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ORIGINAL ARTICLE   **FACIAL SURGERY**

Evaluating the Satisfaction of Patients Undergoing Hair Transplantation Surgery Using the FACE-Q Scales

Yang Liu[1] · Fang Liu[1] · Qian Qu[1] · Zhe-xiang Fan[1] · Yong Miao[1] · Zhi-qi Hu[1]

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Abstract

Background It is necessary to evaluate a successful cosmetic procedure from the patients' perspective. FACE-Q is a patient-reported outcome scale for patients undergoing cosmetic procedures. However, currently there are no FACE-Q scales used in the field of hair transplant surgery. This article aims to apply FACE-Q scales to evaluate the satisfaction of patients undergoing hair transplantation surgery.

Methods FACE-Q scales were modified to contain both preoperative and 6-month postoperative self-assessment, including baseline preoperative information of patients (such as age, family history of alopecia, Hamilton' alopecia grade),preoperative self-assessment (satisfaction with appearance, the preoperative visual age, expected visual age) and postoperative self-assessment (satisfaction with appearance, postoperative visual age, satisfaction with decision, psychological well-being and social function). Besides, early life impact and recovery early symptoms were also re-evaluated.

Results The mean difference between the 6-month satisfaction with appearance and baseline scores showed a significant increase of 29.62 (baseline, 46.97; 6-month, 76.59; $P < 0.001$) and patients perceived they appeared 5.81 years younger after surgery ($P < 0.001$). Postoperative satisfaction with appearance has no significant relevance with gender ($P = 0.460$), age ($P = 0.529$), marriage ($P = 0.811$) or family history of alopecia ($P = 0.641$). However, income ($P = 0.003$), educational level ($P = 0.003$), the purpose of hair transplantation ($P = 0.018$) and early life impact ($P = 0.002$) were shown to have a significant impact on satisfaction with appearance.

Conclusions The FACE-Q scales are a valid and reliable patient-reported outcome tool for patients undergoing hair transplantation and can be widely used to evaluate the satisfaction of patients undergoing such surgery.

Level of Evidence IV This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Hair loss · Hair transplantation · FACE-Q scales · Patient satisfaction · Patient-reported outcome

Yang Liu and Fang Liu contributed equally to this work and should be considered co-first authors.

Yong Miao and Zhi-qi Hu contributed equally to this work and should be considered co-corresponding authors.

✉ Yong Miao
  13265031995@163.com

✉ Zhi-qi Hu
  huzhiqidr@163.com

[1] Department of Plastic and Aesthetic Surgery, Nan Fang Hospital of Southern Medical University, 1838 North Guangzhou AV, Guangzhou 510515, Guangdong Province, China

Introduction

Hair loss affects millions of people worldwide. While there are many potential diagnoses for the condition, the most frequently encountered diagnosis is androgenetic alopecia (AGA). An estimated general population of up to 70% of men and 40% of women will experience some degree of AGA in their lifetime [1]. Contemporary hair transplant

surgery offers results that are natural and undetectable, making it an excellent option of treatment for male and female pattern hair loss [2].

The key to a successful cosmetic dermatologic procedure is patient satisfaction. The ability to detect clinically meaningful change from the perspective of the patient is critical to evaluating satisfaction levels [3, 4]. Effective quantitative instruments for patient-reported outcomes are therefore needed to objectively demonstrate the impact and efficacy of cosmetic procedures. A comprehensive set of scales, called the FACE-Q scales, was subsequently developed to measure outcomes in facial aesthetic patients.

Details of the development of the FACE-Q have been previously published [5]. This patient-reported outcome measure utilizes several assessment scales to evaluate satisfaction with facial appearance, health-related quality of life and satisfaction with the process of care. To date the FACE-Q scales have been used to evaluate the effectiveness of many kinds of plastic surgery, such as facial cosmetic operation, minimally invasive cosmetic procedure and facial injection [6].

However, there are no FACE-Q scales used in the field of hair transplant surgery. To address the lack of available patient-reported outcome tools for patients who undergo hair transplant surgery, our research developed reformative FACE-Q scales that are suitable for hair transplantation patients. Retrospective research was then conducted to evaluate the effect of hair transplantation and its impact on patient satisfaction.

