Factors Associated With Failure of Adult Strabismus–20 Questionnaire Scores to Improve Following Strabismus Surgery

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**IMPORTANCE** Health-related quality of life (HRQOL) typically improves following strabismus surgery. Nevertheless, for some patients, HRQOL does not improve, and reasons for this are unknown.

**OBJECTIVE** To identify factors associated with failure of adult strabismus–20 (AS-20) HRQOL scores to improve following strabismus surgery.

**DESIGN, SETTING, AND PARTICIPANTS** Prospective observational case series at the Mayo Clinic, Rochester, Minnesota, comprising 276 adults, between July 2012 and August 2016.

**MAIN OUTCOMES AND MEASURES** Participants completed the AS-20 HRQOL questionnaire, diplopia questionnaire, Center for Epidemiologic Studies Depression Scale–Revised (CESD-R) (depressive symptoms), and Type-D Scale 14 questionnaire (type-D distressed [type-D] personality) both preoperatively and 6 weeks postoperatively. To assess factors associated with failure of HRQOL to improve (no change or decrease in score), univariate and multiple logistic regression analyses were performed. Each of the 4 AS-20 domains (self-perception, interactions, reading function, and general function) were analyzed separately including only patients able to improve at least by the magnitude of previously defined 95% limits of agreement. Factors assessed were age (at onset and at surgery), sex, number of previous surgeries, presence of visually obtrusive facial anomaly, visual acuity, preoperative and postoperative diplopia questionnaire scores, alignment (as a vector), presence of esotropia, presence of a vertical deviation, CESD-R scores, and type-D personality. Stepwise multiple logistic regression analyses were performed to assess factors associated with failure of AS-20 scores to improve for each domain.

**RESULTS** Of the 276 participants, the median age was 57 years (range, 18-91 years), 153 were women (55%), and 266 were white (96%). Failure to improve was associated with worse diplopia postoperatively on the self-perception (adjusted risk ratio [RR], 1.01; 95% CI, 1.00-1.02), reading function (adjusted RR, 1.02; 95% CI, 1.01-1.03), and general function domains (adjusted RR, 1.02; 95% CI, 1.01-1.03). In addition, failure to improve on the self-perception domain was associated with type-D personality postoperatively (adjusted RR, 4.26; 95% CI, 1.90-9.57) and failure to improve on the interactions domain was associated with postoperative depressive symptoms (adjusted RR, 1.04; 95% CI, 1.02-1.06) and coexisting visually obtrusive anomaly (adjusted RR, 2.12; 95% CI, 1.04-4.32).

**CONCLUSIONS AND RELEVANCE** Postoperative diplopia, depressive symptoms, type-D personality, and visually obtrusive facial anomalies were associated with failure of AS-20 scores to improve (remaining the same or worsening) following strabismus surgery. The association of nonstrabismus factors may have implications for patient treatment and is worthy of continued study.
In an era of increasing use of patient-reported outcome measures, it is important to understand disease-specific and non–disease-specific factors that may influence patient responses. Adults with strabismus often have reduced health-related quality of life (HRQOL), but on average, patients undergoing strabismus surgery show measurable improvements in HRQOL. Nevertheless, in some cases HRQOL does not improve, and the reasons for such failure to improve are unclear.

The adult strabismus–20 (AS-20) questionnaire was designed to evaluate HRQOL and functional vision in patients with strabismus. Previous studies have evaluated associations with decreased HRQOL as measured at a single time, finding depressive symptoms and social anxiety-related conditions associated with reduced HRQOL, in addition to clinical factors such as worse diplopia and greater magnitude of deviation. One previous study evaluated associations with improvement in HRQOL following strabismus surgery and found more association with beliefs, mood, and social support than with clinical factors. In the present study, we analyzed a range of clinical and psychological factors to evaluate associations with failure of AS-20 scores to improve following strabismus surgery in a large cohort of adults with strabismus.

Methods

Approval was obtained from the institutional review board of the Mayo Clinic, Rochester, Minnesota, and each patient gave written informed consent. All procedures and data collection were conducted in a manner compliant with the Health Insurance Portability and Accountability Act, and research adhered to the tenets of the Declaration of Helsinki.

