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Factors Associated with Treatment Outcome Satisfaction Six Months after Upper Blepharoplasty: A Large Cohort Study

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Background: Upper blepharoplasty is the most popular facial cosmetic surgery. Although there are a variety of reasons to undergo this procedure, all patients expect an optimal cosmetic result. However, little is known about the factors that influence satisfaction with treatment outcome.

Objectives: We assessed to what extent patient characteristics, clinician-rated and postsurgical outcome measures, and patient-reported satisfaction with facial appearance and quality-of-life are associated with patient-reported satisfaction with treatment outcome after a primary upper blepharoplasty.

Methods: This study was performed in 583 patients with an upper blepharoplasty between 2016 and 2021. The primary outcome was satisfaction with treatment outcome 6 months postoperatively using the FACE-Q. Determinants were baseline patient characteristics (demographics), preoperative and postoperative clinician-rated and surgical outcome measures, and preoperative and postoperative FACE-Q appearance and quality-of-life scales. Hierarchical linear regression analysis was used to determine how much of the variance in satisfaction with outcome could be explained by these groups of determinants.

Results: A total of 63% of the variance could be explained by the five groups of determinants of which 8% was explained by the baseline patient characteristics and clinician-rated and patient-reported outcomes together, another 8% by the postoperative clinician-rated outcomes, and the remaining 47% by the postoperative patient-reported outcomes.

Conclusions: Patient characteristics, clinician-rated outcome measures, and baseline FACE-Q appearance and quality-of-life scores were of limited value in explaining satisfaction with treatment outcome. However, the postoperative FACE-Q appearance scale and the decision to undergo a blepharoplasty were strongly associated with satisfaction with treatment outcome. *(Plast Reconstr Surg Glob Open 2023; 11:e5260; doi: 10.1097/GOX.0000000000005260; Published online 14 September 2023.)*

INTRODUCTION

Upper blepharoplasty is the most popular cosmetic surgery of the face. In 2020, it was ranked first of all facial aesthetic plastic surgical procedures performed worldwide.[1]

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The reasons to undergo this procedure vary from cosmetic, functional, or both combined.[2,3] Regardless of these different reasons, all patients expect an optimal cosmetic result.

Previous studies often focused on surgical techniques, functional outcomes, and clinician-rated outcomes. However, it is crucial to understand treatment outcomes from the patient's perspective, especially in elective surgery.[2,4–6] Patient-reported outcomes such as patient satisfaction and quality of life are important measures of treatment outcome within the framework of patient-centered care.[7] Introducing routine outcome

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measurement to ensure quality of care can achieve multiple goals, such as improving expectation management, treatment guidance, patient satisfaction, and treatment outcomes.[6,8,9]

To measure treatment outcomes from the patient perspective, a patient-reported outcome measure (PROM) called the FACE-Q Aesthetics was developed for a wide range of facial aesthetic procedures.[9] The FACE-Q consists of multiple independently functioning and validated scales that measure important concepts for facial aesthetic patients.[9] Since the blepharoplasty patient population can have both functional and cosmetic motivations, it is important to measure both appearance-related and quality-of-life outcomes, which can be assessed with different FACE-Q scales.[10]

To improve patient satisfaction after blepharoplasty, a better understanding must be created of the associated variables, as well as assessment of what determines the outcomes of the individual patient.[11,12] Therefore, this study aims to assess which patient characteristics, clinician-rated outcome measures (CROMs), postsurgical outcomes, and PROMs are associated with patient satisfaction with treatment outcome after primary upper blepharoplasty.

Takeaways

Question: Which patient characteristics, clinician-rated outcomes, postsurgical outcomes, and PROMs are associated with patient satisfaction with treatment outcome after primary upper blepharoplasty?

Findings: Eight percent of outcome variance was explained by patient demographic characteristics and baseline clinician-rated and patient-reported outcomes taken together, another 8% by postoperative clinician-rated outcomes, and the remaining 47% by postoperative patient-reported outcomes, adding up to 63% explained variance.

