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Facial Palsy-Specific Quality of Life in 920 Patients: Correlation With Clinician-Graded Severity and Predicting Factors

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Objectives: To investigate the correlation between facial palsy severity and quality of life in a broad cohort of facial palsy patients and to elucidate factors that influence this relationship.

Study Design: Retrospective study.

Methods: Records of patients presenting with a clinician-graded facial function (eFACE) and facial palsy-specific quality-of-life patient-reported outcome measure (FaCE) scale from the same moment were reviewed. Multiple linear regression was performed to study the effect of various variables on FaCE total score.

Results: A total of 920 of 1,304 patients were included, 59.9% female with a mean (standard deviation) age of 48.6 (16.7) years and a median (interquartile range palsy duration of 9.6 [2.2; 42.2] months. A multiple linear regression model predicting FaCE total score was established, finding 10 significant variables: eFACE; viral, malignant, and congenital etiologies; overweight status; anxiety; chronic pain; previous treatment; radiotherapy; and duration of palsy (R^2 = 0.261, P < 0.001). Gender, age, laterality, surgical etiology, depression, and timing of evaluation (at initial intake or at follow up) were not found to predict FaCE total scores.

Conclusion: A correlation between facial palsy severity and quality of life was found in a large cohort of patients comprising various etiologies. Additionally, novel factors that predict quality of life in facial palsy were revealed. This information may help specialists to predict which facial palsy patients are at higher risk of a poorer quality of life, regardless of severity.

Key Words: Facial paralysis, quality of life, Facial Clinimetric Evaluation Scale, predictive factors.

Level of Evidence: 4

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INTRODUCTION

Facial palsy (FP) yields myriad deficits affecting form and function. It can be a devastating and disfiguring condition, leading to psychological difficulties and restrictions of facial expressions, and may have a dramatic impact on interpersonal relationships.[1] The impact of FP on quality of life (QoL) is well known,[2–19] although sometimes no correlation has been found between severity of FP and QoL.[3–6,8,20] When it has been found, the correlation ranges from 0.13 to 0.66,[2,10,12,14,15,17,21,22] meaning that other factors may be important contributors to QoL in patients with FP. Some factors, including gender, age, laterality, and duration of disease, have already been studied. However, the results are conflicting, and it is unclear which factors influence QoL in FP patients, and in what way.[2–4,6–9,11–14,16–18] Increasing knowledge about factors influencing QoL in FP is clinically relevant and will help the multidisciplinary team guide patient care.

The aim of this study was to investigate the correlation between severity of FP and QoL, and if found, determine the strength of this relationship in a broad cohort of patients. Additionally, we aim to analyze possible predictors of QoL after FP.

MATERIALS AND METHODS

Prior to beginning this study, approval was obtained from the Massachusetts Eye and Ear Infirmary Institutional Review Board. Since eFACE[23] was implemented in our Center (February 2014), patients had their degree of facial palsy evaluated using it. In our retrospective study, every patient who underwent assessment between February 2014 and October 2017 and who had both a QoL questionnaire and an eFACE score from the same time point were included. Patients with no FP, bilateral disease, or missing data were excluded.

Data Collection

The eFACE, a reliable and valid method of documenting facial function,[23–26] and the Facial Clinimetric Evaluation (FaCE) scale,[10] a widely adopted patient-reported outcome measure of facial palsy-related QoL, were used. The FaCE total score

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was used as our outcome measure because we set out to study the effect of FP severity on overall FP-related QoL.

Patient charts were reviewed for variables, including gender, side of palsy, etiology, age, duration of palsy, previous treatment for FP, previous radiotherapy, and whether assessment was at initial intake or at follow-up. Medical history and medication lists were analyzed to determine if there was evidence of depression, anxiety, and/or chronic pain. Patients were classified as "not overweight," "unsure," or "clearly overweight" independently by two observers based on photographs of the head and neck. Scores of both observers were averaged to obtain a 5-point scale of body mass index (BMI). Our weight impression was validated in a subset of patients who did have BMI recorded in their medical chart (n = 325). For further analysis, only the patients that both observers considered "clearly overweight" were classified as "overweight"; all others were classified as "not overweight." Etiologies were divided into standard groups aligned with previous studies[13,27] and considering prognosis and gravity of the underlying condition. A dichotomous variable was created for each etiology, and patients were classified as having or not either: congenital, malignant, postsurgical, or viral etiologies. Treatments were recorded as medication, surgery, chemodenervation, or physical therapy. A dichotomous variable was created for previous treatment grouping patients who received at least one of the mentioned treatments and those that had no previous treatment.

