

# From Conventional to Unconventional- The Denture Journey

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## ABSTRACT

In the new generation of dentistry where implants and fixed prosthesis are a common mode of treatment, a wide range of patients and clinicians still opt for removable dentures as a treatment of choice. With the patients demanding better aesthetics, function, and comfort newer materials were introduced for the fabrication of dentures. Hard and soft tissue undercuts are frequently encountered in the fabrication of prosthesis in partially as well as completely edentulous arches. Flexible denture offers a simpler and cost-effective treatment for the oral rehabilitation of such cases. This article reviews the indications and advantages of the flexible dentures and enlists the various commercially available flexible denture base materials.

**Key-words:** Flexible denture, Valplast, Denture base materials, Acrylic denture

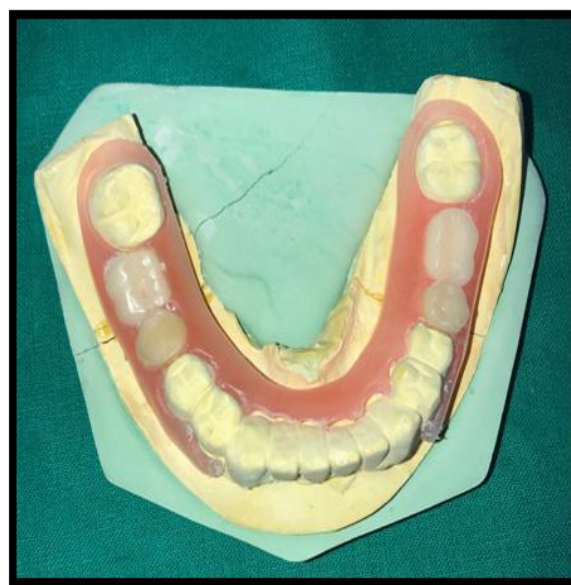
## INTRODUCTION

Clinical, dentist and patient immanent factors influence the choice between several treatment options for replacing missing teeth. Loss of teeth, which may be due to trauma, dental diseases, pathology, or otherwise not only alters the psychological thought of the patients but also disturbs the esthetics, phonetics, and functional occlusion<sup>[1]</sup>. The replacement of missing teeth in a patient's mouth is very important to restore aesthetics and regain function. There are many different treatment modalities available-dental implants, complete dentures, removable partial dentures and fixed partial dentures. Each of them has their own set of benefits and disadvantages too.

The most commonly used material for the fabrication of complete/ partial dentures so far has been PMMA. Some problems with these prostheses are difficult to address, such as insertion in undercut areas, brittleness of methyl methacrylate which leads to fracture, and allergy to

methyl methacrylate monomer<sup>[2]</sup>.

The introduction of flexible dentures made it easier for tackling such problems while fabricating dentures (Fig. 1). The nature of flexible denture material which is flexible and strong at the same time makes it perfectly suited to the variety of natural conditions in the mouth, simplifying design and enabling the flexible nylon resin to act as a built-in stress-breaker that provides superior function and stress distribution<sup>[3]</sup>.



**Fig. 1: Mandibular flexible denture**

### How to cite this article

Sheth N, Ali R, Mistry G, Shetty O. From Conventional to Unconventional- The Denture Journey. Int. J. Life. Sci. Scienti. Res., 2018; 4(3): 1801-1804



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## LITERATURE REVIEW

**Materials-** Thermoplastic materials are used for the fabrication of flexible dentures. A thermoplastic material is a polymer which becomes pliable or moldable above a specific temperature and returns to a solid state upon cooling. Flexible dentures are made from a nylon-derived denture based thermoplastic material that does not sacrifice function and preserves aesthetics.

Unique features-the semi-crystalline nylon composition provides strength, flexibility, transparency, high impact resistance, color stability, high creep resistance, high fatigue endurance, excellent wear characteristics, good solvent resistance, no porosity, no biological material build up or odors 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<sup>[4]</sup>.

The most commonly used material for fabrication of flexible dentures is Valplast (Valpalst Int. Corp. USA). It is a nylon polyamide thermoplastic material (Fig. 2).



**Fig. 2: Valplast**

Other commercially available materials are Flexiplast (Bredent Germany), Pro-flex, Sunflex, Lucitone FRS, Flexite, Flexite M.P etc.