Meaning: The studied baseline variables are of limited value in explaining outcome satisfaction. Potentially, contextual components, such as the patient–clinician relationship, the service and communication quality, patient's mindset, and expected treatment benefits, play a role in explaining the satisfaction with treatment outcome.

METHODS

Study Design and Setting

This multicenter observational cohort study was performed at eight practice sites of the Velthuis Clinic in The Netherlands. All patients who underwent a primary bilateral upper blepharoplasty between January 2016 and June 2021 were invited to complete questionnaires as part of ongoing routinely collected data. If patients agreed to participate, they received questionnaires by email after their first consultation and 6 months postoperatively, with a maximum of three reminders. This study is reported following the Reporting of Studies Conducted using Observational Routinely Collected Data (RECORD) guidelines.[13]

Participants

All blepharoplasties were performed by transcutaneous skin resection with an additional small strip of orbicularis oculi muscle based on the newly formed fold. Fat resection was indicated if fat prolapse was observed perioperatively. Patients were excluded if (1) no informed consent was given; (2) another facial procedure (eg, browlift, facelift, ptosis correction) was performed simultaneously or during 6 months postsurgery; and (3) preoperative and postoperative questionnaires or photograph documentation were incomplete. This study was approved by the local medical ethical review committee (2020-6680), following the guidelines of the Declaration of Helsinki.

Data Collection

Baseline Demographics

Before the first consultation, patients received an intake questionnaire regarding sociodemographic characteristics including age, gender, body mass index (BMI), smoking status, and cosmetic procedures in the past. Patients were categorized as smokers if they were currently smoking or if they quit smoking less than 6 weeks before surgery due to the negative effects on wound healing.[14]

FACE-Q Aesthetics

The FACE-Q Aesthetics is a PROM that is designed to evaluate surgical aesthetic facial treatment.[9] This study used three scales from the appearance domain (scales 1–3) and five scales from the quality-of-life domain (scales 4–8).[7,10] Each scale consists of multiple items and was scored on a four-point Likert scale. Subsequently, the sum score for each scale was calculated and Rasch-transformed to a score ranging from 0 to 100. Higher scores reflected a better outcome.[15]

1. Satisfaction with eyes: measures satisfaction with the appearance of eyes.
2. Appraisal of upper eyelids: measures how bothered someone is by the appearance of their upper eyelids.
3. Satisfaction with facial appearance overall: measures satisfaction with the appearance of the entire face.
4. Psychological well-being: measures psychological function.
5. Aging appearance appraisal: measures how a respondent feels about the age their face looks.
6. Age appraisal visual analog scale (VAS): measures perceived age in comparison to chronological age on a VAS that runs from −15 to +15 years.
7. Satisfaction with decision: measures satisfaction with their decision to undergo a facial procedure.
8. Satisfaction with outcome: measures satisfaction with the result of a facial procedure.

All scales were completed preoperatively and 6 months postoperatively, to evaluate the progress of the procedure, except for scales 7 and 8 which were completed only at 6 months postoperatively. The 6 months follow-up duration

was based on the alignment of clinical follow-up and previous research observing stable treatment outcomes between 6 and 12 months of follow-up.[16]

The primary outcome measure was the satisfaction with outcome scale, because these items measured satisfaction with general statements regardless of the main reason to undergo this treatment and do not focus on appearance or function only.

CROMs and Postsurgical Outcomes

The patients' records were analyzed for standardized preoperative and 6 months postoperative CROMs, photograph documentation, complications (eg, infection, lagophthalmos, wound dehiscence), patient dissatisfaction during postoperative checks (eg, undercorrection, asymmetry) or revisions within the follow-up time. The list of variables of the patients' records can be found in Supplemental Digital Content 1. (**See table, Supplemental Digital Content 1**, which shows potential predictors/variables, **http://links.lww.com/PRSGO/C765**.)

