# Patients' Expectations of and Satisfaction with Implant-Supported Fixed Partial Dentures and Single Crowns

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> Purpose: Patient variables and expectations may influence patients' evaluations of treatment outcomes, which are essential to the success of therapy. The main objective of this study was to compare patients' expectations before and satisfaction after receiving implant-supported fixed partial dentures (FPDs) and single crowns. A secondary objective was to evaluate other variables that may affect patient satisfaction. Materials and **Methods:** The sample comprised 52 volunteers (mean age:  $51.2 \pm 10.6$  years) who had received implant-supported FPDs (n = 25) and single crowns (n = 27). A visual analog scale (VAS) was used to assess their expectations before and satisfaction after therapy with regard to mastication, esthetics, comfort, and phonetics. Patients also completed a questionnaire concerning other variables involved in the treatment and their evaluation of their clinician's conduct. **Results:** Patient expectations before treatment were higher than satisfaction after treatment, but this difference was significant only for esthetics in patients who had received implant-supported FPDs. Negative correlations were found between satisfaction and age and between number of absent teeth and number of postdelivery adjustments, but only for implant-supported FPDs. A positive relationship was found for the majority of questions concerning patients' evaluations of clinician conduct and VAS scores. Conclusion: Patients' evaluation of clinician conduct appears to be an important factor that influences their expectations before and satisfaction after receiving implant-supported FPDs and single crowns. Int J Prosthodont 2012;25:484-490.

Dental implants have become a more accessible treatment option for individuals with various stages of edentulism.<sup>1</sup> Differing treatment conditions may result in patients receiving different types of implant prostheses, thereby creating varying expectations.<sup>2</sup> Patients' expectations influence their evaluations of the therapy outcome,<sup>3,4</sup> and this evaluation is important to the success of therapy.<sup>5</sup> Psychologic factors such as neurosis also play a role in this evaluation<sup>6</sup> and may negatively influence patient satisfaction.<sup>7</sup> However, there are few studies that compare patients' expectations before with their satisfaction after various types of implant treatments.<sup>4</sup> The need to understand the factors that influence patients' satisfaction with implant therapy has gained importance since there are studies demonstrating no correlation between the evaluation of prosthesis quality by dentists and patients' satisfaction with that prosthesis.<sup>8</sup>

Taking this into consideration, dentists should pay special attention to several factors that may influence patient satisfaction with dental implant therapies since patient/professional communication is important for achieving optimal results. Outlining the limitations of the treatment at the beginning of therapy may help patients to develop realistic expectations regarding the final outcome.<sup>9-11</sup>

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This study aimed to compare patients' expectations before and satisfaction after receiving implantsupported fixed partial dentures (FPDs) and single crowns. Other variables that may affect patient satisfaction, such as sex, age, location of the edentulous area, number of postdelivery adjustments, use of cemented or screwed prostheses, and patients' evaluations of the clinician's conduct, were also evaluated. The tested hypotheses, which were formulated based on a previous study,4 were as follows: (1) patient satisfaction after therapy would surpass their pretreatment expectations, (2) there would be no relationship between clinical variables and scores for expectation and satisfaction, and (3) there would be a relationship between patients' evaluations of clinician conduct and their satisfaction after treatment.

#### **Materials and Methods**

### **Participants**

The sample comprised 52 individuals who had received implant therapy at the clinics of the School of Dentistry, University of Vale do Paraíba, São José dos Campos, São Paulo, Brazil. This sample had an estimated power of 0.74 (Minitab) to represent the city's entire population, with a sampling error of 13%. These individuals received implant-supported single crowns or FPDs (all metal-ceramic) using a standardized technique. If patients received both treatment options, they were included in the FPD group for analysis. Nineteen participants were men (36.5%), and the mean age of the entire sample was  $51.2 \pm 10.6$  years (range: 28 to 77 years).

This study was approved by the Committee for Ethics in Research of the University of Vale do Paraíba (protocol no. H098/CEP/2009).

