

# Flexible Dentures in Prosthodontics - An overview

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## ABSTRACT:

There is evidence that Dentistry was practised as far back as 3000 B.C. in Egypt. Dentures are believed to be the mode of treatment for replacing missing teeth around 700 BC. Thereafter, a process began towards improvement in the quality of materials used for fabricating dentures, as the patients demanded better aesthetics, function and comfort. This review tracks the history of flexible materials used as a denture base to the present stage and point towards the research and development in the future. Hard and soft tissue undercuts are frequently encountered in the fabrication of prosthesis in partially as well as complete edentulous arches. This article is an effort to review the various commercially available flexible denture base materials and highlights their indications and special instructions in wearing and maintenance of the same.

**Key words:** Flexible dentures, undercuts, Acrylic clasps, Fibre-reinforced resin

## INTRODUCTION

Flexible dentures are custom-made dental installations that rely on unique products to achieve a less rigid design. These new kinds of dentures are popular for those who struggle with the conventional acrylic base of dentures that may wear, irritate the gums, induce allergic reactions or generally fail to provide a comfortable result. Dentists and their patients are often interested in what these newer and more versatile products can do to better outfit those with a history of tooth decay (Fig. 1 and 2) or who need dental prosthesis to function or who want to avoid the discomfort due to the rigidity of the denture base.

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## **FLEXIBLE DENTURE BASE MATERIAL (Soft dentures)**

Polymerization shrinkage encountered in conventionally cured Poly(methyl methacrylate) led to the development of a special injection-molding technique. Initially developed as a Fluoropolymer (1962), Acetal began to be used in 1971. The material used nowadays is Nylon based plastic (Polyamide). Elastomeric resins can be added to resin polymer formulas to create greater flexibility and can be strengthened with glass fibres.<sup>1</sup> Unique features-the semi-crystalline nylon composition provides strength, flexibility, transparency, high impact resistance, colour stability, high creep resistance, high fatigue endurance, excellent wear characteristics, good solvent resistance, no porosity, no biological material build up or odours or stains, low water sorption and good dimensional stability, monomer and metal free and the microcrystalline structure is easy to finish and polish like acrylic.

An alternative denture prosthesis design in which optimal flange height and thickness can be achieved is by using flexible denture base material.<sup>2</sup> Soft dentures are an excellent alternative to traditional hard-fitted dentures. Traditionally relining dentures with a soft base increases comfort at the cost of chewing efficiency. To make up for the loss of chewing efficiency, denture wearers would use denture adhesive, which has its own problems.

A flexible material is now an option that does not trade off the ability to eat. Flexible denture (soft dentures) are generally used when traditional dentures cause discomfort to the patient that cannot be solved through relining.<sup>3</sup> Soft dentures are not the same as a soft reline 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 raw. Some of the commercially available products are Valplast, Duraflex, Flexite, Proflex, Lucitone, Impak.

### **Advantages:**

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 and partial techniques. Flexible dentures will not cause sore spots as seen with rigid acrylic resins. Flexible dentures may be used as an alternative treatment plan in rehabilitating the anomalies such as Ectodermal dysplasia.

It is nearly unbreakable, pink coloured like the gums, can be built quite thin, and can form both the denture base and the clasps as well. The clasps are built to curl around the necks of the teeth and they are practically indistinguishable from the gums that normally surround the teeth due to its Opalescence. This type of partial denture is extremely stable and retentive, and the elasticity of the flexible plastic clasps keeps them that way indefinitely. It has superior aesthetics, no metallic taste and is non-allergic. Free movement is allowed by the overall flexibility and can, therefore, be referred to as "a built in stress breaker". Long term health of tissues and teeth is maintained due to their gentle massaging action without adversely loading abutments.

### **Disadvantages:**

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. They do discolour due to sorption.

### **Indications:**

Full dentures, partial dentures, Bases and relines, in cases with bilateral in-operable undercuts when pre-prosthetic surgery is contraindicated.

Special applications- for TMJ splints, for the patients allergic to acrylic monomers, as cosmetic

veneers/gum veneers to mask gingival recession (Fig. 3), in periodontally involved teeth, sensitive teeth, cancerous mouths or other conditions in which the teeth are compromised, treatments involving high torus or cleft palate conditions, as mouth guards in sports, Bruxismus splints/ Night guards, Bite splints, Space maintainer, Paediatric cases, Obturators, Speech therapy appliances and orthodontic retainers.<sup>4</sup>

The Flexible dentures in combination with cast partial framework:

#### **Advantages:**

This combination eliminates most of the difficulty of recurrent sore spots, since the framework resists movement and pressure from the clasps, while having the benefit of nearly invisible, gum coloured clasps (Fig. 4 and 5). It also has the advantage of being tooth supported.