Statistical Analysis

A simple linear regression was performed to study the relation between the eFace score and FaCE scale total score. A multiple linear regression model was used to generate a model of all predictors of QoL as measured by the FaCE total score. First, independent *t* tests and Pearson correlation coefficients (coef.), for nominal and continuous data, respectively, were used to determine which factors might be of influence on the FaCE total score. A typical *P* value less than 0.2 was used as a cutoff. Secondly, the multiple regression model was used to determine which of these variables predicts FaCE scale total score. All previously selected variables were entered one by one. Variables with *P* value higher than 0.1 were excluded. All statistical analyses were performed using SPSS version 24 (IBM Corp., Armonk, NY).

RESULTS

Of 3,032 eFACE assessments for 1,304 different patients between February 2014 and October 2017, 975 patients had a corresponding FaCE scale from the same time point. We excluded 55 patients with no clinically apparent FP, bilateral FP, or missing data; the other 920 were included in our analysis. Patients excluded (29%) had their demographic characteristics compared to the patients included, and they were not different with regard to age, gender, duration of palsy, and etiology. A slight majority of included patients were female (59.5%); mean age was 48.6 years (standard deviation [SD] 16.7); and median duration of FP was 9.6 months (interquartile range [IQR] 2.2; 42.2). Affected sides were evenly distributed. The most common etiology was Bell palsy (40.8%), followed by acoustic neuroma (10.2%), Varicella zoster (9.8%), and head and neck cancer (8.0%), as determined by the treating physician. Other etiologies included trauma, benign tumors, iatrogenic injuries, central nervous system lesion, Lyme disease, congenital, and others. Six hundred ninety-six patients (75.7%) had received previous treatment at the time of evaluation. Data were obtained at the initial intake in 847 patients (95.1%). The degree of facial function measured by eFACE was 71.3 on average (SD 14.6), and the mean FaCE scale total score was 47.6 (SD 20.1) (Table I).

Weight impression assessment was done by two independent investigators in three categories. A quadratic weighted kappa for interrater agreement was 0.66 (thus good). The weight impression scale was plotted against BMI values for a subset of 325 patients for whom

TABLE I.
Demographic Description of 920 Patients

Gender (n (%))	
Male	373 (40.5)
Female	547 (59.5)
Age, years (mean (SD))	48.6 (16.7)
Duration of palsy, months (median (IQR))	9.6 (2.2;42.2)
Side (n (%))	
Right	474(51.5)
Left	446(48.5)
Etiology (n (%))	
Bell palsy	375 (40.8)
Pregnancy-associated	35
Recurrent	20
Acoustic neuroma	94 (10.2)
Varicella zoster	90 (9.8)
Head and neck cancer	74 (8.0)
Postresection	57
Trauma	52 (5.7)
Soft tissue trauma	23
Temporal bone fracture	23
Benign tumor	49 (5.3)
Facial nerve tumor	26
Iatrogenic injury	40 (4.3)
CNS lesion	37 (4.0)
Lyme	34 (3.7)
Congenital	17 (1.8)
Otologic disease	9 (1.0)
Stroke	9 (1.0)
Other	8 (0.9)
Unclear	32 (3.5)
Previous treatment	
Medication	517 (56.2)
Surgery	160 (17.4)
Chemodenervation	76 (8.3)
Physical therapy	162 (17.6)
Timing of evaluation	
Intake	847 (92.1)
Follow-up	73 (7.9)
eFACE (mean (SD))	71.3(14.6)
FaCE scale total score (mean (SD))	47.6 (20.1)

eFACE = clinician-graded facial function scale; FaCE = Facial Clinimetric Evaluation; IQR = interquartile range; SD = standard deviation.

a BMI was available. A concurrent increase in BMI with the weight impression scale was seen and found to be significant (Spearman rho 0.677, $P < .001$) (Appendix I).

