

# Full Mouth Rehabilitation of a Patient Using Cast Partial Dentures with Precision Attachments

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## Abstract

Precision attachments play a huge role in dentistry by offering excellent means of retaining a prosthesis. Cast partial dentures can be retained using precision attachments. However, there are many factors which need to be considered before undertaking the treatment. Accurate case selection is of paramount importance. This article explains the clinical case report of full mouth rehabilitation of a patient having generalized attrition using cast partial dentures with attachments.

## Introduction

Dentistry is no longer limited to the prevention and treatment of dental disease but also extends itself to meet the patients' demands for better esthetics. It has evolved from a curative to a creative science in a very short span.<sup>1</sup>

There are various treatment options available for replacement of missing teeth. Implants are always the first choice of treatment. However, other treatment options like a fixed partial denture or removable partial denture may have to be considered as implants may not be possible in all patients due to local and systemic factors or economic reasons.

While replacing missing teeth by artificial substitutes, our primary objectives must be the restoration of oral health, oral function, and esthetics. Not all dental replacements satisfy these objectives. In fact, too many partial dentures are made with negligible consideration or planning other than a desire to fill a void where natural teeth have been lost. This results in limited esthetic values, and from the time of insertion, the appliances contribute to the premature loss of remaining natural teeth and alveolar support.<sup>2</sup>

Rehabilitation of partially edentulous situations can be challenging especially in distal extension situations where a fixed prosthesis cannot be fabricated. In these cases, acrylic or cast partial dentures were largely preferred, with barely satisfactory esthetic results. In the words of Charles Pincus, an early pioneer of esthetic dentistry; esthetics truly has become the "fourth dimension in full mouth rehabilitation".<sup>3</sup>

Precision attachment has long been considered the highest form of partial denture therapy. Attachment retained RPD is the treatment modality that can facilitate both esthetic and a functional replacement of missing teeth and oral structures. The few retrospective studies available show a survival rate of 83.3% for 5 years, of 67.3% up to 15 years and of 50% when extrapolated

to 20 years.<sup>4,5</sup>

An attachment is a connector consisting of two or more parts. One part is connected to a root, tooth, or implant and the other part to prosthesis.

Precision attachments can be classified in to four main groups<sup>6</sup>:

1. Intracoronal attachments
2. Extracoronal attachments
3. Stud attachments
4. Bar attachments

Stauble<sup>7</sup> has classified attachments as:

- Class 1a Solid, rigid, non resilient
- Class 1b Solid, rigid, lockable with U- pin.
- Class 2 Vertical Resilient
- Class 3 Hinge Resilient
- Class 4 Vertical and Hinge Resilient
- Class 5 Rotational and vertical resilient
- Class 6 Universal, Omniplanar

## Indications, Contraindications & Advantages of Precision Attachments

Selection of precision attachment should be based on the functional and physiologic requirements of the prosthesis. The primary indication for an attachment retained cast partial denture is esthetics. When the removable partial denture is essential, the precision attachment provides the most equitable and definite means of distributing stresses, and in some instances it is by far the most satisfactory means of replacing teeth with reasonable certainty that oral health be maintained. It eliminates the necessity of the unsightly labial clasp arm.

The great advantage of precision attachment appliances over those retained by clasps is not only the elimination of wedging but the fact that all horizontal stresses are most favourably distributed. The attachments virtually tie abutment teeth together in a way that not only horizontal stresses are distributed between all abutments, but the excessive movement of abutment teeth in function is limited, and abutment teeth give support to each other. Precision attachment restorations have commonly been constructed with rigid palatal or lingual bars, while the connecting arms of the average clasp appliance have been much too flexible. A flexible bar precludes the possibility of a

bilateral distribution of horizontal stresses or the stabilization of abutment teeth. Too flexible or poorly planned clasps have little value in bilaterally distributing horizontal stresses.<sup>8</sup>

The contraindications to the use of attachments in removable partial dentures are numerous. Short clinical crowns prove to be the foremost contraindication to the use of attachments in the construction of removable partial dentures. The tooth must have adequate crown height to house the attachment components and effectively offset the leverage forces exerted on the crown. In addition, adequate height must be present for the corresponding attachment components to be housed within the RPD framework or supportive acrylic resin while allowing an optimal artificial tooth placement.<sup>2</sup>

This article discusses the clinical case report of full mouth rehabilitation of a patient having generalized attrition using cast partial dentures with precision attachments.

