

# Patient satisfaction and complication rates after delivery of removable partial dentures: A 4-year retrospective study

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## ABSTRACT

**Background:** Patients' satisfaction and complication rates of removable partial dentures (RPDs) can affect patient acceptance and compliance in using RPDs. This study aims to determine complication and satisfaction rates in patients wearing RPDs. **Materials and Methods:** Patients that were treated with RPDs at the Prosthodontic Department in the last 4 years (2010–2014) were invited for a clinical examination. Demographic information and RPD characteristics (Kennedy classification; edentulous jaw: Upper versus lower; clinician: General dental students or prosthodontic residents; denture type: Cobalt-chromium or full acrylic) were recorded. The patients' satisfaction was measured on the basis of four criteria: Mastication, esthetic appearance, speech, and comfort components by a visual analog scale. Data were analyzed by SPSS version 18 using Kruskal–Wallis and Mann–Whitney tests ( $P < 0.05$ ). **Results:** A total of 60 patients (30 men and 30 women, age range, 37–64 years) were evaluated. The most common complications were food impaction (68.3%), ridge resorption (63.3%), loss of support (36.7%), abutment caries (36.7%), loss of retention (35%), and pain and discomfort (30%). The patients reported a moderate level of satisfaction (6.2 out of 10). Higher satisfaction scores were significantly associated with older age, upper RPDs, and RPDs fabricated by prosthodontic residents ( $P < 0.05$ ). Gender, Kennedy classification, and denture type had no significant effect on patient satisfaction ( $P > 0.05$ ). **Conclusion:** The findings of this study revealed that RPD complications were not uncommon. The clinicians' experience can influence postinsertion patient satisfaction and complication rates.

**Key words:** Denture complications, removable partial denture, satisfaction

## INTRODUCTION

Tooth loss can compromise facial esthetics, speech, and masticatory difficulties.<sup>[1]</sup> Removable partial dentures (RPDs)


are commonly used to replace lost teeth.<sup>[2]</sup> The demand for this type of dental treatment is increasing, owing to improved quality of life and its consequential effect on life expectancy of elderly populations, even in developing countries.<sup>[3]</sup> Therefore, dental practitioners should have

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a sound knowledge of diagnosis and treatment using appropriate design and construction of RPDs. Maintenance should also be taught to oral health caregivers.<sup>[4]</sup> An ideal prosthetic restoration should be biocompatible in the oral environment and should enhance the facial esthetics of the patient. Properly designed and fabricated dental prostheses that satisfy physiological needs can benefit the patient for many years. Dental prostheses should support oral soft and hard tissues without any injuries.<sup>[5]</sup> The dentist should design a treatment plan that leads to the proper construction of RPD, taking into consideration the physiologic, anatomic, and psychological needs of the patient.<sup>[6]</sup>

Even when all these aspects are considered, some patients remain unsatisfied with their treatment and may not use their RPDs.<sup>[4]</sup> Problems with the dental prosthesis may begin immediately after delivery and may continue long afterward, causing the patient to discontinue its use.<sup>[7]</sup> Some of the most common problems encountered include increased salivation in the first 72 h, pain and discomfort, and lack of stability and retention.<sup>[8,9]</sup>

Patients may also suffer from functional problems such as problems with eating, food impaction, salivation, dysgeusia, nausea, speech difficulties and/or facial esthetic problems such as visible clasps, unesthetic or misplaced tooth arrangement, and color or shape mismatch.<sup>[5,10]</sup> Psychological problems such as depression may cause a sense of dissatisfaction, loss of retention, or functional problems.<sup>[9]</sup>

Problems related to RPDs can affect patient satisfaction and service life of the prosthesis. Hummel *et al.* reported that 65% of patients wearing RPDs have at least one problem, with lack of stability being the most common.<sup>[11]</sup> Bilhan *et al.* showed that the loss of retention, issues related to the vertical dimension of occlusion, trauma, and ulcers play a significant role in patient satisfaction.<sup>[12]</sup> Koyama *et al.* found a significant relation between age, edentulous ridge, number of occlusal rests, pain and discomfort, shade and form of artificial teeth with a patient's willingness to use their RPD.<sup>[13]</sup> Akeel found that pain and discomfort are the most important causes of discontinuation of RPDs.<sup>[14]</sup>

Considering the importance of postdelivery problems of RPDs, this study aims to evaluate different problems associated with RPDs and their impact on patient satisfaction.