Patients

Consecutive adult patients with strabismus undergoing strabismus surgery were prospectively enrolled from 1 author’s (J.M.H.) strabismus practice between July 2012 and August 2016. All types of diplopic and nondiplopic strabismus were included, and previous strabismus surgery was allowed. If more than 1 surgery was performed in the study period, only the first was included. All included patients completed 4 study questionnaires: preoperatively and 6 weeks postoperatively (window, 3 weeks to <5 months, taking the examination closest to 6 weeks). The 4 questionnaires were the patient-reported AS-20 HRQOL questionnaire, the Type-D Scale 14 distressed personality questionnaire, and the Center for Epidemiologic Studies Depression Scale–Revised (CESD-R) depression screening questionnaire. During the study, patients were excluded if they were unable to read or understand English, had severe cognitive impairment, or failed to complete 1 or more of the 4 questionnaires.

Clinical Data

Ocular alignment was assessed preoperatively and postoperatively using the simultaneous prism and cover test at distance (3 m) and near (0.33 m), in refractive correction (without prism). If visual acuity was too poor to allow accurate prism and cover testing, Krimsky measurements were used. Data extracted from the preoperative examination were best-corrected visual acuity, number of previous surgeries (also analyzed as previous surgery yes/no with same results), current age, age at strabismus onset, and the presence (vs absence) of any visually obtrusive anomaly affecting the face or head (eg, ptosis or other lid anomalies, facial palsy, facial trauma, or scarring).

Key Points

Question What factors are associated with failure to improve on the patient-reported health-related quality-of-life adult strabismus–20 questionnaire following strabismus surgery in adults?

Findings In this observational case series, failure of improvement on the adult strabismus–20 questionnaire was associated with worse postoperative diplopia, postoperative type-D personality, postoperative depressive symptoms, and coexisting visually obtrusive facial anomaly.

Meaning Both strabismus-related and non–strabismus-related factors are associated with failure of the adult strabismus–20 questionnaire to improve following strabismus surgery; understanding such associations may be important for proper interpretation of patient-reported outcome measures and for optimal patient treatment.
overall score was calculated as a mean of all answered items (http://cesd-r.com/).

**Type-D Scale 14 Questionnaire**
The Type-D Scale 14 is a 14-item questionnaire designed to assess for Distressed type (type-D) personality. Scores were calculated as the mean of all answered items. A score of at least 10 on each subscale categorizes a patient as having type-D personality.

**Analysis**
Change in AS-20 score from preoperative to postoperative was calculated for each AS-20 domain (self-perception, interactions, reading function, and general function). To reduce potential ceiling effects, patients were included only if preoperative AS-20 scores were able to improve by at least the magnitude of previously established 95% limits of agreement [30.37 points for self-perception (preoperative scores of 69.63 or less included), 19.32 for interactions (preoperative scores of 80.68 or less included), 24.75 for reading function (preoperative scores of 75.25 or less included), and 27.66 for general function (preoperative scores of 72.34 or less included)]. Included patients were classified as showing failure to improve if there was zero change in AS-20 score or a decrease in score preoperatively to postoperatively.

To evaluate associations with failure of AS-20 scores to improve, we included a range of demographic, clinical, and psychological factors in univariate logistic regression analyses. Demographic factors included were age at strabismus onset, age at surgery, sex, and number of previous surgeries. Clinical factors included were preoperative and postoperative alignment by simultaneous prism and cover test/Krimsky (largest of distance or near measurements for uniplanar deviations and magnitude of combined vector [largest of distance or near] for horizontal and vertical deviations), best-eye visual acuity preoperatively, presence of esotropia (1 prism diopter [PD] or more, distance or near) vs no esotropia (exotropia or no horizontal), vertical deviation (1 PD or more distance or near) vs no vertical deviation, diplopia questionnaire scores, and presence (vs absence) of a visually obtrusive facial anomaly. Psychological factors included were CESD-R scores and presence of type-D personality preoperatively and postoperatively. For all univariate analyses, each variable with a significance of a 1-sided P value less than .10 was included in multivariate analyses.

