

THE INFLUENCE OF REPLACING ANTERIOR TEETH ON PATIENT ACCEPTANCE OF REMOVABLE PARTIAL DENTURES IN SAUDI ARABIA

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ABSTRACT

The current study aims to investigate the interaction between factors that might affect patients' acceptance of removable partial dentures (RPDs) with a focus on the impact of replacing the anterior teeth. One hundred and forty-seven patients were recruited for the study. These patients were treated with removable partial dentures (RPD) during undergraduate courses at two different dental schools in Riyadh province in the Kingdom of Saudi Arabia. Patients were contacted by telephone and asked about satisfaction with their dentures based on a standardized questionnaire (a set of 17 questions). Participants were distributed into two groups: The first group included patients who have had RPDs replacing anterior teeth (aesthetic area) and the second group included patients who have had RPDs replacing posterior teeth only. No statistically significant relationship between the area of replacement and satisfaction with the denture could be found (Chi-squared test $p = 0.45$). The majority of participants who were currently using dentures reported being satisfied while the majority of those who sometimes use or don't use dentures reported being dissatisfied. Common reasons limiting the use of dentures were "Denture is causing some pain" (33.3% of participants who were not using dentures) and "Denture is loose" (42.9% of participants who were not using dentures). The current study demonstrates that there is no relation between patient satisfaction and the replacement of the anterior teeth. However, the dissatisfaction may increase with dentures being loose or if they cause pain.

Key words: Anterior teeth, Denture, Aesthetics, Patient satisfaction.

Introduction

Teeth loss may affect facial appearance, mastication, and speech [1], which, as a result, has a huge impact on general and oral health and eventually on the quality of life [2]. Hence, replacing the missing teeth with suitably constructed prostheses is highly demanded. Partially edentulous patients have various treatment options to replace missing teeth. These might include prostheses supported by implants, conventional fixed partial dentures (FPDs), or removable partial dentures (RPDs) [3]. RPDs are a common choice that is usually prescribed over FPDs or implant-supported prostheses for partially edentulous patients, especially when a relatively low cost and noninvasively alternative is indicated [4-6]. RPDs could provide preservation of the existing tissue, improve phonetics and chewing performance, as well as enhance esthetics [7]. However, the patient compliance to continuously wearing removable partial dentures has been reported by Jepson *et al.*, 1995 to be as low as 60% [3]. In their study, it was found that replacing anterior teeth with dentures is a considerable factor in the compliance of the patients to wear them. The study showed that most of the non-wearers were having dentures that does not replace the anterior teeth [3].

Biological, psychological, mechanical, and esthetic factors have been demonstrated to be related to RPDs acceptance and success [6]. Satisfaction with removable partial dentures was also associated with mechanical factors such as denture fit, number of missing teeth, and retention. In addition, mastication and phonetics are considerable factors, while age and hygiene factors are not correlated with satisfaction [6]. The personality of the patient and physical adaptability and social adaptation was found to be associated with satisfaction with RPDs [5]. The stomatognathic system in new dentures wearer requires some time to reach adaptation and acceptance [8]. A duration of 6 to 8 weeks was suggested for determining adequate usage of the new dentures, as the capacity to develop new patterns of memory for muscles of mastication can be achieved during this period [9]. Most often, edentulous people spend prolonged spans without dentures, thus they have greater trouble learning to masticate with new dentures, and the time for adaptation is expected to be longer [9].

By valuing appearance for RPDs, creative clasp design provides the possibility of reducing the visibility of clasp, making them more acceptable to patients [8]. Additionally, patient acceptance is influenced by denture retention, support, and chewing ability [7]. As various interrelating factors could have a direct or indirect effect

on patient acceptance of RPDs, this study aims to investigate the interaction between some of these factors with a focus on replacing the anterior teeth and its impact on patient acceptance and continuity of using their RPDs. This can assist clinicians in predicting the prognosis of their treatment, as well as patients in treatment selection and understanding the treatment's risks.