# Assessment of Patient Expectations Before and Satisfaction After Therapy

To assess expectations before and satisfaction after therapy, a visual analog scale (VAS) ranging from 0 to 10 was used, where 0 represented the lowest rating (worst possible outcome) and 10 the highest (best possible outcome). Initially, the numbers chosen by patients corresponded to the evaluations of their expectations before treatment. After treatment, the numbers chosen by patients corresponded to their degree of satisfaction with the outcomes. Patients assigned scores to the following four aspects both before and after treatment: esthetics, mastication, comfort of use, and phonetics.

# Assessment of Clinical and Patient-Related Variables

Clinical and patient-related variables such as sex, age, location of the edentulous area, number of postdelivery adjustments, and whether the prostheses were cemented or screwed were noted. A questionnaire was also developed to gauge patients' evaluations of clinician conduct based on previously developed questionnaires and using a Likert-type scale.<sup>12,13</sup>

#### Data Analysis

Data were tabulated and descriptive statistics were formulated. To verify possible relationships between variables, the Wilcoxon, Mann-Whitney, and Kruskal-Wallis tests were used. The Spearman correlation test was also used to determine whether there were correlations between the quantitative variables. All tests adopted a significance level of 5%.

# Results

# **Clinical Variables**

Implant-supported FPDs were placed in 48.1% (n = 25) of patients, while 51.9% (n = 27) received single crowns. The descriptions of the scores for expectations and satisfaction with regard to mastication, esthetics, phonetics, and comfort of use for both FPDs and single crowns are shown in Tables 1 and 2, respectively. Statistical differences among pre- and posttreatment scores were not found in the evaluated aspects except for esthetics in patients who received implant-supported FPDs (Wilcoxon test). There were no differences among the groups in terms of expectation and satisfaction VAS scores for esthetics (P = .375 and P = .254, respectively), mastication(P = .851 and P = .577, respectively), comfort of use(P = .842 and P = .453, respectively), or phonetics(P = .842 and P = .932, respectively) (Mann-Whitney test). Expectation and satisfaction scores with patients who had received single crowns were correlated only for phonetics (P = .004, 53.0%) and comfort of use (P = .006, 51.1%) (Spearman correlation test).

The distribution of prostheses according to location is shown in Table 3. Tables 4 and 5 present the mean VAS scores for each edentulous area for implant-supported FPDs and single crowns, respectively. In Table 4, the analysis covers patients with only posterior or posterior and anterior locations, since only one patient presented with an anterior implantsupported FPD.

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#### Table 1 VAS Scores for Patients Who Received FPDs

	Mastication		Esthetics		Phonetics	
	Pretreatment	Posttreatment	Pretreatment	Posttreatment	Pretreatment	Posttreatment
Mean	9.4	9.0	9.4	8.4	9.5	9.2
Median	10.0	10.0	10.0	9.0	10.0	10.0
Standard deviation	1.2	1.4	1.3	1.7	1.2	1.4
Ν	25	25	25	25	25	25
Confidence interval	0.5	0.5	0.5	0.7	0.5	0.6
Р	.177		.0:	27*	.2	59

VAS = visual analog scale; FPD = fixed partial denture.

\*Significant difference (Wilcoxon test).

Table 2	VAS Scores for	Patients Who	Received	Implant-	Supporte	d Single (	Crowns
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	Mastication		Esth	Esthetics		Phonetics	
_	Pretreatment	Posttreatment	Pretreatment	Posttreatment	Pretreatment	Posttreatment	
Mean	9.5	9.3	9.4	9.0	9.7	9.4	
Median	10.0	10.0	10.0	9.0	10.0	10.0	
Standard deviation	1.0	0.9	1.0	1.3	0.8	0.9	
Ν	27	27	27	27	27	27	
Confidence interval	0.4	0.3	0.4	0.5	0.3	0.3	
Ρ	.416		.163		.0	84	

VAS = visual analog scale.

# **Table 3**Distribution of Prostheses According toLocation of the Edentulous Area

	Anterior		Pos	Posterior		Both	
	n	%	n	%	n	%	
Single crowns	5	18.5	19	70.4	3	11.1	
FPDs	1	4.0	16	64.0	8	32.0	
Total	6	11.5	35	67.3	11	21.2	

FPD = fixed partial denture.

