Treatment satisfaction with facial prostheses

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Statement of problem. Facial defects secondary to the treatment of neoplasms, congenital malformations, and trauma result in multiple functional and psychosocial difficulties. Prosthetic rehabilitation attempts to restore these facial disfigurements and may improve the level of function and self-esteem for these patients. However, a limited number of studies have evaluated the change in perceived quality of life after maxillofacial prosthetic rehabilitation.

Purpose. The purpose of this study was to evaluate patients' perceptions of treatment with adhesive-retained and implant-retained facial prostheses and to assess differences in overall satisfaction with these 2 types of treatments.

Material and methods. In this study, a questionnaire with 28 items was administered for evaluation of perceptions of appearance, comfort, fit and irritation, reliability of retention, frequency of wear, ease of placement and removal, level of self-consciousness, and value of treatment. Subjects were categorized into 2 groups: adhesive-retained group (n = 16) and implant-retained group (n =19). Comparisons were made for each item in the questionnaire using Fisher exact tests (α=.05).

Results. The implant group reported higher positive ratings on all 28 questionnaire items when compared with the adhesive group. Statistically significant ($P<.05$) differences between the implant and adhesive groups were noted for ease of placement and removal, frequency of wear at home, and quality of retention during various activities, such as home chores and when perspiring or sneezing/coughing.

Conclusion. The implant-retained facial prosthesis offers significant enhancement over an adhesive-retained prosthesis with respect to ease of use and retention during a variety of daily activities, resulting in greater use of the prosthesis. (J Prosthet Dent 2005;94:275-80.)

CLINICAL IMPLICATIONS

Improvements in ease of use and retention with an implant-retained facial prosthesis appear to increase prosthesis use when compared to an adhesive-retained prosthesis. However, clinicians should evaluate patient factors, treatment costs, and the burden of additional surgery prior to determining the most appropriate prosthetic treatment for a patient.

Facial defects secondary to the treatment of neoplasms, congenital malformations, and trauma result in multiple functional and psychosocial difficulties. Prosthetic rehabilitation to restore these facial disfigurements may improve the level of function and self-esteem for patients. However, difficulties with facial prostheses arise due to movable tissue beds, quality of prosthesis retention, and associated skin reactions to adhesives. The use of osseointegrated implants in the craniofacial region reduces prosthesis limitations associated with medical-grade adhesives and has been proven to be a reliable treatment option with high long-term success rates for facial prostheses.[1] Patient acceptance of facial prostheses may be significantly enhanced due to the quality of prosthesis retention and stability afforded by craniofacial implants.

The concept of quality of life (QOL) has emerged as an organizing schema to describe and evaluate the experience of patients in clinical research. Many definitions for QOL reflect "the ability to conduct daily activities" from the patients' perspective.[2] There have been numerous studies reporting the QOL of head and neck cancer patients.[3-10] These studies indicate elevated levels of emotional distress, physical limitations, disturbed body image, and impaired relationships. Studies of the change in perceived QOL after maxillofacial prosthetic rehabilitation are limited.[11-13]

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Table I. Questions and example response scale

Question for all subjects
How satisfied are you with the appearance of the prosthesis?
Very satisfied Moderately Very unsatisfied
1 2 3 4 5
Do you think others could notice that you are wearing a prosthesis?
How comfortable is your prosthesis?
How well or poor did your prosthesis fit?
Does the prosthesis ever cause your skin or surrounding tissue any type of irritation?
How well or poorly does your prosthesis stay on during the following activities?
Household activities
Eating
Exercise
Perspiration
Sneeze or cough
How many hours do you wear your prosthesis each day?
What circumstances do you wear your prosthesis?
Home Work Social occasions Never
How easy or difficult is it to put on your prosthesis?
How easy or difficult is it to remove your prosthesis?
Without any prosthesis, does your facial defect make you self-conscious?
In public, does wearing the prosthesis reduce your feeling of self-consciousness?
Was the prosthesis treatment very worthwhile for you or not?
Would you recommend this treatment to others?
Comparative questions for subjects having both adhesive and implant prostheses
Compared to the adhesive-retained prosthesis, are you more or less self-confident with the implant-retained prosthesis?
More confident Same Less confident
1 2 3 4 5
Compared to the adhesive-retained prosthesis, did you wear the implant-retained prosthesis more or less hours each day?
Compared to the adhesive-retained prosthesis, was your implant-retained prosthesis more or less convenient to wear?
Compared to the adhesive-retained prosthesis, was your implant-retained prosthesis more or less satisfactory?
Compared to the adhesive-retained prosthesis, did your implant-retained prosthesis require more or less preparation ahead of time to wear?
If you had the chance to choose which prosthesis to have made again, with which would you prefer? Please rank.
Implant-retained prosthesis Adhesive-retained prosthesis
Gauze and tape Nothing placed over the defect

