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Comparing Patient, Casual Observer, and Expert Perception of Permanent Unilateral Facial Paralysis

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Abstract

IMPORTANCE—Differences in perception of facial paralysis among patients, casual observers, and experts may have implications for outcomes research and patient care.

OBJECTIVE—To compare multiple domains of casual observer and expert perception with the actual experience of patients with permanent unilateral facial paralysis.

DESIGN, SETTING, AND PARTICIPANTS—This investigation was a prospective cohort study conducted at an academic tertiary referral center. Patients with permanent unilateral facial paralysis (House-Brackmann grades IV to VI) were randomly selected from The Johns Hopkins University Division of Facial Plastic and Reconstructive Surgery clinic. A diverse group of casual observers and experts were recruited to rate their perception of each patient with facial paralysis. The study dates were July 2014 to July 2015.

MAIN OUTCOMES AND MEASURES—Patients rated their paralysis severity, attractiveness, quality of life, and affect using established metrics. Casual observers and experts viewed standardized facial videos of each patient and then used the same metrics to rate each patient's paralysis severity, attractiveness, quality of life, and affect.

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RESULTS—The analysis yielded 40 patient observations, 6400 casual observer observations, and 200 expert observations for each outcome metric in the study. Compared with the patients' self-perception, casual observers and experts rated patients with facial paralysis more negatively in all measured domains. A multivariable mixed-effects regression showed that observers perceived patients as having greater paralysis severity (8.49 [95% CI, −0.65 to 17.64] of 100 points; SE, 4.67), being less attractive (−7.71 [95% CI, −14.92 to −0.50] of 100 points; SE, 3.68), and having a worse quality of life (−7.76 [95% CI, −14.18 to −1.34] of 100 points; SE, 3.28) compared with the patients' perceptions. Logistic regression demonstrated that observers were less likely to rate patients' affect as positive (odds ratio, 0.28 [95% CI, 0.14–0.58]; SE, 0.10) compared with the patients' self-rating. The raw data and regression analyses also showed that patients, casual observers, and experts perceived faces with higher House-Brackmann grades more negatively in all measured domains of facial perception.

CONCLUSIONS AND RELEVANCE—This study found that casual observers and experts generally perceive patients with facial paralysis more negatively than patients perceive themselves. These findings have implications for patients and facial plastic surgeons alike. They also emphasize the importance of assessing outcomes from all 3 perspectives. This pilot study lays the groundwork for developing new tools to assess the social perception of facial deformity that could lead to advancement in facial paralysis outcomes research and improved care for patients with facial paralysis.

LEVEL OF EVIDENCE—NA.

For facial plastic surgeons, facial paralysis represents a great reconstructive challenge.^{1,2} For patients, facial paralysis is a debilitating condition with functional and aesthetic sequelae that often result in physical, psychosocial, communicative, and quality-of-life detriments.^{3–7} For society, it causes attentional distraction when viewing paralyzed faces compared with nonparalyzed faces,^{8,9} which may account for society's tendency to perceive people with facial paralysis negatively. Studies have shown that casual observers in society perceive paralyzed faces as more affectively negative,^{10,11} more disfigured and bothersome,¹² less attractive,^{12,13} and more disabled, with a worse quality of life compared with demographically matched nonparalyzed faces.¹⁴

It was previously noted that the perspectives of clinicians, patients, and society must be considered when assessing the effect of facial paralysis and treatment outcomes, and a battery of individual metrics exists to assess these outcomes from different perspectives.^{15,16} However, a notable question remains. How do the perspectives of clinicians, patients, and society directly compare? For example, how does a patient's perception of his or her attractiveness or disease severity compare with society's and experts' perception of that patient? The present study sought to address these questions.