In terms of sex, the only difference noted between men and women was for esthetic expectations regarding single crowns (P = .05, Mann-Whitney test), with women presenting higher expectations (mean score: 9.6) than men (mean score: 8.9).

Most patients received cemented prostheses (57.6%), while 23% received screw-retained prostheses; 19.2% of patients received prostheses with both retention methods. Statistical differences for VAS scores among screw- and cement-retained prostheses were not found for implant-supported FPDs or single crowns (Kruskall-Wallis test).

The mean number of postdelivery adjustments was  $1.5 \pm 0.7$  (range: 0 to 3). For FPDs, a negative correlation was found between satisfaction VAS scores and

the number of postdelivery adjustments because of esthetics; the higher the number of postdelivery adjustments, the lower the satisfaction scores (Table 6). A negative correlation among satisfaction VAS scores and age for chewing and comfort of use was also found; the older the patient, the lower the satisfaction scores (Table 6). For single crowns, there was no correlation between VAS scores and number of postdelivery adjustments or age (Table 7).

A negative correlation between the number of missing teeth and esthetic scores was found for expectation (single crowns: -44.5%, P = .020) and satisfaction (FPDs: -43.4%, P = .030); the greater the number of absent teeth, the lower the expectation scores.

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Comfort of use					
Pretreatment	Posttreatment				
9.5	9.0				
10.0	10.0				
1.2	1.5				
25	25				
0.5	0.6				
.0	96				

Comfort of use					
Pretreatment	Posttreatment				
9.7	9.4				
10.0	10.0				
0.8	0.8				
27	27				
0.3	0.3				
.0	62				

Table 4	Mean VAS Scores for Patients Who Received
Implant-S	upported FPDs Based on Location of the
Edentulou	is Area

	Mean	SD	n	Р
Mastication				
Pretreatment				
Posterior	9.6	0.8	16	.125
Both*	8.8	1.8	8	
Posttreatment				
Posterior	9.0	1.3	16	.867
Both*	8.8	1.8	8	
Esthetics				
Pretreatment				
Posterior	9.7	0.7	16	.294
Both*	8.9	2.1	8	
Posttreatment				
Posterior	8.6	1.7	16	.228
Both*	7.9	1.7	8	
Phonetics				
Pretreatment				
Posterior	9.9	0.5	16	.016 <sup>†</sup>
Both*	8.8	1.8	8	
Posttreament				
Posterior	9.4	1.1	16	.188
Both*	8.5	1.9	8	
Comfort of use				
Pretreatment				
Posterior	9.9	0.5	16	.016 <sup>†</sup>
Both*	8.8	1.8	8	
Posttreatment				
Posterior	9.2	1.2	16	.312
Both*	8.4	2.0	8	

VAS = visual analog scale; SD = standard deviation.

\*Anterior and posterior locations.

<sup>†</sup>Significant difference (Mann-Whitney test).

#### Patient Evaluations of Clinician Conduct

The responses to questions 1 through 7 of the questionnaire concerning patients' evaluations of clinician conduct are shown in Table 8. For question 8 ("Which word better describes the dentists you saw?"), 61.5% answered "professional," 32.7% answered "careful," and 3.8% answered "careless." The relationship between satisfaction VAS scores and the answers to the questions was evaluated using the Kruskal-Wallis test.

For question 1, a relationship was found between phonetics (P = .027) and mastication (P = .013) for FPDs and phonetics (P = .009) and comfort of use (P = .008) for single crowns. For question 2, no statistical differences were found for patients receiving FPDs. However, for those with single crowns, relationships were found between VAS scores and mastication (P = .005), phonetics (P = .012), and comfort of use (P = .017). For question 3, relationships were found between VAS scores and mastication (P = .05) and phonetics (P = .033) for FPDs and mastication (P = .029), phonetics (P = .029), and comfort of use (P = .026) for single crowns. For question 4, relationships were found between VAS scores and mastication (P = .036) for FPDs and mastication (P = .006), phonetics (P = .002), and comfort of use (P = .003) for single crowns. For question 5, no relationships were found for FPDs, while for single crowns, relationships were found between VAS scores and mastication (P = .03), phonetics (P = .012), and comfort of use

