

Cross-Sectional Study

## Studying the Level of Patients' Satisfaction with Free Gingival Grafting and Sub-Epithelial Connective Tissue Treatment

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### ABSTRACT

Examining the factors of patient dissatisfaction after gum transplantation can lead to an increase in the therapist's insight into the factors that affect patients' satisfaction and the best implementation of treatment. This study aimed to specify the level of patient satisfaction with gum grafting. In this descriptive-cross-sectional study, 63 patients who underwent free gingival grafting and sub-epithelial connective tissue were randomly evaluated, and their choice and level of satisfaction with gingival grafting were evaluated by a researcher-made questionnaire. The data was analyzed using SPSS version 23 software and ANOVA, t-test, and Spearman's correlation coefficient statistical tests ( $\alpha = 0.05$ ). Based on the findings of the study, the overall satisfaction score of the patients was calculated as  $3.47 \pm 0.64$ , which was in the average satisfaction range. There was no remarkable difference in the mean satisfaction scores of female and male subjects ( $P > 0.05$ ). The highest level of satisfaction was associated with "giving necessary explanations by the doctor about the process of gum transplant surgery at the beginning" and "Gum transplant surgery has made it easier for me to maintain hygiene." In addition, the lowest satisfaction level was associated with "duration of pain after surgery" and "color matching of the transplanted gums with adjacent gums." According to the results of this study, the patients who received gum transplants had relatively favorable satisfaction.

**Keywords:** Patients' satisfaction, Free gingival grafting, Sub-epithelial connective tissue, Patients' dissatisfaction

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### Introduction

Two important etiological factors in gingivitis are trauma caused by brushing teeth and periodontal inflammation caused by bacterial plaque. Therefore, the control of these two factors prevents the occurrence and further progress of analysis [1, 2]. In addition, the lack of sufficient width and thickness of the adhesive gum not only causes the gum to be prone to decay, but

it is also important from the point of view of beauty [3, 4]. Various methods are used to increase the width of the gums, of which gum grafting is the most common and has proven its effectiveness in the long term [5]. The types of surgical methods to cover the root surface are in four main groups: free soft tissue grafts, soft tissue-based grafts, GTR technique, and a combination of the above situations [6].

Among the applications of gum grafting, the following can be mentioned: covering the root surface of the tooth to reduce the intensity of sensitivity, and beauty, and increasing the width and thickness of the adhesive gum around the implant and tooth before performing restorative treatments or orthodontic treatment [7]. The advantages of this method include the high success rate and predictability, the simplicity of the surgery, the removal of abnormal frenum during surgery, and the possibility of performing it on several teeth at the same time [8]. Despite the mentioned benefits, gum grafting has many problems such as limited available gum, choosing an inappropriate treatment plan, bleeding, pain, and discomfort of the patient at the graft site, and cosmetic problems due to the lack of harmony of contour and color with the adjacent gum [9, 10].

Satisfaction is a feeling that occurs when a person's need or expectation is met [11, 12]. In treatment systems, if the success of the treatment exceeds the patient's expectations, satisfaction with the result is obtained [13]. The higher the patient's satisfaction, the better and faster the physical and mental recovery and it motivates the patient to carry out the treatment instructions correctly and on time [14, 15].

Patient satisfaction has been considered an important indicator in the evaluation of service quality in America since the 90s. Nowadays, patient satisfaction is considered one of the important indicators in the evaluation of the quality of health services by healthcare organizations, and its evaluation has helped these organizations to improve the quality of their services [16, 17].

Among the most important factors affecting the patient's satisfaction with dental services are the communication and interaction between the dentist and the staff, appointment and waiting time of the patient, the quality of the treatment performed and the way the service is provided, the speed of the dentist's operation and skill, the costs, compliance Infection control, rate of recovery after treatment, easy access to the place of service and overall satisfaction of the individual were mentioned. The importance of good communication between the dentist and the patient is such that in many cases, it affects the dentist's skill [14, 18].

In the field of examining the level of satisfaction of patients with dental services, a study at the University of Louisiana stated that the most important factor of satisfaction is reasonable cost and then the provision of up-to-date services [19]. In Vermynen *et al.*'s study, the overall satisfaction level of patients with the quality of their tooth restoration was high and they recommended the treatment to others [20]. In Hashim's study, the relationship between the level of satisfaction and the

level of education showed that people with a higher level of education had the lowest level of satisfaction with dental services [21]. Since not much research has been done in the field of patients' satisfaction with gum grafting, this study tries to comprehensively examine the possible influencing factors on patient satisfaction with free gingival grafting (FGG) and connective tissue grafting of gingiva (CTG).