Patient perceptions of outcome and satisfaction with treatment are key elements in evaluating quality of care, but are often absent in clinical studies. Lacking evidence of the patient's perspective of the importance of various outcomes, critical decisions about appropriate treatments and individual patient management are often made on the basis of clinicians' intuitive judgments of patient preferences.[14,15] Although the implant-retained facial prosthesis has become a predictable treatment modality from the perspective of implant success rates, no evidence was identified by the authors that evaluated patient's perceptions of outcomes between adhesive-retained and implant-retained facial prosthetic treatments. Critical information describing the outcomes from the patients' perspective of extensive maxillofacial prosthetic rehabilitation is needed to plan the most effective treatment modality. The purpose of this study was to evaluate patients' perceptions of treatment with adhesive-retained and implant-retained facial prostheses and to assess differences in satisfaction, use, and value of these treatments.

Table II. Location of defect in adhesive and implant groups

		Implant (n = 19)	
Location of defect	Adhesive (n = 16)	IR group (n = 7)	AIR group (n = 12)
Auricular (n = 16)	5	6	5
Nasal (n = 13)	6	1	6
Orbital (n = 6)	5	0	1

Table III. Percentage of positive responses to questions of comfort and appearance of facial prostheses

Question	Adhesive group (n = 16)	Implant group (n = 19)	*P* value
Comfortable	81%	89%	0.744
Appearance	63%	95%	0.084
Others notice	38%	16%	0.602
Reduces self-consciousness	75%	95%	0.273
Self-conscious without prosthesis	68%	90%	0.120

Table IV. Percentage of positive responses to questions of fit and irritation of facial prostheses

Question	Adhesive group (n = 16)	Implant group (n = 19)	*P* value
Good fit	75%	100%	0.098
Ease in placement	56%	100%	0.001*
Ease in removal	69%	100%	0.049*
No irritation	50%	74%	0.174

*Significant difference at $P<.05$.

Table V. Distribution of implant and adhesive groups for hours of daily wear

Hours/day	Adhesive (n = 16)	Implant (n = 19)
12-16	50%	95%
7-11	25%	5%
3-6	25%	0%

MATERIAL AND METHODS

The study protocol was reviewed and approved by the General Campus Institutional Review Board at UCLA. All patients undergoing facial prosthetic rehabilitation or follow-up treatment/evaluation of a pre-existing facial prosthesis were informed of the study by the treating maxillofacial prosthodontists and offered the opportunity to participate in this study. Therefore, subjects had varied length of wear and wear experiences with pre-existing and existing facial prostheses. No subjects were excluded based on gender, racial/ethnic background, or age criteria. Exclusions included those patients who had difficulty in understanding the consent process or the questionnaire. Informed consent was obtained from all prospective subjects who agreed to participate in the study.

Subjects were categorized into 2 groups: adhesive-retained (n = 16) and implant-retained (n = 19). Further comparison within the implant group included 2 subgroups—those who experienced implant-retained facial prosthesis only (IR group, n = 7), and those who had experience with both adhesive and implant-retained facial prostheses (AIR group, n = 12).

The questionnaire consisted of 28 items designed to obtain the subject's perceptions of his/her facial prosthesis. Questions covered topics related to appearance, comfort, fit and irritation, reliability of retention, frequency of wear, ease of placement/removal, level of self-consciousness, and value of treatment. The question items and format were based, in part, on questionnaires evaluating similar factors in patients receiving partial and complete denture treatment.[16-19] The questions were also based on the authors' previous experience with patients treated with various types of facial prostheses and the issues reported. All subjects responded on a 5-point scale for 22 items listed in Table I evaluating their current prosthesis (adhesive- or implant-retained). Six additional comparative questions were designed for the AIR group only. These questions were added to provide within-subject comparisons between adhesive-retained and implant-retained prostheses for perceptions of confidence, length of daily use, convenience, satisfaction, and preparation time (Table I). The questionnaire was administered to the subjects at least 3 months after completion and adjustment of their facial prostheses. The questions were provided to the subject in written form for review, and the questionnaire was read to the subject by an investigator (TC) who recorded each response. The investigator (TC) collecting the data was not involved in fabricating the facial prostheses for the subjects. Additional information on patient and prosthesis characteristics was collected in the questionnaire, including age, gender, location of the defect, medical history related to facial defect, date of resection surgery, date of implant surgery, if applicable, and insertion date of the facial prosthesis.