Previous studies have preliminarily compared the perspectives. Wilson et al¹⁷ compared the perceptions of patients with metastatic breast cancer with those of their treating physicians and found that the physicians systematically underestimated their patients' perceptions of overall health, social functioning, physical functioning, and global quality of life. Goines et al¹⁴ found that casual observers (ie, society) rated the quality of life of patients with facial paralysis as worse than the patients rated themselves. The present study aimed to directly

compare the perceptions of patients, experts, and society in the following 4 established domains: unilateral facial paralysis severity, attractiveness, quality of life, and affect. Throughout this study, the perspective of society is represented by a cohort of nonexpert raters referred to as casual observers. Based on the aforementioned studies, we hypothesized that society and experts would perceive patients more negatively than patients perceive themselves. To our knowledge, this pilot study is the first of its kind to directly measure and compare the perception of unilateral facial paralysis from the 3 major perspectives of patient, casual observer, and expert.

Methods

Participants

Written informed consent was obtained from patients, permitting the use of their clinical, survey response, and photographic data for research purposes. Written consent was also obtained from all participating study observers. The institutional review board at Johns Hopkins School of Medicine approved this study. This investigation was a prospective cohort study conducted at an academic tertiary referral center. Patients with facial paralysis were randomly selected from The Johns Hopkins University Division of Facial Plastic and Reconstructive Surgery clinic if they met the following criteria: (1) were at least 18 years old, (2) had permanent House-Brackmann grades IV to VI unilateral facial paralysis, (3) completed an intake survey, and (4) consented to have their facial photographs and videos used in research. Table 1 lists the demographics for the 40 patients with facial paralysis included in this study. The 5 experts (J.K.D., L.E.I., K.D.O.B., P.J.B., and M.I.) were authors of this article and were considered experts by virtue of at least 5 years' experience in facial paralysis outcomes research and in subjectively and objectively assessing faces with paralysis. Representing the perspective of society, casual observers naive to the study objectives were recruited using public access website postings to randomly select a sample from the general population. We excluded observers who were younger than 18 years and those self-reporting schizophrenia or autism spectrum disorder because of established differences in how these individuals perceive the face.^{18,19} Of the 171 casual observers with completed surveys, we excluded 11 as outliers because their mean paralysis severity rating was below the 5th percentile (n = 7) or above the 95th percentile (n = 4). Demographic information for the remaining 160 casual observers is listed in Table 1.

Instrument

Data from the patients with permanent unilateral facial paralysis were collected prospectively as part of each patient's Johns Hopkins University Facial Plastic and Reconstructive Surgery previsit paperwork. Each patient was asked to rate his or her attractiveness using a sliding scale of 0 to 100 with 1-point increments, where 100 is the most attractive. Using the same type of sliding scale with 1-point increments, patients were asked to rate the severity of their facial paralysis (0 is normal facial function and 100 is the most severe paralysis) and their quality of life (0 is death and 100 is perfect health with no facial paralysis). These metrics for assessing the perception of attractiveness,^{12,13,20,21} facial deformity severity,^{12,13,21} and quality of life^{20,22–24} are well established in the literature.

Patients also completed the Derogatis Affects Balance Scale–Short Form²⁵ to assess their affect.

To measure casual observer and expert perception, a survey was created using video clips from the 40 patients with permanent unilateral facial paralysis in this study. For each patient, we included a standardized 15-second head shot video clip of the patient having a structured conversation. Supported by data from a prior study,¹⁴ we chose to use dynamic stimuli to better convey the effect of facial paralysis on facial form and function. After viewing and replaying each video as necessary, the 160 casual observers and 5 experts rated the paralysis severity, attractiveness, quality of life, and affect of each patient. Therefore, each of the 40 patients with facial paralysis (cases) was evaluated for every outcome of interest by 1 patient rater (himself or herself), 160 casual observers, and 5 expert raters. This analysis yielded 40 patient observations, 6400 observer observations, and 200 casual observer observations for each outcome metric in the study.