## MATERIALS AND METHODS

Prior to conducting the study, the research protocol was approved by the Institutional Ethical Committee (Ref. No. 933917). This study evaluated patients who were treated with RPDs at the College of Dentistry, between 2010 and 2014. The patients were treated either by students

completing their general dentistry degree requirements or by prosthodontic residents.

Inclusion criteria were age between 30 and 70 years and lack of any debilitating systemic disease. The necessary sample size was estimated using the following formula:

$$n = \frac{z^2 s^2}{d^2} = \frac{1.96^2 2.5^2}{0.7^2} @60$$

The patients' files were collected from the University Archives. Patients were invited to participate in this study. The patients signed consent forms before completing a clinical check-up. Personal and demographic information (sex and age) and variables related to RPDs, such as date of delivery, academic degree of the clinician (general or resident), type of RPD used (acrylic partial denture or chrome-cobalt), Kennedy classification of edentulous ridge, and edentulous arch (upper or lower) were collected.

To evaluate problems associated with RPDs, previous studies have used a form covering 15 types of associated problems, developed by Phoenix *et al.*<sup>[8]</sup> The patient satisfaction form used in this study was derived from a questionnaire developed by de Siqueira *et al.*<sup>[15]</sup> This questionnaire assesses patient satisfaction in four categories: (1) Mastication, (2) appearance, (3) speaking, (4) level of comfort. In each part, patient satisfaction was evaluated using Likert's visual analog scale with ranking from 0 to 10, with zero representing the least satisfaction and 10 representing the highest satisfaction with their RPD.<sup>[16]</sup> Mean satisfaction in all the four categories was calculated.<sup>[17]</sup>

Data were analyzed using SPSS version 18 (SPSS Inc., Chicago, IL, USA). Categorical variables are presented as frequency and percentages of data. Demographic variables and related factors to patient satisfaction were analyzed using the Mann–Whitney U-test and Kruskal–Wallis test.  $P < 0.05$  was considered statistically significant.

## RESULTS

Sixty patients (30 men and 30 women) between the ages of 37 and 64 years (mean age,  $52.1 \pm 6.3$  years) participated in the study. Time of RPD delivery was between 0 and 48 months (mean,  $21.9 \pm 15.6$  months). The distribution of related problems to RPD is shown in Figure 1. Among 60 patients, the most common problems associated with RPDs were food impaction under RPDs (68.3%), ridge resorption (63.3%), loss of support (36.7%), abutment caries (36.7%), loss of retention (35%), and pain and discomfort (30%). Other related problems were reported in <30% of patients.

Table 1 shows a comparison of related problems according to the postdelivery time of RPDs. The most common problems

were ridge resorption (80.7%), abutment caries (57.1%), abrasion of teeth (49.9%), and issues related to vertical dimension of occlusion (46.4%) in patients who received their RPDs more than 24 months prior ( $P < 0.05$ ).

The most common problems in patients who received their RPDs < 12 months prior were mucosal ulcers (60%), pain and discomfort (86.7%), and loss of support (66.7%) ( $P < 0.05$ ).

Table 2 shows the relation between patient satisfaction according to demographic and prosthetic variables.

Patient satisfaction in patients aged 50 years or older was significantly higher in all four categories, compared with patients aged less than 50 years ( $P < 0.05$ ).

In all the four categories, there were no significant differences between male and females. Kennedy classification of the edentulous ridge had no influence on patient satisfaction ( $P > 0.05$ ).