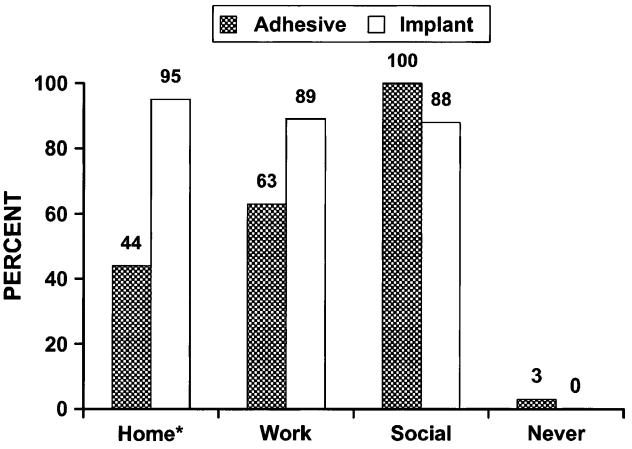

Fig. 1. Frequency of wear. *Asterisk,* Significant difference at $P<.05$.

For statistical comparisons of the frequency distributions of responses between groups, Fisher exact tests (α=.05) were used due to frequent occurrences of cell counts less than 5. Each item was considered as an independent variable and no corrections were made for multiple comparisons.

RESULTS

Sample characteristics

Of the 35 subjects enrolled, 16 wore adhesive-retained prostheses and were categorized in the adhesive group. Nineteen wore implant-retained prostheses and were categorized in the implant group. Within the implant group, 7 had experienced only an implant-retained prosthesis (IR group), and 12 had experienced wearing an adhesive-retained prosthesis prior to the current implant-retained prostheses (AIR group). The sample included 8 men (23%) and 27 women (77%). Age ranged from 21 to 89 years, with a mean of 59.3 ± 18.6 years. There was no statistical difference in mean age between the adhesive group (62.9 ± 17.9 years) and the implant group (56.2 ± 19.1 years). Facial defects were primarily the result of tumor resection (n = 28, 80%); 14% were the result of congenital defects (n = 5), and 6% were the result of acquired trauma (n = 2). The location of the facial prostheses (Table II) was distributed between auricular prostheses (n = 16, 46%), nasal prostheses (n = 13, 37%), and orbital prostheses (n = 6, 17%).

Comparisons between adhesive- and implant-retained prosthesis groups

Comfort and appearance. Due to the limited sample size, the 5-point response scales were collapsed to 3-point scales as follows: 1 and 2 collapsed as "positive," 3 (could be slightly positive or negative, or neutral)

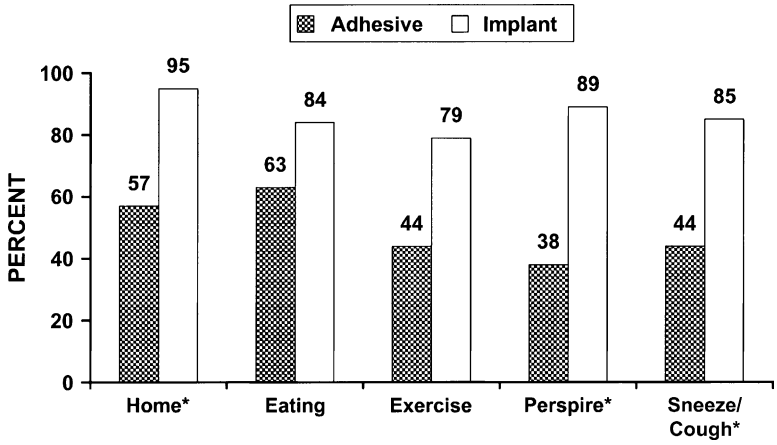

Fig. 2. Quality of retention during daily activities. *Asterisk,* Significant difference at $P<.05$.

