 1st ed. Elsevier, chapter 25. p. 575.

8. Burns DR, Ward JE. A review of attachments for removable partial denture design: Part 1. Classification and selection. Int J Prosthodont. 1990;3(1):98-102.
9. Makkar S, Chhabra A, Khare A. Attachment retained removable partial denture: A case report. Int J Clin Dent Sci. 2011;2(2):39-43.
10. Konwar AK, Parameswari D, Annapoorni H. Removable denture options in rehabilitation of missing dentition: A series of case reports. Ann Prosthodont Restor Dent. 2020;6(2):110-3.
11. Kumar RD, Parameswari BD, Annapoorni H. Rehabilitation of partially edentulous patient using Precision Attachment denture– A case report. IP Ann Prosthodont Restor Dent. 2020;6(3):162-6.
12. Mukhopadhyay N, Das SL, Sen UK, Mondal S, Banerjee S. Functional Rehabilitation of Mandibular Distal Extension Partial Edentulous Arch Combined with Maxillary Complete Edentulism. IJCMCR. 2022;19(3):002.
13. Patil AP, Pawar AV, Patil R. Unique, Cost- effective and Retentive Removable Prosthesis to Rehabilitate Long Span Kennedy's Class I Edentulism with Custom Attachment System: A Case Report. J Contemp Dent Pract. 2020;21(2):215-8.
14. Turagam N, Mudrakola DP, Yelamanchi RS, Deepthi M, Natarajan M. Esthetic clasp cast partial denture. J Int Soc Prev Community Dent. 2019;9(1):94-8.
15. Patil R, Shetty O. Prosthetic rehabilitation using extra coronal attachments. Int J Dent Res. 2019;4(1):5-8.
16. Arita S, Gonda T, Togawa H, Maeda Y, Ikebe K. Influence of mandibular free-end partial edentulism on the force exerted on maxillary anterior teeth. J Prosthodont Res. 2020;64(4):454-9.