# Patients' Expectations Before and Evaluation After Dental Implant Therapy

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## ABSTRACT

*Background:* Patients' expectations may influence their satisfaction with implant treatment, but there is a paucity of reports comparing patient expectations and their posttreatment satisfaction.

*Purpose:* The aim was to compare patients' expectations before with their satisfaction regarding function and esthetics after dental implant therapy.

*Materials and Methods:* Fifty volunteers (49 years ± 11.45) answered a questionnaire about influencing variables and underwent an initial examination followed by implant therapy. Their expectations regarding esthetics and function were verified on a visual analogue scale (VAS) before treatment. The VAS was also used for posttreatment completion rating.

*Results:* The average ratings for esthetic and functional expectations were 5.0 ± 2.6 and 5.0 ± 3.0; the posttreatment completion ratings were 9.1 ± 1.1 and 9.0 ± 1.7, respectively. The posttreatment completion ratings significantly exceeded expectations ($p < .001$, Wilcoxon test). Positive correlations were found between expectations and posttreatment completion ratings for esthetics (Spearman's rho = 0.496, $p < .001$) and function (Spearman's rho = 0.706, $p < .001$). An inverse correlation was found between age and functional expectations (Spearman's rho = –0.313, $p = .027$).

*Conclusions:* Patients' posttreatment completion ratings significantly exceeded their initial expectations. Expectations and posttreatment completion ratings were irrespective of smoking habits, location in the jaw, sex, or educational level.

KEY WORDS: dental implants, patient expectations, patient satisfaction, success rates

Patient satisfaction is one of the most important goals to achieve in oral rehabilitation using dental implants and should be used to evaluate the success of such therapies.[1]

Numerous researches have evaluated the efficacy of dental implant treatment based on patient satisfaction,[2,3] and in most of these studies, patients stated they were satisfied with the treatment. Different prosthetic designs, such as single-tooth restorations,[4] fixed partial dentures,[5,6] and overdentures[7,8] have all been well evaluated by patients. Adequate results with respect to patient satisfaction have also been demonstrated in unfavorable areas for implant placement, such as posterior mandibular areas[9] and atrophic maxilla.[10] Longitudinal studies have confirmed that this tendency was maintained over a significant period of 10 years[11] and even 20 years.[12]

Some factors could, however, have a negative impact on patient satisfaction with prosthetic treatment, as is the case in patients presenting neuroticism.[13,14] In addition, Levi and colleagues[15] stated that patients' expectations are another important factor that should influence patient satisfaction with implant treatment.

Our search for reports comparing patient expectations before initiating implant treatment and their satisfaction after implant treatment was unsuccessful.

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Therefore, the present article compares patients' expectations before and satisfaction after implant treatment. Some common patient-related variables (smoking, implant placement area, sex, educational level, and age) were tested to ascertain whether or not they were correlated with the patients' initial expectations and final ratings. These are variables that influence implant prognoses (smoking habits,[16] implant placement area[17]) and patient responses to oral rehabilitation (sex, educational level, and age[18]).

We hypothesize that: (1) patients' expectations before implant treatment are higher than their final ratings of the outcome; and that (2) women have higher expectations than men, especially regarding esthetic aspects. These hypotheses are based on the fact that many of the factors that impact the results of dental implants are known only by dentists and that patients are unaware of them, as well as the fact that Brazilian media have hyped up dental implants.

## MATERIALS AND METHODS

### Subjects

This research project was approved by the ethics committee of the University of Taubaté (protocol number CEP/UNITAU 372/03), and all the subjects signed an informed consent form before participating.

A total of 50 patients seeking dental implant treatment at the University of Taubaté participated as volunteers in this project, making up a sample with a planned score of 0.9757 using the Minitab™ power and sample size tool (Minitab Inc., State College, PA, USA). The average age was 49 years (SD 11.45), with the oldest patient being 80 and the youngest 23. Most of the volunteers (32) were women. All the patients underwent a detailed interview, a full clinical oral examination, panoramic radiographs, and blood testing (full blood count, glucose levels, prothrombin time, and activated partial thromboplastin time). Blood tests are a standard protocol in Brazil, mainly to prevent hemorrhagic events. The patients were selected for implant treatment according to the clinical protocols, and patients with untreated diabetes and hypertension were excluded only because they would have had to undergo systemic treatment before implant placement.