## Materials and Methods

The current study was a descriptive study that was conducted on 63 patients (25 men and 35 women) who were candidates for gum transplant treatment. This population was selected by an easy selection method from the available samples.

Inclusion criteria included patients who volunteered to undergo gum transplant treatment in the age range of 18 to 60 years, systemic and mental health, no medical or surgical treatment in the past month, and no pregnancy or breastfeeding. Patients' exclusion criteria included non-cooperation, smoking, alcohol, or inappropriate plaque control.

To collect information, the researcher's questionnaire was used. After checking the face validity, and the content validity, the group of experts was asked to rate each question according to the coordination of each question with the purpose of the study (Lawshe model). In addition, the experts were asked to comment on each of the questions, and if they have any special opinions or suggestions. Then, the questions that scored 2 to 3 were removed or modified, and thus, finally, 17 questions were selected as the final questionnaire. In addition, the test-retest method was used to determine the reliability of the questionnaire questions, and Cronbach's alpha coefficient ( $\alpha=0.92$ ) was calculated. The questions were arranged in such a way that the satisfaction of the patients from different aspects, such as beauty, pain after transplantation, the time elapsed until the return of oral function, and the effectiveness of the treatment were examined separately. In addition, the patient's overall satisfaction with the treatment and its relationship with several influential factors were examined in the form of sub-goals.

Patients who met the inclusion criteria were treated with one of the two methods of free gingival grafting or sub-epithelial connective tissue grafting, and post-operative instructions, including hygiene, soft diet, antibiotic regimen, and painkillers, were given to the patients equally; the first part of the questionnaire, including demographic questions and background information about the treatment performed immediately after surgery, and the second part, including questions related to patient satisfaction, were

completed 2 months after surgery. Likert scale was used to score and determine the satisfaction score of patients. In this way, for each question, three options (a) Yes, I agree, (b) I somewhat agree, and (c) I disagree, were considered.

Scoring was done in such a way that if option (a) was chosen, 3 points were awarded, option (b) was given 2 points, and if option (c) was chosen, 1 point was awarded. Except for questions seven and nine, in which option (a) was given a score of 1, option (b) was given a score of 2, and if option (c) was selected, a score of 3 was awarded. Therefore, a score of 15 to 25 indicates low satisfaction, a score of 26 to 35 indicates moderate satisfaction, and a score of 36 to 45 indicates high satisfaction.

Statistical analysis was done using SPSS version 23 software. To compare the averages in age groups and

educational groups, the ANOVA statistical test was used, to compare the averages in two genders, two locations, city, and village, and to compare the relationship between the average satisfaction score and different economic situations, Spearman's rho correlation coefficient was used. Descriptive methods were also used, including mean, standard deviation, confidence intervals, and independent T-test to compare the two sexes ( $\alpha = 0.05$ ).

## Results and Discussion

The studied population included 63 people with an average age of  $36.34 \pm 10.80$ . 25 patients were male and 38 were female. **Table 1** shows the demographic characteristics of these people.

**Table 1.** Frequency distribution of people participating in the study according to different indicators.

Statistical index		N	%	Mean $\pm$ standard deviation of satisfaction	P-value
Gender	Male	25	39.7	$3.51 \pm 0.64$	0.762
	Female	38	60.3	$3.45 \pm 0.65$	
Level of education	Under diploma	8	12.7	$3.33 \pm 0.89$	0.75
	Diploma	13	20.6	$3.66 \pm 0.52$	
	Associate degree	19	30.2	$3.51 \pm 0.68$	
	Bachelor's degree	16	25.4	$3.47 \pm 0.58$	
	Master's degree	5	7.9	$3.19 \pm 0.73$	
	Ph.D.	2	3.2	$3.24 \pm 0.64$	
Place of residence	City	49	77.8	$3.56 \pm 0.64$	0.048
	Village	14	22.2	$3.17 \pm 0.59$	
Transplant recipient location	Front of the mandible	34	54.0	$3.41 \pm 0.69$	0.087
	Behind the mandible	10	15.9	$3.17 \pm 0.62$	
	Front of the maxilla	12	19.0	$3.82 \pm 0.34$	
	Behind the maxilla	7	11.1	$3.63 \pm 0.63$	
The therapist	2nd-year resident	9	14.3	$2.95 \pm 0.60$	0.006
	3rd-year resident	37	58.7	$3.47 \pm 0.59$	
	Periodontist	17	27.0	$3.77 \pm 0.62$	
Transplant site	Palate	55	87.3	$3.52 \pm 0.63$	0.171
	Tuberosity	4	6.3	$2.91 \pm 0.65$	
	Etc.	4	6.3	$3.35 \pm 0.67$	

Regarding the role of gum grafting in smile beauty, 29 of the participants (42.6%) agreed on the positive effect of gum grafting on beauty. 43 people (68.3%) stated that the problems related to gum transplant surgery were within their expectations and 7 people (11.1%) stated that the problems were more than they expected. Regarding easier hygiene, more than half of the people, i.e. 44 people (69.9%) believed that cleaning the transplanted area has become easier.

