

CLINICAL REPORT

PRECISION ATTACHMENTS RETAINED REMOVABLE PARTIAL DENTURES - A CLINICAL REPORT

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ABSTRACT

Among the numerous treatment options available to replace missing teeth, a removable partial denture with semi-precision attachment system has been well accepted and considered as a beneficial prosthesis. It integrates the features of both fixed and removable partial denture, thereby providing improved stability, retention and better cosmetic appeal. This case report discusses the use of a precision attachment to retain a maxillary bilateral distal extension removable partial denture. Precision attachments add new dimensions to conventional removable partial dentures.

Keywords: attachments, overdentures, hybrid dentures, snap fasteners.

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INTRODUCTION

Prosthetic rehabilitation is a challenging clinical scenario especially in cases of patients presenting with multiple missing teeth. Precision attachments have wide applications, used in fixed removable bridge, removable partial dentures, overdentures, implant retained overdentures, and maxillofacial overdentures. The treatment modalities includes implants, removable partial denture, fixed partial denture, fixed -removable (hybrid) dentures and so on.¹ Because of the integration of features of both removable and fixed dentures, precision attachment is the connecting link between these two prosthetic systems.¹

It is also called as frictional attachments, slotted attachments, parallel attachments, and key and keyway attachments.²

An attachment is generally defined as a mechanical device meant for fixation, retention, and stabilization of prosthesis. Precision attachments consist of

two metal components, that form an articulate joint. Precision attachment can be described as a retainer used in fixed and removable partial denture construction consisting of a metal receptacle and a closely fitting part, the former is usually contained within the normal or expanded contours of the crown of the abutment tooth, and the latter is attached to a pontic or to the denture framework. The unique design substitutes certain components of conventional clasp retained partial denture such as occlusal rest, bracing arm, and retaining arm.¹ This paper describes the case report where removable denture with precision attachment was used for a patient with multiple missing maxillary teeth.

Case Report

A 60 year old female patient came to the Department of Prosthodontics, Pushpagiri College of Dental Sciences, Thiruvalla, Kerala with a chief complaint of multiple missing upper posterior teeth and inability to chew the food. She had a history of Carcinoma and underwent associated treatment including radiotherapy. On oral examination it was diagnosed as Kennedy's Class I case where, only maxillary anterior teeth were left (Figure 1). After clinical and radiographic examination a prosthetic treatment plan with an endodontic component was set up.



Figure 1: Pre-operative clinical view

Treatment plan included root canal treatment for the retained teeth and fabrication of semi precision attachment retained denture. A cast partial denture with extracoronal precision attachment was planned for maxillary bilateral distal extension arch. The diagnostic casts were studied which showed enough interocclusal space to accommodate the stud attachments. After endodontic treatment, the abutment teeth were prepared. After fabricating definitive impressions, it was ensured that the abutments prepared were temporized. Copings were placed and checked for the fit and pickup impressions were made with addition silicone material (Aquasil soft putty/regular set and Aquasil LV, Dentsply, Caulk, Germany) (Figure 2). Wax patterns were prepared for metal denture bases on refractory cast and casted

in cobalt chromium (Wironium, Bego, D 28359 Bremen, Germany) with prefabricated housings for patrix in the region of abutments (Figure 3). Metal denture bases were checked for fit (Figure 4). After recording maxillomandibular relation, try-in was done and dentures was fabricated. Copings were cemented using GIC cement (Ivoclar Vivadent AG, FL9494 Schaan/Liechtenstein).

After necessary occlusal error corrections, fabricated dentures were delivered. The artificial teeth in the RPDs were made of acrylic resin. The patient was given post insertion instructions. The subsequent visits were scheduled after 1 day, 1 week, 1, 3, 6 and 12 months interval to assess the abutments and status of periodontal tissues. The results were appreciable in the subsequent visits. (Figure 5) The



Figure 2: Copings checked for fit.



Figure 3: Bisque trial



Figure 4: Metal denture base and FPD checked for fit



Figure 5: Post-operative view

patient was well satisfied with the denture throughout the period of 5 year follow up.

Discussion

The state of edentulousness partial or complete disturbs the integrity of masticatory function and leads to poor aesthetics thereby compromising the quality of life of the patient.

The rehabilitation of partially edentulous arch is truly challenging in case of Kennedy's class I and class II situations. Due to the absence of abutment tooth in the distal aspect of edentulous area, the retention, support and stability offered by removable partial denture is questionable. The insufficient support renders the saddle area more prone for rotating both away from and towards the mucosa. Here because of clinically missing distal abutments, the treatment modality of fixed partial denture cannot be thought about. Implant supported prosthesis can be considered depending on the systemic conditions and radiographic status on the quality of alveolar bone.^{4,5} The systemic status of the patient following oncology treatment also does not favour any invasive procedures like the introduction of implant. The affordability of the patient for implant is yet another issue. Hence after a thorough clinical and radiographic examination, weighing the benefits and risks involved, the fabrication of a cast partial denture with extra coronal precision attachment was chosen as the treatment plan. Attachment-retained cast partial dentures facilitate both aesthetic and functional replacement of missing teeth.^{4,5,6} Clasp less design enhances better conservation of adjacent teeth. The improved fracture resistance of metal base and favourable responses of denture supporting tissues to metal base and ease in maintenance were the prime reasons to select metal as the material of choice for denture base.³

Even though titanium has better clinical properties than cobalt chromium, the material of choice for the fabrication of cast partial denture was cobalt chromium because of economic reasons. Rheins stud attachments were preferred in this case due to ease of maintenance and simpler design.^{3,6}

The abutment selection also plays a vital role in the

prognosis of the patient. Anterior teeth have less chances of formation of infra bony defects or craters. The position and shape as well as larger periodontal attachment renders canines to provide the best proprioception among anteriors.⁵

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.^{4,5,6} Holst et al suggested that the effects of precision attachment on the longevity of treatment cannot be evaluated completely in vitro because in vitro studies the contributions of ridge resorption, salivary changes and occlusal equilibrium are not assessed.⁷

When compared to removable partial dentures, retention offered by precision attachments may be related to patient comfort, satisfaction, improved masticatory function and better distribution of occlusal loads and considerable preservation of abutment teeth. Precision attachments provide better vertical support and better stimulation to the underlying tissue through intermittent vertical massage.

The advantages of extra coronal attachments include preservation of abutment, ease of insertion and flexible design. These attachments eliminate the need for facial clasp arm and thereby improved aesthetics. Another advantage is that it can be used even when there is insufficient buccolingual width to accommodate the intraoral intracoronal attachment.^{8,9} The design is not free from disadvantages. In certain cases, there occurs improper control of force distribution between dentulous and edentulous area. Maintenance and rebasing issues as well as break or wear are also associated with this treatment modality.^{8,9}

Precision attachments pose a challenge in the field of technical skill. An in-depth comprehension of the bio mechanics of arches and thorough knowledge of material science is crucial in diagnosing and treating a case of precision attachment. If a proper treatment plan is made based on compliance of the patient, supported by clinical skills of dentist firmly deep rooted in clinical, scientific and technical aspects, precision attachments could serve as the best choice in terms of retention, stress distribution, function and aesthetics.²

Conclusion

Removable partial denture with precision attachment integrates the features of both fixed and removable partial denture, thereby providing improved stability, retention and acceptable aesthetics. When planned and delivered meticulously in a suitable patient, it can enhance patient comfort, satisfaction, improved masticatory function and better distribution of occlusal loads.

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