Journal of Oral Rehabilitation

Journal of Oral Rehabilitation 2009 **36**; 909–915

Discriminant analysis of patients' reasons for choosing or refusing treatments for partial edentulism

C. R. LELES*, R. R. MARTINS*, E. T. SILVA* & M. F. NUNES† *Departments of *Prevention and Oral Rehabilitation and †Stomatological Sciences, School of Dentistry, Federal University of Goias, Goiania, Goias, Brazil*

SUMMARY The aim of the study was to explore partially edentulous patients' reasons for choosing or refusing prosthodontic treatment with removable partial dentures (RPD), fixed partial dentures (FPD) and implant partial dentures (IPD). Clinical and oral health-related quality of life measures were collected from 165 partially edentulous patients undergoing treatment. Patients' preferences were recorded and reasons for choosing or refusing treatments were measured with 32 questions using a five-point Likert scale. Descriptive statistics, chi-square and multiple logistic regression were used to compare patients' preferences according to clinical variables. Discriminant analysis was used to examine the impact of each reason for a patient's decision to choose or refuse treatment options. Results showed that older patients ($P < 0{\cdot}001$) and with greater oral-related quality of life impacts ($P < 0{\cdot}05$) were more likely to choose RPD. IPD were preferred by patients with higher education levels ($P < 0{\cdot}01$). Discriminant functions revealed that the desire to have a fixed or removable denture had great impact on preferences. Removal of tooth structure was the main reason for refusing FPD and financial cost had a great impact on refusing IPD. Overall agreement between observed patients' decisions and those predicted by the discriminant function was >90% for all treatments. Reasons vary greatly among patients, and the role of individual perception of potential reasons for treatment selection was the most important determinants of patients' decisions. The main reasons for choosing or refusing treatments focused in this study can be used to guide shared decision-making, providing treatments that better match patients' expectations and desires.

KEYWORDS: partial denture, decision-making, patient acceptance of health care

Accepted for publication 4 October 2009

Introduction

The importance of assessing edentulous patients' opinions and preferences about the assignment of treatment during the clinical decision-making process in prosthodontics is well-documented in clinical trials (1–3). Active participation of the patient in shared clinical decisions has been considered to have a strong influence on treatment outcomes, patient satisfaction and cost-effectiveness of the intervention (1, 4–6).

Providing information and helping patients participate in the decision about treatment are essential parts of dentists' communication skills (7), which frequently is unrelated to patients' information-seeking behaviour and their participation in the decision-making process (8). As a consequence, problems during the dental encounter may arise because of differences about the needs and options for treatment between dentists and patients (9–11).

The theoretical concept of entire process of prosthodontic care, proposed by Narby *et al.* (5, 6), suggests barriers or 'gatekeepers' between need and demand (impact on quality of life, level of dental anxiety, perception of need, financial concerns, lack of access, health beliefs and social structure) and between demand and utilization of dental treatment (factors associated to health service availability, socio-economic background, costs and insurance system). An another

doi: 10.1111/j.1365-2842.2009.02018.x

important determinant of treatment decisions is the patient's individual preferences, which is regulated by subjective factors such as personal views, previous experiences, attitudes and beliefs about prosthodontics (12). The reasons for opting for types of prosthodontics are as diverse as the treatment options themselves. For some patients, it is purely a personal decision while for others cultural and social considerations may play a part.

Patients' reasons for choosing or refusing implant-retained dentures were explored by Walton and MacEntee (3) in a prospective clinical setting. They found that when cost was removed as a factor, 36% refused osseointegrated implants for retention of mandibular dentures. Functional limitation and concerns about appearance were considered the most important predictors of choosing an implant treatment. However, little is known about how and why partially edentulous patients make choices between treatment options and how clinicians could better predict assignment of treatments and make recommendations to guide a patient's decision. This study therefore sought to explore patients' preferences and identify predictors and reasons that help distinguish between those who choose or reject different types of prosthodontic treatments.

