

PROSTHETIC REHABILITATION OF A PARTIAL EDENTULOUS CONDITION BY A COMBINATION OF EXTRACORONAL SEMI PRECISION ATTACHMENT AND A CAST PARTIAL DENTURE: A CLINICAL REPORT

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Abstract

Restoration of the lost structure can be achieved by using simple conventional removable partial dentures, cast partial dentures, precision or semi precision attachment system for a removable partial dentures, telescopic dentures and dental implants.

Fabrication of fixed prosthesis becomes difficult if a patient exhibits a highly reduced dentition with regard to number of teeth lost due to caries or periodontal disease.

Patient's systemic factors do not favour Implant placement. Treatment utilizing attachment prosthesis and cast partial denture must follow the biologic tenets of basic fundamental principles.

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Introduction

In the treatment of partial edentulous situations, attachments are used to improve the esthetics and longevity of the prosthesis. Extracoronar attachments introduced by Henry R. Boos (1900) and modified by F Ewing Roach (1908).¹

Extra coronal attachments exhibit hinge, vertical and rotational movements during function. These attachments allow free movement of the prosthesis to distribute potentially destructive forces away from the abutments to supportive bone and tissue.²

The use of "cast partial dentures (CPD)" has improved outcomes for partial edentulous patients compared with conventional removable partial denture.^{3,4}

Case Report

A 38 year old female patient reported to the Department of Prosthodontics, Dayananda Sagar College of Dental Sciences, Bengaluru complains of missing teeth causing inability to chew food. On intra oral examination [Figure-1,2], teeth present were permanent maxillary right central incisor, permanent maxillary right lateral incisor, permanent maxillary right canine, permanent maxillary left central incisor, permanent maxillary left lateral incisor, permanent maxillary left canine, permanent maxillary left second molar along with conventional removable partial denture in maxillary arch.



Figure 1. Preoperative Intra oral picture.

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Figure 2. Preoperative Intra oral picture .

In mandibular arch, permanent right central incisor, permanent right lateral incisor, permanent right canine, permanent left central incisor, permanent left lateral incisor, permanent left canine along with cantilever fixed partial denture in permanent left first pre molar, permanent left second pre molar, permanent left first molar and "fixed partial denture (FPD)" in permanent right first pre molar, permanent right second pre molar, permanent right first molar and permanent right second molar were present.

The treatment was divided into three phases - diagnostic phase, endodontic phase and prosthetic phase.

Diagnostic phase

After clinical and radiographic examination, diagnostic casts were prepared. Facebow transfer was done and casts mounted on semi adjustable articulator (Artex) with centric relation record made by bimanual manipulation (Dawson's technique)⁵ to analyze the inter-arch factors. FPD was not considered for maxillary arch due to long edentulous span. Removable partial denture was not a treatment of choice due to improper force distribution, lack of retention and stability. Implants were also not considered as the patient was not ready for the surgical procedure. To achieve functional requirements, attachments and cast partial denture were selected as the treatment of choice.

Vertical distance of about 6mm between the crest of the residual ridge and the opposing tooth at the site of attachments on the articulated casts were present in 3rd quadrant. Availability of different attachments in market, determining a definite path of insertion and removal and to balance the patient desire between cosmetic appeal and functional stability, extracoronal Rhein 83 attachment was selected.

The casts were surveyed and designed to finalize the mouth preparation and for fabricating CPD for a Kennedy's class II modification 1 in maxillary arch, and extracoronal semi precision attachment in 3rd quadrant along with replacement of FPD in 4th quadrant. Patient was educated about the treatment and associated procedures.

Endodontic phase

Root canal treatment along with post and core was carried out in permanent mandibular left first pre molar, permanent mandibular left second pre molar and permanent mandibular right first pre molar.

Prosthetic phase

Oral prophylactic measures were taken and conventional removable partial dentures were fabricated for both the arches to partially satisfy the primary concerns of the patient during the treatment period.

Mouth preparation was carried out as planned for CPD and minimal tooth preparations were done to receive a metal ceramic restorations in permanent maxillary left lateral incisor, permanent maxillary left canine, permanent mandibular left first pre molar, permanent mandibular left second pre molar, permanent mandibular right first pre molar and permanent mandibular right second molar.

Provisional restorations were fabricated with the putty index using tooth coloured self cure acrylic resin and cemented with Non Eugenol temporary cement. On the stone model, wax patterns were waxed up and Rhein 83 burn-out plastic male part was incorporated parallel to the path of insertion, and on the crest of the ridge, using the paralleling mandrel to the distal side of permanent mandibular left second pre molar and the palatal portion of wax pattern were milled in permanent maxillary left lateral incisor using a paralleling cutting device. Wax patterns were casted, finished, polished and evaluated intraorally [Figure-3,4].