30 people (47.6%) stated that gum grafting increased their self-confidence and improved their social behavior. About people's opinions about the reasonableness of the cost of gum transplant, 29 people (46%) said that the cost was acceptable. The frequency distribution of patients' responses to questionnaire questions is shown in **Table 2**. The overall satisfaction score of the patients was calculated as  $3.47 \pm 0.64$ , which was in the average satisfaction range.

Based on the results of the T-test, there was no significant difference between the average satisfaction scores of men ( $3.51 \pm 0.64$ ) and women ( $3.45 \pm 0.65$ )

( $P=0.762$ ). In addition, there was no significant difference between the average satisfaction score of people living in the city and the village ( $P=0.048$ ).

**Table 2.** Frequency distribution of patient responses to satisfaction questions.

The content of the question	Totally agree	Agree	I have no opinion	Opposite	Totally opposite	Mean $\pm$ SD
Gum transplant surgery has had a positive effect on the beauty of my smile	5(7.9%)	24(38.1%)	14(22.2%)	17(27%)	3(4.8%)	$1.07 \pm 3.17$
After the surgery, the color of the transplanted gum has a good match with the adjacent gums	10(15.9%)	17(27%)	18(28.6%)	17(27%)	1(1.6%)	$1.08 \pm 3.28$
After surgery, the edges of the grafted gingiva have a good match with the adjacent gums	17(27%)	17(27%)	16(25.4%)	12(19%)	1(1.6%)	$1.13 \pm 3.59$
The duration of pain after surgery was acceptable	2(3.2%)	22(34.9%)	10(15.9%)	24(38.1%)	5(7.9%)	$1.08 \pm 2.87$
After the surgery, the pain intensity of the part where the graft was removed was tolerable	10(15.9%)	18(28.6%)	19(30.2%)	14(22.2%)	2(3.2%)	$1.09 \pm 3.32$
After the surgery, the pain intensity of the grafted part was tolerable	9(14.3%)	20(31.75)	20(31.7%)	13(20.6%)	1(1.6%)	$1.02 \pm 3.36$
Tooth sensitivity has decreased after gum transplant surgery	13(20.6%)	25(39.7%)	12(19%)	10(15.9%)	3(4.8%)	$1.13 \pm 3.55$
The complications associated with gum graft surgery (such as bleeding, pain, and difficulty eating) have been within my expectations	19(30.2%)	24(38.1%)	13(20.6%)	7(11.1%)	0(0%)	$0.97 \pm 3.87$
Gum transplant surgery has made hygiene easier for me	11(17.5%)	33(52.4%)	10(15.9%)	8(12.7%)	1(1.6%)	$0.96 \pm 3.71$
Gum transplant surgery has had a positive effect on my speaking	8(12.7%)	22(34.9%)	19(30.2%)	12(19%)	2(3.2%)	$1.03 \pm 3.35$
Gum graft surgery made it easier for me to chew food	4(6.3%)	26(41.3%)	26(41.3%)	6(9.5%)	1(1.6%)	$0.81 \pm 3.41$
I am satisfied with the duration of gum transplant surgery	13(20.6%)	27(42.9%)	13(20.6%)	10(15.9%)	0(0%)	$0.98 \pm 3.68$
The cost paid for treatment is acceptable against the therapeutic advantages of transplant surgery	7(11.1%)	22(34.9%)	12(19%)	17(27%)	5(7.9%)	$1.17 \pm 3.14$
Necessary explanations about the process of gum transplant surgery were given to me at the beginning of the work	14(22.2%)	38(60%)	7(11.1%)	3(4.8%)	1(1.6%)	$0.82 \pm 3.96$
My expectations from the gum transplant have been met	14(22.2%)	28(44.4%)	11(17.5%)	8(12.7%)	2(3.2%)	$1.06 \pm 3.69$
Gum transplant surgery has improved my self-confidence and social relationships	14(22.2%)	16(25.4%)	18(28.6%)	14(22.2%)	1(1.6%)	$1.11 \pm 3.44$
To friends and other people who have the same conditions as me; I suggest gum transplant surgery	13(20.6%)	22(34.9%)	22(34.9%)	4(6.3%)	2(3.2%)	$0.99 \pm 3.63$

