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Effect of the Quality of Removable Prostheses on Patient Satisfaction

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Abstract

Aim: The objective of this study was to evaluate patient satisfaction with removable prostheses and its relationship with denture quality.

Methods and Materials: Sixty-seven patients who received 119 new removable prostheses over a period of one year at the College of Dentistry, King Saud University, were recalled for an interview with regard to their satisfaction with their dentures and a clinical examination. Prosthetic quality was determined using the California Dental Association criteria.

Results: Results showed 75% and 66% of upper and lower dentures, respectively, were reported by patients as satisfactory. Of all the upper prostheses rated as being of acceptable quality, 94% were also reported by patients as satisfactory, but of those of unacceptable quality, only 52% were reported by patients as unsatisfactory. The corresponding figures for lower dentures were 91% and 71%, respectively. No significant associations were found between patient satisfaction and age, or denture experience.

Conclusions: Although acceptable quality of removable prostheses usually resulted in patient satisfaction, the finding that some patients were satisfied with their prostheses despite unacceptable quality suggests other factors besides quality affect outcomes.

Clinical Significance: Patient satisfaction with removable dentures cannot be fully predicted from only the quality standards of those dentures.

Keywords: Quality assessment, removable dentures, patient satisfaction, self assessments, questionnaire, retrospective study.

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Introduction

In many countries a large part of the population has an incomplete, but still functional, dentition. A substantial number of those portions of the dental arches where teeth are missing will not have been prosthetically restored,[1] and many patients

function satisfactorily with a shortened dental arch without the need for treatment.[2] Nevertheless, restoring oral function in its complete sense, including appearance, is often necessary and often demanded by patients. Not surprisingly, those from higher economic groups seem to have a greater percentage of prosthetic replacements.[3]

With advances in dental research, technology, and education, many older people in industrialized countries are retaining more of their natural teeth for longer than their predecessors.[4,5] Yet more than 40% of adults over age 65, as well as many younger adults, are still edentulous and in need of complete denture therapy.[6] Although the placement of implants to reestablish lost function and esthetics has increased substantially in recent years, implants may not be a solution for a significant number of adults because of medical, physiological, psychological, or financial constraints.[7-9] Therefore, conventional removable denture therapy will remain an important and essential tool for the restoration of the oral function of edentulous and partially edentulous adults for the foreseeable future.

Dissatisfaction with removable dentures is commonly reported by patients, with 25% of denture wearers having severe problems with their dentures.[10,11] Pain and denture looseness are among the frequent reasons for complaints, with many denture wearers reporting difficulties during eating and speaking.[12] Similarly, dissatisfaction with removable partial dentures (RPD) was related to chewing difficulties, esthetics, and speech.[13,14] Despite the large volume of literature regarding patient satisfaction with removable denture therapy, there is little consensus among investigators with regard to the most reliable predictors of denture success. In a Dutch follow-up study conducted five years after provision of dentures, well-fitting and functioning dentures, the absence of pain, and a socially acceptable appearance were found to have contributed most to patient satisfaction.[15] Similarly, in a Japanese study, there was a highly significant association between aspects of denture quality and patient perceptions of denture comfort and the ability to masticate.[16] Complete denture usage patterns also were found to be positively associated with the accuracy of intermaxillary relations.[17] On the other hand, Vervoorn et al.[18] reported no significant association between denture success and denture quality, or between denture complaints and denture quality. They suggested other aspects of care, perhaps dentist–patient interaction, may be mostly responsible for denture success. These findings corroborate the conclusions of several other investigators.[12,19-22]

It has been suggested the patient's personality and his/her relationship with the dentist play a substantial role in overall success, and psychological attributes are as important for success as a patient's anatomical features as well as the dentist's skill in providing complete denture therapy.[23,24] Supporting this view, an inverse association between the quality of centric relation and patient satisfaction with dentures has been reported[25,26] and another investigator reported the better quality of the dentures resulted in greater dissatisfaction by the patient.[27] No correlation has been shown with regards to patient characteristics and satisfaction with dentures.[22]

