

*Case Report***Rehabilitation of Partially Edentulous Patients Using a Flexible Removable Partial Denture - A Case Report****Aihab Albade¹, Zohir Alaosta² and Anas Sherif¹**

1. Department of Prosthodontics and Dental Materials, University of Zawia

2. Department of Oral Pathology, Faculty of Dentistry, University of Zawia

Corresponding Author : Aihab Albaden Email: a.albaden@zu.edu.lyReceived: 02/12/2024 | Accepted: 15/02/2025 | Published: 24/02/25 | DOI: <https://doi.org/10.26719/LJMR.19.1.14>**ABSTRACT:**

Partially edentulous patients often face functional and aesthetic challenges that significantly impact their quality of life. This case report presents the aesthetic and functional rehabilitation of patients with partial tooth loss using flexible removable partial dentures. The main treatment options for partial tooth loss include fixed partial dentures (FPDs), either conventional or implant-supported and removable partial dentures (RPDs). When fixed options are not feasible, RPDs may be the only alternative. However, clasps in the aesthetic zone of traditional RPDs can be visually unappealing. Flexible partial dentures, among various materials for removable dentures, provide enhanced aesthetics and are particularly suited for patients prioritizing appearance.

KEYWORDS: Flexible Removable Partial Denture, Partial Edentulism, Dental Prosthetics, Valplast, Flexiplast, Case Report.

INTRODUCTION

Contemporary dentistry provides several solutions for restoring a partially missing set of teeth, including removable partial dentures (RPD), fixed bridges, and dental implants. Removable partial dentures gained significant popularity decades ago with the advent of acrylic polymers and chrome cobalt alloys. Many patients choose removable partial dentures due to considerations such as cost and physiological factors. While implants and fixed dental prostheses (FDP) offer specific benefits compared to removable partial dentures, there are situations where removable partial dentures may be the only viable option. Removable cast partial dentures are employed as final removable prosthetics when appropriate, though the placement of clasps can impact their appearance. Therefore, if a patient is concerned about aesthetics, flexible removable partial dentures, which provide a more aesthetically pleasing alternative to temporary and cast partial dentures, might be considered. The use of flexible nylon resin is becoming increasingly popular due to its streamlined design and built-in stress-relieving features, which enhance stress distribution and overall performance. As a result, flexible dentures have emerged as a favourable choice for both dentists and patients.¹⁻³

The aim of this paper is to present different prosthetic solutions for the patients with flexible prostheses made from a nylon-based thermoplastic material (polyamide). Nylon exhibits good strength, resistance to heat, and resistance to chemicals. The material, can be heated and injected under pressure into a mold for definite formation of the prosthesis. The material exhibits excellent flow characteristics and can be injected under a pressure of 7.0 to 7.5 bar up to a 0.5 mm thickness. The high pressure reduces shrinkage and ensures extended dimensional stability so that precision-fit dentures are obtained and plaque accumulation avoided. Nylon resin can be also be semi-translucent and provides excellent aesthetics. These dentures in our patients represent an immediate solution for permanent prosthesis in patients who does not like adjacent teeth preparation or retention elements (attachments) or visible metal parts characteristic for classic and cast metal removable partial denture. the dentures are very thin, and through elastic clasps provide good stabilization and retention of the denture during the process of mastication.⁴

CASE REPORT:

A 43-year-old male patient visited the Department of Prosthodontics at Zawia Dental School. He presented with partially edentulous maxillary and mandibular arches, demonstrating tooth loss classified as Kennedy Class IV in the lower jaw and Kennedy Class II mod. 1 in the upper jaw (Figure 2). The patient reported difficulty chewing and expressed concern about the appearance of his smile, primarily due to the missing front teeth (Figure 1). He was particularly focused on aesthetics and preferred to avoid rigid or metal prostheses. Clinical examination revealed a healthy oral cavity with adequate soft tissue condition, and radiographic analysis showed no bone abnormalities.



Figure 1. Preoperative view



Figure 2. Intraoral view

PROCEDURE:

The treatment plan included the fabrication of a flexible RPD to restore function and aesthetics while ensuring minimal tooth preparation. The design process involved obtaining occlusal and interocclusal records. The framework was designed to cover the edentulous area and allow for tooth movement without excessive stress.

Initially, Impressions were taken using a flexible alginate material for optimal accuracy

to create diagnostic casts (Figure 3). A custom tray was created for a definitive impression, capturing the precise morphology of the remaining teeth and the edentulous spaces.

Final impressions of both arches were made using polyvinyl siloxane light body material (Figure 4), and final casts were poured with Type III dental stone. Maxillomandibular relationships were recorded using the check bite method. The definitive casts were then mounted on an articulator. Shade selection was completed, and artificial acrylic resin teeth were arranged accordingly. A try-in of the denture was performed in the patient's mouth, and following the patient's full satisfaction, the denture was processed using an injection system. The final denture was then finished, polished, and inserted, with occlusion evaluated and adjusted as necessary (see Figures 5 & 6). Postoperative instructions were provided to the patient on how to insert the prostheses and the importance of maintaining oral hygiene.



Figure 3. primary impressions



Figure4. Secondary impression

Outcome:

Post-insertion, the patient reported significant improvements in oral function and a boost in self-esteem due to the restored aesthetics. Follow-up visits indicated a high level of satisfaction, with the patient adjusting well to

the new prosthesis. No significant complications were reported, and occlusal stability was maintained.