Bivariate analyses were used to select possible predictors of the FaCE total score. The eFACE score was positively correlated to QoL (R = 0.434, $P < 0.001$) (Fig. 1). Correlations between age and duration of palsy were −0.088 ($P = 0.007$) and 0.097 ($P = 0.003$), respectively, indicating that higher age was associated with a lower QoL and that a longer duration was associated with a higher QoL. The dichotomous variables "viral etiology," "congenital etiology," "malignant etiology," "overweight status," "anxiety," "chronic pain," "previous treatment," "radiotherapy," and "timing of evaluation" were found to be possible predictors of FaCE total score (Table II).

Possible FaCE total score predictors of univariate analyses were used to establish multiple linear regression models. Two variables with P values > 0.1 were excluded from the model in the following order: age ($P = 0.920$) and timing of evaluation ($P = 0.460$). In the final model, the severity of FP measured by eFACE was associated with FaCE total score (coef. = 0.60, $P < 0.001$). Viral etiology was associated with lower QoL (coef. = −3.57, $P = 0.008$), whereas malignant and congenital etiologies were associated with higher QoL (coef. = 4.18 and 10.23; $P = 0.096$ and 0.027, respectively). Overweight status, anxiety, and chronic pain were predictors of lower QoL (coef. = −7.61; −7.32 and −3.07; $P = < 0.001$, < 0.001, and 0.098, respectively). Longer duration FP was associated with a higher QoL (coef. = 0.01, $P = 0.030$). Having been previously treated or having undergone radiation therapy were associated with lower QoL (coef. −2.65 and −7.64; $P = 0.073$ and 0.011, respectively). The explained variance in FaCE total score of the multiple regression model was 26.1% ($R^2 = 0.261$) (Table III). Gender, age, laterality, surgical etiology, depression, and timing of evaluation were found not to be predictors of FaCE total scores.

DISCUSSION

This study demonstrates a relationship between the degree of FP and QoL in a large cohort of FP patients with a wide variety of etiologies. Among the 10 variables found to predict FaCE total score, of all 16 variables studied, severity of FP was the most important factor, explaining 18.9% out of the total 26.1% of the FaCE score variance predicted by eFACE. Similar to previous studies,[2,12,17,21,22] the correlation found in our data between severity of FP and patient-reported outcome (PROM) was moderate. A systematic review examining the impact of disease-related impairments on health-related QoL found that the association between impairment and QoL in patients with various disorders usually

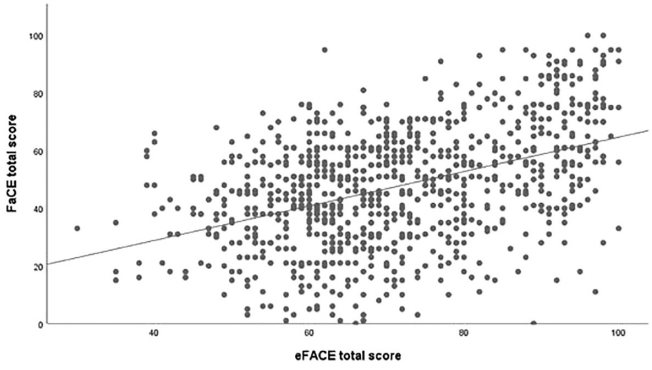

Fig. 1. Scatterplot of eFace scores and FaCE scale total scores. Line represents the regression line ($R^2 = 0.189$, $P < 0.001$). eFACE = clinician-graded facial function scale; FaCE = Facial Clinimetric Evaluation.

TABLE II.
Initial Dichotomous Variables Analysis.

	FaCE total score (mean (SD))	*P Value*
Gender		.594
Male	48.0(20.1)	
Female	47.3(20.1)	
Side		.711
Left	47.8(19.6)	
Right	47.3(20.6)	
Viral etiology		.002
Yes	45.6(20.4)	
No	49.6(19.6)	
Congenital etiology		< .001
Yes	65.4(10.9)	
No	47.2(20.1)	
Malignant etiology		.138
Yes	44.4(19.9)	
No	47.9(20.1)	
Postsurgical etiology		.553
Yes	46.9(19.7)	
No	47.8(20.3)	
Overweight status		< .001
Yes	38.8(19.5)	
No	48.7(19.9)	
Depression		.232
Yes	45.9(20.1)	
No	48.0(20.1)	
Anxiety		.001
Yes	41.0 (21.0)	
No	48.3(19.9)	
Chronic pain		.004
Yes	42.4(19.1)	
No	48.3(20.2)	
Previous treatment		.001
Yes	46.3 (19.5)	
No	51.6 (21.5)	
Radiotherapy		.002
Yes	39.1 (20.4)	
No	48.1 (20.0)	
Timing of evaluation		.002
Intake	47.0 (20.3)	
Follow-up	53.6 (16.7)	

Possible predictors of FaCE total score are presented in bold.
FaCE = Facial Clinimetric Evaluation; SD = standard deviation.