### Data Collection

During the initial appointment, volunteers were asked to fill out a questionnaire about smoking habits, implant placement area (anterior, posterior, or total edentulism), sex, educational level (elementary and middle school, high school, graduate and postgraduate levels), and age. Based on personal clinical experience with Brazilian patients, we hypothesize that the influence of the life partner in the choice of dental implant treatment should affect patient satisfaction, so this aspect was also addressed in a dichotomous (yes or no) question.

During the first appointment, the patients were also asked to indicate their expectations about the esthetic and functional results of their dental implant treatment, ranging from 0 (indicated by the expression "worst results") to 10 (indicated by the expression "best results") on a 10 cm visual analogue scale (VAS).

The specific questions asked prior to the treatment were: *(1) On this scale of 0 to 10, how would you score the functional benefits you expect from the treatment (mastication, comfort, retention in the mouth, etc.)?* and *(2) On this scale of 0 to 10, how would you score the esthetic benefits you expect from the treatment?*

*After completing the treatment, a week after final adjustments (which were usually done during three appointments after installation of the prosthesis), they were again asked to indicate, on the same VAS, their rating of the outcome of the two aforementioned parameters by answering the following questions: (1) On this scale of 0 to 10, how would you score the functional benefits you observed from the treatment (mastication, comfort, retention in the mouth, etc.)? and (2) On this scale of 0 to 10, how would you score the esthetic benefits you observed as a result of the treatment?*

### Dental Implant Treatments

The dental implant treatment was completed by postgraduate trainee dentists, using standard titanium dental implants manufactured by SIN (São Paulo, Brazil) and/or Emfils (Itu, Brazil). Surgeries for implant placement followed the same protocol in terms of planning, antiseptic care, pre- and postoperative medication, and drilling sequences. No additional surgical procedures (eg, sinus lifts, alveolar nerve lateralization, bone grafts) were included in the design of this study. The prosthetic procedures ranged from single crowns to full fixed bridges, covering fixed partial bridges and overdentures on two ball abutments. Fixed prostheses were usually cemented instead of screwed, except in the case of full-arch fixed bridges, which were all screw retained.

**TABLE 1 Average Patient Pretreatment Ratings ($n = 50$) Compared with Posttreatment Ratings ($n = 47$)**

| | Esthetics | | Function | |
|---|---|---|---|---|
| | Before | After | Before | After |
| Average | 5.0 | 9.1 | 5.1 | 9.0 |
| SD | 2.6 | 1.1 | 3.0 | 1.7 |
| Rating range | 0–9 | 6–10 | 0–10 | 0–10 |
| CI | 0.72 | 0.32 | 0.84 | 0.49 |
| *p* Value | <0.001* | | <0.001* | |

*A statistically significant difference (Wilcoxon test).
CI = confidence interval.

### Data Analysis

A significance level of .05 was adopted for all the tests applied during the present research.

The Mann-Whitney test was applied to check for possible associations between VAS scores and smoking habits. The same test was used to check possible associations between VAS scores and influence of the life partner on the choice of dental implants, as well as between VAS scores and the patient's sex.

The Kruskal-Wallis test was applied to check for possible associations between VAS scores and implant placement area. The same test was used to check for possible associations between VAS scores and educational level.

The Wilcoxon test was used to compare average expectation and outcome VAS scores for both esthetic and functional evaluations.

The Spearman correlation test was used to check for possible correlations between age and the above-mentioned scores, and between expectations and final evaluation scores.

## RESULTS

Of the 50 initial volunteers, 47 (94%) concluded their treatment and answered the final evaluations.

The average VAS ratings for esthetics and function before and after implant treatment are shown in Table 1, which also indicates that the outcome significantly exceeded pretreatment expectations. Positive, but only regular, correlations were also found between expectations and posttreatment ratings for esthetic outcomes (Spearman's rho = 0.496, $p < .001$). A strong positive correlation was found between expectations and posttreatment ratings for function (Spearman's rho = 0.706%, $p < .001$).

A weak negative (inverse) correlation was found between age and functional expectations (Spearman's rho = –0.313, $p = .027$). No correlation was found between age and esthetic expectations ($p = .548$).

No significant association was found between esthetic and functional expectations, and smoking ($p = .308$ and $p = .377$), implant placement area ($p = .164$ and $p = .061$), sex ($p = .480$ and $p = .385$), and educational level ($p = .911$ and $p = .084$).

The same holds true for the association between esthetic and functional posttreatment completion ratings and smoking habits ($p = .773$ and $p = .930$), implant placement area ($p = .179$ and $p = .126$), sex ($p = .090$ and $p = .173$), educational level ($p = .926$ and $p = .539$), and age ($p = .224$ and $p = .924$).

