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Evaluation of subjective satisfaction of dental implant patients

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Abstract (J Korean Assoc Oral Maxillofac Surg 2014;40:130-134)

Objectives: The goal of this study was to estimate the overall satisfaction level of dental implant patients and further evaluate factors influencing satisfaction.

Materials and Methods: Self-administered questionnaires were mailed to patients who received dental implant therapy at Seoul National University Bundang Hospital (Seongnam, Korea) from October 2003 to April 2005. The main portion of the questionnaire was shared to evaluate the level of satisfaction with implant therapy. The questionnaires contained evaluations of influencing factors, which were classified as pain-related, service-related, and complication-related.

Results: The responses from 93 patients (41 males, 52 females) with a total of 325 implants were included in the analysis, and the mean score for overall satisfaction level with implant therapy was 8.26. Female patients showed higher visual analogue scale (VAS) scores for both pain during (P=0.000) and after implant surgery (P=0.016). Male patients showed more 'negative' values for the reasonability of treatment cost (P=0.008) and the adequacy of the treatment period (P=0.022).

Conclusion: The subjective satisfaction of patients was influenced by various factors, especially complication-related factors.

Key words: Implants, Satisfaction, Subjective

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I. Introduction

As the average life span increases, people are becoming increasingly interested in quality of life, including dietary life. Dental implants are considered one of the most common and popular treatment options for edentulous patients, and there has been remarkable advancement in the techniques and materials in the field. It is known that dental implants have many advantages such as superior masticatory efficiency and adjacent teeth preservation compared to other prosthetics; however, high cost and long treatment period remain the main limitations of dental implant therapy. The fact that a surgical procedure is required is also problematic. In some cases, more invasive procedures such as maxillary sinus elevation or bone graft are necessary for implantation.

Since patients who spend more money and time for their dental treatment expect satisfactory results and dental services in return, it is important to understand the factors influencing patient satisfaction in order to provide better services in the future[1,2].

The objective of this study was to estimate the overall satisfaction level of dental implant patients with implant therapy and to monitor patients during the maintenance period to further evaluate factors influencing patient satisfaction.

II. Materials and Methods

This study was approved by the Institutional Review Board at Seoul National University Bundang Hospital (B-1109-136-303). For the study, self-administered questionnaires were mailed to patients who had received dental implant therapy at Seoul National University Bundang Hospital (Seongnam, Korea) from October 2003 to April 2005. The main portion of the questionnaires dealt with the evaluation of satisfaction level with implant therapy. Implant therapy was evaluated in-

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dependently as implant surgery and implant prostheses. Next, evaluation of satisfaction level during the maintenance period was followed in a functional aspect. The questionnaires also contained evaluations of influencing factors that were categorized as pain-related factors, service-related factors, and complication-related factors.

Respondents rated their level of satisfaction on an 11-point scale where '10' was the most positive and '0' was the least positive response. The midpoint in the scale was '5'. In other words, the scores were " '10'=completely satisfied, '0'=completely dissatisfied, and '5'=neither satisfied nor dissatisfied". For the evaluation of influencing factors, a visual analogue scale (VAS) for pain-related factors and a 5-point scale for service-related factors were utilized. The 5-point scale ranged from 'strongly agree' to 'strongly disagree'. For the evaluation of complication-related factors, respondents were asked to report their experience of complications for implant surgery and implant prostheses, independently.

Surgical complications were grossly categorized as neurologic problems (i.e., paresthesia), bleeding problems, temporomandibular joint (TMJ) problems, postoperative infection, implant failure, and others (comment or description). Prosthetic discomfort included occlusal problems, fitting problems, food impaction, repetitive gingival swelling, habitual cheek or tongue biting, and others.

The differences in satisfaction between the groups were analyzed by independent t-test and Mann-Whitney U test using SPSS ver. 15.0 for Windows (SPSS Inc., Chicago, IL, USA). *P*-values <0.05 were considered statistically significant.

III. Results

1. Patient characteristics

The responses from 93 patients (41 males, 52 females) with a total of 325 implants were included in the analysis. The age of the patients ranged from 25 to 82 years, and the mean age was 55.8 (standard deviation [SD], ±13.1) years.(Table 1) The mean duration of occlusal loading was 30.8 (SD, ± 11.6) months. The prosthetic types of the patients included 40 single implant restorations, 23 fixed partial prostheses, 53 splinted prostheses with adjacent natural teeth, and 5 fixed full dentures.

