

The Influence of Kennedy's Classification, Partial Denture Material and Construction on Patients' Satisfaction

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Summary

The aim of the study was to evaluate patients' general satisfaction with their removable partial dentures of different classification, construction, material, denture base shape (major connectors), denture support and the number of missing teeth. The aim was also to evaluate patients' satisfaction with denture retention, speech, aesthetics, chewing ability and the comfort of wearing dentures, depending on the construction. A total of 165 patients with partial dentures took part in this study. There were 59 males and 106 females aged from 38 to 87 years. Patients graded satisfaction with their partial dentures in total and also with aesthetics, speech and retention, chewing ability and the comfort of wearing dentures by means of a scale from 1 to 5. The dentist determined Kennedy classification and their modifications, material and denture support, denture base shape and the number of missing teeth. The dentist also evaluated the denture construction. On the basis of the statistical analysis the following conclusions were made: 1. Patients were on the whole satisfied with their partial dentures (distribution of the scores of the patients' assessments was asymmetrical towards the highest scores in all examined categories). 2. Kennedy classification and their modifications, material, denture base shape and denture support do not have an influence on patients' satisfaction with denture retention, speech, mastication, aesthetics and comfort of wearing dentures ($p > 0.05$). 3. The number of lower missing teeth influence the comfort of wearing lower dentures ($p < 0.05$). 4. Construction of lower dentures have an influence on patients' satisfaction with speech with lower partial denture ($p < 0.05$).

Key words: patients' satisfaction, partial denture construction, partial denture classification

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Introduction

Patients' satisfaction with their partial dentures is an important component of the quality of care. For some patients, satisfaction with dentures relates primarily to comfort and ability to masticate with their dentures (1). For the others, aesthetics and retention also seem to be important (2).

According to the results of Frank's studies, the most frequent areas of dissatisfaction were as follows: fit (33.6%), eating-chewing (29.5%), natural tooth problems (26.3%), overall perception (26.2%), oral cleanliness (20.4%), speech (17.9%), appearance (17.8%), denture cleanliness (15.3%) and odor (13.2%) (11, 12).

However, the influence of patients' personality, patients' attitude towards the dentures and patients' motivation for wearing dentures are very important factors. Usually, patients with good motivation adhere to the rules necessary for successful denture wearing more easily.

Patients' attitude and expectations towards the dentures are correlated with satisfaction. This improves later adjustment to the new dentures, regardless of oral conditions (5).

The most common reasons for patients' dissatisfaction with partial dentures are the condition, number and alignment of the abutment teeth, gingival, periodontal and mucosa tissue health, type of construction and denture support, material and denture base shape (type of major connectors).

Dentists consider dentures to be successful when they meet certain technical standards (6), whereas the patients evaluate them from the viewpoint of their personal satisfaction (7,8).

Success of removable denture treatment, however, is often judged differently by dentists and patients (9).

Patients evaluate partial dentures personally, and thus measurement of patients' satisfaction is difficult.

Although several verbal and non-verbal scales have been developed to assess patients' pain or discomfort, there is no established standard scale that quantifies patients' subjective feelings. The visual analogue scale has recently been used to

measure feelings such as discomfort in patients with various prosthodontic treatments (10-12).

Dentists evaluate partial dentures objectively. Partial denture therapy success is based upon evaluation of retention, stabilization and aesthetics (6, 13,14), construction, type of material and denture support on the remaining teeth.

When planning treatment for partially edentulous patients, the dentist is confronted with a myriad of combinations of edentulous spaces and remaining teeth. In making the framework design, the dentist must consider the patient's comfort, aesthetics, biomechanics of the prosthesis, and prognosis of the abutments (15).

Proper evaluation of the actual dental and periodontal situation, periodontal treatment, maintenance of good oral hygiene, and regular postinsertion controls are also of major importance in minimizing the problems associated with wearing removable partial dentures, such as caries, progression of periodontal disease, and residual ridge resorption (16).

The main disadvantage of removable partial dentures is the risk of local damage to the remaining teeth and their supporting tissues, mainly as a result of increased plaque accumulation, caries, periodontal disease, and resorption of the residual ridge supporting the partial denture (17-19), which also have a great impact on the patients satisfaction with their partial dentures.

The aim of the study was to evaluate patients' satisfaction with their removable partial dentures of different classification, construction, material, denture base shape, denture support and the number of missing teeth. The aim was also to evaluate patients' satisfaction with denture retention, speech, aesthetics, chewing ability and the comfort of wearing dentures, depending on the construction, material and classification.

