

Aesthetic and functional rehabilitation with flexible removable partial denture: A case report

Islam S¹, Kabir MH², Quader SMS³, Gofur A⁴, Rahman MA⁵, Rashid MM⁶

Abstract:

Replacement of missing tooth is very essential for aesthetic and functional rehabilitation. Conventional fixed partial dentures, implant supported Fixed Partial Dentures (FDPs) and removable partial dentures are the most common treatment options for the partially edentulous patients. Hard and soft tissue undercuts are frequently encountered in the fabrication of prosthesis in partially as well as completely edentulous arches. Innovation of flexible dentures, flexibility combined with strength, specially in undercut areas and light weight provides total comfort and great looks. Features of these prostheses are good retention, aesthetically superb and virtually invisible, excellent strength, easy in handling, no involvement of metal, noninvasive procedures, comfort. All of these factors become important when producing long-term prostheses. So, when patient is concerned about aesthetics, flexible partial dentures which is aesthetically superior to flipper and cast partial dentures, may be considered. This article is an effort to review the available flexible denture base materials and highlights their indications and special instructions in wearing and maintenance.

Key words: Flexible Denture, Removable Partial Denture (RPD), Undercuts, Prosthesis, Denture Base.

(Bangladesh Dental Journal 2012; 28: 49-53)

Introduction:

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. Unilateral or bilateral undercuts are frequently encountered and may complicate successful fabrication of denture prosthesis. Management of these situations conventionally includes alteration of the denture prosthesis bearing area, adaptation of the denture base, careful planning of the path of insertion and the use of resilient lining material. There are several types of RPD's.^{1,2}

All of them use standard denture teeth as replacements for the missing natural teeth.¹ The differences between them are the materials used to support the denture teeth and retain the RPD in the mouth.^{1,3} An alternative denture prosthesis design in which optimal flange height and thickness can be achieved is by using flexible denture base material. The application of nylon-like materials to the fabrication of dental appliances has been seen as an advance in dentistry.¹ This material generally replaces the metal, and the pink acrylic denture material used to build the framework for standard RPD's.^{1,4}

Thermoplastic materials for dental prostheses, Valplast (Valplast Int. Corp.-USA) and Flexiplast (Bredent - Germany), were first introduced to dentistry in the 1950s.¹ Both materials were similar grades of polyamides (nylon plastics). Since their introduction, there has been a continued interest in thermoplastic dental materials.^{1,5,6} Acetal was first proposed as an unbreakable thermoplastic resin RPD material in 1971. It was during this period that Rapid Injection Systems developed the first tooth-colored clasps with a thermoplastic fluoropolymer.⁷ In 1992 The Flexite Company developed and patented the first preformed tooth-color clasps known as Clasps-Eze. This product, made of a nylon material, is available in pink and clear color shades and currently sold worldwide.¹ Thermoplastic resins are used for a broad variety of applications from removable flexible partial dentures preformed partial denture clasps, fiber reinforced fixed

1. Dr. Saiful Islam, BDS, MPH, MS (Prosthodontics), Lecturer & Prosthodontist, Dhaka Dental College, Dhaka.
2. Dr. Md. Humayun Kabir, BDS, DDS, General Sec- Bangladesh Dental Society, Head of Dental Unit, Shaheed Shurawardy Medical College, Dhaka.
3. Dr. Sheikh Md. Shahriar Quader, BDS, MS (Prosthodontics), Oral & Dental Surgeon, Sarkari Karmachari Hospital, Fulbariya, Dhaka.
4. Dr. Abdul Gofur, BDS, MS (Prosthodontics), Lecturer, Dept. of Dental Pharmacology, Dhaka Dental College, Dhaka.
5. Dr. Md. Aminur Rahman, BDS, MS, Associate Professor, Department of Prosthodontics, Saphena Women's Dental College, Dhaka.
6. Dr. Md. Mamunur Rashid, BDS, MS (Prosthodontics), Barisal Med. College (Dental Unit), Barisal.