Methods

Research Design

This study aimed to evaluate the efficacy of hair transplantation by the FACE-Q scales, evaluate the role of the FACE-Q scale in assessing the degree of satisfaction of hair transplant patients and, most importantly, investigate the factors that may affect patient satisfaction after surgery.

AGA, cosmetic hair grafting (such as hairline adjustment and beauty tip planting) and cicatricial alopecia were included in this study. Eyebrow and eyelash planting were excluded. Different types of hair transplantation were grouped to observe the effects of hair transplantation types on patient satisfaction. The FACE-Q scales were sent via email to 168 patients who received hair transplantation in the Plastic and Aesthetic Surgery Department of Nan Fang Hospital from 2016 to 2017 for postoperative follow-up. Follicle unit extraction (FUE) was chosen for all hair transplant operations since it caused less surgical trauma and faster recovery than follicle unit transplant (FUT).

This study has been approved by the local ethics review committee and meets ethical requirements.

FACE-Q Scales Design

Considering the difference between hair transplantation and traditional facial plastic surgery, the original FACE-Q scales were modified by deleting appraisal content related to facial rejuvenation, adding evaluating indicators that were all based on hair appearance, such as visual age, psychological functions and operation complication [7]. The preoperative and 6-month postoperative self-assessments were included to determine whether the surgery had any real effect on visual age. Specifically, there are the preoperative normal information of patients (such as gender, age, family history of alopecia, educational level, personal disposable annual income, alopecia level in Norwood–Hamilton grade and the purpose of hair transplantation), the preoperative self-assessment (satisfaction with appearance, the preoperative visual age, expected visual age) and the postoperative self-assessment (satisfaction with appearance, postoperative visual age, satisfaction with decision, psychological well-being, social function, early life impact and recovery early symptoms).

Data Collection and Statistics

A total of 131 patients were included in this research, whose relevant evaluating indicators included preoperative and postoperative information. Preoperative information included demographic indicator (gender, age, marriage, educational level and personal disposable annual income) and information related to alopecia (family history of alopecia, alopecia level in Norwood–Hamilton grade, the purpose of hair transplantation, the hair related visual age and expected visual age).

Based on Rasch measurement theory [8, 9], the postoperative information has been compiled into tables, including satisfaction with decision, psychological well-being and social function, early life impact and recovery early symptoms, in the last, the preoperative and postoperative satisfaction with appearance (Tables 2, 3, 4).

Statistical Analysis

The data were analyzed by using SPSS 23.0 statistical software, and the T test was used to compare preoperative and postoperative satisfaction that contains satisfaction with appearance and evaluation of the visual age. A P value < 0.05 was thought to have statistically significance. Finally, logistic regression analysis was used to analyze the impact of the preoperative normal information

of patients (such as gender, age and educational level) on postoperative patient satisfaction.

Results

Evaluation of the Postoperative Patient Satisfaction

A total of 131 patients who underwent hair transplantation surgery were involved in this study. Patient preoperative information is shown in Table 1. Postoperative patient satisfaction results were subdivided into three sections, which are progressively related.

Satisfaction with decision, psychological well-being and social function all showed positive results. More than half of the patients agreed with such improvement after surgery (Table 2). Significantly, 81.7% of patients thought the improvement in social function was achieved and 54% of the patients even indicated that the improvement was obvious.

Early life impact (such as sleep, bath, study, work, travel) and recovery early symptoms (such as severe hair loss, scalp itching, dandruff) are two important indicators of

postoperative satisfaction [10]. Patients with smaller early life impact and less recovery early symptoms were found to have better recovery and higher postoperative satisfaction [11]. It is not difficult to see from the data that 78.6% of patients had no inconveniences or only occasionally felt inconveniences of early life after surgery. Mild recovery early symptoms were experienced by 39.7% of patients, whereas 45.8% reported no significant complications (Tables 3, 4).

A majority (69.4%) of patients were unsatisfied with the appearance of their hair before surgery, and only 6.9% of patients showed a positive attitude in the preoperative satisfaction with appearance. On the contrary, there were only 12.2% of patients who still showed discontent with their appearance 6 months after surgery, whereas 87.8% of patients felt satisfied (Table 5).