To detect masking of variable influence, Spearman rank correlations were calculated, and moderate to strong correlations (r ≥ 0.6) between factors were identified. Multiple logistic regression analyses were performed, first with all items identified as significantly associated in univariate analysis and then repeated including only 1 of any pair of correlated factors if 1 or both was significant in the multiple logistic model (correlations between included factors are only relevant if 1 or both factors were significant in the multiple logistic regression model). For example, preoperative and postoperative type-D personality (Type-D Scale 14 scores) were correlated, and one was significantly associated in the self-perception model; therefore, we performed 1 analysis with only preoperative and another with only postoperative type-D included. Stepwise multiple logistic regression analyses were performed including only patients with data on each variable, and factors were considered significantly associated at a threshold of P less than .05. All P values were 1-sided.

We calculated risk ratios (RRs) with 95% confidence intervals to provide an estimate of the proportion of cases meeting the outcome (failure of AS-20 scores to improve) in 1 group (eg, type-D personality) vs another (eg, no type-D personality). To evaluate the predictive accuracy of each logistic regression model, we calculated the concordance or C statistic, equivalent to the area under the receiver operating characteristic curve. The C statistic shows the probability of predicting the outcome compared with chance (range, 0.5 [the prediction value of the model is not better than chance] to 1.0 [the model perfectly predicts the outcome]). Typically, a C statistic greater than 0.7 indicates the model is reasonable and a C statistic greater than 0.8 indicates the model is strong. Statistical analyses were performed using SAS software, version 9.4 (SAS Institute Inc).

**Results**

**Patients**
Two hundred seventy-six patients with strabismus were prospectively enrolled. Median age was 57 years (range, 18-91 years), 153 were women (55%), and for 266 of 276 participants (96%), race/ethnicity was self-reported as white. Preoperative examinations were median, 1 day (range, 1-11 days) preoperatively, and 6-week examinations were median, 8.1 weeks (range, 3.9-21.4 weeks) postoperatively. Two hundred seventeen of 276 patients (79%) had diplopia preoperatively, and 114 (41%) had undergone previous eye muscle surgery. Median best-eye visual acuity was 20/20 (range, 20/15 to 20/63). A visually obtrusive facial anomaly was present in 53 of 276 patients (19%).

Mean preoperative AS-20 domain scores were 60.3 (31.4) on self-perception, 76.5 (23.4) on interactions, 55.7 (25.7) on reading function, and 55.1 (23.2) on general function. Overall type-D personality was present in 59 patients (21%) preoperatively and in 47 patients (17%) postoperatively. Center for Epidemiologic Studies Depression Scale–Revised scores were elevated (subnormal) in 29 of 276 patients (11%) preoperatively and 23 patients (8%) postoperatively.

