

## Study of Flexible and Rigid Removable Partial Prostheses Indications in Iraq

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### Case Study

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#### ABSTRACT

Esthetics of denture as defined by glossary of prosthodontics terms is "the effect produced by the prosthesis that affects the beauty and attractiveness of the person". When planning of treatment for patients with partial edentulous, the esthetics and masticatory function would be taken into consideration. Esthetic restoration of removable partial denture (RPD) is an important function and it determines the treatment successful. The role of achieving optimal esthetics, while maintaining retentive integrity, stability and protecting the teeth health are the most difficult task. Removable partial prosthesis is a repulsive modality of treatment that we still must rely upon for some cases and is a part of the practice. But these patients expect prosthesis to look as esthetic as any other contemporary modality of treatment.

Since 2013, the Iraqi Dental Association/Baghdad was contacted and provide a list of (68) dental laboratories cell phone directory. All dental laboratories listed were contacted and invited to contribute in this study and asked about their laboratories equipment's to flexible and hard acrylic removal partial dentures with modified clasps. Respondents were also asked to forward new cases of regarding fabrication of flexible and hard dentures they had received from clinicians. From 68 dental laboratories listed, four (5.88%) were noncontact able, and five (7.35%) not responding to take part in this study, fourteen (20.58%) of the remaining laboratories did not have the facilities to fabricate flexible dentures on their office and concentrated on hard acrylic prostheses, leaving forty five (66.17%) laboratories contributing in this study. The remaining laboratories had the facilities to fabricate flexible and rigid (with lingual clasp modification) dentures on their office. There is no study has been previously carried out in Iraq, this investigation research to provide baseline data in this area. Consequently, the analysis of data collected used a quantitative rather than qualitative method. The fabrication of flexible denture indicated differences between these types of denture rather than acrylic rigid denture.

#### INTRODUCTION

Removable partial dentures (RPD) became commonly used for many years ago with the introduction of acrylic polymers materials and chrome-cobalt alloys in dental field. Most of patients choose RPD due to cheaply materials and to psychology factors <sup>[1]</sup>. In 1937 Dr. Wright <sup>[2]</sup>; introduced and utilized the Poly methyl methacrylate (PMMA) as a denture base material, since that time these materials became the main polymer material to be used. In addition to PMMA; the metal cast material also used to fabricate the denture base and to restore the defects. There are some of the problems with PMMA are hard to address, such as insertion in deep undercut regions, weakness of PMMA which leads to broken and allergy of soft tissue to PMMA monomer. In addition to, the main another problem with rigid removable partial denture the metal clasps; form the esthetic part seems to be undesirable for the patients who lead to increase number of them avoiding and neglect their use. In past time, most of patients had low interested esthetic outcomes to conventional removable denture. However, today these interesting have altered leading to more patients challenging the esthetic aspect of own prostheses. From the 1950's thermoplastic resins materials have been available in the market and can be used to fabricate both of partial and complete removable dentures <sup>[3-5]</sup>.

Thermoplastic removable dentures have been used terms are flexible dentures, clasp free metal-free and non-metal clasp dentures. In the recent times flexible dentures have become commonly used. Dentures made from these materials should be

showing some of advantages over the conventional acrylic rigid denture ones. Since these materials are flexible, undercuts area of the alveolar ridges can be easier engaged for better retention, path insertion in the mouth is much easier, good resistant to plastic deformation and breakage, the denture base can be thinner than in acrylic rigid dentures, no allergic response, with good esthetic due to the semi transparency of the material that give and reflects the color of the mucosa and the lack of metal clasps which makes the dentures practically invisible in the mouth [6-10].

Esthetics of denture as defined by glossary of prosthodontics terms is "the effect produced by the prosthesis that affects the beauty and attractiveness of the person". When planning of treatment for patients with partial edentulous, the esthetics and masticatory function would be taken into consideration. The prosthesis esthetic shall improve motivation and acceptance of patient. It was very unrealistic to assume that due to acceptable masticatory capability was achieved; patients shall not tolerate a poor appearance of the prosthesis [11].