Figure 5. upper and lower flexible prosthesis



Figure6. Postoperative view

DISCUSSION

Removable partial dentures are often used for patients who are not suitable candidates for traditional fixed partial dentures or implant-supported prostheses. For decades, removable cast partial dentures have been a reliable option for rehabilitating partially edentulous patients. These dentures can be made from metal alloys, acrylic resin, or thermoplastic resins. The metal alloy version features a metal base with acrylic teeth and metal clasps that secure the denture in place. However, these metal clasps can have an undesirable metallic appearance, which many patients find unappealing, particularly those concerned about aesthetics. In cases where only the anterior teeth remain and the posterior teeth are missing, some patients may find the metallic clasps on the canines especially unattractive.

The second type of removable partial denture, as previously mentioned, is made entirely from acrylic resin and is often referred to as a temporary or interim removable partial

denture. This type of denture serves as a space maintainer and is typically used to restore tooth function during the treatment period until a permanent prosthesis can be created in the laboratory.

Flexible denture materials are super polyamides, which are a type of nylon. They come in granule form and are packaged in cartridges of different sizes. These materials were first introduced under the brand names Valplast and Flexiplast in 1956. The resins used are made from dicarboxylic acids, diamines, amino acids, and lactams.⁵ The most commonly used method for manufacturing flexible denture base prostheses is the injection-molding technique.⁶

Prostheses made from these materials offer several benefits compared to others. They require minimal or no preparation of the mouth, provide excellent retention, and are comfortable for the patient due to their thin and lightweight nature. Additionally, they are resistant to fractures and are aesthetically pleasing because of their translucent pink shade, which blends well with natural tissues. Acrylic resin teeth do not chemically bond with the flexible denture base resin; instead, they are held in place by creating T-shaped holes into which the resin flows, securing the teeth mechanically.⁷

Flexible partial dentures (FPD) feature a thin, finger-like extension that reaches into undercuts to act as a clasp. This design is beneficial for patients with gingival recession, as it helps mask elongated gums, and for those who are allergic to acrylic.² However, they are not recommended for patients with insufficient inter-arch space (less than 4mm), prominent residual ridges with limited space for labial tooth placement (since T-shaped holes are needed for mechanical retention), or flat, flabby ridges with inadequate soft tissue support, as these conditions require a more rigid prosthesis.³

A limitation of flexible prostheses is their difficulty in repair, relining, or rebasing. They are also prone to staining from tea and coffee if not adequately polished and cleaned on a regular basis. To preserve the prosthesis's appearance and cleanliness, patients should be advised to maintain good oral hygiene, clean the prosthesis after each meal, and remove it while brushing their natural teeth to avoid surface roughening. Additionally, using a commercially available denture cleanser for a daily soak of 10-15 minutes is recommended.

CONCLUSION

Flexible removable partial dentures represent an effective modality for the rehabilitation of partially edentulous patients. This case highlights the procedural effectiveness and patient satisfaction associated with flexible RPDs, advocating for their broader application in clinical practice. As dental professionals, it is essential to stay informed about developments in prosthetic materials and designs to provide optimal solutions for patients. The creation of an ideal restoration relies on the clinician's expertise in selecting the appropriate type of restoration.

Fabricating prostheses for partially edentulous arches presents unique challenges, including various interferences, placement paths, tilted teeth, and misaligned occlusions, which complicate treatment planning. Flexible partial dentures can be an excellent choice for replacing missing teeth, especially for patients concerned about aesthetics. These dentures often provide superior retention and aesthetic satisfaction, but proper care is essential to prevent staining and maintain their appearance. While flexible dentures were once chosen by only a few patients and clinicians, they have now become a popular treatment option.

REFERENCES

1. Thakral G, Aeran H, Yadav B, Thakral R. Flexible Partial Dentures – A hope for the Challenged Mouth. *People's Journal of Scientific Research*, 2012;5(2):55-9.
2. Singh K, Aeran H, Kumar N, Gupta N. Flexible Thermoplastic Denture

Base Materials for Aesthetical Removable Partial Denture Framework. *Journal of Clinical and Diagnostic Research*, 2013; 7(10): 2372-3.

3. Jain AR. Flexible Denture for Partially Edentulous Arches - Case

Reports. International Journal of Recent Advances in Multidisciplinary Research 2015; 2(1):182- 6.

4. Mijoska, A. (March, 2019). "FLEXIBLE POLYMER DENTURES - CONTEMPORARY SOLUTIONS FOR SUPERIOR ESTHETIC AND COMFORT Vol.30.4." KNOWLEDGE – International Journal Vol.30.4.

5. Yunus N, Rashid AA, Azmi LL, Abu Hassan MI. Some flexural. Properties of a nylon denture base polymer. J Oral Rehabil. 2005; 32:65-71.

6. Parvizi A, Lindquist T, Schneider R, Williamson D, Boyer D, Dawson DV. Comparison of the dimensional accuracy of injection-molded denture base materials to that of conventional pressure-pack acrylic resin. J Prosthodont Off J Am Coll Prosthodont 2004 Jun;13(2):83–9.

7. Phoenix RD, Mansueto MA, Ackerman NA, Jones RE. Evaluation of mechanical and thermal properties of commonly used denture base resins. J Prosthodont Off J Am Coll Prosthodont 2004 Mar;13(1):17–27.