	Mean	SD	n	Р
Mastication				
Pretreatment				
Anterior	9.2	1.1	5	.479
Posterior	9.5	1.0	19	
Both*	10.0	0.0	3	
Posttreatment				
Anterior	9.8	0.4	5	.080
Posterior	9.1	1.0	19	
Both*	10.0	0.0	3	
Esthetics				
Pretreatment				
Anterior	9.4	0.9	5	.969
Posterior	9.4	0.9	19	
Both*	9.0	1.7	3	
Posttreatment				
Anterior	8.4	1.1	5	.087
Posterior	9.1	1.3	19	
Both*	10.0	0.0	3	
Phonetics				
Pretreatment				
Anterior	9.6	0.9	5	.694
Posterior	9.6	0.8	19	
Both*	10.0	0.0	3	
Posttreatment				
Anterior	9.8	0.4	5	.127
Posterior	9.2	1.0	19	
Both*	10.0	0.0	3	
Comfort of use				
Pretreatment				
Anterior	9.6	0.9	5	.694
Posterior	9.6	0.8	19	
Both*	10.0	0.0	3	
Posttreatment				
Anterior	9.8	0.4	5	.120
Posterior	9.2	0.9	19	
Both*	10.0	0.0	3	

**Table 5**Mean VAS Scores for Patients Who ReceivedImplant-Supported Single Crowns Based on Location ofthe Edentulous Area

VAS = visual analog scale; SD = standard deviation.

\*Anterior and posterior locations.

(P = .013). For question 6, a relationship among VAS scores and phonetics (P = .004) and comfort of use (P = .014) for FPDs and mastication (P = .004), phonetics (P = .004), and comfort of use (P = .003) for single crowns was noted. None of the groups showed any statistical relationship with satisfaction VAS scores for mastication, esthetics, phonetics, or comfort of use for question 7.

### Discussion

The first tested hypothesis (patients' satisfaction after therapy would surpass pretreatment expectations) was not verified. The results indicated a greater mean expectation score when compared to satisfaction for all evaluated aspects. However, this difference was significant only for esthetics in patients who had received FPDs. These findings differ from previous observations<sup>4,6</sup> since the aspects evaluated by other studies (esthetics and function) were scored significantly higher after therapy. However, the results of these studies cannot be directly compared to those presented since Bellini et al<sup>6</sup> studied patients who had received conventional complete dentures and Baracat et al<sup>4</sup> did not evaluate implant-supported FPDs and single crowns separately but rather several types of implant-supported therapies, which may present different expectations, as observed by Smith and McCord.<sup>2</sup>

Furthermore, this study noted a statistical correlation for single crowns between expectation and satisfaction in terms of phonetics and comfort of use. This aspect was not evaluated separately in the studies of Bellini et al<sup>6</sup> and Baracat et al,<sup>4</sup> in which only esthetics and overall function were evaluated. Nevertheless, Baracat et al<sup>4</sup> observed a direct correlation between expectation and satisfaction in patients who had received different types of implant-supported rehabilitations. This result was partially supported by the present results, at least for implant therapy using single crowns.

The second hypothesis (there would be no correlation between clinical variables and expectation and satisfaction scores) was only partially verified. A statistical relationship was not found between the location of the edentulous area and VAS scores for single crowns. Similarly, there was no significant difference between groups for VAS scores. However, patients receiving implant-supported FPDs presented negative correlations between satisfaction with mastication, comfort scores, and age, as well as between satisfaction with esthetics, the number of postdelivery adjustments, and the number of absent teeth. For single crowns, a negative correlation between esthetic expectations and the number of absent teeth was verified.