**Failure to Improve on Self-perception Domain**
One hundred sixty-four of 276 patients were included for analysis of the self-perception domain, of whom 22 (13%) failed to improve postoperatively. In univariate analysis, 6 factors were associated (P < .10) (Table) with failure of AS-20 scores to improve: male sex (RR, 2.44; 95% CI, 1.11-5.37; P = .02), higher diplopia questionnaire score (more diplopia) postoperatively (RR, 1.02; 95% CI, 1.01-1.03; P = .002, Figure, A), larger postoperative angle of deviation (RR, 1.07; 95% CI, 1.02-1.13; P = .02), presence of type-D personality preoperatively (RR, 2.49; 95% CI, 1.16-5.34;
### Table. Factors Associated With Failure of AS-20 Scores to Improve on Each of the 4 Domains Using Logistic Regression Analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Self-perception*</th>
<th>Interactions</th>
<th>Reading Function</th>
<th>General Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR (95% CI)</td>
<td></td>
<td>RR (95% CI)</td>
<td>RR (95% CI)</td>
</tr>
<tr>
<td></td>
<td>P Value From</td>
<td></td>
<td>P Value From</td>
<td>P Value From</td>
</tr>
<tr>
<td></td>
<td>Univariate</td>
<td></td>
<td>Univariate</td>
<td>Univariate</td>
</tr>
<tr>
<td>Age</td>
<td>0.98 (0.96-1.01)</td>
<td>.21</td>
<td>1.02 (1.00-1.04)</td>
<td>.12</td>
</tr>
<tr>
<td>Age at onset</td>
<td>0.99 (0.97-1.00)</td>
<td>.14</td>
<td>1.01 (0.99-1.02)</td>
<td>.35</td>
</tr>
<tr>
<td>Sex</td>
<td>2.44 (1.11-5.37)</td>
<td>.02</td>
<td>1.20 (0.57-2.55)</td>
<td>.63</td>
</tr>
<tr>
<td>Previous surgeries, No.</td>
<td>1.11 (0.85-1.43)</td>
<td>.46</td>
<td>0.95 (0.71-1.29)</td>
<td>.77</td>
</tr>
<tr>
<td>Best-eye visual acuity</td>
<td>0.03 (0.00-0.36)</td>
<td>.24</td>
<td>1.50 (0.04-50.66)</td>
<td>.85</td>
</tr>
<tr>
<td>Vertical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>0.47 (0.12-1.88)</td>
<td>.26</td>
<td>0.66 (0.21-2.07)</td>
<td>.47</td>
</tr>
<tr>
<td>Postoperative</td>
<td>2.36 (1.08-5.13)</td>
<td>.03</td>
<td>0.93 (0.35-2.51)</td>
<td>.89</td>
</tr>
<tr>
<td>Magnitude SPCT</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Preoperative</td>
<td>0.98 (0.95-1.00)</td>
<td>.13</td>
<td>0.99 (0.96-1.02)</td>
<td>.41</td>
</tr>
<tr>
<td>Postoperative</td>
<td>1.07 (1.02-1.13)</td>
<td>.02</td>
<td>0.99 (0.91-1.07)</td>
<td>.75</td>
</tr>
<tr>
<td>Visually obtrusive facial anomaly</td>
<td>0.56 (0.18-1.79)</td>
<td>.31</td>
<td>2.10 (1.00-4.41)</td>
<td>.05*</td>
</tr>
<tr>
<td>Diplopia questionnaire score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>1.00 (0.99-1.01)</td>
<td>.37</td>
<td>1.00 (0.99-1.01)</td>
<td>.78</td>
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<tr>
<td>Postoperative</td>
<td>1.02 (1.01-1.03)</td>
<td>.002*</td>
<td>1.01 (1.00-1.02)</td>
<td>.09</td>
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<tr>
<td>CESD-R score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>1.01 (0.98-1.04)</td>
<td>.66</td>
<td>1.01 (0.98-1.04)</td>
<td>.58</td>
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<tr>
<td>Postoperative</td>
<td>1.01 (0.98-1.05)</td>
<td>.49</td>
<td>1.04 (1.02-1.06)</td>
<td>.004*</td>
</tr>
<tr>
<td>Type-D personality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>2.49 (1.16-5.34)</td>
<td>.02*</td>
<td>1.14 (0.52-2.49)</td>
<td>.75</td>
</tr>
<tr>
<td>Postoperative</td>
<td>5.14 (2.39-11.04)</td>
<td>&lt;.001*</td>
<td>2.19 (1.05-4.58)</td>
<td>.04</td>
</tr>
</tbody>
</table>

Abbreviations: AS-20, adult strabismus-20 questionnaire; RR, risk ratios; SPCT, simultaneous prism and cover test.
* Correlated factors ($r = 0.6087$). With postoperative type-D personality removed, postoperative diplopia questionnaire score ($P = .006$) and male sex ($P = .03$) were associated, but preoperative type-D personality was no longer associated.

With all 6 significantly associated factors (univariate analysis) entered into multivariate analysis, only higher postoperative diplopia questionnaire score (adjusted RR, 1.01; 95% CI, 1.00-1.02; $P = .03$; Figure, A) and the presence of type-D personality postoperatively (adjusted RR, 4.26; 95% CI, 1.90-9.57; $P < .001$) remained associated with failure of AS-20 scores to improve on the self-perception domain (Table; C statistic, 0.784). Preoperative and postoperative presence of type-D personality were significantly correlated ($r = 0.6087$), and so separate models were created. With postoperative type-D personality removed from the model, postoperative diplopia questionnaire score remained associated (adjusted RR, 1.02; 95% CI, 1.00-1.03; $P = .006$) and male sex was also associated (adjusted RR, 2.12; 95% CI, 0.98-4.60; $P = .03$), but preoperative type-D personality was no longer associated.