A total of five view-standardized head photographs (frontal, anterior/posterior, and lateral) were taken during the first consultation and approximately 6 months postoperatively. The postoperative photographs were scored based on the cosmetic appearance in comparison with the preoperative photographs using a VAS score (range 0–10). A higher score indicated a greater cosmetic outcome. Trained by an experienced plastic surgeon (D.J.O.U.), the first 50 photographs were independently scored by two junior scientists (L.S.H., K.P.L.). The intraclass correlation coefficient observed moderate interrater reliability. Subsequently, the photographs were divided to be scored by one of the junior scientists while being blinded from the PROMs.

Statistical Analyses

A complete case analysis was performed including patients with completed questionnaires and CROMs.

Multivariable hierarchical linear regression analysis was performed to explain the variance in satisfaction with outcome by the independent variables, which were grouped in five sets: (1) patient characteristics, (2) preoperative CROMs, (3) preoperative FACE-Q scores, (4) postoperative CROMs with postsurgical outcomes, and (5) postoperative FACE-Q scores. Postoperative variables could contribute to expectation management since these variables are of visual support during the first consultation where the achievable outcome will be shown by the surgeon while the patient looks into a mirror.

Because a total of 49 variables were collected, interpretability of the hierarchical linear regression analysis was enhanced by variable selection using least absolute shrinkage and selection operator regression analysis. Variables with zero coefficients were omitted from the model, and variables with nonzero coefficients were added to the model in stages, to assess the relative contribution of each set of variables to the 6 months postoperative satisfaction with outcome. The sequence of stages of variable sets was based on previous literature and their relationship with satisfaction.[17–20] In addition, the variable sets were added separately based on time points (ie, baseline and 6 months postoperatively) to understand how strong preoperative variables influence the variance in satisfaction with the treatment outcome in comparison with the variables postoperatively.

The regression model was initiated by adding baseline patient characteristics. In the second step, the CROMs at baseline were added. In the third step, the baseline FACE-Q scores were entered. In the fourth step, the CROMs at 6 months postoperatively with postsurgical outcomes were included, and in the fifth and last step, the FACE-Q scores 6 months postoperatively were added.

For each independent variable, the regression coefficient (B) with corresponding 95% confidence intervals and standardized regression coefficient (β) were reported. The β allows for comparison of the strength of associations when the independent variables were measured on different scales. The explained variance (R^2), the explained variance adjusted for number of variables in the model (adjusted R^2), and the significance of F-change are reported for each step. Multicollinearity between variables was examined using the variance inflation factor and interpreted as suggested by James et al.[21]

Since participation in the routine outcome measurement was voluntary, missing data were expected. Therefore, a nonresponder analysis was performed to see whether patient characteristics and the preoperative scores from patients who completed all questionnaires with available photograph documentation (complete cases) were different from patients who only completed the baseline questionnaires (noncompleters). *T* tests were used for normally distributed continuous data and Mann-Whitney-Wilcoxon tests for nonnormal continuous distributed data. Chi-square statistics were deployed for categorical data. Effect sizes were calculated to report the substantive significance, interpreted according to Cohen's criteria (0.2, small; 0.5, medium; 0.8, large) for numeric variables and according to Cliff's delta criteria (0.147, small; 0.33, medium; 0.474, large) for categorical variables.

Statistical analyses were performed using R, version 3.6.3 (R Foundation for Statistical Computing, Vienna, Austria). For all tests, a *P* value of less than 0.05 was considered statistically significant. To handle the problem of multiple comparisons, a Bonferroni-corrected *P* value of less than 0.002 (0.05 divided by the 26 variables of the hierarchical regression analyses) was considered statistically significant for the hierarchical regression analyses.[22]

RESULTS

Between January 2016 and June 2021, 7399 patients underwent a primary upper blepharoplasty. In total, 4906 patients (66%) were excluded because they did not provide informed consent, had missing baseline questionnaires, or underwent another facial cosmetic treatment simultaneously or within the follow-up period.

Of the 2477 eligible patients, 963 patients (response rate 39%) completed all questionnaires. However, 380 patients had incomplete photograph documentation which resulted in missing VAS score. This led to an enrollment of 583 patients in this study (Fig. 1).