Subjects and methods

A total of 165 patients with partial upper, lower or upper and lower dentures took part in this study. One hundred and ten patients were examined in the Department of Removable Prosthodontics, School

of Dental Medicine, and 55 patients were examined in the Geriatric Institution "Trešnjevka", Zagreb.

The study included 59 males and 105 females. Patients were aged from 38 to 87 years. A questionnaire was devised for the purpose of the study, divided into two parts and completed by the patients and the dentist. In the first part patients graded their dentures, depending on the level of satisfaction with their partial dentures. They first graded their dentures in total and then graded them separately with regard to retention, aesthetics, speech, mastication and comfort of wearing dentures. Patients graded their dentures by using a scale from 1 to 5, as it common in our society and used in all schools and Universities.

In the second part the dentist determined Kennedy classification and their modifications (exempting cases with very long saddles), material (metal/ acrylic) and denture support, upper denture base shape (palatal plate-type/ U-shaped/ single palatal bar/ anterior and posterior palatal bar type), lower denture base shape (linguoplate/ half-pear-shaped lingual bar) and the number of missing teeth (three groups: 1. from 1 to 5 teeth missing, 2. from 6 to 10 teeth missing and 3. more than 10 teeth missing). The dentist also evaluated the denture construction by using a scale from 1 to 5.

Statistical analysis was made by using the statistical software SPSS 3.0 for Windows with the following methods:

- a) Distribution of frequencies for testing variables.
- b) Mean, standard deviation, median, mode.
- c) Testing the normality of distribution by one-way Kolmogorov-Smirnov test.
- d) Testing the significance of the differences between different variables by the Kruskal-Wallis test.

Results

Diagrams of the frequencies for the variables assessed by the patients (scale from 1 to 5), depending on how satisfied they had been with their partial dentures are shown in Figure 1. Patients assessed the following variables: their general satisfaction with upper and/or lower partial denture(s), satisfaction

with the aesthetic appearance of their dentures, satisfaction with speech, mastication and the comfort of wearing their partial dentures. With regard to comfort assessment, if patients had any problems with their dentures, they were assessed from 1 to 5, where 5 indicated the greatest problems (Figure 1). For all of the assessed variables, distribution was completely asymmetrical towards the highest grades (5) with one or two small peaks in the lower grades (Figure 1), except for the comfort of wearing dentures, where values were asymmetrical towards the lowest grades (Figure 1). From the distributions of the patients' evaluation of their partial dentures obvious by the great majority of the patients are really satisfied with their dentures. More than half of the patients assessed all the variables describing their satisfaction with their partial dentures as the highest grade (grade 5) (Figure 1). For general satisfaction with the partial denture, 74% of the patients gave the highest grade (5) for the upper and 76.2% for the lower partial denture (Figure 1). For retention of the upper partial dentures 64.6% of the patients gave the highest grades (5) and for retention of the lower partial dentures 60.8% of the patients gave the highest grades, while 75.2% of the patients assessed their speech with the upper partial denture as the highest grade and 67.7% of the patients assessed the in speech with the lower partial denture as the best highest (Figure 1). Grade five was given for mastication with the upper partial denture by 63.7% of the patients and for mastication with the lower partial denture by 51.5% of the patients. The highest percentage of the patients had no problem at all with the comfort of wearing the upper (89.5%) or lower (76.2%) partial denture (Figure 1).

Histograms of the frequencies, as well as standard deviations (SD), modes and medians for partial denture construction (scale 1-5) assessed by the dentist are shown in Table 1, as well as determination of Kennedy classification, number of missing teeth in the upper and /or lower jaw (divided in to 3 groups), type of denture material and support and denture base shape.

The most frequent Kennedy Class was Class I (56% of upper and 74% of lower removable partial dentures), followed Class II (30% of upper and 19% of lower removable partial dentures), while the lowest percentage of partial dentures were of Class III

(10%). Considering Kennedy Classification subdivisions, the most frequent was subdivision 1 (70%), followed by subdivision 2 (20%), while the lowest percentage of partial dentures were of subdivision 3 (7%). Subdivision 4 was not found.

With regard to the number of missing teeth in the upper and/or lower jaw (divided in to 3 groups), most of the patients were in group 3 (more than 10 missing teeth) (60%).

In the upper jaw, the most frequent was a palatal plate-type (44%) denture base, while U-shaped connectors and single palatal bars occurred in the same percentage (27,4%).

The lowest frequency (0.9%) was for the upper anterior and posterior palatal bar type partial dentures.

In the lower jaw 64.6% were linguoplate types, and 35.4% half pear shaped lingual bars.

Seventy percentage of the partial dentures were tooth supported.

The dentist evaluated the denture construction by using a scale from 1 to 5, and scores 4 and 5 were present in the same percentage (41%), while score 3 appeared in 18.4% (Table 1).

