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Case Report

Rehabilitation of partially edentulous patient using Precision Attachment denture– A case report

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ABSTRACT

Satisfactory restoration in a patient with a partially edentulous situation can be challenging especially when unilateral or bilateral posterior segment of teeth is missing. Successful restoration can be done with various conventional and contemporary treatment options. One such treatment modality is attachment-retained cast partial dentures. This paper describes a case report of a patient with mandibular bilateral distal extension edentulous span restored with a cast partial denture having an extracoronal castable precision attachment (RHEIN 83 OT CAP attachments system).

1. Introduction

Rehabilitation of partially edentulous arch can be challenging when it is a distal extension situation classified under Kennedy's class I and class II situations.[1] In such a condition, a fixed partial denture cannot be fabricated because of missing distal abutment. Implant-supported prosthesis can be planned, but it is sometimes not feasible due to insufficient amount of bone and economic reason. So, in such situation an acrylic partial denture or a cast partial denture is largely preferred. Cast partial dentures are made retentive by the use of retainers and precision attachment components.[2] Precision attachments could be extracoronal and intracoronal. Attachment-retained cast partial dentures facilitate both esthetic and functional replacement of missing teeth. Studies have shown a survival rate of 83.35% for 5 years, of 67.3% up to 15 years, and of 50% when extrapolated to 20 years.[3,4] This paper describes a case report of a patient with mandibular bilateral distal extension Kennedy's class I condition which is prosthetically restored by a cast partial denture retained using a extracoronal precision attachment (RHEIN 83 OT CAP attachments system).

2. Case Report

A 65-year-old male reported with missing mandibular molars bilaterally. He gave a history of heart surgery one and half years back. On intraoral examination, it was noted that patient had missing mandibular first, second and third molars bilaterally (Kennedy's Class 1) and he had missing 14 and 26 in maxillary arch. He also had existing metal ceramic fixed partial prosthesis on 21, 11, and 12 and in 31, 32, 33, and 34 (Figures 1, 2 and 3).

After complete clinical and radiographic examination, a prosthetic treatment plan was set up. A cast partial denture with extracoronal precision attachment was planned for mandibular bilateral distal extension arch and metal ceramic fixed partial denture prosthesis for missing maxillary teeth. After getting the consent from the patient's physician for this treatment, we started with the tooth preparation of 13, 15 and 16 abutment teeth (Figure 4). A metal ceramic bridge was then prepared for 13, 14, 15 and 16, and luted with type1 Glass ionomer cement. The preparation of adjacent arch 24, 25 and 27 abutment teeth were done and provided with similar metal ceramic fixed prosthesis (Figure 5).

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After restoring maxillary teeth, we proceeded with the preparation mandibular teeth 34, 35, 44, and 45 abutment teeth were done and temporized after making a definitive impression (Figure 6).

2.1. Lab Procedure

Waxing up of abutments 34, 35, 44 and 45 was done and design of attachment structure was waxed and then they were also cast along with the copings of the abutments. Metal try-in was done to check the overall fit of the copings and attachments (Figure 7). Articulation spaces and bulkiness were also evaluated. After metal trail, the ceramic powder was added to the abutments and porcelain firing was done.

2.2. Cast Partial Denture Design and Fabrication

After proper planning and surveying, an appropriate cast partial denture framework was designed for the patient and then fabricated with attachment in the laboratory. The metal framework trail was done in the patient's mouth for the accuracy of fit. Cast structure framework was checked up for stability and precision. Inter-occlusal records were then made.

2.3. Wax-Up Trial

Waxing up of teeth was performed and teeth setting trial was done in patient's mouth. The trial denture was sent for acrylization and cast partial denture finished (Figures 8 and 9).