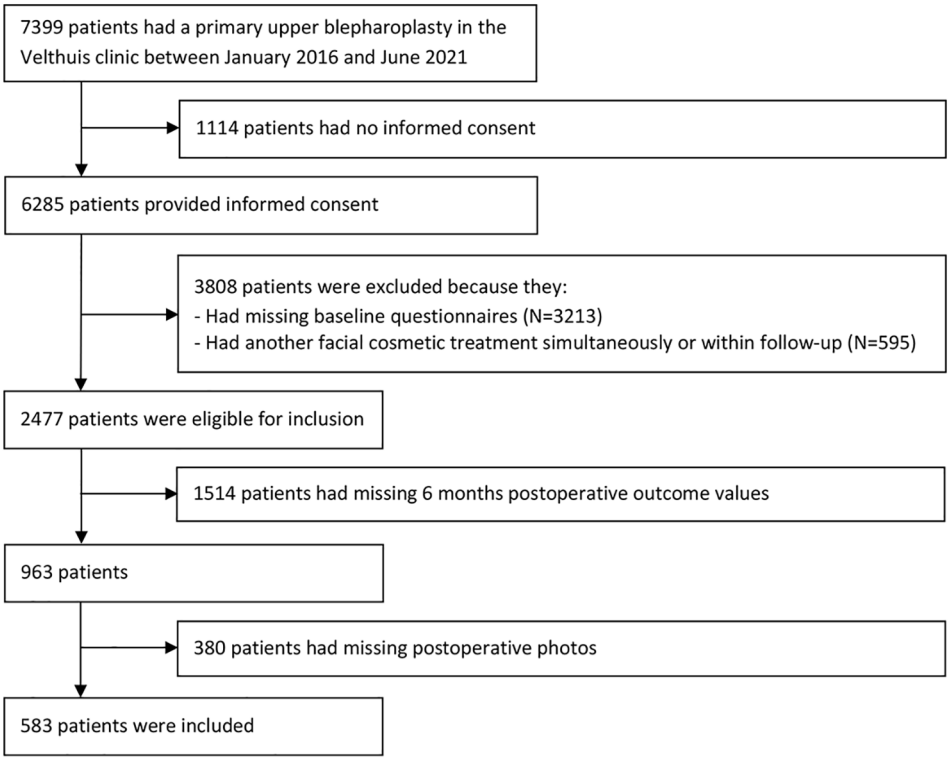

Fig. 1. Flowchart of patient inclusion.

Table 1. Baseline Patient Characteristics (N = 583)

Variable	N (%)
Gender, female	484 (83.0)
Age (y)*	53.64±9.19
BMI (kg/m²)†	24.70 [22.50, 27.15]
Smokers	73 (12.5)
Cosmetic surgery in the past	90 (15.1)

*Mean (±SD).
†Median [IQR].

PATIENT CHARACTERISTICS

The mean patient age was 53.6±9.2 years (range 22–89) (Table 1). In total, 83.0% of patients were female.

MULTIVARIABLE LINEAR REGRESSION MODEL

The least absolute shrinkage and selection operator regression analysis resulted in a selection of 26 variables of interest out of 49 variables. Two of five variables of the patient characteristics set were selected. Six of 14 of the preoperative and eight of 14 of the postoperative CROMs variables were selected, as well as one of three of the postsurgical set, four of six of the preoperative PROMS, and five of seven of the postoperative set (all selected variables are shown in **Supplemental Digital Content 1, http://links.lww.com/PRSGO/C765**).

Model 1: Influence of Patient Characteristics

The first model showed that gender and age were not significantly associated with treatment satisfaction. These variables explained only 1% of the variance. (**See table 2, Supplemental Digital 2**, which describes model 1, **http://links.lww.com/PRSGO/C766.**)

Model 2: Model 1 Plus Preoperative CROMs

After taking patient characteristics into account, the preoperative CROMs explained 4% of the variance in satisfaction with outcome (**Supplemental Digital Content 2,** model 2, **http://links.lww.com/PRSGO/C766**). None of these variables were significantly associated with the outcome. (**See table, Supplemental Digital Content 2**, **http://links.lww.com/PRSGO/C766**.)