Materials and Methods

In total, 147 randomly selected patients were recruited for the study. These patients were treated with removable partial dentures (RPD) during undergraduate courses at the College of Dentistry, Prince Sattam bin Abdulaziz University and Al Farabi College of Dentistry and Nursing. The permission to carry out the study was obtained from the institutional ethical committee before conducting the study. Out of the 147, 104 responded while 37 did not respond, and the remaining 6 refused to participate. Of the total responses, the gender distribution was 64 males (61.5%) and 40 females (38.4%). Patients were treated by undergraduate dental students supervised by experienced specialist faculty members. A self-administered validated questionnaire was developed for the study. Items for the questionnaire were developed through a literature search and an expert focus group consisting of an assistant professor in prosthodontics (IA), a prosthodontics consultant (AA), and one psychometric statistician (SK). A pilot study and pretesting of the questionnaire were conducted on a sample of 27 participants that were also included in the final survey. A principal components analysis (PCA) was conducted to examine the factor structure of the questionnaire. The questionnaire items were then tested for reliability using the Cronbach's coefficient alpha measure of internal consistency. The overall internal reliability of the questionnaire was 0.89 which indicates good internal consistency.

Before starting the survey, the authors estimated the sample size. The author asked around 147 patients to be part of the study. (The margin error was kept at 0.5 and the confidence level at 95 percent). The effective sample size came out to be 100 since one can expect subjects to leave the study in between because of various reasons, so the total sample was taken [10].

Patients were contacted by research contributors using the telephone and then asked about their experience and satisfaction with the provided dentures based on the prepared questionnaire (a set of [11] questions). Based on their responses, they were distributed into two groups: The first group included patients who have had RPDs replacing anterior teeth (esthetic area) while the second group included patients who have had RPDs replacing posterior teeth only. The questionnaire consisted of information about the patient's age, gender, education, and income. The highest level of confidentiality was applied to start by collecting the sample using the colleges' file systems after

getting official approval. Respondents were asked for their verbal and written approval to contribute to the survey and assured of the confidentiality of handling their contact information and their responses.

Statistical analysis

Data were coded, tabulated into spreadsheet software (Microsoft Excel (2010)) and analyzed using SPSS (Statistical Package for Social Sciences; IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp). Descriptive statistics were used to calculate the frequency and distribution of demographic variables like gender, age, education, income, and nationality that were presented as numbers and percentages. The frequency distribution of participant responses to each question was also presented as numbers and percentages. Pearson's chi-square tests were used to compare responses of participants between gender, age, and other demographic variables. A p-value less than 0.05 was considered statistically significant.

Results and Discussion

The education level of the participants, 57% were up to the primary level of education, followed by 16% with the secondary level, 15% holding a Diploma, and 12% with a bachelor's degree. The participants aged from 42 years old to 81 years old, and the majority of the participants were between 51 and 60 years old (44%), followed by the age class of 61 – 70 years old (30%), and the younger class 40–50 years old (23%). The participants were questioned about the area of their mouth which was replaced by the denture. Possible answers were “replacement of anterior teeth” or “replacement of only back teeth”. Of all the participants, 71% stated that the anterior teeth were replaced by the denture, while 29% stated that only the back teeth were replaced **Table 1**.

Table 1. Total number of answers related to the area of replacement of the mouth by the denture according to gender, education level, and age class of the participants

Area of replacement	Gender		Age (classes)		
	Male	Female	40 – 50	51 – 60	above 60
Replacement of anterior teeth	45	26	17	36	17
Replacement of only back teeth	19	14	8	10	15

The relationship between satisfaction with the denture and the remaining variables (through Chi-squared tests) is summarized in **Table 2**. Satisfaction was found to be related to four of the considered variables in the research. A question of interest was if there was any influence of the area replaced by the denture on the satisfaction of the participants. No relationship between both factors could be

found in the investigation (chi-square test, $p = 0.45$) **Table 2**.

Table 2. Summary for the Chi-squared tests performed to assess the association between satisfaction with the denture and other factors

Factors	Satisfaction
Gender	0.12
Income	0.08
Age group	0.24
Nationality	0.59
Education level	0.32
Area of replacement	0.45
Current use of dentures*	< 0.001
First time using a denture	0.12
Time since the start of using denture*	< 0.01
Adaptation time*	< 0.001
Hours of use per day*	< 0.001

“p-value” indicates the p-value of the corresponding Chi-squared test. Asterisk (*) indicates statistically significant associations