Hair Transplantation Significantly Improves Patients' Satisfaction with Appearance

The evaluation of satisfaction with appearance was conducted via Rasch scale [12], with "strongly satisfied" being given a score of 76–100, "satisfied" scoring 51–75,

Table 1 Preoperative information of patients

Characteristics	Grade	Frequency	n (%)
Age	21–30	65	49.6
	31–40	42	32.1
	41–50	24	18.3
Marriage	Unmarried	66	50.4
	Married	65	49.6
Gender	Male	99	75.6
	Female	32	24.4
Educational level	Below high school	11	8.4
	High school	16	12.2
	University degree	70	53.4
	Postgraduate	34	26.0
Income	Less than 30,000	17	13.0
	3–50,000	41	31.3
	5–100,000	33	25.2
	100,000 and above	40	30.5
Family history of alopecia	Yes	65	49.6
	No	66	50.4
Alopecia level in Norwood–Hamilton grade	1	12	9.1
	2	22	16.8
	3	48	36.7
	4	35	26.7
	5	14	10.7
The purpose of hair transplantation	Androgenetic alopecia	75	15.3
	Cicatricial alopecia	36	27.5
	Cosmetic hair grafting	20	57.3

Table 2 Satisfaction with decision, psychological well-being and social function

	Fully agree (4)	Partially agree (3)	Disagree (2)	Deeply disagree (1)
Satisfaction with decision	67 (51.1%)	26 (19.8%)	28 (24.1%)	10 (7.6%)
Psychological well-being	55 (42.0%)	36 (27.5%)	27 (20.6%)	13 (9.9%)
Social function	71 (54.2%)	36 (27.5%)	14 (10.7%)	10 (7.6%)

Table 3 Early life impact

Early life impact	Never (0)	Occasionally (1)	Frequently (2)	Always (3)
	35 (26.7)	68 (51.9)	18 (13.7)	10 (7.6)

Table 4 Recovery early symptoms

Recovery early symptoms	None (0)	Mild (1)	Moderate (2)	Severe (3)
	60 (45.8)	52 (39.7)	17 (13.0)	2 (1.5)

Table 5 Preoperative and postoperative satisfaction with appearance

Satisfaction with appearance	Strongly unsatisfied	Unsatisfied	Satisfied	Strongly satisfied
Preoperative	37 (28.2%)	54 (41.2%)	31 (23.7%)	9 (6.9%)
Postoperative	1 (8%)	15 (11.5%)	49 (37.4%)	66 (50.4%)

"unsatisfied" scoring 26–50 and "strongly unsatisfied" scoring 1–25. In the questionnaire, patients could fill in any number between 1 and 100.

The research indicated that the mean difference between 6-month satisfaction with appearance and baseline scores showed an increase of 29.62 (baseline, 46.97; 6-month, 76.59), which was statistically significant ($P < 0.001$). From the patients' point of view, visual age was significantly decreased 6 months after hair transplantation. They appeared 5.81 years younger after surgery ($P < 0.001$). Nevertheless, this study shows that there was indeed a statistical difference between them ($P < 0.001$) (Table 6). Therefore, hair transplantation is an effective way to increase patients' satisfaction with appearance and freshen up their appearance, although it did not fully meet the patient's expectations.

Preoperative and Postoperative Factors Impact Satisfaction with Appearance After Surgery

Logistic regression analysis was performed to evaluate the factors influencing satisfaction with appearance of hair transplant patients. Differences were considered significant if $P < 0.05$ plus lower bound and upper bounds are both positive and negative. Among them, if both lower and upper bounds are positive, this factor has a positive effect. Likewise, if both of them are negative, this factor has a negative effect (shown in Table 7). In general, this study suggested that postoperative satisfaction with appearance had no significant relevance with gender ($P = 0.460$), age ($P = 0.529$), marriage ($P = 0.811$), family history of alopecia ($P = 0.641$). However, income ($P = 0.003$), educational level ($P = 0.003$), the purpose of hair transplantation ($P = 0.018$) and early life impact ($P = 0.002$) were shown to have a significant impact on satisfaction with appearance (Table 7).