Model 3: Model 2 Plus Baseline PROMs

Baseline PROMs were associated with satisfaction with outcome (**Supplemental Digital Content 2,** model 3, **http://links.lww.com/PRSGO/C766**). Lower satisfaction with the appearance of the upper eyelids (B = –0.18; β = –-0.14) and a higher score on psychological well-being (B = 0.18; β = 0.16) were significantly related to higher satisfaction with treatment outcome. An additional 4% of the variance in satisfaction with outcome was explained by adding baseline PROMs.

Model 4: Model 3 Plus Postoperative CROMs

After adding postoperative CROMs, in particular, a greater score on psychological well-being (B = 0.18; β = 0.16) was significantly related to higher satisfaction with outcome (**Supplemental Digital Content 2,** model 4, **http://links.lww.com/PRSGO/C766**). For postoperative CROMs,

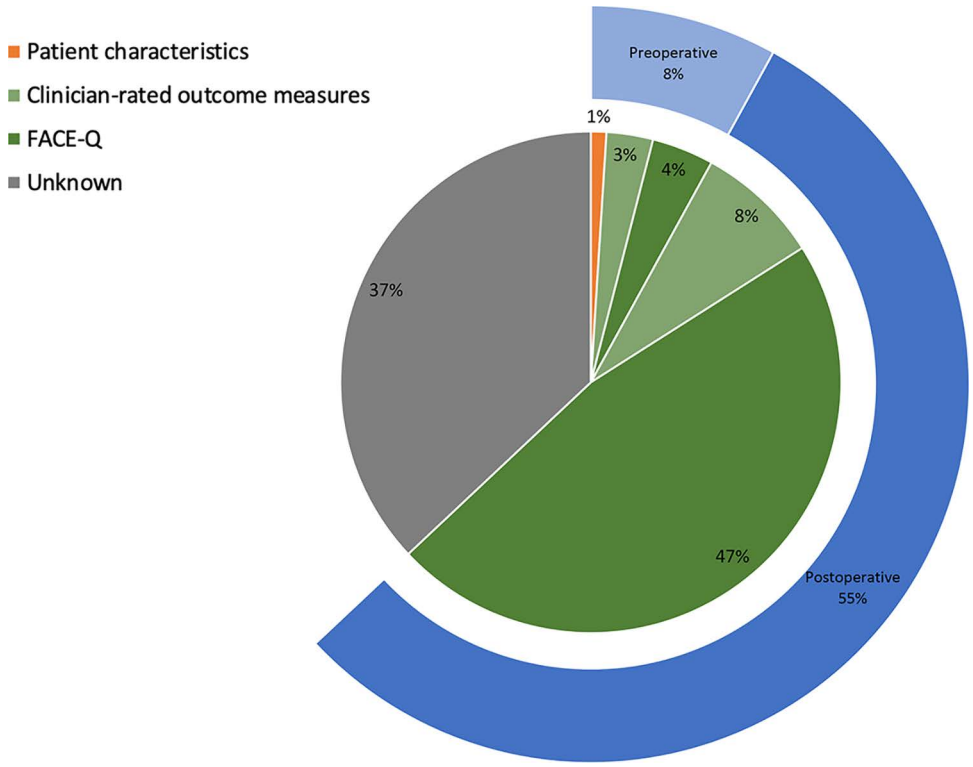

Fig. 2. Increase in explained variance (increase in multiple R^2) of satisfaction with treatment outcome 6 months postoperative per step in the hierarchical linear regression model.

the patient being satisfied at the postoperative checkup (B = 23.80; β = 0.19) was significantly related to higher satisfaction with treatment outcome. These variables added 8% to the explained variance in satisfaction with outcome.