Table 1. Patients' age and gender

Age (yr)	Male	Female	Total
20-29	2 (8)	5 (19)	7 (27)
30-39	1 (2)	1 (2)	2 (4)
40-49	4 (8)	8 (20)	12 (28)
50-59	16 (35)	17 (68)	33 (103)
60-69	14 (51)	15 (65)	29 (116)
70-79	4 (19)	5 (22)	9 (41)
80-89	0 (0)	1 (6)	1 (6)
Total	41 (123)	52 (202)	93 (325)

Values are presented as number of patients (number of implants).

2. Evaluation of satisfaction level with implant therapy (Table 2)

The mean score of overall satisfaction level with implant therapy was 8.26. A 'highly-satisfied' response (score over '8') was marked in 71 (76.3%) patients. The mean scores of satisfaction level with implant surgery and implant prostheses were 8.47 and 8.45, respectively. The same 'highly-satisfied' response with both implant surgery and implant prostheses was reported in 75 (80.6%) patients.

On the contrary, a 'dissatisfied' response (the score under '5') was detected in 5 (5.4%) patients with overall implant therapy, 8 (8.6%) patients with implant surgery, and 6 (6.5%) patients with implant prostheses.

3. The evaluation of satisfaction level in the maintenance period (Table 2)

The evaluation of satisfaction level in the maintenance period was composed of aesthetic function, masticatory function, phonetic function, comfort, and convenience of oral hygiene self-care. The mean scores of satisfaction level with aesthetic, masticatory, and phonetic function were 8.20, 8.31, and 8.91, respectively. 'Highly-satisfied' responses were

Table 2. Satisfaction level of patients (11-point scale)

Questionnaire	Mean	Standard deviation
Satisfaction level with implant therapy		
Satisfaction level with implant surgery	8.47	2.20
Satisfaction level with implant prostheses	8.45	2.05
Overall satisfaction level with implant therapy	8.26	2.00
Satisfaction level in the maintenance period		
Aesthetic function of implant prostheses	8.20	2.20
Masticatory (chewing) function	8.31	2.10
Phonetic (speaking) function	8.91	2.10
Comfort of implant prostheses	8.32	2.00
Convenience of oral hygiene self-care, including tooth brushing	8.34	2.00

marked in 69 (74.2%), 74 (79.6%), and 78 (83.9%) patients, respectively, while 'dissatisfied' responses were expressed in 6 (6.5%), 5 (5.4%), and 4 (4.3%) patients, respectively. The mean scores for comfort and convenience of oral hygiene self-care were 8.32 and 8.34, respectively. 'Highly-satisfied' responses were expressed in 75 (80.6%) and 72 (77.4%) patients, respectively, while 'dissatisfied' responses were checked in 5 (5.4%) and 8 (8.6%) patients, respectively.

4. The evaluation of factors influencing patients' satisfaction

1) Pain-related factors

The mean VAS scores for intra- and post-implant surgery were 4.33 and 4.06, respectively. In the evaluation of intraoperative pain, 'no pain (VAS=0)' was reported in 14 (15.1%) patients, 'mild pain (0<VAS≤3)' in 30 (32.3%) patients, 'moderate pain (3<VAS<7)' in 26 (27.9%) patients, 'severe pain (7≤VAS<10)' in 13 (13.9%) patients, and 'unbearable pain (VAS=10)' in 10 (10.8%) patients. Also, in the evaluation of postoperative pain, 'no pain (VAS=0)' was reported in 11 patients, 'mild pain (0<VAS≤3)' in 41 patients, 'moderate pain (3<VAS<7)' in 19 patients, 'severe pain (7≤VAS<10)' in 14 patients, and 'unbearable pain (VAS=10)' in 8 patients.(Table 3)

2) Service-related factors

A 5-point scale was used for the evaluation of service-related factors, and the mean score of the reasonability of treatment cost was 2.15. Only two patients reported 'positive' responses ('4: agree' or '5: strongly agree'). Seventy patients gave 'negative' responses ('2: disagree' or '1: strongly disagree'). On the other hand, the mean score for the kindness of dental staff members was 4.47. 'Positive' responses were reported by 86 patients. For the adequacy of the treatment period, the mean score was 2.47. 'Negative' responses were returned by 47 patients.