Casual observers and experts used the same scales as the patients (0–100 points, with 1-point increments) to assess paralysis severity, attractiveness, and quality of life. For paralysis severity, casual observers and experts were first given a definition of unilateral facial paralysis as facial muscle weakness that affects one-half of the face. They were then asked to rate the paralysis severity of each face using a sliding scale of 0 to 100, where 0 is normal facial function and 100 is the most severe paralysis. For attractiveness, casual observers and experts were asked to rate the attractiveness of each face from 0 to 100, where 100 is the most attractive. For quality of life, we used the visual analog scale method, which is well established in the literature.^{20,22–24} Casual observers and experts were first asked to imagine living their lives with the facial paralysis displayed in each video; they then rated their quality of life with the facial paralysis using a normalized slider bar with 1-point increments from 0 (death) to 100 (perfect health with no facial paralysis). To measure perceived affect display, observers selected all that applied from a list of 9 affects, including neutral and the 8 core affects from the Derogatis Affects Balance Scale–Short Form²⁵ (joyful, content, vigorous, affectionate, anxious, depressed, guilty, and hostile). These assessment methods and domains of facial perception have been well established in multiple models of facial deformity.^{10–14,20}

Data Analysis

Patient data were collected from The Johns Hopkins University Division of Facial Plastic and Reconstructive Surgery clinic. Casual observer and expert data were collected with surveys created and administered on SurveyGizmo (<http://www.surveygizmo.com>). The data were analyzed using statistical software (Stata, version 13; StataCorp LP). The means (SDs) for paralysis severity, attractiveness, and quality of life were calculated for patients, casual observers, and experts. The affect data were analyzed using a statistical package (poLCA in R; R Foundation for Statistical Computing).²⁶ Similar to the methods described by Dey et al,¹¹ latent class analysis and regression were used to group the affects into 2 global affect classes (positive and negative) and then assign a class for each observation based on its probability of association with the 2 latent classes.

Multivariable mixed-effects and logistic regression analyses were then conducted to quantify and test the significance of differences between the groups for each metric. Given that the expert group ($n = 5$) was much smaller than the patient group ($n = 40$) and the casual observer group ($n = 160$), we did not have enough expert samples to assure zero mean in the bias. Therefore, given the similarity in the raw data ratings between the casual observer and expert groups, we collapsed the experts into the casual observer group and ran our regressions comparing observers (including experts) vs patients. The expert group in this study was too small to make strong arguments beyond observations of the raw data. A multivariable mixed-effects regression was used to analyze the continuous variable metrics (paralysis severity, attractiveness, and quality of life) for patients and casual observers, and marginal means then were used to estimate the differences between patients and observers for each metric. Standard errors were estimated using the delta method, and statistical significance was estimated using the z score. A multivariable mixed-effects regression was selected because it allowed us to account for observer bias while controlling for the covariate of House-Brackmann grade. Logistic regression was used to analyze the affect data, which were coded in a binary fashion (positive or negative) as previously described. Again, we were able to account for House-Brackmann grade in the affect logistic regression. The experiment-wide α was set at .05.

Results

The demographics for the patients with permanent unilateral facial paralysis and casual observers are listed in Table 1. Our cohort of 40 patients with facial paralysis is a representative sampling of the patient population seen at The Johns Hopkins University Division of Facial Plastic and Reconstructive Surgery clinic. The most common etiology of permanent facial paralysis in the cohort was vestibular schwannoma resection. We had a balanced sample of patients with paralysis in regard to duration of facial paralysis and House-Brackmann grade. The observer population matched the general US population in measured demographics, with the exception of a female predominance and fewer observers of Hispanic descent.

Table 2 lists the means (SDs) for all metrics of facial perception as perceived by patients, observers, and experts. These data are presented for all patients with facial paralysis and then subdivided by House-Brackmann grade. The data in Table 2 summarize some key observations that are further studied in the subsequent regression analyses. First, patients perceive themselves as less severely paralyzed and more attractive, with a better quality of life and a more positive affect, than casual observers and experts perceive those same patients. That is, these raw data suggest that, compared with casual observers and experts, patients perceive themselves more positively in all domains. Or, framed in the converse, casual observers and experts perceive patients more negatively than they perceive themselves. Second, as House-Brackmann grade increases, perceived paralysis severity increases, attractiveness decreases, quality of life decreases, and positive affect decreases. This finding of worsening perception with increasing objective severity of paralysis (House-Brackmann grade) is seen for patients, observers, and experts.