Edentulousness is the condition in which of teeth are loss form adverse aesthetic and biomechanical squeal. Teeth replacement techniques have evolved considerably over years, however, patient's acceptance to traditional prosthesis have never been foreseeable and are never complete and there have been a constant pursuit of achieving better restoration ways [12]. Although complete edentulism has reduced, the number of partially edentulous individuals has increased, probably due to the worldwide ageing population and oral health-related prevention policies. There are limited advantages that will be accomplished by the removable partial dentures for replacing the natural teeth, like non-invasive and low-cost partial prosthesis will be constructed by heat cured acrylic resin solely known as all acrylic partial prosthesis, whereas cast partial dentures have metallic framework along with metallic denture base or denture base acrylic resin [13].

Removable partial prostheses are an effective and affordable treatment modality to restore esthetics and function. During the prosthetic rehabilitation, the remaining structures could be properly used to distribute the occlusal forces to all teeth and stress bearing areas. Esthetics influences the appearance, dignity and self-esteem of an individual. The understanding of which kind of esthetic is acceptable or not varies for different groups of people (specialists, general dentists and patients). The responsibility to make recommendations to achieve the best esthetic outcome for a particular patient depends on dentist [14-17].

Removable partial prostheses are commonly used for treating the patient who is not good candidates for conventional fixed partial prostheses and implant supported prostheses. These prostheses are fabricated from metal alloy, acrylic resin and thermoplastic resins. The removable metal partial prosthesis is a definitive prosthesis that has been used in dental profession since decades for rehabilitation of patients who are partial edentulous. Patient demands a removable partial prosthesis for many reasons as health, anatomic, psychological, or financial. Fabricating an esthetically pleasing removable partial prosthesis while avoiding the unsightly display associated with conventional clasp assemblies often presents a challenge to the operators [18,19].

Thermoplastic acrylic resins have more variability in physical and mechanical properties, clinicians would utilize them with careful consideration of the specific properties of each product [20]. Several methods to overcome the esthetic dilemma include the painting of clasps with tooth colored resin, use of lingual clasps position engagement of mesial rather than distal undercuts, or use of gingival approaching clasps. Although clasps can be avoided by using precision attachments, some of the removable partial prostheses framework shall be invariably visible. Clasp is used as direct retainer for the removable partial prostheses; the flexible tip of clasps engages the undercut of the abutment tooth to provide retention [21].

The components of any clasp assembly must maintain six biomechanical properties such as retention, support, stability, reciprocation, encirclement and passivity. As well as the clasp assembly must ideally not affect esthetics adversely. Careful selection of clasp position on the individual tooth depends on type, material, location in the dentition and the number of clasps is important. The design of clasp arm which producing less stress is important for predictable long term use of a removable partial prosthesis [22]. Three factors affect the design of a clasp arm which is clasp material, clasp form and the amount of abutment undercut. Clasp involves the elements of curvature, length and taper and cross sectional dimension. Among these, the first two elements are determined by the contour of abutment tooth, and the latter two elements are under the control of the dentist and technician. Clasps are used as direct retainers for the removable partial prosthesis; the flexible clasps tips engage the undercut of the abutment to provide retention. The position of highest convexity on the tooth surface, which is determined via surveying, serves as a guide in the clasps placement. Clasps are classified into infra bulge clasps and supra bulge clasps. The supra bulge clasps approach the undercut from an occlusal direction and are visible. The infra bulge clasps approaching the undercut from a gingival direction, in addition referred to as the gingival approaching clasps, have more potential for being hidden in the disto-buccal aspect of teeth [23].

The aim of this study was to survey flexible and rigid (with lingual metal clasp) removable partial prostheses indications in Iraq. It was hypothesized that dental clinicians in Iraq are providing and determine flexible and rigid removable partial dentures to dental laboratories. Incidence data of dentures were documented in a survey of 68 dental laboratories in Iraq [24].

## PROCEDURE

Usually in the most of cases, the only part of a removable partial denture that is visible is the retentive clasp arm. We have hit that eliminates the using of a buccal clasp arm by using the lingual clasp arm made of a wrought wire clasp (**Figures 1 and 2**).