The influence of the life partner in the choice of dental implants was also not significantly correlated with esthetic and functional posttreatment completion ratings ($p = .424$ and $p = .892$) nor with presurgery expectations ($p = .972$ and $p = .662$, respectively).

## DISCUSSION

Our first hypothesis was that the patients' expectations before implant treatment would be higher than their final evaluation of the outcome. However, the subjects in this study had low expectations regarding implant therapy compared to their posttreatment completion ratings for both functional and esthetic aspects, thus contradicting our hypothesis.

To the best of our knowledge, there are no published studies about patient expectations prior to dental implant treatment, as previously stated here. Pjetursson and colleagues[11] reported that 92% of their patients stated that implant dental therapy outcomes satisfied their expectations. Because their patients' pretreatment expectations were not recorded, we do not know if their results were because of high posttreatment completion ratings, low pretreatment expectation ratings, or a combination of these two factors.

Possible reasons for the low expectation scores presented here are previous unpleasant experiences with dental treatments, inadequacy of pre-implant prosthetic status and patients' personal motives. In an evaluation of the changes and attitudes toward implant treatment in a Swedish population, Narby and colleagues[19] found that patients with removable dentures generally presented lower expectations for both oral function and esthetics.

On the other hand, the higher levels of satisfaction with the outcome recorded in the present research are comparable with the results of previous studies,[2,3] regardless of prosthetic designs,[4–8] implant placement area,[9,10] or observation period.[11,12]

An interesting aspect is the wide range (0–10) of posttreatment function ratings, which indicate that patients were highly sensitive to minor variations in prosthetic function. Dentists should take this aspect into account when explaining to patients, before treatment, how an implant-supported prosthesis works, thus giving their patients a realistic forecast of the outcome.

Our second hypothesis is that women have higher expectations than men, especially regarding esthetic aspects. However, this hypothesis was also not corroborated by our findings. Neither esthetic nor functional evaluations showed statistically significant pre- or posttreatment associations with patients' sex.

In a recent survey, Carlsson and colleagues[20] observed a contradictory result regarding gender-related attitudes about dental appearance. They had assumed that Swedish women were more sensitive to deficiencies in dental appearance but found, instead, that men emphasized the importance of dental appearance more than women. The common belief is that women are more interested in their appearance than men. However, other factors appear to influence patients' attitudes toward dental esthetics, such as culture, education, economy, traditions, dental care system, patient/dentist relationship, media images of dental appearance, among others.

Other variables that influence implant prognoses (smoking habits,[16] implant placement area[17]) and patient responses to oral rehabilitation (sex, educational level, and age[18]) were also tested to assess patients expectations before and satisfaction after implant treatment. Based on personal clinical experience with Brazilian patients, we also assumed that the influence of the life partner in choosing dental implant treatment was an important factor in treatment outcomes. The majority of these possible associations proved not to be statistically significant in this sample.

Only a weak negative (inverse) correlation was found between age and functional expectation, indicating that younger patients have higher expectations regarding function. This is probably because of the increasing number of functional disabilities that elderly patients perceive. However, Siadat and colleagues[18] observed that the elderly were more satisfied with esthetics and comfort. We found no statistically different final scores related to our patients' age.

Another result of the present work that deserves highlighting is that we found a positive correlation between pretreatment expectations and the final posttreatment ratings for both esthetics and function, as suggested by Levi and colleagues.[15] These correlations indicate that patients' expectations influence their satisfaction. It also emphasizes that patients' expectations should be assessed by the dental professional in an attempt to predict how patients will evaluate their dentures after treatment.

Several important factors influencing patients' expectations before dental implant treatment and evaluation after treatment, such as previous prosthodontic experiences,[21] personality traits,[13,14] implant position,[15] and other factors were not evaluated in the present research.

We believe that further research involving larger numbers of patients and covering a wider range of variables should be conducted to increase our knowledge about patients' pretreatment expectations and final evaluation after dental implant therapies.

## CONCLUSIONS

The patients' esthetic and functional posttreatment ratings of dental implant therapies were significantly higher than their expectations before these therapies. Additionally, a positive correlation was observed between expectations and posttreatment completion ratings for both esthetics and function.

Smoking habits, implant placement area, sex, educational level, and influence of the life partner in choosing dental implants did not significantly influence initial expectations or final evaluations of the outcomes of dental implant therapies.