To further analyze these preliminary findings and better understand the relationships between these groups, we used a multivariable mixed-effects regression and logistic regression. We then compared patient and observer perceptions for each metric. We accounted for House-Brackmann grade as a covariate in the model because we observed the effect that it had on the raw data (Table 2). When building the regressions, we tested the effect of the collected demographic variables and found that they did not statistically significantly influence the facial perception regression models. Therefore, they were not included in the final models.

Table 3 and Table 4 summarize the multivariable mixed-effects regression comparing patient and observer perception of paralysis severity, attractiveness, and quality of life. Table 3 lists the fixed effects for the model, and Table 4 lists the random effects for the model. These regression data confirm many observations from the raw data. Unfortunately, the patient and expert sample sizes were not large enough to confirm all observations with statistical significance. Using the regression data listed in Tables 3 and 4, we calculated the difference in perception between patients and observers using marginal means. The marginal means showed that observers perceived patients as having greater paralysis severity (8.49 [95% CI, -0.65 to 17.64] of 100 points; SE, 4.67), being less attractive (-7.71 [95% CI, -14.92 to -0.50] of 100 points; SE, 3.68), and having a worse quality of life (-7.76 [95% CI, -14.18 to -1.34] of 100 points; SE, 3.28) compared with the patients' perceptions. Because House-Brackmann grade is orthogonal to the patient and observer variables, these estimated marginal differences should be independent of House-Brackmann grade. This regression also quantifies the effect of increasing House-Brackmann grade on these metrics of facial perception. With House-Brackmann grade IV as the base category, Table 3 summarizes that, as House-Brackmann grade increases, perceived paralysis severity increases and perceived attractiveness and quality of life decrease for observers. As summarized in Table 3, our patient sample did not have sufficient power (ie, was not large enough) to show a statistical difference in perception by House-Brackmann grade.

The affect data are binary, positive, or negative and were therefore analyzed using logistic regression, as summarized in Table 5. Here, we see that the observer odds ratio is 0.28 (95% CI, 0.14-0.58; SE, 0.10), so observers are less likely to rate patients' affect as positive compared with the patients' rating of their affect. With increasing House-Brackmann grade, the odds of a positive affect rating decrease. There will be some observer-weighted bias in these results because of the asymmetry in sample size between patients and observers. In summary, observers perceived patients with permanent unilateral facial paralysis more negatively in all measured domains compared with the patients' perceptions.

Discussion

This study found that observers and experts generally perceive patients with facial paralysis more negatively than patients perceive themselves. As summarized in Tables 2 through 5, the data suggest that observers and experts perceive patients with facial paralysis as having a greater disease severity, as being less attractive and more affectively negative, and as having a worse quality of life compared with the patients' perceptions. These differences in

perception have implications, and further understanding them could ultimately lead to better care for patients with facial paralysis.

The importance of understanding if differences in perception exist between these 3 groups lies in the significance and implications of the interactions between patients, expert clinicians, and society. Patients with facial paralysis undergo treatment based on an expert clinician's perception and experience. Furthermore, society's general perception and subsequent interactions with people with facial deformity can greatly influence their health, self-esteem, and psychosocial well-being.^{7,27,28} A better understanding of the relationships between the perceptions of patients, experts, and society could also lead to development of an office-based assay to assess for the social perception and normalization of appearance after facial reconstructive surgery, which would produce higher-quality outcomes research and could lead to better care for patients with facial paralysis.

One implication of these data lies in recognizing that these differences in perception exist. As clinicians treat patients with facial paralysis, it is important for them to assess the patients' perceptions and to acknowledge any differences that may exist. In addition, patients seeking treatment for facial paralysis are often concerned about how others perceive their facial deformity.^{16,29} The data in this study may help clinicians address this common concern, informing patients that, in general, people in society perceive the facial deformity more negatively than the patient's perception. This information may help patients better understand difficulties they are having with social interactions and perhaps guide them to pursue strategies and treatments to improve social function.