The material is available in two forms:

- 1) Pre-packaged cartridges (Fig. 3)
- 2) Granular form (Fig. 4)



**Fig. 3: Pre-packaged cartridges**



**Fig. 4: Granular form**

**Indications-** The appropriate and acceptable uses for a flexible partial denture include all cases of conventional partial denture indications plus the areas where conventional partials are limited or contra-indicated<sup>[3]</sup>.

1. Flexible dentures are indicated where bilateral undercuts are present as they utilize the undercuts in the ridge for retention.
2. Where better aesthetics is required e.g. clasp has been given in the esthetic zone the flexible denture is a better option as it does not have metal clasps
3. Patients who allergic to acrylic monomer
4. As it is cost-effective patients who cannot afford implants
5. Patients with large bony exostoses that cannot be removed
6. It is also indicated in patients having microstomia, systemic diseases like scleroderma<sup>[5]</sup>, or other cases where there is restricted mouth opening.
7. Patients with maxillary tuberosity undercut often pose challenges in denture fabrication. Flexible denture flanges for patients exhibiting undercut tuberosities can solve this problem<sup>[6]</sup>.

Additionally, they can also be used as obturators, cosmetic gum veneers, orthodontic devices, bruxism appliances, temporary prosthesis and unilateral space maintainers.

**Contraindications-** They are contraindicated in certain cases, given below:

1. Bilateral distal extension with knife-edge ridges
2. Unilateral distal extension
3. Deep overbite cases
4. If there is less than 4mm inter-occlusal space posteriorly
5. Little remaining dentition with minimal undercuts for retention

6. Bilateral free-end distal extension on maxilla with extremely atrophied alveolar ridges <sup>[3]</sup>

**Advantages-** Flexible dentures have various advantages over the conventional acrylic denture:

1. Better aesthetics, the translucency of the material picks up the tissue undertones.
2. Metal-free restoration, hence no clasping is visible on the tooth surface.
3. The material has better flexibility hence can be easily inserted in patients with undercuts.
4. Ability to engage the undercuts giving it better retention and stability.
5. No periodic adjustments are needed for the clasp to keep them tight.
6. Good biocompatibility.
7. Less bulky and lighter, more comfortable.
8. In cases of undercut due to tilted teeth, the flexibility of the material makes it possible to insert the prosthesis over the angulated teeth <sup>[3]</sup>.
9. Rebasing is possible.
10. 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 <sup>[7]</sup>.

#### Disadvantages

1. Intended for generally provisional or temporary applications.
2. **Major drawback:** De-bonding of the acrylic teeth from the nylon denture base as there is no chemical bonding between them.
3. **Procedure is technique sensitive:** Extreme caution needs to be taken while processing so as to not come in contact with any of the heated substances.
4. One has to purchase separate instruments to adjust/trim the flexible denture so it might add to the cost.
5. The Valplast shows clinically significant chromatic instability, so the flexible removable partial denture might show staining and discoloration with time <sup>[8]</sup>.
6. The elastic modulus of flexible nylon (Valplast) is lesser than that of PMMA <sup>[9]</sup>.
7. Difficult to reline, repair or add teeth.
8. The patients that have periodontal problem may have several teeth that are mobile due to bone loss. Therefore, the whole area keeps on flexing causing unfavorable forces that in turn result in more bone loss <sup>[3]</sup>.

#### CONCLUSIONS

Because of their flexible nature and strength of the material the flexible dentures can be a good option for the replacement of missing teeth when the patient is concerned about aesthetics. They also can be used in most of the cases where the conventional acrylic dentures do not yield good results. Proper diagnosis, treatment planning followed by proper insertion techniques can yield good long-term results. More research in the field of dentistry will result in better materials and viable options for making removable prosthodontics more comfortable and more aesthetically acceptable to the patients.

#### ACKNOWLEDGMENTS

Thank you to my professor, Dr. Rubina Tabassum for helping me in every step of my work.

#### CONTRIBUTION OF AUTHORS

**Dr. Nami Sheth-** Data collection, analysis, interpretation and drafting of the article.

**Dr. Rubina Tabassum-** Drafting of the article and revision of the article.

**Dr. Gaurang Mistry and Dr. Omkar Shetty-** Revision and final approval of the article.

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**Received: 19 Feb 2018/ Revised: 15 Mar 2018/ Accepted: 22 Apr 2018**

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