Based on a one-way analysis of variance, between the average satisfaction score in people treated by second-year residents ( $2.95 \pm 0.60$ ) and third-year residents ( $3.47 \pm 0.59$ ) and periodontist ( $3.77 \pm 0.62$ ) there was a significant difference ( $P = 0.006$ ). In completing the data analysis, the LSD correlation test showed that there was a significant difference between the satisfaction of patients treated by second-year residents compared to third-year residents ( $P = 0.023$ ) and second-year residents compared to periodontists ( $P = 0.002$ ), while there was no significant difference

between the average satisfaction of patients treated by third-year residents and periodontists ( $P = 0.089$ ).

In addition, there was no significant difference between the average satisfaction score of people based on the four regions of the transplant recipient including lower anterior, lower posterior, upper anterior, and upper posterior ( $P = 0.087$ ). The one-way variance test showed that there is no significant difference between the average satisfaction score of the people and the transplant site including palate, tuberosity, and other areas ( $P = 0.171$ ).

In addition, no significant difference was observed in the average satisfaction score of people with different educations including sub-diploma, diploma, post-diploma, bachelor, post-graduate, and doctorate ( $P = 0.75$ ).

Spearman's correlation coefficient showed that there was no significant relationship between satisfaction and the periodontist's work experience ( $r = 0.373$ ,  $P =$

$0.127$ ) and between satisfaction and the patient's age ( $r = 0.026$ ,  $P = 0.841$ ).

In the end, to investigate the effect of different variables on each other, a backward multiple linear model regression analysis was performed on both independent and dependent variables, and the significant results are shown in **Table 3**.

**Table 3.** Regression of satisfaction components according to the variables under investigation.

Kind of satisfied	Variable	Regression coefficient	Standard error	P-value
Satisfaction with beauty	Place of residence (village)	-2.394	0.49	< 0.001
	Link size	-1.146	0.206	< 0.001
	Posterior receptor site	1.43	0.341	0.019
	Front receiver location	0.94	0.519	0.002
	Posterior maxillary receptor site	0	-	-
	Palate	2.405	0.519	0.002
	Etc.	0	-	-
Satisfaction with the amount of pain after surgery	Link size	-0.48	0.147	0.005

According to the analysis, the level of education showed an inverse relationship with satisfaction with the beauty of the transplant. In addition, there was an inverse relationship between graft size and satisfaction with graft beauty. Regarding the place of residence, the villagers were less satisfied than the urban dwellers. The location of the transplant recipient was also related to satisfaction with the beauty of the transplant. In the case of the graft donor area, the regression coefficient was positive so that the satisfaction in the case of the palate donor site was lower than the other two sites.

Regarding pain satisfaction after surgery, an inverse correlation was observed with graft size. Regarding overall satisfaction, only the size of the graft showed an inverse correlation, regardless of the satisfaction with the pain and beauty of the graft. Regarding the overall satisfaction, taking into account the satisfaction with the pain after surgery and the satisfaction with the beauty of the graft, the overall satisfaction of women was lower than that of men. Meanwhile, satisfaction with post-operative pain and satisfaction with transplantation showed a direct relationship with overall satisfaction (**Table 3**).

Patient satisfaction should be considered as the key criterion in dental practices. However, the study on the level of satisfaction of patients undergoing various dental treatments has been done much less compared to other treatment fields. Satisfaction is a multidimensional concept that has been investigated in each study. This research was the first study conducted on the level of satisfaction of patients receiving gum transplants.

The present study, in addition to evaluating the overall satisfaction of referring patients, also examined the factors influencing their satisfaction or dissatisfaction. According to this study, the statement "I was given the necessary explanations about the process of gum transplant surgery at the beginning of the work" had the highest level of satisfaction among the questions in the questionnaire, so that 52 people (82%) marked the option agree and completely agree which showed that the most important factor affecting patient satisfaction, regardless of various factors, was the good interaction between the dentist and the patient, as well as informing the patient about the disease and how to treat it.