3) Complication-related factors (Table 4)

Out of all the patients, 54 (58.1%) answered 'none', in other words 'no experience of complications related with implant surgery'. The complications evaluated are listed in Table 4. The major surgical complications were paresthesias in 15 (16.1%) patients and TMJ problems in 8 (8.6%). With regard to prosthetic discomfort, 33 (35.5%) patients responded 'none'. Frequently reported prosthetic discomfort symptoms included food impaction (33.3%), habitual cheek/tongue biting (18.3%), and repetitive gingival swelling (8.6%).

To evaluate the influence of complications on satisfaction, differences in the satisfaction level between the 'complication' group and 'complication-free' group were analyzed. Patients in the 'complication-free' group showed significantly higher satisfaction scores for both implant therapy and maintenance periods.(Table 5)

5. Difference in satisfaction level and influencing factors between genders (Table 6)

There was no gender difference for satisfaction level in this study. Additionally, differences in factors influencing satisfaction levels between genders were analyzed. For pain-related factors, female patients showed a higher VAS score for both pain during the implant surgery (5.40 vs. 2.98, P=0.000) and after the implant surgery (4.77 vs. 3.17, P=0.016). In contrast, male patients checked more 'negative' values than

Table 3. Pain-related factors (VAS) and service-related factors (5-point interval scale)

Questionnaire	Mean	Standard deviation
Pain-related factors (VAS)		
Pain during implant surgery	4.33	3.30
Pain after implant surgery	4.06	3.00
Service-related factors (5-point interval scale)		
Reasonability of treatment cost	2.15	1.00
Kindness of dental staff and hospital workers	4.47	0.70
Adequacy of treatment period	2.47	0.60

(VAS: visual analogue scale)

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Table 4. Complication-related factors

Types of surgical complications and prosthetic discomfort	Cases (%)
Complications after implant surgery	
Paresthesia	15 (16.1)
Temporomandibular joint problems	8 (8.6)
Implant failure	5 (5.4)
Uncontrollable pain	3 (3.2)
Postoperative bleeding	3 (3.2)
Postoperative infection	2 (2.2)
Others	4 (4.3)
Prosthetic discomfort	
Food impaction	31 (33.3)
Habitual cheek/tongue biting	17 (18.3)
Repetitive gingival swelling	8 (8.6)
Occlusal problems (chewing difficulty)	4 (4.3)
Detachment of prostheses	3 (3.2)
Others	7 (7.5)

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Table 5. Influence of the experience of complications after surgery on satisfaction score

Questionnaire	Satisfaction score		*P*-value[1]
	Complication (n=39)	Complication free (n=54)	
Satisfaction level with implant surgery	7.76±2.50	8.98±1.65	0.015*
Satisfaction level with implant prostheses	7.71±2.32	8.96±1.63	0.007*
Overall satisfaction level with implant therapy	7.29±2.48	8.89±1.33	0.001*
Aesthetic function of implant prostheses	7.44±2.82	8.72±1.51	0.019*
Masticatory (chewing) function	7.62±2.93	8.79±1.22	0.032*
Phonetic (speaking) function	8.18±2.93	9.30±1.41	0.046*
Comfort of implant prostheses	7.35±2.51	9.00±1.07	0.001*
Convenience of oral hygiene self-care	7.56±2.89	8.88±1.36	0.017*

[1]By two-tailed tests.
*P<0.05.
Values are presented as mean±standard deviation.
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Table 6. Differences of influencing factors between genders

	Male (n=41)	Female (n=52)	*P*-value[1]
Pain during implant surgery	2.98±2.28	5.40±3.65	0.000*
Pain after implant surgery	3.17±2.53	4.77±3.49	0.016*
Reasonability of treatment cost	1.98±0.52	2.30±0.59	0.008*
Adequacy of treatment period	2.32±0.61	2.60±0.54	0.022*

[1]By two-tailed tests.
*P<0.05
Values are presented as mean±standard deviation.
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female patients for the reasonability of treatment cost (1.98 vs. 2.30, P=0.008) and the adequacy of the treatment period (2.32 vs. 2.60, P=0.022).