Materials and methods

A cross-sectional study was designed, selecting a convenience sample of 209 consecutive patients with prosthodontic needs assigned for treatment at the School of Dentistry of the Federal University of Goias, Brazil during a 2-month period between October and November 2007. For participation in the study, the sole inclusion criteria was the presence of at least one untreated partially edentulous arch. Eighteen fully dentate and 25 fully edentulous patients were excluded from the study and the final sample comprised 165 subjects (79·3%). Age ranged from 18 to 71 years (mean ± SD = 44·5 ± 11·1), and 69·1% were female. The study protocol was approved by the University ethical review committee, and all patients gave written informed consent for their participation.

Clinical data were collected, including position and location of edentulous spaces, previous prosthodontics treatment and age at first tooth loss. The impact of oral condition on quality of life was assessed by the Brazilian version of the short-form Oral Health Impact Profile (OHIP-14) (13). Socio-demographic variables such as marital status, educational level and individual and family income were also assessed.

Preferences and reasons to opt for treatments were assessed by a two-part questionnaire. Before application, the purposes of the study were explained and all patients attended a lecture focused on prosthodontic alternatives for partial edentulism. Additionally, patients received printed charts illustrating treatment modalities and acrylic resin replicas of edentulous arches with restored spaces to better visualize the possibilities of treatment and to provide equivalent baseline information for all patients. Six parameters for comparative analysis of patients were provided for each treatment: need for surgical procedures, time to complete treatment procedures, relative cost, complexity of treatment, need for dental preparation and removability. If the patient had any doubts or questions about treatments, they were impartially answered by the examiner.

In the first part of the questionnaire, patients were asked to rank in order of preference four treatment approaches for partial edentulism: removable partial denture (RPD), teeth-supported fixed partial dentures (FPD), implant-supported partial dentures (IPD) and no treatment (NT). These options were ranked in order of preferred treatment option for each partially edentulous arch. The extremes were presumed as the 'chosen' treatment (which they certainly would prefer) and the 'refused' treatment (which they certainly would want to avoid). Choosing or refusing a specific treatment option was considered the dichotomous dependent variable for purposes of applying the discriminant analysis.

In the second part, patients were asked to rate the importance of various potential reasons for explaining the options stated in the previous question. Items were based on a previous study about potential outcomes of prosthodontic treatment (14). Original items were examined by a panel of three experienced prosthodontists with clinical expertise and rearranged and/or grouped, resulting in a 32-item survey. The final questionnaire was tested on a sample of patients excluded from the sample study to confirm the clarity and comprehension of the questions. Responses were rated on an ordinal five-point Likert scale ranging from 1 (not important at all) to 5 (extremely important).

Descriptive analysis was used to measure frequencies. Chi-square tests and multiple logistic regression were used to compare treatment preferences and test the

association between choosing/refusing treatments and independent variables (clinical, socio-demographic and oral health-related quality of life measures). Discriminant analysis was used to characterize the relationship between the choosing/refusing variable (dependent variable) and several numerical or ordinal variables simultaneously – the reasons for patients' treatment decisions (independent variables). The impact of choosing/refusing a treatment for each of the reasons was determined by finding linear combinations of the potential predictors that provide the best discrimination between the groups that choose or refuse a treatment. The final analysis provided information about which variables had the greatest contribution in discriminating between the two groups, and finally, the discriminant model was validated by checking the percentage of group cases correctly classified after cross-tabulation of actual and predicted group membership provided by the discriminant function. SPSS 16.0* for Windows was used for data analysis.

Results

Table 1 contains the results of the preference options among treatments for the maxillary and mandibular arches separately. Only three (1·8%) and seven (4·2%) patients chose NT as their preferred option for maxilla and mandible, respectively. Because of the low frequency, the NT group was excluded from comparative analysis with the other treatments. No statistically significant difference was found for choosing or refusing RPD, FPD and IPD treatment for comparison between maxilla and mandible ($P > 0·05$). When each arch was considered separately, choosing an RPD was significantly more prevalent for mandible ($P = 0·007$) while refusing IPD was fairly common for both maxilla and mandible (Table 1).