It is well known that dental prosthesis satisfaction is related to the quality of the prosthesis,<sup>14</sup> demographic factors,<sup>15</sup> the patient's personality,<sup>6</sup> oral health, and other clinical variables.<sup>15,16</sup> Although the predictive variables of dental prosthesis satisfaction vary according to the type of rehabilitation, these findings are corroborated by this study since a greater number of required adjustments after delivery led

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	Age		No. of adjustme	ents
	Correlation coefficient P		Correlation coefficient	Р
Mastication				
Pretreatment	0.0%	.998	-21.2%	.309
Posttreatment	-41.1%	.041*	-37.8%	.063
Esthetics				
Pretreatment	-16.3%	.435	4.1%	.844
Posttreatment	-25.6%	.217	-45.7%	.022*
Phonetics				
Pretreatment	17.8%	.395	-24.7%	.234
Posttreatment	-15.4%	.464	-25.3%	.221
Comfort of use				
Pretreatment	17.8%	.395	-24.7%	.234
Posttreatment	-41.3%	.040*	-16.4%	.434

 Table 6
 Spearman Correlation Test for VAS Scores of FPDs Regarding Age and No. of Postdelivery Adjustments

\*Statistically significant.

 Table 7
 Spearman Correlation Test for VAS Scores of Single Crowns Regarding Age and No. of Postdelivery Adjustments

	Age		No. of adjustments		
	Correlation coefficient P		Correlation coefficient	Р	
Mastication					
Pretreatment	-26.0%	.191	-10.0%	.620	
Posttreatment	-4.6%	.819	-37.5%	.054	
Esthetics					
Pretreatment	-26.0%	.191	-19.9%	.320	
Posttreatment	32.4%	.099	-23.3%	.242	
Phonetics					
Pretreatment	-29.0%	.143	-24.0%	.228	
Posttreatment	-4.5%	.823	-29.0%	.142	
Comfort of use					
Pretreatment	-29.0%	.143	-24.0%	.228	
Posttreatment	-8.5%	.674	-24.8%	.213	

# Table 8 Responses to Questions 1 to 7 of the Questionnaire Concerning Patients' Evaluations of Clinician Conduct (%)

	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
Question 1: The dentists I saw explained well what treatment was needed before they began treatment	0.0	0.0	40.4	23.1	36.5
Question 2: I am confident that I received good dental care	0.0	1.9	30.8	30.8	36.5
Question 3: The dentists I saw usually explained what they were going to do	0.0	0.0	51.9	17.3	30.8
Question 4: The dentists I saw were friendly to me	0.0	0.0	23.1	28.8	48.1
Question 5: The dentists I saw always treated me with respect	1.9	0.0	11.5	30.8	55.8
Question 6: The dentists I saw allowed me to express my opinion	0.0	1.9	30.8	30.8	36.5
Question 7: The dentists I saw were very careful to check everything when examining their patients	1.9	1.9	25.1	28.8	42.3

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to lower VAS scores for FPDs. Thus, it is reasonable to assume that a greater number of postdelivery adjustments may cause discomfort for patients, which is an apparent predictor of denture satisfaction for partially edentulous patients.<sup>16</sup>

The third hypothesis (there would be a relationship between patients' evaluations of clinician conduct and VAS scores) was verified. The majority of the questions used to verify patients' evaluations of the clinicians showed a relationship with VAS scores for both the expectations and satisfaction of patients with FPDs and single crowns: the more positive the responses to the questionnaire, the higher the VAS scores. This result identifies a need for dentists to establish a trustworthy, dialog-based relationship with patients to understand their expectations and needs since the success of therapy is often judged in entirely different ways by dentists and patients.<sup>8</sup> Thus, careful explanation of treatment possibilities and limitations is a key factor in allowing patients to have realistic expectations regarding their rehabilitations.<sup>9-11</sup>

The main limitations in this study include grouping the treatments received as opposed to itemizing individual treatment interventions, location differences and prosthesis specifics, the limited number of individuals in the sample, and the statistically based correlational approach, which limits the interpretation of the causal relationship among the evaluated variables. However, this study further improves knowledge about patients' expectations of and satisfaction with specific implant therapies (FPDs and single crowns). Further studies using larger sample sizes and qualitative approaches should be conducted to further increase knowledge within this field.

# Conclusions

It was possible to verify that patients' expectations before placement of implant-supported FPDs and single crowns were higher than their satisfaction after treatment. There was no relationship between expectation and satisfaction scores and location of the edentulous area or the method for prosthesis retention. However, there was a negative correlation between satisfaction scores and age and between the numbers of absent teeth and postdelivery adjustments. There was a positive relationship between satisfaction scores and patients' evaluations of clinician conduct.

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