It has been contended patient satisfaction with complete dentures is influenced by a complex of psychological, biological, anatomic, and constructional factors. For example, the dilemma of providing dentures to patients with unrealistic expectations of dental care has been discussed.[28] According to Albino et al.,[29] a patient's pretreatment expectations may influence treatment outcomes, and treatment failures may result from mismatched perceptions and expectations of the patient and the dentist. Because individual patients have unique experiences, expectations, emotions, adaptive abilities, and physical attributes, the task of predicting denture success is complex. Often, there are factors beyond the dentist's control that affect a patient's ability to achieve a successful denture outcome. Numerous factors associated

with aging—for example, xerostomia, tissue fragility, muscle weakness, osteoporosis, arthritis, and depression have been reported as possible causes for denture failure.[30] Experience with denture usage is another determinant of patients' acceptance of their new dentures.[11,31]

The purpose of this investigation was to analyze the relative importance of objectively assessed denture quality among a number of other patient factors that could affect patient satisfaction with removable prostheses.

Methods and Materials

The study sample comprised all patients who were treated with removable dentures at the College of Dentistry, King Saud University in Riyadh, Saudi Arabia, over a period of one year. Patients were treated by prosthodontists and by undergraduate dental students supervised by experienced faculty members who were specialists. A conventional protocol for construction of removable dentures was followed that included the following elements:

- Preliminary impressions for fabrication of custom trays
- Border molding
- Final impressions with polysulfide material
- Routine use of centric relation maxillomandibular jaw relationship except when stable tooth contacts were present
- Mounting of casts in a semi-adjustable articulator using a facebow transfer and an interocclusal record (in most cases).

Dentures were tried in the mouth at the wax setup stage and patients were allowed to return for adjustment after insertion. Recalls for the purpose of this study were arranged by telephone contact, and the patient was requested to return for examination.

The "Patient Denture Satisfaction Questionnaire" used was a modification of the one developed by Bolender et al.[32] Each participant had his/her personal data recorded, including age, sex, number of years of denture experience, and educational level. A satisfaction score was calculated based on the patient's rating of different aspects of perceived denture quality, including appearance, retention, ability to chew, ability to speak, and overall comfort. Rating categories were satisfactory, sort of satisfactory, unsatisfactory, and completely unsatisfactory, with allocated numerical scores of 4, 3, 2, and 1 respectively. The final score was obtained by summation of individual scores.

All objective quality evaluations were performed by one examiner using the portion of the CDA (California Dental Association) system specifically designed for follow-up of removable prostheses.[33] The CDA guidelines assess dentures in terms of indication, esthetics, materials used, extensions, design, occlusion, function, stability, and retention. Following evaluation, the denture is rated according to one of four possibilities: range of excellence, range of acceptability, replace or correct for prevention, and replace immediately. The first two ratings were considered acceptable, while the last two ratings were considered unacceptable.

Calibration of the examiner was achieved through comparison of repeat examination results of the same patients seen on two consecutive visits that were two weeks apart. Intraexaminer agreement was assessed using Cohen's kappa, with K being 0.809.

The relationship between denture quality (independent variables) and satisfaction was analyzed using the Chi-square test and Pearson's correlation coefficient. The Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) software was used for data analysis with the significance level set at $p<0.05$.

Results

Of a total of 238 listings in the year's completed removable prosthetic treatments, 120 (50.4%) were non-contactable, 2 (0.84%) were deceased, 16 (6.7%) had moved out of town, 3 (1.2%) were ill and unable to attend a recall, and 4 (1.68%) had already changed their dental treatment plan. Of the 93 remaining people who were personally contacted, 67 patients attended for reevaluation, yielding an adjusted response rate of 72%.

The typical patient recalled was 55 years old (mean=54.9, SD=10.59) and was wearing at least one removable denture constructed about a year earlier. The age range was 32 to 87 years and

Table 1. Percentage distribution (and numbers) of types of removable dentures according to CDA quality classification.

Type of Prosthesis	Acceptable		Unacceptable	
	R	S	T	V
Complete denture (n=30)	12	2	9	7
Removable partial denture (n=72)	22	27	20	3
Transitional denture (n=12)	1	1	9	1
Complete overdenture (n=5)	4	1	—	—
Total (119)	39	31	38	11

Notes: Chi-square (Π^2)=18.435 ($p<0.05$)
(R=Range of excellence, S=Satisfactory, T=Repair or correct for prevention, V=Replace immediately)

Table 2. Quality evaluation of removable dentures by student courses.