Model 5: Model 4 Plus Postoperative PROMs

The postoperative PROMs increased the explained variance of satisfaction with outcome score from 16% (total variance of model 4) to 63% (**Supplemental Digital Content 2,** model 5, **http://links.lww.com/PRSGO/C766**). Figure 2 shows the increase in explained variance per model and per time point. At 6 months postoperatively, the degree of dermatochalasis (1: fold covered, eyelashes not covered) (B = 7.55; β = 0.11), a higher VAS score (B = 2.28; β = 0.11), greater satisfaction with eyes (B = 0.32; β = 0.25), and greater satisfaction with decision (B = 0.56; β = 0.50) were only associated with greater satisfaction with outcome. Of all significant variables in the final model, satisfaction with decision had the largest standardized regression coefficient (β = 0.50), indicating the largest independent effect on satisfaction with treatment outcome of all variables analyzed in this study. There were no indications for multicollinearity in all models, as the variance inflation factor ranged from 1.01 to 2.81.

NONRESPONDER ANALYSIS

Table 2 shows the patient characteristics and baseline FACE-Q scores between patients who only completed the baseline questionnaires and patients who completed all questionnaires with available photograph documentation. A significant difference between noncompleters and completers regarding age, BMI, and appraisal of upper eyelids was observed. However, effect sizes showed a small negligible effect. Thus, these differences were not regarded as clinically relevant.

DISCUSSION

To the best of our knowledge, this is the first study that assessed whether satisfaction with treatment outcome after upper blepharoplasty was associated with patient characteristics, CROMs, postsurgical outcomes, and PROMs regarding appearance as well as quality-of-life. Patient characteristics (ie, gender, age, BMI, smoking status, and cosmetic procedures in the past) were not associated with satisfaction with outcome after upper blepharoplasty. Satisfaction with outcome was associated with postoperative CROMs (ie, dermatochalasis degree and VAS score) and postoperative FACE-Q scales (e, satisfaction with eyes, appraisal of upper eyelids, satisfaction with face, and satisfaction with decision). Preoperative CROMs (ie, MRD-1 and elliptic space) and baseline FACE-Q scales (ie, psychological well-being) did not survive Bonferroni correction. Surprisingly, preoperative and postoperative CROMs, postsurgical outcomes, and baseline FACE-Q scales explained only a negligible part of the variance in satisfaction with outcome. The postoperative FACE-Q scores explained a larger part of the variance in satisfaction with

Table 2. Nonresponder Analysis

Patient Characteristics, N (%)	Nonresponder, N = 1894	Responder, N = 583	*P*	Effect Size*
Female gender	1522 (80.4)	484 (83.0)	0.170	0.027
Age (y)†‡	52.2±9.8	53.6±9.2	0.001	0.152
BMI (kg/m²)‡§	24.2 [22.0, 26.7]	24.7 [22.5, 27.2]	0.005	0.116
Smokers	269 (14.2)	73 (12.5)	0.337	0.017
Cosmetic procedure in the past‡	355 (18.7)	89 (15.3)	0.064	0.035
FACE-Q scores† at intake (range, 0–100)‖				
Satisfaction with eyes‡	36.1±15.6	34.7±15.7	0.061	0.089
Appraisal of upper eyelids‡	44.6±16.3	42.6±17.2	0.011	0.121
Satisfaction with facial appearance overall	46.0±13.5	45.6±13.8	0.564	0.027
Aging appraisal	60.7±22.2	59.1±21.5	0.110	0.076
Psychological well-being	67.1±18.9	66.4±19.2	0.453	0.036
VAS aging¶	0.4±4.6	0.6±4.6	0.309	0.048

The nonresponder analysis showed statistically significant differences in age, BMI, appraisal of upper eyelids. However, these differences have a negligible effect size and were regarded as not clinically relevant.
*Effect size: interpreted according to Cohen's criteria; negligible, <0.2; small, 0.2; medium, 0.5; and large, 0.8 or Cliff's delta criteria; negligible <0.147; small, 0.147; medium, 0.33; large, 0.474.
†Mean (±SD).
‡Statistically significant ($P < 0.05$).
§Median [IQR].
‖Higher scores indicate higher satisfaction.
¶Years (range, −15 to +15).

outcome. That is, a larger improvement in the satisfaction with appearance scales and decision to undergo treatment were associated with higher satisfaction with the treatment outcome.