#### **Disadvantages:**

Flexibility is not an advantage where there are no undercuts in a complete denture situation, as the retentive peripheral seal can be broken in function. It is difficult to use with less inter-ridge space, as bulk of the tooth is needed for mechanical retention.

#### **Insertion:**

Denture is placed in very hot water (150 degree F) for a minute prior to insertion and allowed to cool to tolerable temperature. This makes the partial as flexible as it would be at body temperature. Grinding is done as a last resort at a low speed of around 250-300 rpm using green stones.

Unilateral or bilateral undercuts are frequently encountered and may complicate successful fabrication of denture prosthesis.<sup>5,6</sup> Management of these situations conventionally includes alteration of the denture bearing area, adaptation of the denture base; careful planning of the path of insertion and the use of resilient lining material, and this can be sorted using a flexible material.

#### **Pro-flex:**

Pro-flex is the flexible denture base material which can be used for Full & Partial flexible denture.

Pickett Dental Laboratory has been offering pro-flex full and partial flexible dentures since 1998. Pro-flex is easy to work with the quality, aesthetics and most importantly the final results. Pro-flex denture material may be indicated in some of the anatomical considerations where tooth and tissue undercuts are a hindrance. It enables the material to effectively engage those undercuts. Also pro-flex being hypo-allergenic is recommended for patients with known acrylic or metal sensitivities. Aesthetically the material is semi-translucent, allowing the prosthetic to better blend with the colour of the natural gum tissue. With pro-flex flexible partials, there are no metal clasps. Pro-flex full and partial flexible dentures are easily adjusted by the dentist.

#### **Valplast:**

Valplast is a flexible denture base resin that is ideal for partial dentures and unilateral restorations. The resin is a biocompatible nylon thermoplastic with unique physical and aesthetic properties that provides unlimited design versatility and eliminates the concern about acrylic allergies. The valplast flexible partial allows the restoration to adapt to the constant movement and flexibility in the mouth (Fig. 6,7,8 and 9). The flexibility combined with the strength and light weight, provides total comfort and great looks. The valplast partial is virtually invisible because there are no metal clasps and the material itself blends with the tissue in the mouth. Valplast flexible dentures can be indicated in case of patients who have acrylic allergies, history of partial frame breakage, alternative to implants or fixed prosthesis and presence of tori.

#### **Sunflex:**

The sunflex flexible denture base materials are virtually invisible, unbreakable, metal-free, light weight and incredibly comfortable. They are made from a strong biocompatible nylon thermoplastic material.

#### **Advantages:**

The sunflex flexible denture base materials are exclusively used in partially edentulous arches because of its versatile advantages such as-

- No need of metal clasps-only tissue colored clasps that blend with natural teeth
- More stain-resistant than other flexible acrylics
- Has the perfect degree of flexibility
- Can be relined and repaired
- Will not warp or become brittle
- Stands aesthetically superior removable partial with full functionality and comfort
- Ideal for patients considering a removable partial and those who do not want metal clasps
- Are perfect for patients who are allergic to monomer.

#### **Unbreakable Flexite Plus Dentures:**

Flexible dentures created a great deal of excitement when they were first launched. No more ugly metal wires, no more broken dentures. What's more, the denture can be bent or even twisted, it springs right back into its original shape. Flexite Plus is material of choice for all removable partial dentures. Unlike their predecessors which were flexible throughout and create problems when they are long-span, the new material is selectively flexible and shows rigidity when due.

#### **Advantages:**

The biggest advantage of this sort of dentures is that unlike the hybrid dentures, they are unbreakable (Fig. 10 and 11) like the former fully flexible denture systems. Like their fully flexible predecessors, they also do not have the unsightly clasps seen in chrome dentures. Flexite Plus is pink in colour. Flexite Plus plates are not flexible. This makes them capable of supporting chewing forces in long-span dentures. Another possibility with Flexite Plus is the very tiny sectional denture (Fig. 12 and 13). Without the plate covering the entire roof of the mouth, these dentures tend to be more comfortable.

Below is another example of a Flexite Plus denture. It is a sectional prosthesis that shows remarkably good retention and stability. This was only a temporary denture which the patient used

while the patient waited for the implant to integrate. No prosthesis beats an implant restoration in terms of function.

Above are 2 dentures belonging to the same patient. On the left is old acrylic denture with metal clasps (Fig. 14 a), which has cracked a few times when the patient dropped it. The new denture on the right uses Flexite clasps which are pink in colour, which will not break when dropped (Fig. 14 b).