Table 6 Comparison of patients' satisfaction before and after hair transplantation

	Satisfaction with appearance		Visual age		d_{y2}	
	Mean	SD	Mean	SD	Mean	SD
Preoperative	46.97	20.540	36.99	7.291	29.60[a]	6.687
Postoperative	76.59	14.157	31.18	6.798	31.18[b]	6.798
T	− 15.838		14.151		− 5.764	
P	< 0.001		< 0.001		< 0.001	

[a]Preoperative visual age

[b]Postoperative visual age

Table 7 Logistic regression analysis of influencing factors on satisfaction with appearance of hair transplant patients

Items		Pre-procedure satisfaction with appearance				Post-procedure satisfaction with appearance			
		Estimate	P	95% confidence interval		Estimate	P	95% confidence interval	
				Lower bound	Upper bound			Lower bound	Upper bound
Gender	Male	.373	.250	− .262	1.007	.691	.132	− .209	1.590
	Female	0	0	0	0	0	0	0	0
Age	21–30	.137	.701	− .561	.835	− .149	.761	− 1.109	.811
	31–40	.223	.478	− .392	.837	− .071	.877	− .968	.827
	41–50	0	0	0	0	0	0	0	0
Marriage	Married	− .417	.116	− .937	.103	− .254	.468	− .940	.432
	Unmarried	0	0	0	0	0	0	0	0
Family history	No	.305	.269	− .236	.845	.118	.752	− .615	.851
	Yes	0	0	0	0	0	0	0	0
Education level	Below high school	− .436	.381	− 1.413	.541	− 1.987	.001	− 3.159	− .815
	High school	− .212	.592	− .988	.564	− .136	.786	− 1.118	.846
	University degree	.040	.878	− .465	.544	− .280	.431	− .978	.417
	Postgraduate	0	0	0	0	0	0	0	0
Income	Less than 30,000	− .326	.392	− 1.073	.421	− 1.015	.025	− 1.901	− .128
	3–50,000	− .248	.428	− .860	.365	− .143	.716	− .916	.629
	5–100,000	.212	.446	− .333	.756	.121	.766	− .676	.918
	100,000 and above	0	0	0	0	0	0	0	0
Purpose	Cicatricial alopecia	.392	.285	− .327	1.111	1.648	.016	.313	2.982
	Cosmetic hair grafting	.449	.141	− .149	1.048	.234	.581	− .598	1.066
	Androgenetic alopecia	0	0	0	0	0	0	0	0
Alopecia grade	Level 1	3.045	.002	1.116	4.973	2.016	.095	− .351	4.383
	Level 2	2.209	.010	.521	3.898	1.941	.055	− .041	3.923
	Level 3	.373	.666	− 1.322	2.069	4.887	.000	2.468	7.305
	Level 4	.744	.396	− .972	2.460	4.380	.000	2.050	6.710
	Level 5	0	0	0	0	0	0	0	0
Complication	None					− .679	.552	− 2.912	1.555
	Mild					− .505	.654	− 2.713	1.703
	Moderate					− .829	.469	− 3.072	1.415
	Severe					0	0	0	0
Life impact	Never					2.218	.000	1.029	3.408
	Occasionally					1.529	.002	.551	2.507
	Frequently					1.018	.065	− .064	2.099
	Always					0	0	0	0

The data showed that preoperative demographically related factors influence postoperative satisfaction. Patients with an educational level below high school had the lowest postoperative satisfaction ($P = 0.001$). As for the personal disposable annual income, it is intriguing to know that patients with the lowest income had the lowest postoperative satisfaction ($P = 0.025$). Among the three different reasons for hair transplantation, patients with cicatricial alopecia had the highest postoperative satisfaction ($P = 0.016$). For AGA patients, a 3–4 alopecia level in the Norwood–Hamilton grade tended to have relatively higher postoperative satisfaction with appearance than patients with other alopecia levels.

Other than preoperative factors, postoperative factors, such as early life impact also related to postoperative satisfaction with appearance. Patients having no or little impact to their daily life after hair grafting had higher postoperative satisfaction with appearance compared to those whose daily life had been adversely affected.

Preoperative and Postoperative Factors Have no Impact on Psychological Well-Being, Social Function and Satisfaction with Decision

Psychological state also has an impact on the outcome of hair transplantation. Three indicators (psychological well-being, social function and satisfaction with decision) were chosen as an ancillary to evaluate patient satisfaction after hair transplantation. However, no statistically significant differences were found, although the related factors before surgery may have had a slight influence on psychological well-being, social function and satisfaction with decision.

