

# Flexible Thermoplastic Denture Base Materials for Aesthetical Removable Partial Denture Framework

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## ABSTRACT

Conventional fixed partial dentures, implant supported Fixed Partial Dentures (FDPs) and removable partial dentures are the most common treatment modalities for the aesthetic and functional rehabilitation of partially edentulous patients. Although implants and FDP have certain advantages over removable partial dentures, in some cases, removable partial dentures may be the only choice which is available. Removable cast partial dentures are used as definitive removable prostheses when indicated, but location of clasps may affect aesthetics. So, when patient is concerned about aesthetics, flexible partial dentures which is aesthetically superior to flipper and cast partial dentures, may be considered. But for the success of flexible removable partial denture, proper diagnosis, treatment planning and insertion technique of this prosthesis is very important, which have been thoroughly described in this article.

**Key words:** Flexible partial dentures, Valplast, Flexiplast, Nylon, Retento-grip tissue bearing technique and flipper

## CASE REPORT

A 55-year-old female patient reported to the Department of Prosthodontics, Institute of Dental Studies and Technologies, Modinagar, Ghaziabad, Uttar Pradesh, India, with chief complaint of bad aesthetics due to missing teeth. The patient presented with partially edentulous arches with bilaterally missing posterior teeth in maxilla (Kennedy class I) and premolars and first molars in mandible (Kennedy class III), as shown in [Table/Fig-1]. Some of the remaining teeth had carious lesions, cervical abrasions and carious exposures. Carious and cervically abraded teeth were restored and root canal treatment of carious, exposed teeth was done. We planned removable cast partial dentures for replacing the mandibular missing teeth, because aesthetics was not a problem and as it was a totally tooth supported prosthesis. Flexible partial denture was fabricated for replacing maxillary posterior teeth, because clasps placed on canines with flexible material are aesthetically good and more retentive because of their extensions into undercuts which present lateral to maxillary tuberosity.

Acrylic resin teeth do not bond chemically with flexible denture

base resin. They are mechanically retained by making T shape holes diatorics, shown in [Table/Fig-2] into which denture base resin flows to retain teeth mechanically. This retention technique is known as Retento-Grip tissue bearing technique. The clasps of flexible removable partial dentures [Table/Fig-3 and 4] are extensions of denture base into undercut areas, which can be adjusted by dipping the clasp area in boiling water and then bending with the plier in or out to increase or decrease the retention [Table/Fig-4] shows the flexibility of the prosthesis and [Table/Fig-5] shows a final horse shoe shape designed flexible removable prosthesis in patient's mouth.

The second patient presented with bilaterally missing, mandibular, posterior teeth [Table/Fig-6]. She was very much apprehensive about the appearance of metal clasp and did not want any metal prosthesis in her mouth. Mandibular missing teeth were restored with flexible partial dentures [Table/Fig-7, 8 and 9] and she was very much satisfied with aesthetics as well as with function of the prosthesis. The two years follow up of both the patients showed generalized yellow staining of the prostheses due to improper care of the prostheses.



[Table/Fig-1]: Pre-operative, [Table/Fig-2]: Wire inserted to check the orientation of the holes (Diatorics), [Table/Fig-3]: Flexible removable partial denture, [Table/Fig-4]: Checking flexibility of RPD, [Table/Fig-5]: Prosthesis in patient's mouth



[Table/Fig-6]: Pre operative  
[Table/Fig-7]: Flexible Removable partial denture  
[Table/Fig-8]: Checking flexibility of RPD  
[Table/Fig-9]: Prosthesis in patient's mouth

## DISCUSSION

Removable partial denture is commonly used for treating the patients who are not good candidates for conventional fixed partial dentures and implant supported prosthesis. These prostheses can be fabricated from metal alloy, acrylic resin and thermoplastic resins. The removable cast partial denture is a definitive prosthesis which has been in use in dental profession since decades for rehabilitation of partially edentulous patients. It consists of a metal base (made up of base metal alloys, commonly with cobalt-chromium alloy), with acrylic teeth attached to it. Metal retentive clasp holds the cast partial denture in place. The metallic appearances of the clasp may be restrictive, treating the patient who are very much concerned about the aesthetics. When maxillary posterior teeth are missing and only anterior teeth are present, placement of metallic clasps on canines may not be acceptable to few patients.

The second type of removable partial denture is all acrylic resin prosthesis, which is also known as temporary, interim removable partial denture or a "FLIPPER". It acts as a space maintainer and is usually used to restore the function during the treatment until the definitive prosthesis is fabricated.

Flexible denture material is available in the form of granules in cartridges of varying sizes [1]. It was first introduced by the name of valplast and flexiplast to dentistry in 1956 [2,3]. These are superpolyamides which belong to nylon family. Nylon is a resin derived from dicarboxylic acid, diamine, amino acid and lactams [4]. Injection-molding technique is used for fabrication of flexible denture base prosthesis [5].

The flexible partial denture, only aesthetically has several advantages over the other two types of partial dentures. Instead of metal clasps, it has thin finger like extensions which extended into undercuts and act as clasps. It is also an option for cosmetic improvement of teeth that appear elongated due to recession of gums and also for patients who are allergic to acrylic.

The fabrication of flexible partial and complete dentures is contraindicated in patients with insufficient interarch space (< 4mm space for placement of teeth), prominent residual ridges where there is less space for labial placement of teeth because T-shape holes are necessary for mechanical retention of teeth to denture base,

and flat- flabby ridges with poor soft tissue support which require more rigid prosthesis.

The prosthesis fabricated from these materials requires minimum / no mouth preparation, it provides a good retention, it is comfortable for patient (thin and lightweight), it is resistant to fractures and is aesthetically good because translucent and pink shade matches that of natural tissues.

Flexible prosthesis is difficult to reline and rebase with soft tissue denture liners, acrylic resin and even with the other flexible denture base materials. It is difficult to repair and is prone to staining by various ingredients of food, tea and coffee if it is not polished properly and cleaned by the patient regularly.

The patient should be instructed to practice good oral hygiene and clean prosthesis regularly after every meal, in order to maintain appearance and cleanliness of the prosthesis. The prosthesis should be removed during the brushing of the natural teeth, to avoid the scratching of the prosthesis.

## CONCLUSION

Flexible partial dentures can be a good option for the replacement of missing teeth when patient is concerned about aesthetics. They have given a option of thinking beyond complex designing of cast partial dentures. They can be considered for treating any patient who needs replacement of missing teeth because of aesthetics, but the proper care of prosthesis is required, in order to minimize the staining of the prosthesis, which otherwise affects the aesthetics of the prosthesis later on.

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