## Clinical Case Report

A 64 years old male patient named Mr. B. R. Patil (Fig.1) reported to the the Department of Prosthodontics with a chief complaint of missing teeth in the maxillary and mandibular posterior regions. The patient gave history of tobacco chewing since 20 years. On clinical examination, the teeth present in the maxillary arch were 11, 12, 13, 21, 22, 23, 24, 25 and the teeth present in the mandibular arch were 31, 32, 33, 38, 41, 42, 43 and 47. The teeth displayed generalized attrition and abrasion facets along with tobacco staining (Figs. 2, 3 and 4). The periodontal condition of all the teeth was very good, except teeth nos. 32, 33, 38 and 47. Teeth nos. 32 and 33 displayed gingival recession labially. However, the bone support was excellent lingually, resulting in no clinical mobility. However, teeth nos. 38 and 47 showed grade II mobility.

Implant therapy for replacement of missing teeth was ruled out for economic reasons. The patient was evaluated clinically and he displayed a loss of vertical dimension of 3 mm. He was suggested a full mouth rehabilitation treatment to restore the existing

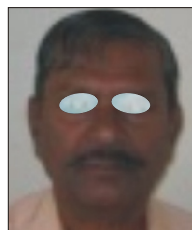


Fig. 1 Pre-Operative Frontal View



Fig. 2 Intra-oral Frontal View



Fig. 3 Intra-oral Left Lateral View



Fig. 4 Intra-oral Right Lateral View

teeth with porcelain fused to metal crowns and to replace the missing teeth using cast partial dentures. Attachment retained dentures were planned for the patient since esthetics was a prime concern and sufficient vertical space was available.

Diagnostic impressions were made and 2 sets of maxillary and mandibular casts were poured. A diagnostic jaw relation was carried out and mounted at the existent vertical dimension. A pre-requisite for precision attachments is the availability of vertical space. Another jaw relation which recorded the restored vertical dimension was carried out on the other set of casts. This helped to assess the available vertical space and subsequent options of precision attachments. A facebow record was taken and the casts were mounted at the restored vertical dimension in centric relation. A wax-up was done on the mounted casts. Transparent

acetate matrices were made using the wax-up. The matrices were used as a guide in preparation of the teeth to receive porcelain fused to metal restorations.

After tooth preparations, an impression was made of the prepared teeth to receive heat cured acrylic resin temporary crowns. A temporary maxillary and mandibular acrylic removable partial denture was delivered to the patient at the restored vertical dimension along with cementation of temporary crowns. (Fig. 5) The patient was kept under observation for 6 weeks to evaluate his response to the prosthesis.

After 6 weeks, the patient was recalled. His temporary crowns were removed, the tooth preparations (Figs. 6 and 7) were refined and a final impression using polyvinyl siloxane impression material (Aquasil; Dentsply, USA) was made.

Final casts were poured and working models were made. A facebow record and jaw relation was carried out to mount the working models. The temporary crowns were removed, the acrylic partial denture was placed in the mouth and an anterior jig was made using impression compound. Using the anterior jig which was fabricated at the correct restored vertical dimension, a jaw relation record was made posteriorly using record bases and wax rims. A mounting of the working models was carried out.