The finding that there are differences in how experts, patients, and society perceive the same facial deformity further emphasizes the importance of assessing outcomes of facial paralysis and its treatment from all 3 perspectives. There are numerous qualitative and quantitative metrics for each perspective. For clinicians, common metrics include the House-Brackmann Scale,³⁰ Sunnybrook Facial Grading Scale,³¹ eFACE clinician-graded electronic facial function assessment scale,³² and several computer-based facial measurement tools.^{33–36} For patients, the Facial Clinimetric Evaluation (FaCE) Scale is widely used.³⁷ For society, there are several subjective metrics of facial perception^{10–13,20} and objective eye-tracking methods^{8,9} to assess outcomes. As described by Hadlock¹⁵ and by Bhama and colleagues,³⁸ it is vital that we serially assess all 3 perspectives and that we work toward standardizing these outcomes metrics to advance the field in terms of research quality and better patient care.

Of the 3 perspectives, the perspective of the casual observer or society is among the most difficult to assess. While measuring patient and expert perception can be accomplished in clinic, measuring the perception of society involves carefully designed studies using patient photographs and videos that are viewed by large numbers of casual observers in society. Therefore, it is not practical now to measure the social perception for each patient in the clinic. The present study takes the first step toward developing an assay that would allow clinicians to estimate the social perception of each patient using patient and expert data points collected as part of the patient's clinical evaluation. As we better understand the relationships and differences between the perspectives of patients, experts, and society, we

can develop algorithms and models that could anticipate a social perception score based on available patient and expert data, which could be used for outcomes research and eventually as an office-based tool to assess society's perception of a return to normalcy after treatments.

Another noteworthy finding involves the results observed with increasing facial paralysis severity, as measured by the House-Brackmann Scale. The 40 patients in this study were evenly distributed among House-Brackmann grades IV through VI (Table 1). As summarized in Table 2, on average, with increasing House-Brackmann grade there was an increasing perception of paralysis severity by patients, observers, and experts. Despite the differences in perception between patients, observers, and experts, these groups, on average, seem to appreciate and react to the objective increase in facial paralysis severity. As summarized in Tables 2 through 5, this result was also seen with the other metrics (attractiveness, quality of life, and affect), where attractiveness, quality of life, and positive affect decreased as House-Brackmann grade increased. The regression summarized in Table 3 found this effect of House-Brackmann grade to be statistically significant for observers, but not for patients, likely because of the small sample size. So, the House-Brackmann grade severity of a patient's paralysis may be an important rudimentary prognosticator of how patients are viewed by others and perhaps how they view themselves.

Given these findings and their potential implications, a notable question is why do patients with facial paralysis, in general, perceive themselves more positively than do society and experts? A possible explanation is the response shift theory, where over time patients with disability make changes in their internal standards, values, and expectations that help them adjust to their new reality.^{39,40} This shift is a powerful coping mechanism that is likely multifactorial, related to the patient's core values, emotional intelligence, length of time and experience with the disability, and support systems, among other factors. Some studies^{14,41} have observed this coping in patients with facial paralysis. While response shift is experienced in varying degrees by patients, it is not experienced by society and experts, which could explain why patients, in general, perceive themselves more positively than do experts and laypeople in society.

Limitations

Our study has some limitations. In this pilot study, we only included patients with House-Brackmann grades IV through VI facial paralysis, so we cannot generalize the results to patients with less severe facial paralysis. This study also included a small sample size of experts; therefore, we are cautious about making conclusions regarding expert data beyond observations made from the raw data. Our patient sample was also too small to show a statistically significant effect of House-Brackmann grade on patients' self-perception. As previously mentioned, experts show variability in their responses just like patients and observers, so larger sample sizes are needed to make stronger statistical conclusions. Again, given the pilot nature of this study, we used only 4 metrics of facial perception and 1 video stimulus for each patient with facial paralysis. These metrics and stimuli were carefully selected based on prior research^{10–14,20}; however, future studies could be more comprehensive.

This pilot study lays the groundwork for future studies to further measure differences in facial perception between patients, observers, and experts. Future studies should include larger sample sizes, in particular larger expert groups, and more facial perception metrics. While these studies will require substantial resources, they could provide sufficient power to more precisely understand the differences in facial perception between these key groups. With those powerful data in hand, we may better understand trends in perception and can work to develop algorithm-based tools that use available patient and expert data points to estimate the social perception of facial deformity in real time.