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## REFERENCES

1. Buch RS, Weibrich G, Wegener J, Wagner W. Patient satisfaction with dental implants. Mund Kiefer Gesichtschir 2002; 6:433–436.

2. Al-Omiri M, Hantash RA, Al-Wahadni A. Satisfaction with dental implants: a literature review. Implant Dent 2005; 14:399–406.
3. Strassburger C, Heydecke G, Kerschbaum T. Influence of prosthetic and implant therapy on satisfaction and quality of life: a systematic literature review. Part 1 – characteristics of the studies. Int J Prosthodont 2004; 17:83–93.
4. Vermylen K, Collaert B, Linden U, Bjorn AL, De Bruyn H. Patient satisfaction and quality of single-tooth restorations. Clin Oral Implants Res 2003; 14:119–124.
5. Cibirka RM, Razzoog M, Lang BR. Critical evaluation of patient responses to dental implant therapy. J Prosthet Dent 1997; 78:574–581.
6. de Bruyn H, Collaert B, Linden U, Bjorn AL. Patient's opinion and treatment outcome of fixed rehabilitation on Branemark implants. A 3-year follow-up study in private dental practices. Clin Oral Implants Res 1997; 8:265–271.
7. Awad MA, Lund JP, Shapiro SH, et al. Oral health status and treatment satisfaction with mandibular implant overdentures and conventional dentures: a randomized clinical trial in a senior population. Int J Prosthodont 2003; 16:390–396.
8. MacEntee MI, Walton JN, Glick N. A clinical trial of patient satisfaction and prosthodontic needs with ball and bar attachments for implant-retained complete overdentures: three-year results. J Prosthet Dent 2005; 93:28–37.
9. Farzad P, Andersson L, Gunnarsson S, Sharma P. Implant stability, tissue conditions, and patient self-evaluation after treatment with osseointegrated implants in the posterior mandible. Clin Implant Dent Relat Res 2004; 6:24–32.
10. Kaptein ML, Hoogstraten J, de Putter C, de Lange GL, Blijdorp PA. Dental implants in the atrophic maxilla: measurements of patients' satisfaction and treatment experience. Clin Oral Implants Res 1998; 9:321–326.
11. Pjetursson BE, Karoussis I, Burgin W, Bragger U, Lang NP. Patients' satisfaction following implant therapy. A 10-year prospective cohort study. Clin Oral Implants Res 2005; 16:185–193.
12. Lekholm U, Gröndahl K, Jemt T. Outcome of oral implant treatment in partially edentulous jaws followed 20 years in clinical function. Clin Implant Dent Relat Res 2006; 8:178–186.
13. Abu Hantash RO, Al-Omiri MK, Al-Wahadni AM. Psychological impact on implant patients' oral health-related quality of life. Clin Oral Implants Res 2006; 17:116–123.
14. Fenlon MR, Sherriff M, Newton JT. The influence of personality on patients' satisfaction with existing and new complete dentures. J Dent 2007; 35:744–748.
15. Levi A, Psoter WJ, Agar JR, Reisine ST, Taylor TD. Patient self-reported satisfaction with maxillary anterior dental implant treatment. Int J Oral Maxillofac Implants 2003; 18:113–120.
16. Strietzel FP, Reichart PA, Kale A, Kulkarni M, Wegner B, Kuchler I. Smoking interferes with the prognosis of dental implant treatment: a systematic review and meta-analysis. J Clin Periodontol 2007; 34:523–544.
17. Bryant SR. The effects of age, jaw site, and bone condition on oral implant outcome. Int J Prosthodont 1998; 11:470–490.
18. Siadat H, Alikhasi M, Mirfazaelian A, Geramipanah F, Zaery F. Patient satisfaction with implant-retained mandibular overdentures: a retrospective study. Clin Implant Dent Relat Res 2008; 10:93–98.
19. Narby B, Kronstrom M, Soderfeldt B, Palmqvist S. Changes in attitudes toward desire for implant treatment: a longitudinal study of a middle-aged and older Swedish population. Int J Prosthodont 2008; 21:481–485.
20. Carlsson GE, Johansson A, Johansson AK, Ordell S, Ekback G, Unell L. Attitudes toward dental appearance in 50- and 60-year-old subjects living in Sweden. J Esthet Restor Dent 2008; 20:46–55; discussion 56.
21. Allen PF, McMillan AS. A longitudinal study of quality of life outcomes in older adults requesting implant prostheses and complete removable dentures. Clin Oral Implants Res 2003; 14:173–179.