### Failure to Improve on Interactions Domain
One hundred forty-one of 276 patients were included for analysis of the interactions domain, of whom 23 (16%) failed to improve postoperatively. In univariate analysis, 4 factors were associated with failure of AS-20 scores to improve on the interactions domain (Table): higher postoperative diplopia questionnaire score (RR, 1.01; 95% CI, 1.00-1.02; $P = .09$), elevated CESD-R score postoperatively (RR, 1.04; 95% CI, 1.02-1.06; $P = .004$), presence of type-D personality postoperatively (RR, 2.19; 95% CI, 1.05-4.58; $P = .04$), and presence of a visually obtrusive facial anomaly (RR, 2.10; 95% CI, 1.00-4.41; $P = .05$) (Table).

With all 4 significant factors entered into multivariate analysis, only elevated CESD-R score postoperatively (adjusted RR, 1.04; 95% CI, 1.02-1.06; $P = .004$) and the pres-
ence of a visually obtrusive facial anomaly (adjusted RR, 2.12; 95% CI, 1.04-4.32; \( P = .04 \)) remained significantly associated with failure of AS-20 scores to improve on the interactions domain (Table; C statistic, 0.697). There were no significant correlations between factors.

Failure to Improve on Reading Function Domain
Two hundred fifteen of 276 patients were included for analysis of the reading function domain, of whom 36 (17%) failed to improve postoperatively. In univariate analysis, 4 factors were associated with failure of AS-20 scores to improve on the reading function domain (Table): higher postoperative diplopia questionnaire score (RR, 1.02; 95% CI, 1.01-1.03; \( P < .001 \), Figure, C), larger angle of deviation postoperatively (RR, 1.05; 95% CI, 1.01-1.09; \( P = .02 \)), better best-eye visual acuity (RR, 0.03; 95% CI, 0-2.19; \( P = .07 \)), and presence of a vertical deviation postoperatively (RR, 2.20; 95% CI, 1.18-4.11; \( P = .02 \)) (Table).

In multivariate analyses, with all 4 associated factors entered, only higher postoperative diplopia questionnaire score (adjusted RR, 1.02; 95% CI, 1.01-1.03; \( P < .001 \); Figure, C) remained associated with failure of AS-20 scores to improve on the reading function domain (Table; C statistic, 0.717). There were no significant correlations between factors.

Failure to Improve on General Function Domain
Two hundred eight of 276 patients were included for analysis of the general function domain, of whom, 23 (11%) failed to improve postoperatively. In univariate analysis, 4 factors were associated with failure of AS-20 scores to improve on the general function domain (Table): higher postoperative diplopia questionnaire score (RR, 1.02; 95% CI, 1.01-1.03; \( P < .001 \), Figure, D), larger angle of deviation postoperatively (RR, 1.06; 95% CI, 1.02-1.11; \( P = .02 \)), presence of type-D personality preoperatively (RR, 2.43; 95% CI, 1.14-5.19; \( P = .02 \)), and presence of type-D personality postoperatively (RR, 2.05; 95% CI, 0.93-4.51; \( P = .08 \)) (Table).

With all 4 associated factors entered into multivariate analysis, only higher postoperative diplopia questionnaire score (adjusted RR, 1.02; 95% CI, 1.01-1.03; Figure, D) re-
mained associated with failure of AS-20 scores to improve on the general function domain (Table; C statistic, 0.660). There were no significant correlations between factors.

Discussion

In this study evaluating associations with failure of AS-20 scores to improve following strabismus surgery, we found significant association with worse postoperative diplopia for 3 of the 4 AS-20 domains. In addition, the presence of depressive symptoms postoperatively, type-D personality postoperatively, and coexisting visually obstructive facial anomalies were also associated.

Adults undergoing successful strabismus surgery typically experience profound improvement in HRQOL. Nevertheless, some patients fail to show such improvement (11% to 17% in this study), and there are few previous studies exploring reasons for this lack of improvement in HRQOL. We previously found that AS-20 scores improved less in patients whose surgery was unsuccessful (primarily owing to postoperative diplopia) compared with those whose surgery was successful.7,8 This previous finding is consistent with our finding in this study that across 3 of 4 AS-20 domains, failure of AS-20 scores to improve was associated with worse diplopia postoperatively. Diplopia is a troublesome symptom for many adults with strabismus,1,9-11 and data in this study show that the disappointing presence of diplopia postoperatively may explain a lack of improvement in AS-20 scores. It is important to recognize the potential effect of diplopia on HRQOL and to try all reasonable means to improve it using prism and possible additional surgery.