IV. Discussion

There have been a number of studies that examined the satisfaction level of implant patients by comparing conditions before and after surgery. Siadat et al.[3] performed a study on the satisfaction level in mandibular implant overdenture patients by comparing previous prosthetic forms. Wismeijer et al.[4] commented that implant overdenture treatment gave patients social rehabilitation as well as oral rehabilitation. Numerous studies were done with edentulous patients who were treated with implant-supported overdentures or implant fixed full dentures, and patients showed high-satisfaction with both treatments[5-8]. The patients who were treated with implant-supported overdentures showed a higher level of satisfaction than those who were treated with conventional full dentures[9-11]. Also, studies on patients who were treated with a single implant prosthesis showed a high level of satisfaction[12,13]. Another study that compared the satisfaction of patients after implant treatment used the VAS to examine the comfort of chewing and compare masticatory function, pronunciation, aesthetics, and hygienic management between natural teeth and implants. This study also used surveys to compare hygienic management, satisfaction of patients' expectations, and cost between natural teeth and implants. They found that 90% or more of patients were satisfied with masticatory function, with 72% responding that there was no difference in masticatory function between their own teeth and the implants. Additionally, 8% of patients responded that their implants felt safer for chewing, and 92% were satisfied with the implants for pronunciation and 83% with the aesthetics[14].

This study was designed to estimate the overall satisfaction level of dental implant patients with implant therapy and maintenance period and to further evaluate factors influencing patient satisfaction in the aspects of pain, service, and complications. In this study, the patients' overall satisfaction level with implant therapy turned out to be high in general (mean score: 8.26). Only 5 (5.4%) patients replied 'dissatisfied', while 71 (76.3%) patients responded 'highly-satisfied'. The functional aspects of the maintenance period were also encouraging in that the mean score ranged from 8.20 to 8.91 and a 'dissatisfied' response was reported by fewer than 8 (8.6%) patients.

Evaluation of factors influencing patient satisfaction was also performed. For pain-related factors, VAS scores for more than 60% of patients during and after implant surgery were reported as 'mild' to 'moderate' grade. Interestingly, 10 (10.8%) patients checked a VAS score of '10' under the local or general anesthesia, possibly due to psychological bias. Overall, there was no impact of either intra-operative or post-operative pain on patient satisfaction (P>0.05). For service-

related factors, it was remarkable that 70 (75.3%) patients responded 'negative' to the reasonability of treatment cost. It was difficult to statistically compare the 'negative' group with the 'positive' group, because only two patients responded 'positive'. Although it was a hospital-limited score, 90 (96.8%) patients answered that the dental staff and hospital workers at the Seoul National University Bundang Hospital were kind. This was considered to be a result of periodic education on customer-satisfaction as this is an important factor in the evaluation of service facilities. Forty-seven patients reported a 'negative' opinion on the adequacy of the treatment period, while 44 patients answered 'neither agree nor disagree'. Approximately 50% of the patients believed that the treatment period was too long. Therefore, it is important that patients fully understand the healing process for dental implants at the time of informed consent. For complication-related factors, the experience of complications had a negative impact on patient satisfaction level. Although there was a sample size discrepancy between the groups, the influence of each complication and discomfort was examined. Patients who experienced paresthesia (P=0.049), implant failure (P=0.015), occlusal problems (i.e., chewing difficulty) (P=0.001), and repetitive gingival swelling (P=0.001) showed significantly lower satisfaction levels with implant therapy.

In the evaluation of gender differences in influencing factors, female patients showed a higher VAS score for pain than male patients during and after implant surgery. In addition, male patients expressed more 'negative' opinions regarding treatment cost and treatment period. It is recommended that less aggressive surgery or more intensive pain control should be considered for the management of female patients while cost-effectiveness and shortening of the treatment period should be the primary consideration in the treatment planning stage for male patients.

V. Conclusion

This study shows that the subjective satisfaction of implant patients was influenced by various factors, especially complication-related factors. It is suggested that the prevention of surgical complications is important in delivering satisfaction to patients undergoing implant therapy. For safer implant procedures, further development of surgical technique and instruments is necessary. Gender differences in the treatment planning stage also could be considered.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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