Table VI. Responses to items related to treatment value

Question	Adhesive group (n = 16)	Implant group (n = 19)
Treatment worthwhile		
1-Positive	88%	89%
2-Moderate	12%	11%
3-Negative	0%	0%
Recommend treatment to others		
1-Positive	87%	94%
3-Moderate	6%	5%
5-Negative	6%	0%

Table VII. Summarized positive responses of items related to direct comparison between adhesive-retained and implant-retained prostheses from 12 subjects who experienced both types of prostheses

Implant prostheses provided improvement in:	Positive responses
Confidence	92%
Use (hrs/day)	75%
Convenience	100%
Satisfaction	92%
Preparation time	100%

was referred to as "neutral," and 4 and 5 collapsed to "negative" for presentation of results. Table III provides a summary of the frequency distributions of positive responses from the questionnaire items related to comfort and appearance of the facial prostheses. In general, there was a higher percentage of positive responses in the implant group than in the adhesive group for comfort (89% vs 81%) and appearance of the facial prostheses (95% vs 63%). Fewer implant group subjects reported feeling that others noticed their prostheses (16% vs 38%), and more implant group subjects indicated that the prosthesis reduced self-consciousness while worn (95% vs 75%). However, the differences were not statistically significant.

Fit and irritation. Higher percentages of the implant group reported positive responses to prosthesis fit (100%) and lack of irritation complication (74%) compared to the adhesive group (75% and 50%, respectively). However, no significant differences were found (Table IV). There were significant differences for ease of placement and removal of the facial prostheses, with the percentage of positive responses in the implant group being 100% for both placement and removal, whereas percentage of positive responses in the adhesive group were 56% and 69%, respectively ($P<.05$).

Frequency of wear. More subjects in the implant group than in the adhesive group reported long hours of wear of the prostheses each day (95 % vs 50%) (Table V), although the difference was not significant. As seen in Figure 1, significantly more subjects in the implant group (95%) reported a high frequency of wear at home compared to the adhesive group (44%; $P<.05$). No significant differences were found between the implant and adhesive group for frequency of wear at work and/or social situations. The adhesive group all reported wearing the prostheses 100% of the time for social occasions; however, wear of the same prosthesis decreased to 63% of the time at work and 44% of the time at home.

Quality of retention. In relation to retention during various activities (Fig. 2), the implant group generally reported higher positive responses (range 79%-95%) for all activities compared to the adhesive group (range 38%-63%). In addition, retention was more frequently perceived as good during regular home chores and during perspiration and sneezing/coughing for the implant-retained group compared to the adhesive-retained group ($P<.05$) (Fig. 2).

Treatment value. Both the implant and adhesive group rated their prosthetic treatment worthwhile

(89% vs 88%) and indicated that they would recommend this treatment to other people (94% vs 87%) (Table VI). Although the implant group reported a slightly higher percentage of extreme positive responses toward their treatment value than the adhesive group, the difference was not significant.

Comparative questions within implant group

There were 6 questionnaire items designed to directly compare the adhesive-retained and implant-retained prostheses in those subjects in the implant group who experienced both types of prostheses. In these 12 subjects, a high percentage (75%-100%) perceived the implant-retained prosthesis provided improvement for all items, including confidence, length of daily use, convenience, satisfaction, and reduced preparation time for placement of the prosthesis (Table VII). In addition, 100% of these subjects reported they would choose to have the implant-retained prostheses treatment again. The subjects believed that the implant-retained prosthesis to be worthwhile, and would strongly recommend this treatment to other patients. In contrast, only 42% of the subjects in this group reported the adhesive-retained prosthetic treatment was worthwhile.

DISCUSSION

Restoration of facial defects is a challenge for prosthodontists. In the past, the success of the facial prosthetic restoration suffered due to the limitations of movable tissue beds, as well as questionable quality of retention provided by the medical grade adhesive, resulting in poor patient acceptance of the facial prosthesis. Patient acceptance of a facial prosthesis may be significantly enhanced due to the improved retention afforded by craniofacial implants. However, current QOL instruments, such as the University of Washington Quality of Life Questionnaire[20] and the European Organization for Research into the Treatment of Cancer/Quality of Life Questionnaire for Head and Neck Cancer[21] are not designed to specifically evaluate patient acceptance and satisfaction with facial prosthetic treatment, with or without craniofacial implants. There is a significant gap between the items the 2 instruments include and the items specifically related to assessment of outcomes for facial prosthetic treatment. Therefore, a questionnaire was developed for this study to answer specific questions related to the outcome assessment of adhesive-retained and implant-retained facial prostheses. This questionnaire was based on a previous questionnaire for evaluating prosthodontic outcomes in denture wearers. A previous pilot study (J. Fang, DDS, unpublished data, June 1994) using the same questionnaire found that subjects with implant-retained prostheses were significantly more likely than those with adhesive-retained prostheses to have positive responses with respect to ease of placement and removal and reliability of retention during various activities. These results were consistent with the present study, and provided some support for replicability.