Since 2013, the Iraqi Dental Association/Baghdad was contacted and provide a list of (68) dental laboratories cell phone directory. All dental laboratories listed were contacted and invited to contribute in this study and asked about their laboratories equipment's to flexible and hard acrylic removal partial dentures with modified clasps. Respondents were also asked to forward new cases of regarding fabrication of flexible (**Figure 3**) and hard dentures they had received from clinicians. There is no study has been previously carried out in Iraq, this investigation research to provide baseline data in this area. Consequently, the analysis of data collected used a quantitative rather than qualitative method.



**Figure 1.** Lingual clasp was placed (occlusal view).



**Figure 2.** Lingual clasp was placed (tissue side view).



**Figure 3.** Flexible partial dentures.

From 68 dental laboratories listed, four (5.88%) were noncontact able, and five (7.35%) not responding to take part in this study, fourteen (20.58%) of the remaining laboratories did not have the facilities to fabricate flexible dentures on their office and concentrated on hard acrylic prostheses, leaving forty five (66.17%) laboratories contributing in this study (**Table 1**). The remaining laboratories had the facilities to fabricate flexible and rigid (with lingual clasp modification) dentures on their office <sup>[25]</sup>.

**Table 1.** Principal reasons of the laboratories that participated in the study.

Reason	n	%
Noncontact able	4	5.88
Not responding	5	7.35
No flexible dentures facilities (only rigid)	14	20.58
With flexible and dentures facilities	45	66.17
Total	68	100

Usually manufacturing cycle of a flexible and rigid partial denture needs the clinician and the dental laboratory to fabricate it according to recommendations. The most popularity usage material for the fabrication of conventional rigid acrylic dentures so

far has been PMMA. This material is not perfect in every consideration. In spite of numerous progresses and research in dental materials field, training and techniques across of the world, the breakage, nasty smell and allergy to PMMA could not be avoided.

Some of technicians reported by almost of the disadvantages of conventional rigid acrylic dentures and referred to an irritation factor, claiming that conventional acrylic fabrication is dirty and time consuming. In addition, the results revealed these laboratories were asked to identify and prefer fabrication of flexible dentures was the most common reason, reported by almost of the advantages of materials that used in fabrication of this type of dentures. This material commonly replaces the metal and the poly methyl methacrylate denture base material that used to fabricate the framework for conventionally removable partial dentures. It is almost strong, aesthetically acceptable being coloured like the gingival tissues, can be fabricated quite very thin, and can form the denture base and the body of the clasps. It also has high wear, fatigue, solvent resistance. It has no porosity, no biological and stains material build-up. In general, the results respondents prefer flexible dentures in place of acrylic rigid dentures ones and this is in agreement with the results of Pun et al. [26].

Patient expectations need to be established before treatment, as components of the removable partial denture can be visible and perhaps not acceptable to the patient. In view of the importance of esthetics, creative clasp design offers the possibility of decreasing the visibility of clasp assemblies, rendering them highly acceptable to the patient. However, the clinician must be careful in choice of clasp designs as many articles are published based on clinical experience of the authors rather than research [27-30].

A lingual clasp is indicated when the buccal arms are not to be seen. The selection of wrought wires for acrylic removable partial dentures is influenced by alloy type and (diameter, length, curvature and depth of undercut). For the construction of acrylic removable partial dentures, the Academy of Prosthodontics defined eight standards, including retention that is important in preserving oral tissue health. Esthetic aspects of acrylic removable partial dentures design are not part of these standards. Frank et al. would not relate any of these standards to patient satisfaction hence, when patient satisfaction from an esthetic point of view is critical, one could consider the elimination of a clasp visibility.

## CONCLUSION

The fabrication of flexible denture indicated differences between these types of denture rather than acrylic rigid denture. Years in practice of the clinician and dental laboratories are all related to the selects of these dentures, while comfort, esthetic and price were the main causes for deciding flexible dentures for their patients. Dentures processed with this procedure provides good retention and very good esthetic.

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