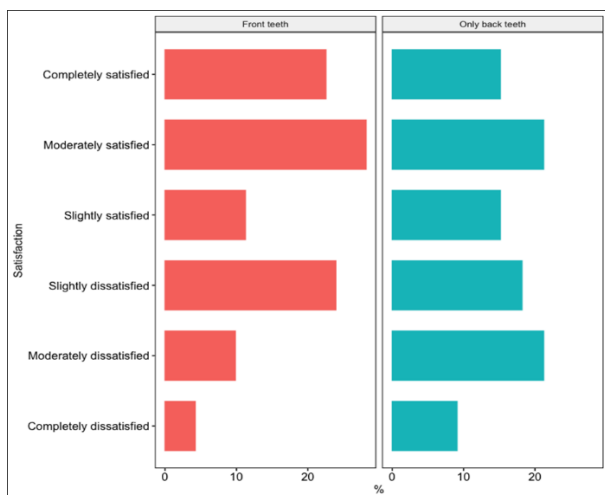


Figure 1. Distribution of the percentage of satisfied and dissatisfied participants in relation to different teeth areas replaced by the denture

However, a trend for an increase in the percentage of dissatisfied participants could be observed when just the back teeth were replaced by the denture. Nevertheless, this trend was not statistically significant. A significant relationship was observed between the current use of dentures and satisfaction (Chi-squared test $p < 0.001$). The adaptation time was also directly associated with the satisfaction of the users (chi-square test, $p < 0.001$). Satisfied users typically need no more than two months to adapt to the denture (**Table 2**). The two most common reasons hindering the use of dentures were “Denture is causing some pain” (33.3% of participants who were not

using dentures) and “Denture is loose” (42.9% of participants who were not using dentures) **Table 3**.

Table 3. Summary statistics for the answers to the research questions

Answers to questions	n	%
Which jaw are you wearing the denture on?		
Both jaws	49	47%
Lower jaws	21	20%
Upper jaw	34	33%
Are you currently using the denture?		
Yes	46	44%
No	21	20%
Sometimes	34	33%
No answer	3	3%
If the answer was “sometimes”, what was the reason?		
Denture is causing some pain	11	32.2%
Denture is loose	13	38.2%
Denture is loose; Denture is causing some pain	2	5.9%
Continued		
Answers to questions	n	%
Denture is loose; Does not like how it looks	2	5.9%
Does not like how it looks	3	8.8%
No answer	3	8.8%
If the answer was “No”, what was the reason?		
Denture is causing some pain	7	33.3%
Denture is loose	9	42.9%
No answer	5	23.8%
If the answer was “yes”, what was the main reason for you to use the denture?		
In order to eat	20	43.5%
In order to eat; In order to improve the way you look	3	6.2%
In order to eat; In order to improve the way you look; In order to improve your speech	3	6.2%
In order to eat; In order to improve your speech	2	4.3%
In order to improve the way you look	17	37%
In order to improve the way you look; In order to improve your speech	1	2.2%
Is that your first set of dentures?		
Yes	91	87.5%
No	13	12.5%
If No, how many dentures have you had before the current one?		
One	8	61.5%

Two	4	30.7%
No answer	1	7.7%
For how long you have been using the denture?		
More than two years	13	12.5%
From 1 year to 2 years	33	31.7%
From 6 months to 1 year	26	25%
Less than 6 months	32	31%
How long did it take for you to adapt to the current denture/s until you reach the point of continuous use?		
Less than a month	46	44.2%
From 1 to 2 months	43	41.4%
More than 2 months	15	14.4%
For how many hours per day do you use the denture?		
Less than 3 hours	27	26%

Between 3 and 8 hours	34	33%
More than 8 hours	43	41%
Overall, how satisfied are you with your denture?		
Completely satisfied	21	20%
Moderately satisfied	27	26%
Slightly satisfied	13	12.5%
Slightly dissatisfied	23	22%
Moderately dissatisfied	14	13.5%
Completely dissatisfied	6	6%

The majority of participants who were currently using dentures reported being satisfied while the majority of those who sometimes use or don't use dentures reported being dissatisfied (**Figure 2**).