Address of Correspondence: Dr. Saiful Islam, Lecturer & Prosthodontist, Dhaka Dental College, Dhaka, Cell No. 01622-440000, 01819-290354, Email: saifulsdental@gmail.com

partial dentures, provisional crowns and bridges, obturators and speech therapy appliances, orthodontic retainers and brackets, impression tray⁸ and border molding materials⁹, occlusal splints, sleep apnea appliances, and implant abutments. Flexible materials (thermoplastic resins and co-polymers) have many advantages over conventional resin systems.¹ A flexible material is now an option that does not trade off the ability to eat.¹⁰

Flexible Dentures

Soft dentures are generally used when traditional dentures cause discomfort to the patient that cannot be solved through relining. Soft dentures are not the same as a soft relined for traditional dentures. Soft relines use a soft putty-like substance to separate gums from the hard acrylic in dentures. Flexible dentures use a special flexible resin that prevents them from chafing the gums, allows the wearer to chew properly. It also provides a soft base that prevents the gums from being rubbed. Some of the commercially available products are Valplast, Sunflex, Duraflex, Flexite, Proflex, Lucitone, Impak where as valplast, Sunflex and lucitone are monomer free.

Advantages of flexible dentures

Flexible dentures have got various advantages over the traditional rigid denture bases.

- Translucency of the material picks up underlying tissue tones, making it almost impossible to detect in the mouth.
- No clasping is visible on tooth surfaces (when used in manufacturing of clear clasps), improving aesthetics.
- The material is exceptionally strong and flexible. Free movement is allowed by the overall flexibility.
- Complete biocompatibility is achieved because the material is free of monomer and metal, these being the principle causes of allergic reactions in conventional denture materials.
- Clinicians are able to use areas of the ridge that would not be possible with conventional denture and partial techniques. Patient can wear appliances that would normally not be comfortable.
- Flexible dentures will not cause sore spots due to negative reaction to acrylic resins and will absorb small amounts of water to make the denture more soft tissue compatible.

- Flexible dentures may be used as an alternate treatment plan in rehabilitating the anomalies such as ectodermal dysplasia.

Disadvantages of flexible dentures

- Flexible dentures generally not used for long term restorations and is intended only for provisional or temporary applications.
- Flexible dentures tend to absorb the water content and will discolor often.
- Metal frame partial dentures remain the "standard" for long-term restorations.
- When grinding this prosthesis, proper ventilation, masks and vacuum systems should be used and the procedure is technique sensitive.
- Extreme caution is necessary when processing to avoid skin contact with the heated sleeve, cartridge, furnace, heating bay, hot cartridge, injection insert, piston head adapter, hot flasks, and heat lamps.

Indications of flexible dentures

- As a provisional in lieu of restorative temporaries or a standard acrylic partial.
- As obturators with maxillectomy procedures.
- In single denture cases.
- The patient prefers not to use a fixed restoration.
- In challenging cases including pediatric patients, cancerous mouths or cleft palates.
- Cosmetic veneers to mask gingival recession, splints and nesbits.
- When protuberant bony formations restrict the insertion of an acrylic full denture.
- When the patient is allergic to acrylic.
- A patient with systemic sclerosis and microstomia.

Contraindications of flexible dentures

- The fabrication of flexible partial dentures is contraindicated in patients with insufficient interarch space (< 4mm space for placement of teeth), prominent residual.
- Ridges where there is less space for placement of teeth.
- Flat flabby ridges with poor soft tissue support which require more rigid prosthesis.

Case Report:

A 48 years old female patient reported in the Department of Prosthodontics, with a chief complaint of multiple missing teeth. The patient presented with partially edentulous arches with bilaterally missing posterior teeth in maxilla (Kennedy class I) and missing both anterior and posterior teeth in mandible (Kennedy class II Modification II), as shown in 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. Flexible partial denture was fabricated for replacing maxillary posterior teeth, because clasps placed on Lateral incisor in upper jaw with flexible material are aesthetically good and more retentive because of their extensions into undercuts which present lateral to maxillary tuberosity, and in mandible for better retention with easy insertion in the mouth.