Regression analysis revealed that greater oral health-related quality of life impacts (higher OHIP-14 scores) and advanced age were associated with patients who chose an RPD as their preferred treatment ($P < 0·05$ and $P < 0·001$, respectively). Higher educational level and lower age were associated with choosing IPD ($P < 0·01$). Although significantly associated with treatment options, the size of the variation in the response variable explained by the regression model was relatively low ($R^2 \leq 0·16$).

*SPSS Inc., Chicago, IL, USA.

Table 1. Frequency table of choosing/refusing treatments for maxilla and mandible

	Maxilla		Mandible		
	Chosen	Refused	Chosen	Refused	*P*-value*
Removable partial denture	45	37	62	44	0·620
Fixed partial dentures	33	37	30	50	0·233
Implant partial denture	48	67	56	78	0·993
P-value*	0·191		0·007		

*Chi-square test.

Figure 1 shows the mean and 95% confidence interval of the importance given by patients to all 32 items regarding reasons for choosing or refusing prosthodontic treatments. A broad range of reasons were included. Cost was by far the most important reason for choosing or refusing treatment and pre-occupation with general health was considered by patients the least important reason.

Discriminant analysis parameters for each prosthodontic treatment (Table 2) provide information about the relative efficacy of each discriminant function (Eigenvalue). The eigenvalue is the ratio of the between-groups sum of squares to the within-groups sum of squares, and the large eigenvalues correspond to the eigenvector in the direction of the maximum spread of the groups means, accounting for great part of the total dispersion. The canonical correlation measure of the association between the discriminant scores and the groups (choosing or refusing), which were reasonably high (≥0·80) indicating that the models are likely to have some predictive ability. The parameters also show the proportion of the total variance in the discriminant scores not explained by differences among the groups (Wilks' lambda). Values close to 0 indicate the group means are different. A chi-square transformation of Wilks' lambda is used along with the degrees of freedom to determine significance, and the *P*-value is the result of testing the hypothesis that the means of the two groups on the discriminant functions are equal. The observed *P*-values (<0·001) indicate that the null hypothesis can be rejected and conclude that the means differ i.e. the predictors have a significant discriminatory ability. In conclusion, Table 2 shows that for each prosthodontic

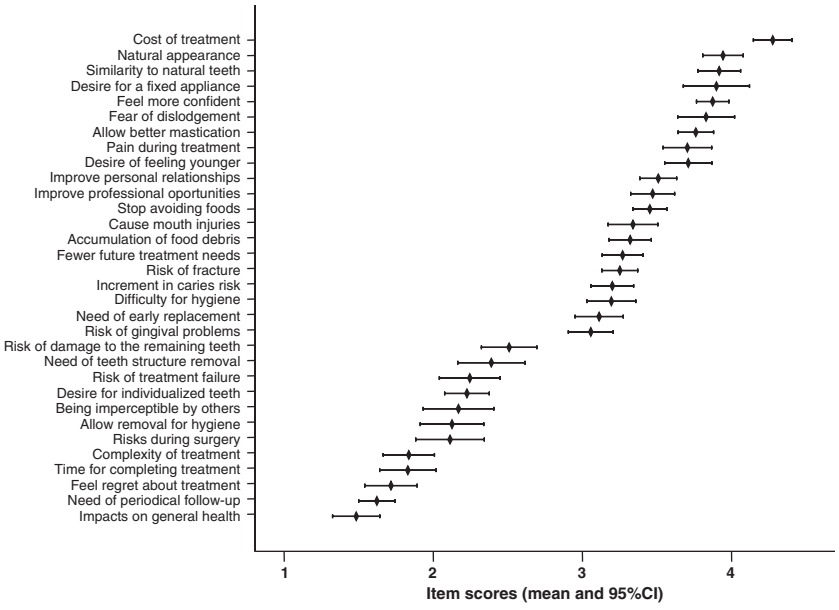

Fig. 1. Mean score and 95% confidence interval of the importance of reasons for choosing/refusing prosthodontic treatments.

treatment in both the maxillary and mandibular arches, the perceived importance of the 32 items has the ability to predict a patient's decision for choosing or refusing treatments.