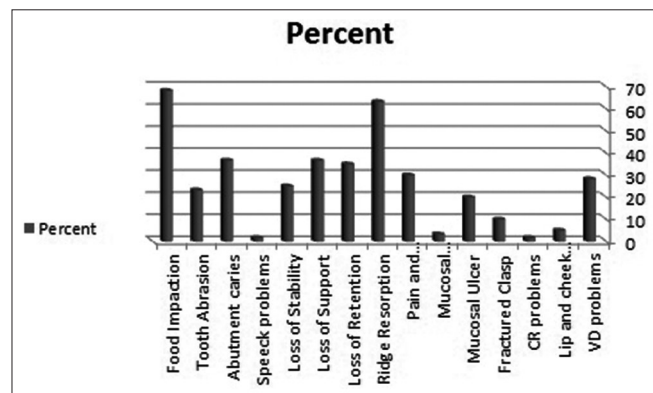


Figure 1: Comparison of problems associated with removable partial dentures

Table 1: Frequency of problems related to postinsertion time of RPDs

Problems	Number of cases (%)			P values
	<12 months	13-23 months	More than 24 months	
VD problems	3 (20)	1 (5.9)	13 (46.4)	0.01
Lip and cheek incompatibility	2 (13.3)	1 (5.9)	0 (0)	0.15
CR problems	1 (6.7)	0 (0)	0 (0)	0.21
Fractured clasp	0 (0)	1 (5.9)	5 (17.9)	0.14
Mucosal ulcer	9 (60)	2 (11.8)	1 (3.6)	0.01
Mucosal hypertrophy	0 (0)	0 (0)	2 (7.1)	0.3
Pain and discomfort	13 (86.7)	1 (5.9)	4 (14.3)	0.01
Ridge resorption	7 (44.7)	7 (41.2)	24 (82.7)	0.003
Loss of retention	9 (60)	2 (11.8)	10 (35.7)	0.017
Loss of support	10 (66.7)	2 (11.8)	10 (35.7)	0.006
Loss of stability	7 (46.7)	2 (11.8)	6 (21.4)	0.06
Speech problems	1 (6.7)	0 (0)	0 (0)	0.27
Abutment caries	0 (0)	6 (35.3)	16 (57.1)	0.001
Tooth abrasion	0 (0)	2 (11.8)	12 (42.9)	0.003
Food impaction	12 (80)	10 (58.8)	19 (67.9)	0.43

RPDs: Removable partial dentures, VD: Vertical dimension of occlusion, CR: Centric relation

Patients wearing maxillary RPDs were more satisfied than patients wearing RPDs of the mandibular arch ( $P < 0.05$ ). Patients treated by prosthodontic residents were more satisfied than those patients treated by dental students ( $P < 0.05$ ). There was no significant difference between patients who had acrylic-based or chrome-cobalt based RPDs ( $P > 0.05$ ).

## DISCUSSION

The use of RPDs is heavily influenced by patient satisfaction. Factors such as patient attitude and personality, quality of delivered RPDs, patient oral hygiene, tolerance, and level of comfort can influence patient satisfaction with their RPD treatment.<sup>[14,18]</sup> Thus, this study aimed to assess distribution and frequency of problems associated with RPD and factors which affect patient satisfaction.

This study showed that the most common issues related to RPDs were food impaction under RPDs, ridge resorption, loss of support, caries of abutment teeth, loss of retention, and pain and discomfort. Other studies found that the loss of retention (64.4%), traumatic ulcers (47.5%), and damaged artificial teeth (33.4%) were the most common complications following delivery of RPDs and complete dentures.<sup>[12]</sup> Akeel found pain and discomfort (50%) was the most important factor preventing patients from wearing their RPDs.<sup>[14]</sup>

This study found that some of the problems (vertical dimension of occlusion problems, ridge resorption, caries of abutment tooth, and abrasion) were associated with postinsertion time, and the longer the RPD has been used, the more associated problems there tended to be. Traumatic ulcer, pain and discomfort, loss of retention, and loss of support are the most commonly seen complications in patients who first received their RPD less than 1 year. van Waas' study showed that loss of retention and lack of support in complete lower dentures were associated with ridge resorption over time.<sup>[18,19]</sup>

Similar results confirm the association of time to delivery and problems associated with RPDs. Saito *et al.* found a sudden increase in clasp fracture of RPDs more than 6 years after delivery.<sup>[2]</sup> In the present study, patients 50 years or older had more satisfaction from their RPDs than those younger than 50 years. Singh *et al.* found a positive correlation between age and patient satisfaction from their RPDs. Patients between the ages of 45 and 65 years were more satisfied than those older than 65 years.<sup>[20]</sup> On the contrary, de Siqueira *et al.* found no correlation between patient satisfaction and age.<sup>[15]</sup>