The results of this study indicated that patient characteristics and CROMs are of minimal impact on the variance of patient satisfaction with outcome 6 months postoperatively. Previous studies showed that patients with similar functional outcomes can have different perceptions of the surgical success.[23,24] Moreover, the patients' perception of success may differ from that of the clinician. Greater improvements in quality of life were seen in PROMs compared to CROMs. This may explain why CROMs are less valuable in assessing patient satisfaction with outcome. Notably, in this study, the clinician-rated cosmetic appearance was in line with the patient satisfaction with outcome; the higher the clinician-rated cosmetic appearance score, the greater the patient satisfaction with outcome.

It was expected that patients would be more satisfied with a less severe degree of dermatochalasis postoperatively, and the current study confirmed this result. However, differences were expected in satisfaction outcome based on preoperative dermatochalasis degree. The model did show greater satisfaction for dermatochalasis degrees 2 and 3 preoperatively, yet these variables were not significant. Nevertheless, the mentioned CROMs only affected the variance in satisfaction for 11%, and therefore, these variables should be interpreted with precaution.

Measuring outcomes as part of clinical care has pros and cons. Due to the larger-scale integrated data collection, compliance was expected to be low and to decrease at follow-up even with repeated reminders.[8,25–27] Only 40% of all patients completed the baseline questionnaire; of those, 39% answered all questionnaires. This might introduce selection bias since unsatisfied patients might choose to continue their treatment elsewhere, whereas satisfied patients do not always feel the need to return for follow-up visits, and both are lost to follow-up. However, the nonresponder analysis showed no signs of selection bias since the differences between the patient characteristics and baseline PROMs of completers and noncompleters were negligible (effect size < 0.2). Considering the large sample size in this study, the minimal amount of 10 patients per variable included in the linear regression models was easily reached, and this study was able to assess the effect of multiple variables on the satisfaction with outcome. The study population contained a large majority of women (83.0%), comparable to the proportion of women in the nonresponder group, and similar to the general facial aesthetic surgery population.[7]

We found that our model was not able to explain satisfaction with outcome from baseline patient and clinical characteristics. A possible reason for this might be that satisfaction with treatment can vary wildly from patient to patient which makes it difficult to measure and interpret.[28] However, a recent study in hand and wrist disorders showed that such a construct could be measured reliably.[29] Another reason might be that we did not include relevant variables. For instance, contextual components, such as patient–clinician relationship, patients' beliefs or expectations regarding the efficacy of the treatment, the patient mindset or psychosocial profile, and the quality of the service delivery and communication have all been shown to influence satisfaction with treatment result.[30–37] It might be especially worthwhile to further study the effects of treatment expectations.[37] In the current study and in a previous study, we found that outcome satisfaction does not depend on the level of (dis)satisfaction patients have with their upper eyelids preoperatively.[16] It is very well possible that patients choosing the surgery are so convinced about the positive outcome of the treatment that this leads to positive reinforcement behavior which consequently results in high satisfaction with the outcome. Postoperative factors also improved the explanation of outcome satisfaction. Although this might not be surprising, this study

forms a solid foundation from which future studies can continue to identify additional factors that are associated with patient satisfaction both preoperatively and postoperatively.

Due to Bonferroni correction, several variables did not survive to remain statistically significant. Future research should verify whether these suggestions are conclusive and should be directed at finding factors that can predict satisfaction with treatment outcome. A prediction model may help to improve patient communication and treatment guidance, and to better manage expectations. This will consecutively influence the patients' experience with healthcare delivery, which may result in an improvement in satisfaction with treatment outcome.

CONCLUSIONS

Patient characteristics, preoperative and postoperative CROMs, and baseline FACE-Q appearance and quality-of-life scores are of limited value in explaining satisfaction with outcome. However, 6-month postoperative FACE-Q appearance scales and the decision to undergo the treatment are strongly associated with satisfaction with outcome. A large part of the variance in satisfaction with outcome might remain unexplained due to missing predictor variables such as patient experiences and treatment expectations. Nevertheless, patients showed great satisfaction with treatment outcome after upper blepharoplasty.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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