Standardized discriminant function coefficients were estimated for each of the 32 items (predictor variables), measuring the relative contribution of the variable to the overall discrimination and indicating which items have the highest contributory ability to decrease or increase the likelihood of choosing or refusing treatments. The pooled within-group correlations between the predictor variables and the standardized functions originate a discriminat analysis structured matrix, ordered by the absolute size of the correlation within function, as described in Table 3. The structure matrix contains within-group correlations of each predictor variable with the canonical function. This matrix provides another way to study the usefulness of each variable in the discriminant function. In other words, the discriminant coefficients in Table 3 classify variables with a higher impact for either choosing or refusing groups. Only coefficients ≤0·20 were exhibited (in descending order), except for choosing an FPD.

Table 2. Overall results of the discriminant models for choosing/refusing removable partial dentures (RPD), teeth-supported fixed partial dentures (FPD) and implant-supported partial dentures (IPD), for maxilla and mandible

	Eigenvalue	Canonical correlation	Wilks' Lamba	*P*-value
RPD				
Maxilla	2·60	0·85	0·28	<0·001
Mandible	1·95	0·81	0·34	<0·001
FPD				
Maxilla	4·17	0·90	0·19	<0·001
Mandible	3·26	0·88	0·23	<0·001
IPD				
Maxilla	1·73	0·81	0·35	<0·001
Mandible	1·66	0·80	0·37	<0·001

The greatest impact for choosing an RPD was removability. Other relevant reasons included low cost, less complexity and time of treatment. The most common reason for refusing an RPD was a desire for a fixed prosthesis, followed by natural appearance, individualized teeth, being imperceptible by others, fear of dislodgement, risk of caries and gingival problems.

The desire for a fixed prosthesis was the only reason that impacted choosing FPD. Refusing was associated with the need for removal of tooth structure, fear of negative effect on remaining teeth and hygiene difficulties.

Choosing an IPD was impacted by the desire for individualized teeth and a fixed prosthesis. Cost, desire for removability, complexity, time of treatment and risk

Table 3. Predictive variables and structure matrix of the discriminant function for choosing or refusing prosthodontic treatments, ordered by absolute size of correlation within function

	Structure matrix	
Predictive variables	Maxilla	Mandible
Removable partial dentures		
Choosing		
Removability	0·580	0·577
Cost	0·299	0·330
Complexity	0·244	0·250
Time of treatment	0·216	0·205
Refusing		
Desire for a fixed appliance	−0·514	−0·508
Desire for a natural appearance	−0·270	−0·242
Desire for individualized teeth	−0·262	−0·330
Being imperceptible by others	−0·258	−0·242
Fear of dislodgement during speech or chewing	−0·236	−0·224
Risk of caries	−0·222	−0·216
Similarity to natural teeth	−0·208	−0·198
Risk of gingival problems	−0·207	−0·248
Fixed partial dentures		
Choosing		
Desire for a fixed appliance	0·198	−0·173
Refusing		
Need of teeth structure removal	−0·619	0·548
Negative effect on remaining teeth	−0·323	0·276
Difficulty for hygiene	−0·204	0·242
Implant fixed dentures		
Choosing		
Desire for individualized teeth	−0·298	−0·274
Desire for a fixed appliance	−0·227	−0·233
Refusing		
Cost	0·564	0·503
Removability	0·326	0·324
Complexity	0·306	0·334
Time of treatment	0·285	0·298
Risk of surgery problems	0·273	0·303

of problems during surgery procedures were the variables that predicted refusing an IPD.

Table 4 presents the cross-tabulation of the original and predicted group memberships, representing how well the discriminant function classified cases into the categories choosing or refusing categories. The cases on the diagonal represent those that have been correctly classified, for choosing/refusing an upper or lower RPD, FPD and IPD. The total percentage correctly classified ranged from 90·7% to 94·8%, indicating that the presented reasons for choosing or refusing prosthodontic treatment options were clinically relevant.