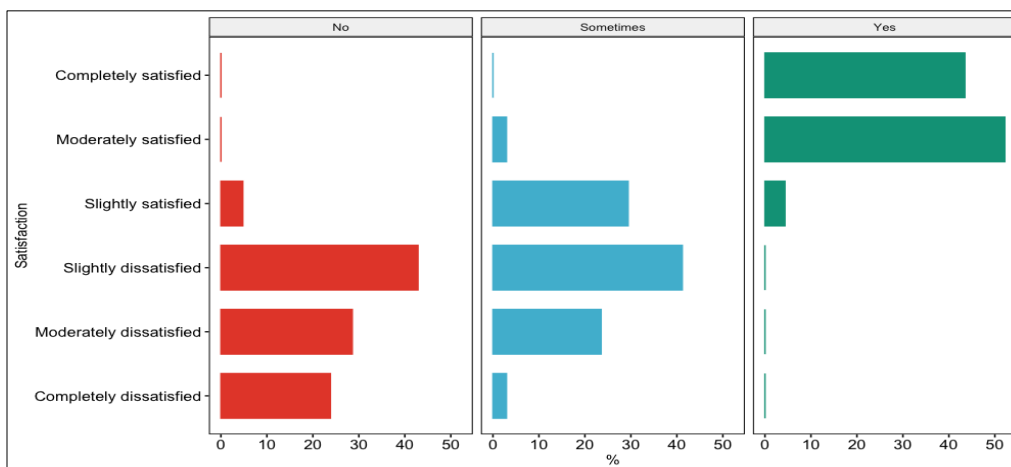


Figure 2. Distribution of the percentages of satisfaction levels of participants per current use of the denture

The hours of use of the denture is also a direct consequence of the satisfaction (chi-square test, $p < 0.001$). People must be satisfied to use the denture for longer periods. Almost the totality of the participants who were completely satisfied

stated to use the denture for periods longer than 8 hours, at the same time that moderately satisfied people used the denture for at least more than 3 hours (**Figure 3**).

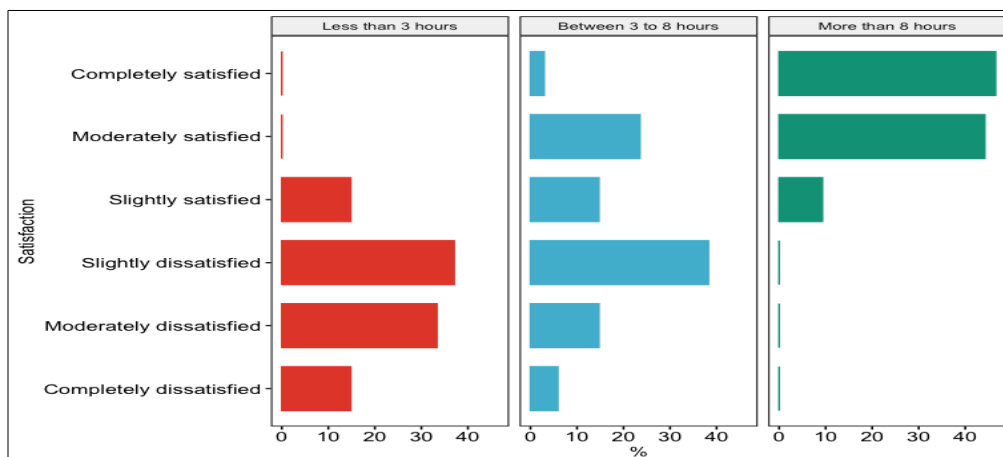


Figure 3. The great majority of people who use the denture for less than 3 hours are dissatisfied

Most of the users with complete satisfaction adapt to the denture before the end of the first month of use, and

those with moderate satisfaction adapt before the end of the second month (Figure 4).