Discussion

Satisfaction with appearance and improving the quality of life are arguably the most important outcomes for the patient undergoing aesthetic procedures [13, 14]. The FACE-Q scales were designed to address the lack of available patient-reported outcome tools applicable to facial aesthetics patients. The set of FACE-Q scales can be incorporated into research and/or routine clinical practice to better understand the recovery process and quality-of-life impact of facial aesthetics procedures and what patients think about their decision to undergo surgery [15].

According to the previous research, this scale can be used to compare outcomes across any procedure type and/or to measure change before and after any facial aesthetic procedure [16]. The scale originally used for facial surgery was modified, and a set of FACE-Q scales suitable for hair transplantation was designed to address the lack of available patient-reported outcome tools for patients who undergo hair transplantation.

Patient baseline data were collected before the operation and postoperative information was collected 6 months after the operation. Patients' satisfaction with appearance and their visual age were recorded before and after hair transplantation, and the data were collected and statistically analyzed. As expected, FACE-Q could accurately reflect the changes of patient satisfaction before and after operation. The postoperative satisfaction of patients who received hair transplantation was significantly higher than satisfaction before surgery ($P < 0.05$).

In addition, an early life impact and recovery early symptoms checklist was made based on the patient recovery information 6 months after the operation, which was useful for identifying the proportion of patients experiencing post-surgical symptoms. The data can help doctors develop reasonable and individual postoperative nursing programs to prevent or effectively cope with the common complications that may occur after the operation. Thus, the quality of life in the early postoperation could be improved. These measures are indispensable to improve the overall satisfaction of patients.

Finally, factors affecting patient satisfaction were evaluated by comparing the preoperative data and postoperative recovery data. Data were analyzed using the level of patient satisfaction. Results indicate that income level ($P = 0.003$), education level ($P = 0.003$), surgical purpose ($P = 0.018$), alopecia grade and impact on early postoperative life ($P = 0.002$) were all statistically significantly related to patients' overall satisfaction. In addition, the closer the patient's visual age to the preoperative expectation level, the higher their satisfaction level.

These data can be applied to clinical practice in which the surgeons can predict the final patient satisfaction based on preoperative patient information by the FACE-Q scales. In that case, surgeons can help and explain to the patient, and to understand the effect of the operation more clearly in advance and adjust the expectation of the operation, which may avoid any dispute after the operation [17, 18]. There have been previous articles that mentioned some psychological factors (such as relational or familial disturbances, an obsessive personality and a narcissistic personality) that can also affect patient satisfaction after cosmetic surgery [19]. A further larger sample trial needs to be carried out to study factors influencing patient satisfaction.

This study also has some limitations. In addition to the sample size mentioned above, there are some details worth exploring. First of all, it is difficult to control the use of hair growth-promoting drugs around hair transplantation surgery. Such drugs may have a certain effect on the preoperative hair condition and the final outcome after surgery. In fact, only 29% of patients had never used hair related drugs around surgery. Second, although the return rate of the scale is relatively high, it still did not meet expectations. Therefore, we are planning to adjust the existing form of scale dispensing and use the face-to-face follow-up form to get a higher response in the following research.

Conclusions

Hair transplantation has evolved from follicular unit transplantation (FUT) to follicular unit extraction (FUE), resulting in less surgical trauma and faster recovery [20, 21]. Technological innovation has brought about an improvement in the effectiveness of the operation and corresponding improvement in patient satisfaction. Thus, the incorporation of a patient-reported outcome instrument can help us understand the profound impact that transplantation surgery has on the appearance and quality of life of patients. Based on the development of FACE-Q and this experimental data, our scale is a valid and reliable tool for

evaluating the outcome of hair transplantation from the patient's point of view. Relevant research has shown that the combination of patient-reported outcomes and clinical practice could improve patient–clinician communication and enhance patient outcomes [22–24].

In addition, FACE-Q scales also reflect some relevant information of patients before the operation, part of which correlated with the patient's postoperative satisfaction to some degree according to our data. Therefore, our scales can also help the surgeons to predict patients' postoperative satisfaction based on their information before the operation and adjust patients' expectations or therapeutic regime during the preoperative conversation.

In summary, the FACE-Q scales can be widely used to evaluate satisfaction in patients undergoing hair transplantation and have the potential to be an evidence-based approach to assess the effectiveness of this kind of surgery.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical Approval All experiments are endorsed by the Ethics Committee of Southern Medical University and complied with the Declaration of Helsinki.

Informed Consent No informed consent was required because data were going to be analyzed anonymously.

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