Table 4. Overall agreement of the discriminant models after cross-tabulation of original group membership and predicted group membership

		Predicted (%)			
	Original (%)	Choosing	Refusing	Total	Overall agreement (%)
Upper RPD	Chosen	40 (88·9)	5 (11·1)	45	93·8
	Refused	0 (0)	35 (100)	35	
Lower RPD	Chosen	52 (88·1)	7 (11·9)	59	92·1
	Refused	1 (2·4)	41 (97·6)	42	
Upper FPD	Chosen	32 (97·0)	1 (3)	33	94·2
	Refused	3 (8·3)	33 (91·7)	36	
Lower FPD	Chosen	29 (96·7)	1 (3·3)	30	94·8
	Refused	3 (6·4)	44 (93·6)	47	
Upper IPD	Chosen	44 (93·6)	3 (6·4)	47	93·0
	Refused	5 (7·5)	62 (92·5)	67	
Lower IPD	Chosen	50 (94·3)	3 (5·7)	53	90·7
	Refused	9 (11·8)	67 (88·2)	76	

RPD, removable partial dentures; IPD, implant partial dentures; FPD, fixed partial dentures.

Discussion

Treatment options should be proposed on an individual basis, with shared decision-making between patients and clinicians. Patients' active role in prosthodontic treatment decision-making is important to achieve successful outcomes (1, 5) by making their expectations more realistic and reducing the anxiety and disappointment associated with treatment (1, 15). Fromentim and Boy-Lefevre (16) showed that the level of patient satisfaction after completion of prosthetic treatment is high, but tends to decrease when compared with expectations and attitudes before treatment. According to Schouten *et al.* (17), patients believe it is important to decide whether or not to undergo treatment. Although it is an important facet of the decision-making process, few studies have investigated patients' reasons for choosing or refusing a particular prosthodontic treatment modality (2).

Clinical and socio-demographic features associated with oral-specific health status measures help to identify the degree of impairment, disability and handicap experienced by edentulous patients (18). Such information may be useful in identification of patients most likely to benefit from prosthodontic treatment. In this study, few patients chose NT, which may be the result of their search for treatment in a School of Dentistry. The fairly common refusing an IPD is likely related to the low

socio-economic status and education levels of participants. Awad *et al.* (2) also found a significant association between higher education levels and a preference for implant therapy, suggesting that well-educated patients might tend to be more knowledgeable about the cost/benefit ratio attributed to each treatment modality. Corroborating our findings, Frank *et al.* (19) reported that dissatisfaction with RPD was higher in younger patients and Knezović-Zlatarić *et al.* (20) showed that an RPD was the preferred option for the mandible. They also found that patients' level of education was inversely correlated with self-assessment of their RPD aesthetics and hygiene and that more missing mandibular teeth led to greater reports of problems with comfort of the mandibular RPD. They also observed no significant difference in the patients' assessments of the quality of their RPDs between different age groups, social and economic status, marital status, smoking habits, presence of chronic diseases, number of previous RPDs and the period of use of the RPD (20).

A patient's personality, prior experience with dentures, motivation for wearing a denture, as well as comfort, retention, masticatory efficiency and denture aesthetics have all been associated with patient satisfaction with prosthodontic treatment (16, 19, 21–23). For RPD, the following factors were related to patient dissatisfaction: number and alignment of abutment teeth (24, 25), periodontal health status (26), method of denture construction (19, 24), materials used and types of major connectors (19, 24) and masticatory, speech and appearance problems (21, 27). The most common reasons for refusing RPD in this study were a desire for a fixed prosthesis, natural appearance, individualized teeth, being imperceptible by others, unsatisfactory retention and risk of caries and gingival problems.

In contrast, choosing an FPD or an IPD was associated with a desire for a fixed prosthesis. A fixed restoration may result in higher psychological benefits when a removable prosthesis does not improve negative feelings experienced by edentulous patients (4). Tan *et al.* (28) reported a high rate of satisfaction among patients with FPD, especially with appearance, comfort in chewing and speech. They found that 35% of patients reported bleeding when cleaning, but 74% identified this as a small problem or not a problem at all. Our results showed that hygiene difficulties were one reason for refusing an FPD. However, the main reason for refusing an FPD was biological cost associated with removal of teeth structure.