The option "gum grafting surgery has made it easier for me to maintain hygiene" with 70% agreeing, shows a high level of satisfaction with the effectiveness of gum grafting, which can be due to the increase in the depth of the vestibule, as well as the increase in the width and thickness of the keratinized gum and the decrease in sensitivity. In addition, patients were favorably satisfied with other options related to the effectiveness of gum grafting, such as "gum grafting surgery has had a positive effect on my speaking" and "gum grafting surgery has made it easier for me to chew food." The options "complications related to gum transplant surgery have met my expectations" (68% agree) and "my expectations from gum transplant have been met" (66% agree) also had a high level of satisfaction among patients, all of which indicate the overall satisfaction level of patients with gum grafting is favorable and considering the lack of significant difference between



these two options and the option “necessary explanations are given before the work” it can be concluded that the explanation before the work and informing the patient about the treatment process, will create realistic expectations and ultimately patient satisfaction.

The least satisfied in this study is related to the statement “the duration of pain after surgery was acceptable” (24 people, 38%), the statement “after surgery, the intensity of pain in the part from which the graft was removed”, in It was tolerable (28 subjects, 44%), and the statement “After surgery, the intensity of pain in the area where the graft was placed was tolerable” (29 agreed, 46%), all of which indicated low satisfaction regarding pain after gum grafting treatment. One of the reasons for the lack of satisfaction, in this case, is that, in most cases, before the treatment, to relax the patient and get the patient's cooperation, dentists describe the amount of pain after the operation as less than the actual level; although pain is unpleasant for the patient in any case. However, the mission of the dentist is not only to treat the current disease but the dentist can be considered successful and efficient in performing his duties when, in addition to treating the disease, he inflicts the least amount of damage and pain on the patient and can reduce the pain after the operation. Today, the use of microsurgery techniques has been able to reduce postoperative pain to some extent. In several studies, the most important patient expectation from dental services aftercare is pain control [22-24].

In addition, statements related to beauty, such as “After surgery, the color of the transplanted gingiva matches well with the adjacent gums” (27 people, 43%) and “Gum transplant surgery has had a positive effect on the beauty of my smile” (29 people, 46%) show a low percentage of satisfaction. One of the most important reasons for the low satisfaction of patients in this field is that most of the transplantation sites are in the front of the mandible and maxilla, which has a great effect on beauty and therefore requires more precision from the therapist. On the other hand, many gum transplant treatments are not originally done to improve beauty, but the goal of the treatment is to increase the keratinized area and help maintain teeth, as well as facilitate plaque control; Perhaps measuring the beauty criteria in such cases is less relevant and it is appropriate to inform the patient in advance of the main goal of the treatment.

The option “The cost paid for the treatment is acceptable compared to the therapeutic advantages of transplant surgery” with 29 agreeable (46%) also showed a low level of satisfaction, which indicates

dissatisfaction with the cost paid. The cost of services is one of the important factors affecting satisfaction. Studies have shown the importance of service rates in patient satisfaction [18, 25-28]. In this regard, Devija *et al.* believe that the relationship between the costs paid by patients and their satisfaction can be affected through insurances that cover medical expenses [29].

In the present study, the level of satisfaction was not related to the gender and education level of the patients. This finding shows the same expectations of both sexes and people with different education levels from medical services. In the study of da Cunha *et al.* a statistically significant difference was observed in the level of satisfaction of women and men in the field of chewing, beauty, and comfort after implant treatment [30]. This difference in the two studies can be due to the cultural and social differences between the two countries or the difference in the age of the patients participating in the two studies and even the difference in the different nature of the two surgeries. In addition, Hamelin *et al.* conducted a study in a hand surgery treatment center, to know the indicators affecting trust and satisfaction in the patient-doctor relationship by distributing questionnaires among 122 patients [31]. Their results showed that people's gender, age, education, and income have no effect on their opinion about the doctor.

Among the limitations of this study, it should be mentioned that the therapists are not the same and their different levels of ability, which can cause errors in checking the overall satisfaction of the clients; therefore, it is suggested that in future studies, the level of satisfaction and the reasons for lack of satisfaction among clients of different medical centers should be evaluated separately. Since this research was the first study conducted in the field of satisfaction of patients receiving gum transplants, and considering the increasing trend of progress in the materials and techniques used in the treatment of gum transplants, it is suggested to evaluate the satisfaction of patients in this field in the form of a course.

## Conclusion

Patients receiving gum grafts showed a relatively favorable level of satisfaction. Considering that in performing any treatment, the occurrence of problems and the high level of expectation of the patients and the failure to estimate it causes dissatisfaction, this level of satisfaction seems to be successful and by examining the factors leading to dissatisfaction, it can be done in the direction of better implementation of gum transplant treatment has taken a step.

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