#### **SUMMARY**

Flexible dentures help the patients to avoid some kind of pain associated with the old style denture models. A flexible resin coating allows for a custom fit, with hard synthetic teeth still imbedded in the design to help with chewing food. Flexible dentures help achieve greater stability and comfort. Those who have found, for example, that even the simple back and forth action of chewing causes gum pain with traditional dentures may be able to find relief in new and more precise fitting flexible varieties of denture products.

In addition to these benefits, flexible dentures are also designed to be porous and to "breathe" better than some other kinds of dentures. This helps prevent the build up of bacteria on the dentures and is another reason that these innovative denture products are so popular.

#### **CONCLUSION**

The fabrication of the optimum restoration is depending on the clinician's skill 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 placement, tilted teeth and deranged occlusion will complicate the treatment plan. Flexible dentures will stand in a superior position in fulfilling the various patients demand for more retentive and aesthetic treatment needs. Flexible dentures were previously selected by few patients and the clinician but nowadays it has become an elective treatment option. No more ugly metal wires. No more broken denture.



**Figure 1:** Cast partial denture



**Figure 5:** Combination of flexible and metal framework



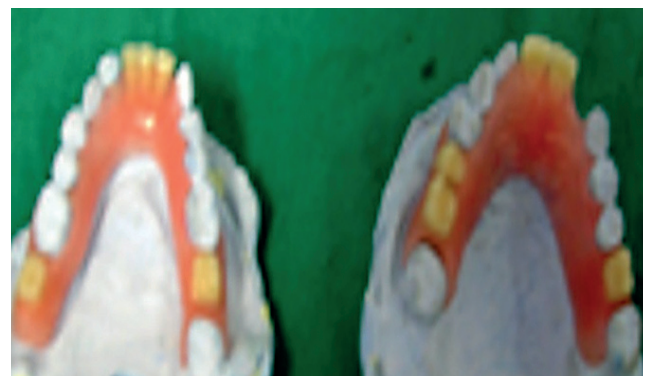
**Figure 2:** Decayed abutments



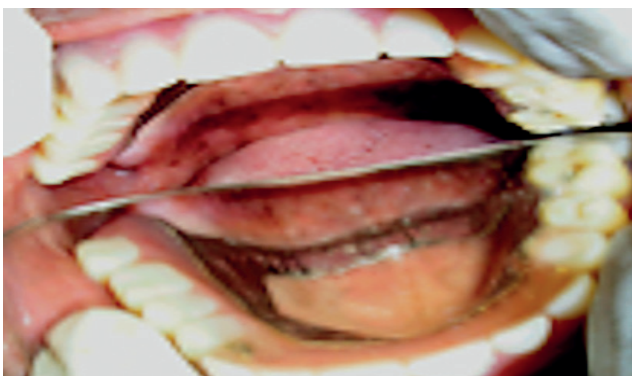
**Figure 6:** Valplast RPD showing thickness and clasps of same material



**Figure 3:** Cosmetic veneer masking gingival



**Figure 7:** Valplast RPD on cast



**Figure 4:** Combination of flexible and metal in framework in situ



**Figure 8:** Valplast RPD in mouth



**Figure 9:** Valplast RPD in mouth



**Figure 10:** Unbreakable Flexite Plus Dentures



**Figure 11:** Unbreakable Flexite Plus Dentures showing its elasticity



**Figure 12:** Flexite plus sectional partial



**Figure 13:** Flexite plus sectional partial denture with good retention



**Figure 14 a:** Old acrylic denture



**Figure 14 b:** Flexite denture

## REFERENCES

1. Lowe LG. Flexible denture flanges for patients exhibiting undercut tuberosities and reduced width of the buccal vestibule: a clinical report. *J Prosthet Dent* 2004;**92**(2):128-131.
2. Naylor WP, Manor RC. Fabrication of a Flexible prosthesis for the edentulous scleroderma patient with microstomia. *J Prosthet Dent* 1983;**50**(4):536-538.
3. Antonelli JR, Hottel TL. The " Flexible augmented flange technique" for fabricating complete denture record bases. *Quintessence* 2001;**32**(5):361-364.
4. William J. O'Brien. *Dental materials and their selection*. Third edition, Quintessence Publishing co. 2002..
5. Anusavice KJ. *Phillips's science of dental materials*. 10th ed. Philadelphia(PA):WB Saunders; 1996. p. 237-271.
6. Blagojevic V, Murphy VM. Microwave polymerization of denture base materials. A comparative study. *J Oral Rehabil* 1999;**26**:804-808.