In our study, patient satisfaction was not related to sex, but females tended to be more satisfied than males. Baran *et al.* reported more satisfaction from RPDs among females (46.8%) than males.<sup>[21]</sup> In addition, Zlataric *et al.* found that among

**Table 2: Mean and SD of demographic and prosthetic variables in four categories**

	Mastication		Facial esthetics		Speak		Comfort	
	Mean±SD	P	Mean±SD	P	Mean±SD	P	Mean±SD	P
Age								
Under 50 years	4.4±4.0	0.004	4.9±3.9	0.01	4.7±3.9	0.01	4.4±4.0	0.004
50 years and upper	7.3±2.4		7.8±2.4		7.3±2.4		7.3±2.4	
Sex								
Male	5.1±3.8	0.07	5.6±3.7	0.13	5.4±3.7	0.1	5.1±3.8	0.06
Female	7.1±2.7		7.1±2.8		7.06±2.8		7.1±2.8	
Kennedy classification								
I	6.5±3.5	0.41	6.8±3.4	0.32	6.7±3.2	0.35	6.5±3.6	0.37
II	6.0±3.2		6.3±3.2		6.1±3.2		6.0±3.2	
III	5.6±3.8		5.8±3.6		5.6±3.7		5.5±3.8	
IV	9.0±-		9.0±-		9.0±-		9.0±-	
Arch								
Maxilla	7.4±3.0	0.004	7.5±3.0	0.005	7.5±2.9	0.004	7.4±3.0	0.006
Mandible	5.1±3.5		5.5±3.4		5.3±3.5		5.1±3.6	
Clinicians academic degree								
General dentist	5.6±3.4	0.009	5.8±3.4	0.003	5.71±3.4	0.004	5.6±3.4	0.006
Prosthodontic resident	8.1±2.8		8.7±1.4		8.6±1.4		8.1±2.8	
RPD type								
Chrome-cobalt	6.01±3.4	0.22	6.2±3.4	0.25	6.15±3.4	0.22	6.01±3.5	0.24
Full acrylic	9.0±1.4		9.0±1.4		9.0±1.4		9.0±1.4	
Total	6.1±3.4		6.3±3.3		6.25±3.3		6.1±3.5	

SD: Standard deviation, RPD: Removable partial denture

RPD wearers, females were more satisfied than males.<sup>[22]</sup> However, Singh *et al.* assessed RPD wearers in a region of India and found that male RPD wearers were more satisfied than females with respect to mastication, esthetics, and speech.<sup>[20]</sup>

There was no difference in patient satisfaction and type of Kennedy classification of the edentulous ridge in the present study. Another study by Akeel confirmed that there was no relationship between patient satisfaction and extent and type of edentulous ridge. When considering all the four categories, patients with maxillary RPDs were more satisfied than those with mandibular RPDs.<sup>[14]</sup>

Patients who had been treated by prosthodontic residents were more satisfied than those treated by students in their general dentistry courses in the present study. This indicated that higher qualifications could influence patient satisfaction with their RPDs; however, Akeel reported patients who had no complaints with low quality RPDs. This suggests the presence of other contributing factors influencing patient satisfaction.<sup>[23]</sup>

In the present study, there was no significant difference between patient satisfaction with acrylic-based RPDs or chrome-cobalt RPDs in all the four aspects. On the contrary, Cosme *et al.* found higher satisfaction in patients who had worn their RPDs for more than 5 years who showed better tolerance to metal frames.<sup>[24]</sup>

In our study also, all cases assessed had moderate to high (6.2 from 10) levels of satisfaction. This is consistent with Cosme *et al.* study that reported most patients were happy after 5 years of using their RPD.<sup>[24]</sup>

This study was the first study that specifically evaluated the quality of RPDs and its relation with patient satisfaction over a period of 4-year in an Iranian population. Most of the previous studies assessed common problems with removable prosthesis regardless of partial or complete dentures, while the present study focused on the identification of problems with RPDs. One limitation of this study was that it did not evaluate the relation between psychological factors such as patients' attitude and personality with the occurrence rate of problems related to RPDs.<sup>[18]</sup>

## CONCLUSION

This study showed that RPDs were commonly associated with offending problems. There is a positive correlation between patient satisfaction and age, arch, and qualification of clinicians. Sex and type of edentulous ridge (Kennedy classification) had no influence on patient satisfaction.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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