Conventional dentures can be effective in improving the oral health-related quality of life for the majority of patients (15, 18, 20), lessening the perceived need for implant therapy. Conversely, implant-supported prostheses may lead to the elimination of some conventional denture limitations. Walton and MacEntee (3) found that the most common reason for choosing implants was anticipation of improved mandibular denture stability or security (73%), while the most common reason for refusal was concern about surgical risks (43%). When the cost factor was removed, more than one-third (36%) of older edentulous participants refused an offer of free implants to retain their mandibular dentures. These findings corroborate our findings that complexity and the risk of surgery are problems associated with refusing an IPD.

Moreover, a desire for a fixed prosthesis and individualized teeth was associated with choosing an IPD. A significant aspect of patient satisfaction is the aesthetic level achieved after treatment. Pjetursson *et al.* (29) showed that more than 90% of patients were completely satisfied with implant therapy, while 97% were satisfied with the aesthetic appearance. The main cause that impacted refusing IPD was treatment cost. However, Pjetursson *et al.* also reported that only 3% of the participants found the costs associated with implant therapy to have been unreasonable. Furthermore, Lewis (30) found that long-term multidimensional benefits often balanced these high costs.

Clinical decisions can be improved by systematically assessing the probabilities of successful outcomes in the context of patient values. Overall agreement between the observed patients' decisions and those predicted by the discriminant function was >90% for all treatment options, showing that the presented reasons for choosing/refusing prosthodontic treatments are valid for clinical application and as a parameter for professionals to discuss and assess the most appropriate treatment for patients. Beyond technical expertise, management of these variables is fundamental for a careful treatment-planning process and may help professionals to achieve predictable treatment success.

In this study, the focus was on treatment preferences; there was no consideration of the treatments patients actually selected in a real clinical situation. The next level of this question might be how do patients' choices of treatment match the most appropriate treatment identified by the clinician.