TABLE III.
Results of Stepwise Multiple Regression Model Showing Predictive Factors of FaCE Scale Score

Predictor	Coefficient	*P* Value
eFACE	0.60	< .001
Etiology viral	-3.57	.008
Etiology malignant	4.18	.096
Etiology congenital	10.23	.027
Overweight status	−7.61	< .001
Anxiety	−7.32	< .001
Chronic pain	−3.07	.098
Previous treatment	−2.65	.073
Radiotherapy	−7.64	.011
Duration of FP	0.01	.045

eFACE = clinician-graded facial function scale; FaCE = Facial Clinimetric Evaluation; FP = Facial Palsy.

Appendix I. Weight impression and mean BMI scores for each category. Weight classification and BMI were found to be significantly correlated (Spearman rho 0.677, p < .001). BMI = Body Mass Index.

has a correlation coefficient of less than 0.50.[28] They concluded that QoL scores reflect the patient's perception of the consequences of disease and depend on numerous additional, usually psychosocial, factors other than the disease itself.

There is relatively scant published information about FP disability as it relates to etiology. Most authors who studied it found that etiology was not a predicting factor of PROMs.[2,16,17] One previous study compared the morbidity of facial nerve dysfunction arising from surgical intervention for VS (n = 53) with those resulting from Bell palsy (n = 22). Investigators found that patients with facial nerve dysfunction arising from VS surgery experienced less morbidity than those with FP caused by Bell palsy.[13] However, we found that viral etiology predicted lower QoL, whereas surgical etiology was found not to be a predictor of QoL. Furthermore, in our data, malignant and congenital etiologies predicted higher QoL. Those interesting findings are novel in the FP scenario and invite further investigations.

Numerous studies in various populations have shown that obesity adversely affects QoL.[29–31] In this study, patients with FP were analyzed for overweight status and its impact on a specific health-related QoL. Overweight status was a predicting factor of lower QoL, suggesting that FP patients who are obese are more likely to experience impaired QoL than patients with normal weight. This hypothesis was generated based on our clinical experience and requires prospective formal analysis to be confirmed.

Longer duration of palsy was associated with a higher QoL. This may suggest that patients learn to adapt to their facial impairment over time, leading to improved QoL, as occurs in other diseases.[32,33] Although this association may seem obvious, the impact of duration on FaCE total scores was small, with a coefficient of 0.01. Other authors who studied the effect of length of time after palsy on QoL found that duration was not a significant factor.[4,5,12,13]

Our study represents the largest series describing QoL in patients with FP from a wide variety of etiologies. This analysis reinforces the relevance of the degree of paralysis and its correlation to health-related QoL and provides insight into new factors influencing it. The fact that viral etiology and malignant etiology were predictive for QoL is novel. Congenital etiology and overweight status have already been investigated in patients with other diseases,[34–36] but their impact on QoL in FP is herewith studied for the first time.

Retrospective data collection is the main limitation of the present study. The information contained in charts was not acquired for research purpose and thus may lack precision. We used medication lists to supplement the medical charts on evidence for anxiety, depression, and chronic pain. The presence of overweight status was defined by an observer rating of patients' photographs. Both methods give an approximation of the variable studied but are inherently inaccurate. Our findings based on these assumptions should be interpreted with caution and help to generate hypothesis to study formally rather than direct treatment.

CONCLUSION

The degree of FP is the main predicting factor of health-related QoL. Duration of palsy, malignant and congenital etiologies (associated with higher QoL), as well as viral etiology, overweight status, anxiety, chronic pain, previous treatment, and radiotherapy (associated with lower QoL) also predict the FaCE total score to varying degrees. Understanding how these factors may predict QoL outcomes in patients with FP can assist physicians to minimize the impact of FP by optimizing assessment and clinical decision-making processes. Early psychological counseling may be a potential strategy targeted at those as risk for poorer QoL outcomes, decreasing the morbidity of FP for those who need it the most.

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