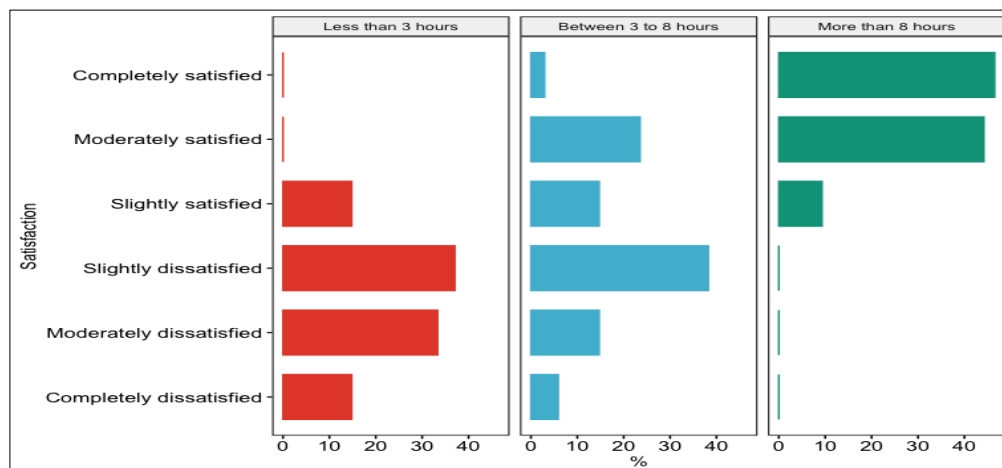


Figure 4. Distribution of the percentages of satisfaction levels of participants per hour of use per day

The current study aimed to investigate the influence of replacing anterior teeth on patients' acceptance of removable partial dentures. This study targeted patients who were treated with removable partial dentures at two colleges of dentistry in Riyadh Province, Kingdom of Saudi Arabia. Upon reviewing the literature, there is limited information on how patients react and adapt to removable partial dentures that replace anterior teeth. Several different factors have been studied in an attempt to understand patient acceptance and therefore success of the treatment [1-3, 5].

Removable partial dentures are a popular treatment option that can provide improvement to both esthetics and function. However, they appear to have a low acceptance rate by patients. In the current study, nearly 50% of patients never or occasionally wear their partial dentures which is consistent with several studies applied to different populations [3, 4, 12].

The esthetics of the denture appears to play a significant role in patients' satisfaction with RPDs [13]. A previous study by [3] found that the majority of participants in the study who stopped wearing their removable partial dentures were provided with dentures that did not replace the anterior teeth. Hence, they concluded that replacing the anterior teeth is a considerable factor for removable partial dentures acceptance which will enhance the compliance of the patients to wear their dentures.

In our study, by comparing the surveyed groups there was no significant difference in terms of denture acceptance whether the dentures were replacing the anterior teeth or not. This is in agreement with previous studies [4, 14]. A possible explanation could be due to the small percentage of patients in the current study that only had their anterior teeth replaced. Sixteen percent of patients were provided

with dentures that replaced only their anterior teeth while the remaining had dentures replacing their anterior and posterior teeth or posterior teeth only. As a result, this may have led to the improper representation of the group replacing anterior teeth only.

The most frequent two reasons for dissatisfaction found in the current study were pain caused by denture or denture looseness. It can be inferred that the main concern of the participants of the current study was comfort rather than esthetic. It was revealed that about 41% of the participants who reported wearing their dentures sometimes complained about pain. And almost the same percentage complained about their dentures being loose. This is consistent with a study by Shaghaghian, *et al.* 2015 where the authors found that the main drawbacks of RPDs are mainly physical, such as pain and lack of stability during chewing and speaking [6]. It has been reported that pain and denture looseness are among the most frequently reported complaints [15-17]. Therefore, it is speculated that solving problems related to pain and looseness of the denture may result in increased satisfaction and continued use of the denture [14]. Another study done on patients demonstrated substantial gains in all areas of investigation following rehabilitation, showing how converting a detachable prosthesis to an implant-supported prosthesis can enhance patients' QoL by improving chewing skills, aesthetics, and self-satisfaction [18].

This study has limitations in that it was done on patients who were treated by undergraduate students, not by experienced dentists. Moreover, sample size and representativeness could be improved if different care centers can be included (Hospitals, private clinics, etc.). The finding of this study highlights the need for a better understanding of patient-related factors that could improve treatment outcomes.

Conclusion

The present study demonstrates that there is no relation between patient satisfaction and the replacement of the anterior teeth. However, the satisfaction may increase with dentures being loose or if they cause pain. Further studies are needed to evaluate the perception of RPDs wearers of their dentures and whether replacing the anterior teeth is an essential factor in encouraging denture wearing.

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Conflict of interest: None

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Ethics statement: The permission to carry out the study was obtained from the institutional ethical committee of Prince Sattam Bin Abdulaziz University, Saudi Arabia (IRB ID: PSAU2020021).

Informed consent has been collected from the study participants and preserved by the author(s).

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