References

1. Feine JS, Awad MA, Lund JP. The impact of patient preference on the design and interpretation of clinical trials. Community Dent Oral Epidemiol. 1998;26:70–74.
2. Awad MA, Shapiro SH, Lund JP, Feine JS. Determinants of patients' treatment preferences in a clinical trial. Community Dent Oral Epidemiol. 2000;28:119–125.
3. Walton JN, MacEntee MI. Choosing or refusing oral implants: a prospective study of edentulous volunteers for a clinical trial. Int J Prosthodont. 2005;18:483–488.
4. Rich B, Goldstein GR. New paradigms in prosthodontic treatment planning. A literature review. J Prosthet Dent. 2002;88:208–214.
5. Narby B, Kronström M, Söderfeldt B, Palmqvist S. Prosthodontics and the patient: what is oral rehabilitation need? Conceptual analysis of need and demand for prosthodontic treatment. Part 1: a conceptual analysis. Int J Prosthodont. 2005;18:75–79.
6. Narby B, Kronström M, Söderfeldt B, Palmqvist S. Prosthodontics and the patient. Part 2: need becoming demand, demand becoming utilization. Int J Prosthodont. 2007; 20:183–189.
7. Schouten BC, Eijkman MA, Hoogstraten J. Dentists' and patients' communicative behaviour and their satisfaction with the dental encounter. Community Dent Health. 2003;20:11–15.
8. Schouten BC, Hoogstraten J, Eijkman MA. Patient participation during dental consultations: the influence of patients' characteristics and dentists' behavior. Community Dent Oral Epidemiol. 2003;31:368–377.
9. Bowley J. Minimal intervention prosthodontics: current knowledge and societal implications. Med Princ Pract. 2002;11:22–31.
10. Sondell K, Palmqvist S, Söderfelt B. The dentist's communicative role in prosthodontic treatment. Int J Prosthodont. 2004;17:666–671.
11. Graham R, Mihaylov S, Jepson N, Allen P, Bond S. Determining need for removable partial denture: a qualitative study of factors that influence dentist provision and patient use. Br Dent J. 2006;200:155–158.
12. Leles CR, Freire MCM. A sociodental approach in prosthodontic treatment decision making. J Appl Oral Sci. 2004; 12:127–132.
13. Oliveira B, Nadanovsky P. Psychometric properties of the Brazilian version of the Oral Health Impact Profile-short form. Community Dent Oral Epidemiol. 2005;33:307–314.
14. Leles CR, Morandini W, Silva ET, Nunes MF, Freire MC. Assessing perceived potential outcomes of prosthodontic treatment in partial and fully edentulous patients. J Oral Rehabil. 2008;35:682–689.
15. Celebić A, Knezović-zlatarić D. A comparison of patient's satisfaction between complete and partial removable denture wearers. J Dent. 2003;31:445–451.
16. Fromentin O, Boy-Lèfevre ML. Quality of prosthetic care: patient's level of expectation, attitude and satisfaction. Eur J Prosthodont Restor Dent. 2001;9:123–129.
17. Schouten BC, Hoogstraten J, Eijkman MAJ. Dutch dental patients on informed consent: knowledge, attitudes, self-efficacy and behaviour. Patient Educ Couns. 2002;46:47–54.
18. Allen P, McMillan A, Walshaw D. A patient-based assessment of implant-stabilized and conventional complete dentures. J Prosthet Dent. 2001;85:141–147.
19. Frank RP, Brudivik JS, Leroux B, Milgrom P, Hawkins N. Relationship between the standards of removable partial denture construction, clinical acceptability, and patient satisfaction. J Prosthet Dent. 2000;83:521–527.
20. Knezović-Zlatarić D, Celebić A, Valentić-Peruzović M, Jerolimov V, Pandurić J. A survey of treatment outcomes with removable partial dentures. J Oral Rehabil. 2003;30:847–854.
21. Knezović-Zlatarić D, Celebić A. Treatment outcomes with removable partial dentures: a comparison between patient and prosthodontic assessments. Int J Prosthodont. 2001; 14:423–426.
22. Quran FA, Clifford T, Cooper C, Lamey PJ. Influence of psychological factors on the acceptance of complete dentures. Gerodontology. 2001;18:35–40.
23. Scott BJ, Leung KC, McMillan AS, Davis DM, Fiske J. A transcultural perspective on the emotional effect of tooth loss in complete denture wearers. Int J Prosthodont. 2001;14:461–465.
24. Knezović-Zlatarić D, Celebić A, Valentić-Peruzović M, Pandurić J, Celić R, Poljak-Guberina R. Influence of Kennedy classification, material and construction on patient's satisfaction with removable partial denture therapy. Acta Stomatol Croat. 2001;35:69–83.
25. Elias AC, Sheiham A. The relationship between satisfaction with mouth and number and position of teeth. J Oral Rehabil. 1998;25:649–666.
26. Knezović-Zlatarić D, Celebić A, Valentić-Peruzović M. The effect of removable partial dentures on periodontal health of abutment and non-abutment teeth. J Periodontol. 2002; 73:137–144.
27. Frank RP, Milgrom P, Leroux BG, Hawkins NR. Treatment outcomes with mandibular removable partial dentures: a population-based study of patient satisfaction. J Prosthet Dent. 1998;80:36–45.
28. Tan K, Li AZ, Chan ES. Patient satisfaction with fixed partial dentures: a 5-year retrospective study. Singapore Dent J. 2005;27:23–29.
29. Pjetursson BE, Karoussis I, Burgin W, Bragger U, lang NP. Patient's satisfaction following implant therapy. A 10-year prospective cohort study. Clin Oral Implants Res. 2005; 16:185–193.
30. Lewis DW. Optimized therapy for the edentulous predicament: cost-effectiveness considerations. J Prosthet Dent. 1998;79:93–99.

Correspondence: Cláudio R. Leles, Universidade Federal de Goiás, Faculdade de Odontologia, Primeira Avenida, número 1964, Setor Universitário, Goiânia, Goias, Brazil.
E-mail: crleles@odonto.ufg.br