Ceramic build up was done on the metal copings and Pick-up impressions were made with an addition silicon. Stone models were poured and the casts duplicated with Agar. On refractory casts wax patterns were prepared for CPD frameworks and casted in cobalt chromium alloy [Figure-5-7]. Cobalt chromium alloy were used in casting due to their biocompatibility, resistance to corrosion,⁶⁻⁸ and rare allergies.^{9,10}

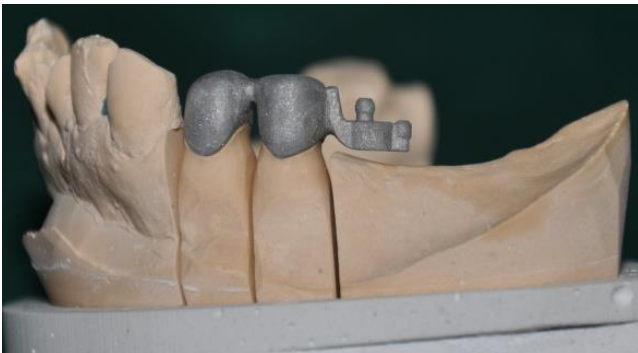


Figure 3. Attachment male part.



Figure 4. Metal copings checked for fit.

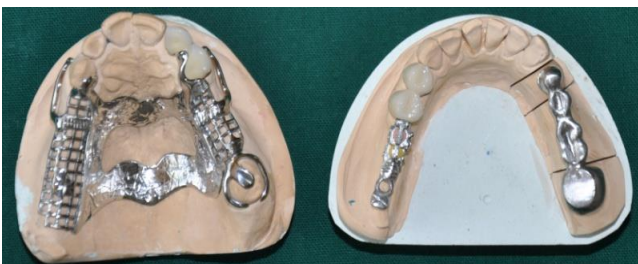


Figure 5. Frame work fitted on the master cast.

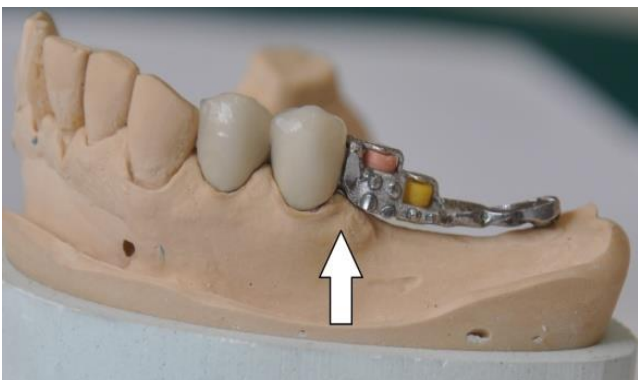


Figure 6. Key and key way.

Following frameworks try in [Figure-8,9], jaw relation record, teeth setting procedures and try in were carried out. The frameworks were then polymerized, finished and polished [Figure-10] taking care not to damage the metal

components. Crowns on permanent mandibular left first pre molar, permanent mandibular left second pre molar were placed on their abutments along with removable prosthesis to obtain a single path of insertion and removal during final cementation with Glass Ionomer luting cement.

After insertion of the removable denture they were evaluated intraorally and adjusted [Figure-11].



Figure 7. Male part and intaglio surface of female part.



Figure 8. CPD frame work try in.



Figure 9. CPD frame work try in.

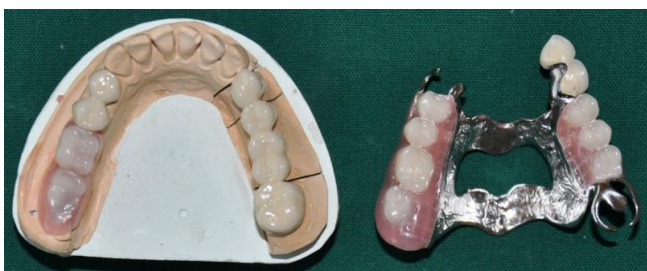


Figure 10. FPD and Finished dentures.



Figure 11. Postoperative Intra oral picture.

Patient was instructed on the use of hygiene accessories such as proxi brushes to keep the underside of the attachment area clean, ease of insertion and removal and to change the female portion of attachment once in a year to maintain proper function. Recall evaluations were done regularly, at an interval of 1 week and 1 month each for 3 months. Patient did not experience any complication and functional expectations were also satisfied.

Discussion

To meet the patient expectations of masticatory efficiency the procedure described in the rehabilitation of this patient is an innovative way of restoration of partially edentulous arches.

In the conventional removable partial denture fabrication forces or loads will be destructive and directed towards the abutments to supportive bone and tissue. But in the current technique force management, maximal retention and stability for the removal prosthesis is achieved.

The impact strength, compressive strength of the alloys stands superior in comparison with the denture base materials and mainly this will enable the patient to fulfill his needs.

Extra coronal attachments requires only a routine full coverage abutment preparation and

provides easy patient insertion and removal. The only servicing requirement is occasional, fast and easy female replacement.

Conclusions

The restoration of the partially edentulous condition requires challenging decision making in planning the treatment without compromising the patient's needs.

The technique followed in the treatment of this patient is simple but yet effective results can be obtained. The Rhein 83 semi precision attachment and CPD has got many advantages and provided better usage and superior masticatory efficiency.

Declaration of Interest

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