Normality of the distribution for the assessed variables was tested by the one-way Kolmogorov-Smirnov test, which indicated out that all of the assessed variables differed from the normal distribution ($p < 0.05$), which shows that with 95% reliability, it could be concluded that distribution of the assessed variables were different from the normal distribution described by Gauss.

As the assessed parameters did not have normal distribution, non-parametric statistical test had to be applied for further analysis, i.e. Kruskal-Wallis test, which is the same as the one-way analysis of variance in the parametric statistics. Kruskal-Wallis test compares categories of ranks for testing the significance of the differences.

Kruskal-Wallis test was used to determine if any significant difference exists between the examined variables. In Table 2 the variables and their ranks with significant differences are listed ($p < 0.05$), while variables which had not showed any statistically significant difference are only mentioned in the further text ($p > 0.05$).

According to the number of missing teeth in the lower jaw, Kruskal-Wallis test revealed that there was significant difference between the number of missing teeth ($p < 0.05$) (Table 1), indicating that patients with a greater number of missing teeth had more problems with denture comfort.

Statistically significant difference also existed between the ability of speech with a lower partial denture and the dentist's evaluation of construction, which shows that the dentures with lower construction scores (given by the dentist) also had lower scores for ability of speech (given by the patient) ($p < 0.05$) (Table 2).

There was no significant difference between the denture base shape and the patients general satisfaction or patients' satisfaction with retention, chewing, speech, aesthetics and comfort ($p > 0.05$). There was also no significant differences for Kennedy classification and subdivisions, type of material, denture support of the upper and lower partial dentures and patient's satisfaction with their partial removable dentures ($p > 0.05$).

Discussion

There are many factors which depend on the patient, as well as on the therapist which can influence patients' satisfaction with their partial removable dentures (1). Apart from psychologic factors, other factors that depend on the patient are as follows: quality of the denture bearing area, quality of oral mucosa, influence of surrounding muscles on denture flanges, viscosity of saliva, patient's age and ability to get used to thea denture, state of abutments, state of other teeth in the mouth, relation between the horizontal and vertical dimension of occlusion, hygiene habits, diet, of chronic diseases, position of patient's teeth in the mouth, quality of a fixed prosthodontic appliance, etc. (3,4).

Denture quality depends on the knowledge and skill of the therapist and technician (7).

From the results of this study, it is clear that the distribution of patients' assessment of their partial dentures (on a scale from 1 to 5) are completely asymmetrical towards the highest scores (grades), i.e. the most of the patients (more than 60%) gave the highest grades to their dentures (Figure 1). This

indicates that the most of the patients are completely satisfied with their partial dentures.

None of the factors, such as the Kennedy classification, denture base shape, type of material or the denture support, were statistically related to the patient's satisfaction in general, satisfaction with mastication, speech, aesthetics or retention ($p>0.05$).

Although it was assumed that the patients with a metal construction, tooth supported dentures and anterior and posterior palatal bar connectors would be more satisfied, this was not confirmed by the results. If the highest percentage of scores 4 and 5 for the construction are considered (given by the dentist) (Table 1), then this indicates that the correct indication was set for almost all the patients. If it was possible to make the tooth-supported denture and metal construction denture then it was done, and where it was impossible, a larger acrylic denture base, or mucosa-supported denture was made. An adequate construction was made for almost all the patients, therefore there was no differences between their satisfaction.

According to the results of this study statistically significant difference ($p<0.05$) was found between the patients' evaluation of lower denture comfort and the number of missing teeth in the lower jaw. It shows that the patients with a greater number of missing teeth in the lower jaw (group 3- more than 10 missing teeth) had more uncomfortable dentures (scores 4 or 5 given by patients) in comparison with patients with less missing teeth.

There is also statistically significant difference between the patients' grades for speech and the dentists' valuation of the lower denture construction ($p<0.05$) (Table 2). In the denture constructions with lower dentist's scores patients were also less satisfied with speech with their partial dentures (Table 2).

Conclusions

From the statistical analysis the following conclusions were made:

1. Patients were mostly satisfied with their partial dentures (distribution of the scores of the patients' assessments was asymmetrical towards the highest scores in all examined categories).
2. Kennedy classification, material, denture base shape and denture support do not have an influence on patients' satisfaction with denture retention, speech, mastication, aesthetics and comfort of wearing dentures ($p>0.05$).
3. The number of lower missing teeth have an effect on comfort of wearing lower dentures ($p<0.05$), more teeth missing, more problems with comfort.
4. Construction of the lower denture has an influence on patients' satisfaction with speech with lower partial denture ($p<0.05$).