A majority of the adhesive group participants in this study reported positive ratings of their adhesive-retained prosthesis for comfort (81%), appearance (63%), fit (75%), and lack of irritation (50%). Similar findings were reported by Markt and Lemon[12] during evaluation of general satisfaction with non–implant-retained facial prostheses, based on 76 responses to a mailed questionnaire. The authors found a majority of the respondents reported their facial prostheses fit comfortably (85%), and most were satisfied with esthetics. In the current study, 50% of the subjects in the adhesive group reported no irritation from the prostheses, similar to results from the Markt and Lemon's study,[12] in which 56% of respondents reported the prostheses did not irritate the skin.

In the present study, the implant group reported a higher frequency of positive ratings on all 22 questionnaire items when compared with the adhesive group. Moreover, significant differences between the implant and adhesive groups were noted for ease of placement and removal, frequency of wear at home, and quality of retention during various activities, including home chores, perspiration, and sneezing/coughing. These findings support the hypothesis that craniofacial implants facilitate the retention and ease of use of a facial prosthesis, which are the primary limitations of the adhesive-retained prosthesis. Schoen et al[11] also reported that patient satisfaction with implant-retained prostheses in the auricular and orbital regions was better than for adhesive-retained prostheses, and offered an improved QOL.

Additional evaluation of the subgroups, based on the location of the defect, found a trend for the orbital prosthesis subgroup with an adhesive-retained prosthesis (n = 5); fewer positive responses were reported with respect to ease of placement (20%), fit (40%), and appearance (40%), and more positive responses were reported for skin irritation (80%) and other people noticing the prosthesis (60%), compared to the adhesive subgroups with auricular (n = 5) and nasal prostheses (n = 6). However, due to the small sample size, statistical conclusions could not be drawn. It was not surprising that lower satisfaction and higher skin irritation ratings were seen for the adhesive subgroup with the orbital prosthesis. This is because of the difficulties in fabrication of an esthetic orbital prosthesis that matches the position of the eye, lid contour, and the skin color of the nondefect side. The dynamic movement of the remaining normal eye and the adjacent orbital structure asymmetry increases the level of difficulty in creating a natural-looking orbital prosthesis. Hygiene procedures are also more difficult for patients with orbital defects

due to the compromised depth perception from monocular vision. Meaningful comparisons of the implant subgroups were not possible due to uneven subgroup size (auricular, n = 11; nasal, n = 7; orbital, n = 1) (Table II).

In this study, 88% of the adhesive group stated their adhesive-retained facial prosthetic treatment was worthwhile. In contrast, only 44% of the subjects in the implant group that had previously worn an adhesive-retained prosthesis reported their adhesive-retained facial prosthesis was a worthwhile treatment. There are 3 possible explanations for these different perceptions toward the same type of treatment. First, subjects in the implant group may have received implant therapy due to difficulty in adapting to the adhesive-retained facial prosthesis and may be a very select sample. Secondly, this group had to recall perceptions toward the adhesive-retained prosthesis because this study was retrospective. There were certain limitations retrospectively, and the subjects' responses are questionable due to recall bias. Thirdly, the positive ratings from the adhesive-only group were made without the benefit of comparison to the implant-retained prosthesis, so each experience was different.

It is important to understand that the criteria to provide a successful facial prosthesis treatment are multifaceted. The provider must not only note the clinical indicators of success from the treatment team point of view, but also be sensitive to the patient's psychological responses to treatment. Patients' perceptions of their facial prostheses in terms of esthetics, comfort, ease of placement and removal, fit, and the quality of retention affect their level of compliance to wear the prostheses. The benefits of the facial prosthesis treatment can be validated only if patients wear the prostheses. The results of this study indicate that craniofacial implants can resolve some of the limitations of adhesive-retained prostheses, such as movable tissue beds and questionable quality of retention, which may result in greater patient acceptance.

CONCLUSION

From this limited study, it is concluded that implant-retained prostheses provided subjects with improved perceptions of treatment satisfaction, value, and use when compared to adhesive-retained prostheses. In addition, patient perceptions of quality of retention, ease of placement and removal, and compliance to wear a facial prosthesis show significant improvements when the prosthesis is retained by osseointegrated implants.

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