	Acceptable	Unacceptable	Total
Junior student courses	43.6% (n=24)	56.4% (n=31)	100% (n=55)
Senior student courses and faculty members	71.9% (n=46)	28.1% (n=18)	100% (n=64)

Note: Chi-square (Π^2) = 3.708 (p=0.054)

85% (n=57) of the patients were male. About 40% of the sample was illiterate, 37% had less than a high school education, and 22% had completed some college and/or postgraduate education. The removable dentures examined were the first for 68% of the sample.

Denture Quality

Table 1 shows the distribution of the types of removable dentures and their quality ratings.

Fifty-nine percent of the dentures were classified as satisfactory in terms of quality, while 41% were not and needed to be replaced. Reasons for classifying dentures as unacceptable included the following:

- Poor esthetics
- Over- or underextension
- An inappropriate peripheral seal
- Presence of occlusal interferences
- An inadequate adaptation
- Improper stability
- An unhygienic design
- Damage to oral structures
- Inadequate retention.

In general, removable dentures fabricated by junior students were less satisfactory with regard to quality than those made by senior students and faculty members (Table 2).

Patient Satisfaction

Most patients (n=48, 72%) were satisfied with their new dentures, although 25% of the sample reported they do not wear their dentures. Table 3 shows the distribution of denture usage with quality of removable dentures.

Denture Quality and Patient Satisfaction

Results showed a strong association between the overall CDA rating and the satisfaction index (Table 4). Of all acceptable removable

Table 3. Quality of removable dentures and denture usage.

	Acceptable	Unacceptable	Total
Dentures not worn (22.6%)	29.6% (n=8)	70.4% (n=19)	100% (n=27)
Dentures worn (77.4%)	67.4% (n=62)	32.6% (n=30)	100% (n=92)
Note: Chi-square (Π^2) = 12.252 (p<0.007)			

Table 4. Patient's satisfaction and denture quality.

	Acceptable		Unacceptable		Total
	R	S	T	V	
Satisfied	44% (n=37)	33.4% (n=28)	17.8% (n=15)	4.8% (n=4)	(n=84)
Dissatisfied	5.7% (n=2)	8.6% (n=3)	65.7% (n=23)	20% (n=7)	(n=35)
Notes: Chi-square (Π^2) = 24.631 (p<0.001) (R=Range of excellence, S=Satisfactory, T=Repair or correct for prevention, V=Replace immediately)					

dentures according to objective assessment, 94% were reported as satisfactory in the upper arch. Only 52% of the unacceptable removable dentures were reported as unsatisfactory. The corresponding figures for the lower dentures were 91% and 71% respectively.

The relationships between patients' satisfaction and patients' age, denture experience, and educational level are shown in Tables 5–7.

The Pearson's correlation coefficient was used to analyze the relationship between the different variables and the patient's satisfaction (Table 8).

Discussion

The great majority of the recalled patients were satisfied with their prostheses. However, 28% were not satisfied with their removable dentures, which is a higher dissatisfaction rate than the 15% and 26% reported by van Waas[25] and Frank et al.[11] respectively. In general, dissatisfaction or the nonuse of removable dentures has been shown to range between 3 and 40%.[31]

Age appeared to have no significant influence on predicting patient satisfaction, a finding that is widely supported by previous studies.[25,31,34,35]

Patients with previous denture experience would be expected to be more satisfied. In this study, denture experience did not show significant association with patient satisfaction, although patients with previous denture experience were slightly more satisfied. As patients acquire additional sets of dentures, their neuromuscular control becomes more highly developed. Their ability to stabilize new dentures in the mouth may be relearned more quickly than is possible for patients who undergo this process for the first time. Although the absence of prior experience seems to be an obvious indicator to the clinician to allow more time for educating the patient and providing follow-up care, the fact that a patient has had past experience may bode both positive and negative warnings. Thus, past experience alone may not be a highly predictive indicator of future satisfaction. However, changes in oral conditions, in patient expectations, or in the patient–dentist relationship could result in an unsatisfactory outcome even in those with a positive past dental history. In those who were dissatisfied with a previous removable denture, it is not always possible to determine the true cause of failure and whether it can be avoided in the future.