It was decided to restore the existent teeth

using splinted porcelain fused to metal crowns and to replace the missing teeth using cast partial dentures with precision attachments. The mandibular molars had very poor bone support. However, due to patient disapproval, they were not extracted. Thus, they were retained but were not used as distal terminal abutments. The precision attachments selected for this case were OT Caps (Rhein 83, USA). OT Cap is a resilient distal extension attachment. OT Cap functions as a stabilizing retentive connector. In addition, for treatment plans which require resiliency, OT Cap provides a "Cushion Effect" similar to a shock absorber. This is achieved by the design of the sphere in conjunction with the elastic retentive caps. The male part or the patrix is attached to the fixed restorations and the female part or the matrix is incorporated in the intaglio surface of the denture. It was decided to give the pink coloured elastic cap in the matrix which offered standard retention.

Wax patterns for splinted crowns were fabricated on the working models. Wax patterns were invested and casted. The patrix was attached to the splinted metal copings. Metal trial was carried out in the patient's mouth (Figs. 8, 9 & 10). Following this, shade A2 was selected for the ceramic and a bisque trial was conducted (Figs. 11, 12 & 13).

Following the bisque trial, pick-up impressions were made (Fig. 14). For the



Fig. 5 Temporary Crowns & Acrylic Partial Denture at the Restored Vertical Dimension



Fig. 6 Maxillary Arch Tooth Preparations



Fig. 7 Mandibular Arch Tooth Preparations



Fig. 8 Metal Trial Frontal View



Fig. 9 Metal Trial Maxillary Occlusal View



Fig. 10 Metal Trial Mandibular Occlusal View



Fig. 11 Bisque Trial Frontal View



Fig. 12 Bisque Trial Right Lateral View



Fig. 13 Bisque Trial Left Lateral View



Fig. 14 Pick Up Impressions

maxillary arch, a self cure acrylic resin special tray was fabricated with one thickness wax spacer in the edentulous region and multiple thickness wax spacer in the region of the bisque trial for the upper arch. Border moulding was carried out in the edentulous region. Following this, the wax spacer was removed and a pick-up impression of the bisque trial was carried out using polyvinyl siloxane impression material Monophase (Dentsply, USA). In the mandibular arch, a single stage, double mix pick-up impression was made using putty and light body consistency polyvinyl addition silicone impression material Aquasil (Dentsply, USA). Casts were obtained from the pick-up impressions and wax pattern framework was made. This was casted to obtain cast partial denture metal framework.

The metal framework was inserted in the patient's mouth and evaluated for fit and accuracy (Figs. 15 and 16). The matrix was incorporated in the intaglio surface of the cast partial denture metal framework. The matrix snugly fits into the matrix, thus aiding in retention. Jaw relation records were made in wax and mounted. Teeth arrangement was done followed by denture trial. Occlusion was evaluated at this stage followed by denture processing.

Final cementation of the porcelain fused

to metal restorations was carried out. The processed dentures were inserted in the patient's mouth (Figs. 17, 18 and 19). Occlusal scheme incorporated was mutually protected in protrusive movements and canine guided in lateral excursive movements. This was decided as the natural teeth were periodontally strong and the retention offered by the attachment was excellent, eliminating the need for a balanced occlusion to aid in retention. At the same time, life of the precision attachment can be prolonged by relieving it of excessive loads in eccentric relations.

The patient was recalled after 24 hours, 1 week, 2 weeks, 1 month, 3 months and 6 months.

#### Summary

Precision attachment retained cast partial dentures are an excellent option for cases where esthetics is a prime concern and economic condition does not permit the use of dental implants. The results are excellent if appropriate case selection is done. The stress-control on abutment is an essential factor for the success of distal extension cast partial denture which is achieved through accurate impression technique, broad coverage and stable denture base, rigid design, physiologic shimmering, splinting of abutments, proper selection of attachment and clasp design.<sup>9, 10</sup>

This case report throws light on the entire clinical journey of a patient having generalized attrition and multiple missing teeth who was restored using cast partial dentures retained by precision attachments.

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Fig. 15 Maxillary Framework



Fig. 16 Mandibular Framework



Fig. 17 Final Prosthesis Frontal View



Fig. 18 Final Prosthesis Right Lateral View



Fig. 19 Final Prosthesis Left Lateral View



Fig. 20 Post Operative - Patient Smiling