Conclusions

The finding that there are differences in perception of facial paralysis between patients, experts, and society perhaps generates more questions than it answers. These results have implications for patients and facial plastic surgeons. They also emphasize the importance of assessing facial paralysis outcomes from all 3 perspectives. Furthermore, this pilot study lays the groundwork for developing new tools to assess the social perception of facial deformity that could lead to advancement in facial paralysis outcomes research and improved care for patients with facial paralysis.

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Key Points

Question

When viewing faces with unilateral facial paralysis, do casual observers and experts rate the faces more negatively in the domains of paralysis severity, attractiveness, quality of life, and affect compared with the patients?

Findings

In this study, statistically significant differences were noted in how patients with facial paralysis perceive themselves compared with how casual observers and experts perceive them; casual observers and experts perceived the patients more negatively than patients perceived themselves.

Meaning

It is important to consider all perspectives when counseling patients about the effect of their facial paralysis and when assessing outcomes of facial paralysis and facial reconstruction.

Table 1**Study Participant Demographics^a**

Variable	Patients (n = 40)	Observers (n = 160)
Age, mean (SD), y	54 (13)	35 (13)
Sex, No. (%)		
Female	22 (55.0)	106 (66.3)
Male	18 (45.0)	54 (33.8)
Race/ethnicity, No. (%)		
Asian	1 (2.5)	20 (12.5)
African American	2 (5.0)	21 (13.1)
Caucasian or white	36 (90.0)	107 (66.9)
Hispanic	0	5 (3.1)
Other	1 (2.5)	7 (4.4)
Educational level, No. (%)		
High school or GED	8 (20.0)	9 (5.6)
Some college	6 (15.0)	33 (20.6)
2-y College degree	5 (12.5)	10 (6.3)
4-y College degree	12 (30.0)	53 (33.1)
Master's degree	6 (15.0)	41 (25.6)
Doctoral degree	3 (7.5)	14 (8.8)
Marital status, No. (%)		
Single or divorced	8 (20.0)	81 (50.6)
Married or engaged	32 (80.0)	79 (49.4)
Etiology of facial paralysis, No. (%)		
Vestibular schwannoma resection	26 (65.0)	NA
Bell palsy	5 (12.5)	NA
Malignant parotid neoplasm	3 (7.5)	NA
Ramsay Hunt syndrome	2 (5.0)	NA
Vascular abnormality	2 (5.0)	NA
Cholesteatoma	1 (2.5)	NA
Birth trauma	1 (2.5)	NA
Duration of facial paralysis, No. (%) ^b		
<6 mo	12 (30.0)	NA
6–24 mo	16 (40.0)	NA
>24 mo	12 (30.0)	NA
HB grade, No. (%)		
IV	13 (32.5)	NA
V	13 (32.5)	NA
VI	14 (35.0)	NA

Abbreviations: GED, general equivalency diploma; HB, House-Brackmann; NA, not applicable.

^aSome percentages do not sum to 100% because of rounding.

^bDefined as time from facial paralysis onset to time of data collection.

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Table 2

Summary of the Perception Data for Patients, Observers, and Experts

Variable	All Patients	HB Grade IV	HB Grade V	HB Grade VI
Paralysis Severity, Mean (SD)				
Patients	40.45 (29.14)	36.00 (25.30)	38.70 (33.84)	46.21 (29.00)
Observers	48.87 (26.72)	37.29 (27.22)	50.30 (24.29)	58.18 (24.34)
Experts	51.92 (26.33)	38.65 (24.42)	51.98 (23.97)	64.19 (24.40)
Attractiveness, Mean (SD)				
Patients	55.58 (22.83)	58.77 (22.78)	58.08 (26.71)	50.29 (19.48)
Observers	47.81 (21.68)	55.98 (20.43)	47.30 (20.09)	40.78 (21.64)
Experts	48.83 (19.14)	59.11 (17.82)	48.95 (16.84)	39.15 (17.47)
Quality of Life, Mean (SD)				
Patients	68.05 (20.66)	75.31 (18.27)	69.15 (22.93)	60.29 (19.18)
Observers	60.29 (22.55)	69.61 (21.10)	59.37 (20.78)	52.60 (22.31)
Experts	59.32 (23.02)	69.12 (19.82)	59.80 (23.18)	49.76 (23.75)
Positive Affect, No./Total No. (%)^a				
Patients	30/40 (75.0)	12/13 (92.3)	11/13 (84.6)	7/14 (50.0)
Observers	2971/6400 (46.4)	1144/2080 (55.0)	98/2080 (48.0)	829/2240 (37.0)
Experts	80/200 (40.0)	39/65 (60.0)	36/65 (55.4)	15/70 (21.4)

Abbreviation: HB, House-Brackmann.