2.4. Prosthesis Insertion

Trial seating of the finished prosthesis was performed and cementation of crowns was done using Glass Ionomer cement. Attachments are protected with a thin layer of petroleum jelly (Vaseline) in order to easily remove cast partial denture after joint PFM crowns with attachment have been seated. Complete seating of finished mandibular prosthesis with extracoronal distal extension precision attachment was seated in the patient's mouth and the patient was recalled after 24 hrs for post-insertion checkup (Figure 10). The patient was happy and satisfied with the treatment.

3. Discussion

There are several treatment options for the rehabilitation of partial edentulism. Depending on several given diagnostic factors and a patient's perspective, best treatment plan should be selected for the patient. In recent years, dentistry has witnessed the use of Computer aided design and Computer assisted milling (CAD-CAM),[5] precision milled and semi-precision attachments, improved impression materials, improved techniques and designs which would

Fig. 1: Pre-Op frontal view

Fig. 2: Intraoral view of maxilla showing missing teeth

Fig. 3: Intra oral view of mandible showing Kennedy's Class 1 bilateral edentulous spaces

Fig. 4: Tooth preparation done on maxillary teeth 13,15,16,25 and 27

Fig. 5: FPD prosthesis cemented in 13,14,15,16 and 25, 26 and 27.

Fig. 6: Tooth preparation done in 34,35,44 and 45

Fig. 7: Metal try-in done with cast copings with RHEIN attachments

Fig. 8: Fabricated cast partial denture framework with acrylic teeth for wax trial

Fig. 9: CPD Wax trial done and occlusion checked.

Fig. 10: Delivered precision attachment prosthesis

eventually attain a comprehensive treatment. In case of partially edentulous mouth, Retention provided by the usage of precision attachments which may be related to comfort, satisfaction, chewing ability, as well as adequate distribution of occlusal loads to, and preservation of abutment teeth in patients with removable partial dentures. An attachment is defined as "A mechanical device for the fixation, retention and stabilization of a prosthesis". Retentive ability increases significantly over time in the metal- alloy precision attachment group. It was Dr. Herman Chayes who first reported the invention of attachment in the early 20th century.[6] These attachments allowed prosthesis to combine the advantage of fixed and removable restorations.[7]

Holst et al[8] cited as it is difficult to evaluate precision attachments' effects on treatment longevity based solely on in vitro results since other factors such as continuous ridge resorption, changes in saliva flow and composition, and occlusal considerations may affects its long-term success.

The decision to use attachments in removable partial denture design should be carefully considered. Clasp-type removable partial dentures should be used whenever practical because of their lower cost, ease of fabrication and maintenance, and the predictability of results.[9] A precision attachment prosthesis has advantages of better retention and stability similar to a fixed prosthesis and also better aesthetics and hygiene maintenance similar to conventional removable prosthesis.[10] The RHEIN 83 OT CAP attachments system used in the case discussed in this paper is extracoronal castable attachment positioned on the distal of the crowns as an extension allowing a lot of vertical space for optimal aesthetics.[11] However, if an attachment removable partial denture is the treatment of choice because of esthetics, abutment alignment, or the need for greater cross-arch bracing, it must be used with a thorough knowledge and understanding of prosthodontic principles and attachment use, as well as an awareness of the intricacies and special problems associated with attachments. In treatment using the attachment-retained distal extension removable partial denture, the development of a stress-directing attachment design as well as the proper distribution of forces between the residual ridge and abutment teeth should be goals for successful treatment.

4. Conclusion

Removable partial dentures still have a good place as a treatment option for partially edentulous Kennedy's class I and class II conditions. With proper case selection and treatment plan, precision attachment such as RHEIN attachments system can be used to improve retention, esthetics, and function of removable partial denture. The above mentioned procedure using allows fabrication of very functional and comfortable prosthetic solution for the edentulous bilateral distal extension patient cases. Attachments retention can be monitored and upgraded during time just replacing retentive caps into the framework of dentures for patients comfort and satisfaction.

5. Source of Funding

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6. Conflict of Interest

None.

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