Educational level correlated significantly with patients' satisfaction. Indeed, it was the only patient factor in this study that positively affected the patient's attitude towards their denture.

Table 5. Rate of satisfaction of patients with removable dentures by denture experience.

	Denture Experience (years)	
	1 (n=45)	<1 (n=22)
Overall satisfaction	69.8%	76.7%
Note: Chi square (Π^2) = 1.408 (p=0.704)		

Table 6. Patient satisfaction with removable dentures by patient age.

	Age of Patients (years)		
	30–45(n=9)	46–60 (n=42)	61–90 (n=16)
Overall satisfaction	77.8%	76.2%	56.3%
Note: Chi-square (Π^2) = 2.46 (p=0.292)			

Table 7. Rate of satisfaction of patients with removable dentures by patients' educational level.

	Educational Level		
	Illiterate (n=27)	Less Than High School (n=25)	More Than High School (n=15)
Overall satisfaction	70%	68%	93%
Note: Chi square (Π^2) = 4.638 (p=0.09)			

Table 8. Correlation between satisfaction with new dentures and independent variables, using Pearson's correlation coefficient.

Variable	r
Denture experience	0.081 (p=0.528)
Age	–0.145 (p=242)
Educational level	0.281 (p<0.05)
Denture quality	0.598 (p<0001)

In an authoritative discussion of dental practice, Bader and Shugars[36] stated the "quality of a service was defined more by its technical perfection than its success in resolving the patient's problem." Insofar as this statement appears to draw a distinction between patient needs and technical excellence, it fails to connect the interplay that might exist between the two. The present finding of a significant association between technical qualities, as assessed through the CDA system, and patient satisfaction confirms the relevance of technical quality to subjectively perceived outcome. As such, it refutes the view that, in evaluating quality of service, technical quality and satisfaction are mutually exclusive. Indeed, research has shown clear associations between health-related quality of life measures and clinical oral indicators.[37]

Furthermore, the present findings are noteworthy in view of the general observation that the disparity in patient and provider judgments of treatment quality increases when patient satisfaction is low. However, this finding may be explained by the fact evaluation of treatment quality was not independently performed.

Despite the generally significant relationship between patient satisfaction and quality of dentures, one should not ignore the small number of patients who did not conform to such a relationship. Those patients who were not satisfied with objectively rated acceptable dentures may represent the most difficult patients to treat. The reason for their dissatisfaction could be explained by poor adaptative abilities and/or psychological reasons. Conversely, patients who are satisfied with unacceptable dentures are regarded as having better adaptative and tolerance levels.

The validity of the satisfaction measure warrants discussion since it relies on questionnaire data. However, the credibility of the main result is strengthened by the fact the result was stable through various questions (for example, there is significant association between the first question regarding general attitude and the mean of the answers "Chi-square=23.470, $p<0.01$"). Another obvious weakness of the present study is, of course, the small size of the sample, which makes generalization of the findings unreliable. Nevertheless, the design of the study was not intended to retain representativity but rather to ensure maximum contrast. The issue of the relation between patient satisfaction and technical quality of the treatment at various levels of these parameters thus remains far from resolved and should be the subject of future studies. Whether patient dissatisfaction is directly caused by a perception that inadequacies of the prosthetic appliance are giving rise to their maladaptation remains to be investigated. In other words, factors may depend on the psychological profile of the patient. An alternative explanation is communication might have been better between the dentist and the patient with good technical quality that led to improved satisfaction. Settling of this issue would require more intricate studies using observations of the patient–provider situation.

Conclusions

In conclusion, the present results underscore the importance of high technical quality as a cornerstone of prosthetic dentistry, and particularly so insofar as patient satisfaction and quality of life are concerned. Further support for this conclusion was obtained by way of the large number of patients who expressed their great satisfaction with their treatment during the questionnaire and interview session. They claimed treatment had influenced their quality of life in a positive way, and while this is clearly qualitative, it reinforces the view that prosthodontic rehabilitation has the potential to positively impact patients' quality of life.

Clinical Significance

Achieving patients' satisfaction after the delivery of removable denture is a challenging task in clinical prosthodontics. Improving the quality of removable dentures will improve but not ensure patient satisfaction. The patients' acceptance of removable dentures is related to several unknown factors and cannot be fully predicted from quality standards of those dentures.

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