Fig.-1: Missing teeth in Upper and Lower Jaw

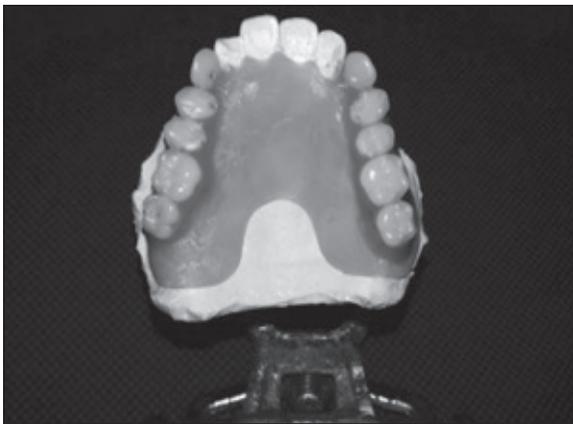


Fig.-2: Alignment of teeth in Articulator



Fig.-3: Fabricated Flexible Upper Denture



Fig.-4: Fabricated Lower Flexible Denture



Fig.-5: Upper & Lower Flexible Denture in Mouth

Procedure

- o Diagnostic casts were prepared using alginate impressions.
- o Cast were mounted on surveyor and were analyzed on the basis of present undercut.

- o The diagnostic casts were articulated (semi adjustable articulator) using centric relation record and face bow transfer to evaluate inter arch space.
- o Final Impressions were made using polyvinyl siloxane light body material of both the arches.
- o In case of distal extensions cases Primary impressions were made with alginate and primary casts were made and special tray prepared with self cure acrylic resin. Definitive impressions were made using custom trays border moulding was done with low fusing compound and final impressions were made using polyvinylsiloxane light body material.
- o Final casts were made with Type III dental stone.
- o Maxillomandibular relationships were recorded with check bite method.
- o Definitive casts were mounted on semi adjustable articulator.
- o Shade selection was done and artificial acrylic resin teeth were arranged.
- o Dentures were tried in patient's mouth and after approval by patient dentures were processed in injection system.
- o Dentures were finished, polished and inserted. Occlusion was evaluated and adjusted.
- o Postoperative instructions on how to insert the prostheses and with instruction on adequate oral hygiene maintenance.

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 professions 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.¹¹ 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. It was first introduced by the name of valplast and flexiplast to dentistry in 1956. These are superpolyamides which belong to nylon family. Nylon is a resin derived from dicarboxylic acid, diamine, amino acid and lactams. Injection-molding technique is used for fabrication of flexible denture base prosthesis. The prosthesis fabricated from these materials requires minimum /no mouth preparation, it provides a good retention, it is comfortable for patient (thin and light weight), it is resistant to fractures and is aesthetically good because translucent and pink shade matches that of natural tissues. Acrylic resin teeth do not bond chemically with flexible denture base resin. They are mechanically retained by making T shaped holes into which denture base resin flows to retain teeth mechanically.

The clasps of flexible removable partial dentures 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. 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.^{11,12,13}

Conclusion:

The fabrication of useful restoration is depending on the clinicians skills in selection of the type of the restorations which is required for the patient. The fabrication of prosthesis for the partially edentulous arches encountered a special challenge where many interferences, various path of insertion, tilted teeth and deranged occlusion will complicate the treatment plan. Flexible partial dentures can be a good option for the replacement of missing teeth when patient is concerned about aesthetics. Flexible dentures will stand in a superior position in fulfilling the various patients demand for more retentive and aesthetic treatment needs, 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. Flexible dentures were previously selected by few patients and the clinician but now a days it has become a better treatment option.

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