^a Affect scored as positive or negative. Values represent the percentage of patients perceived as positive in each group.

Table 3Fixed-Effects Variables for the Multivariable Mixed-Effects Regression of Observer and Patient Perception^a

Covariate	Regression Coefficient (95% CI)	SE	P Value
Observers			
Paralysis severity			
HB grade V	13.99 (12.33 to 15.65)	0.85	<.001
HB grade VI	21.01 (19.40 to 22.63)	0.82	<.001
Observer variance	Constrained		
Constant	37.03 (34.40 to 39.66)	1.34	<.001
Attractiveness			
HB grade V	−9.23 (−10.52 to −7.94)	0.66	<.001
HB grade VI	−15.23 (−16.49 to −13.98)	0.64	<.001
Observer variance	Constrained		
Constant	56.20 (53.93 to 58.47)	1.16	<.001
Quality of life			
HB grade V	−10.41 (−11.74 to −9.07)	0.68	<.001
HB grade VI	−17.00 (−18.29 to −15.70)	0.66	<.001
Observer variance	Constrained		
Constant	69.63 (67.27 to 71.98)	1.20	<.001
Patients			
Paralysis severity			
HB grade V	2.69 (−19.17 to 24.55)	0.24	.81
HB grade VI	10.21 (−11.26 to 31.69)	0.93	.35
Constant	36.00 (20.54 to 51.46)	4.56	<.001
Attractiveness			
HB grade V	−0.69 (−17.76 to 16.38)	8.71	.94
HB grade VI	−8.48 (−25.25 to 8.28)	8.55	.32
Constant	58.77 (46.70 to 70.84)	6.16	<.001
Quality of life			
HB grade V	−6.15 (−21.09 to 8.78)	−0.81	.42
HB grade VI	−15.02 (−29.69 to −0.36)	−2.01	.04
Constant	75.30 (64.75 to 85.87)	13.98	<.001

Abbreviation: HB, House-Brackmann.

^aAll variables are scaled 0 to 100. In this model, the constant term represents the value for a patient with HB grade IV facial paralysis.

Table 4

Random-Effects Variables for the Multivariable Mixed-Effects Regression of Observer and Patient Perception

Covariate	Regression Coefficient (95% CI)	SE
Observers		
Paralysis severity		
Observer variance	239.04 (189.42–301.66)	28.38
Residual variance	388.93 (370.41–408.38)	9.68
Attractiveness		
Observer variance	186.23 (148.12–234.15)	21.76
Residual variance	234.83 (223.65–246.56)	5.84
Quality of life		
Observer variance	200.78 (159.72–252.39)	23.44
Residual variance	252.03 (240.03–264.63)	6.27
Patients		
Paralysis severity		
Residual variance	808.97 (521.82–1253.92)	180.89
Attractiveness		
Residual variance	493.05 (318.10–764.24)	110.24
Quality of life		
Residual variance	377.43 (243.50–585.02)	84.40

Table 5Logistic Regression for the Positive Affect Variable ^a

Covariate	Odds Ratio (95% CI)	SE	P Value
Observers	0.28 (0.14–0.58)	0.10	.001
HB grade V	0.71 (0.60–0.84)	0.06	<.001
HB grade VI	0.44 (0.37–0.52)	0.04	<.001
Constant	4.59 (2.21–9.54)	1.71	<.001

Abbreviation: HB, House-Brackmann.

^aProbability exceeding $\chi^2 = 0.000$. In this model, the constant term represents the value for a patient with HB grade IV facial paralysis.