Previous studies have identified depressive symptoms in adults with strabismus,5,11,13,23 and we previously found an association with worse AS-20 scores when measured at a single time.10 But we are unaware of studies evaluating depressive symptoms in relation to failure of HRQOL to improve following strabismus surgery. In other areas of medicine, depression has been associated with poorer HRQOL following anterior temporal lobectomy for epilepsy24 and posterior cerebral fusion surgery,25 and in this study we found an association of postoperative depressive symptoms with failure to improve on the AS-20 interactions domain. Depressive symptoms may change from 1 time to another, and it is important to recognize the potential effect of current depressive symptoms on strabismus-specific HRQOL as well as the possible need to refer the patient for appropriate assessment and treatment of their depressive symptoms.

Type-D personality was another nonstrabismus factor found to be associated with failure of AS-20 scores to improve. We were interested in evaluating type-D personality because in other populations (eg, cardiology,26 cancer,27,28 and irritable bowel syndrome29) type-D personality has been reported to be strongly associated with poorer HRQOL and with no change or deterioration of HRQOL following treatment, eg, coronary artery bypass graft surgery.30 Our finding of an association between type-D personality and failure of AS-20 scores to improve further highlights the importance of considering psychological and personality parameters when interpreting patient-reported outcome measures such as HRQOL. Interestingly, type-D personality was not constant in some patients (measured by DS-14), which we did not anticipate because personality type is not expected to fluctuate. This variability is worthy of further study.

Previous studies have reported an association of nonstrabismus factors with HRQOL in adults with strabismus,10,11,14 but an important finding of our study is that such nonstrabismus factors may also be associated with failure of AS-20 scores to improve postoperatively. These associations have important clinical implications because there is increasing emphasis on using patient-reported outcomes for evaluating treatment effectiveness. In addition to initiating appropriate referral where necessary, some authors11 have suggested that psychological interventions should be considered when treating adults with strabismus and coexistent psychological disorders. Further work is needed on the role and timing of psychological interventions in patients with strabismus (eg, addressing psychological issues preoperatively vs postoperatively).

Our finding of an association between certain factors and failure of AS-20 scores to improve does not mean that the presence of that factor in an individual patient precludes improvement. Diplopia or depressive symptoms (for example) may be present but not negatively affect a patient's HRQOL related to their strabismus, as illustrated by the finding that patients with severe postoperative diplopia (Figure) or depressive symptoms may have dramatic improvement in AS-20 scores.

We found the presence of a coexistent anomaly affecting the face was associated with failure of AS-20 scores to improve on the interactions domain. Our finding of an association with failure of AS-20 scores to improve is important for understanding that the presence of common coexisting conditions, such as ptosis, may account for less than expected improvement in AS-20 scores following strabismus surgery.

Limitations

There are a number of limitations to this study. We included only 2 psychological measures (depressive symptoms and type-D personality) and we may have found different associations had we included measures of other personality types, stress, anxiety, social issues, or patient expectations. We may also have found different associations had we included additional clinical and demographic factors. We analyzed data at a relatively early postoperative time, and associations may be different with longer follow-up. In addition, we chose to define failure to improve using a strict threshold of change less than one point from preoperatively to postoperatively. Alternative analyses using, for example, failure to exceed the 95% limits of agreement may be of value but would increase the likelihood of patients being classified as failing to improve when they had in fact improved. Further, because the purpose of this study was to evaluate overall associations, we did not specifically explore changes over time in depressive symptoms or type-D personality including preoperatively to postoperatively.
Conclusions

In adults undergoing strabismus surgery, failure of AS-20 scores to improve postoperatively was associated with worse postoperative diplopia, postoperative depressive symptoms, postoperative type-D personality, and visually obtrusive facial anomalies. It is important to be aware of the association with psychological factors because appropriate referral of affected patients may be warranted.

REFERENCES


