A Patient- and Observer-Rated Analysis of the Impact of Lateral Rhinotomy on Facial Aesthetics

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**Objective:** To determine, using patient- and observer-rated facial disfigurement measures, whether a lateral rhinotomy imparts significant aesthetic morbidity.

**Design:** Retrospective and subject-controlled study in a large, tertiary-referral, academic otolaryngology department. Twenty-one consecutive patients who had undergone lateral rhinotomy for the treatment of inverted papilloma were studied in the long-term.

**Main Outcome Measures:** Scores on the following: (1) the novel Patient-Rated Facial Disfigurement Analogue Scale questionnaire and (2) the reliable and validated Observer-Rated Facial Disfigurement 9-Point Likert Scale.

**Results:** Patients rated their facial appearance as minimally altered and significantly less apparent to others. The observers in this study, a surgeon (J.C.I.) and a psychiatrist (M.R.K.), rated the patients’ facial disfigurement as minimally visible. Patients seem to rate how apparent their appearance is to others in a similar fashion to observers. The observer-rated facial disfigurement scale used is valid and reliable.

**Conclusion:** Patient- and observer-rated facial disfigurement measures suggest that a lateral rhinotomy does not impart significant aesthetic morbidity.

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**LATERAL RHINOTOMY,** although first described by Moure in 1902, was only popularized as an approach to the maxilla by Doyle in 1968. During the past 30 years, it has developed a reputation as a versatile and minimally morbid approach to the mid-face. However, an exhaustive search of the English-language literature failed to discover any quantitative evidence, supporting most researchers’ general assertions that lateral rhinotomy does not impart significant functional or aesthetic morbidity. In an earlier report, we provided quantitative evidence that lateral rhinotomy does not impart significant functional morbidity. The present report seeks to determine, using patient- and observer-rated facial disfigurement measures, whether a lateral rhinotomy imparts significant aesthetic morbidity.

**RESULTS**

**PATIENT-RATED FACIAL DISFIGUREMENT ANALOGUE SCALE**

The patients’ mean rating of the extent to which their facial appearance had been altered by surgery was 13% from not at all (13 of 100 mm; range, 0-80 mm; SD, 18.6 mm). The patients’ mean rating of the extent to which their surgery was apparent to other people was 5% from not at all (5 of 100 mm; range, 0-50 mm; SD, 11.8 mm). The difference between these 2 patient-rated disfigurement measures was statistically significant (P=.01). Although women rated their appearance to be more altered (mean, 20% vs 9%) and apparent (mean, 8% vs 4%) than men, these differences did not reach statistical significance (P>.05). Younger patients rated their appearance to be more altered (mean, 17% vs 9%) and apparent (mean, 10% vs 2%) than older patients; however, again, these differences did not reach statistical significance (P>.05). Patients’ rating of how their appearance was altered correlated significantly with how their appearance was apparent to others (R=0.76, P<.001).

**OBSERVER-RATED FACIAL DISFIGUREMENT 9-POINT LIKERT SCALE**

Of 9 total points, the surgeon’s (J.C.I.) mean rating of facial disfigurement was 1.7 points (range, 1-4 points; SD, 0.78 points),
POPULATION AND METHODS

DESIGN

The study design was retrospective and subject controlled. The study setting was a large, tertiary-referral, academic otolaryngology—head and neck surgery department. The study population was all patients who were referred to the Head & Neck Surgical Oncology Service, Department of Otolaryngology, The University Health Network, The University of Toronto, Toronto, Ontario, servicing an estimated 7 million people from southern Ontario and the greater metropolitan Toronto area, between July 1, 1993, and December 31, 1996. Predetermined inclusion criteria selected all patients with a pathologically verified inverted papilloma, resected through a standard lateral rhinotomy, at least 6 months previously, without evidence of tumor recurrence by flexible nasal endoscopy at last follow-up.

All lateral rhinotomies were performed by 3 experienced head and neck surgeons at The Toronto Hospital, Toronto (J.C.I., D.H.B., and P.J.G.). All 3 surgeons design their incisions in a similar fashion. The superior third of the incision is placed midway between the midline nasal dorsum and the medial canthus. The middle third of the incision is placed in a gently curving fashion a few millimeters dorsal to the cheek-nasal inflection to lay entirely on the nasal dorsal skin. The inferior third of the incision is placed 1 mm lateral to the nasolabial groove and sulcus to lay entirely on the cheek-lip skin.

All patients were administered a 2-item analogue scale questionnaire (Figure 1). They were asked to place a single mark across a 100-mm line scale representing: (1) the extent to which their facial appearance had been altered by surgery and (2) the extent to which their surgery is apparent to other people. Anchors were provided at the left (“not at all”) and right (“worst possible”) ends of the analogue scale. The portion of the 100-mm line to the left of the patient’s mark measured in millimeters represents the value for the scale and is expressed as a percentage of the total length of the line (eg, 15 mm = 15%).

We developed an analogue scale measurement tool for the patient-rated assessment of postoperative facial disfigurement. The benefit of this method is its simplicity, in understandability and analysis. The significant correlation between patient-patient ratings (P<.001), and between patient-observer ratings (P=.04), suggests that this measure is valid and reliable within this group of patients.

Patients rated their appearance to be minimally altered (13%) and significantly (P=.01) less apparent to others (5%). More than one third (8 of 21 patients) rated themselves as not disfigured at all (0 of 100 mm), and almost two thirds (13 of 21 patients) believed that their incision was not at all apparent to others (0 of 100 mm). Although women rated their appearance to be more altered and apparent than older patients; again, these differences were not significant. Younger patients also rated their appearance to be more altered and apparent than older patients; again, these differences were not significant. Patients’ rating of how their appearance was altered significantly with either the surgeon’s (R=0.29, P=.20) or the psychiatrist’s (R=0.38, P=.09) ratings of facial disfigurement. However, the patients’ rating of the extent to which their surgery was apparent to other people correlated significantly with the surgeon’s facial disfigurement rating (R=0.45, P=.04), and almost significantly with the psychiatrist’s rating (R=0.37, P=.10).

A search of The Toronto Hospital tumor database produced 31 potential candidates. Predetermined criteria excluded any patients who underwent previous surgery of the nose or paranasal sinuses (n=2), who had significant concurrent medical conditions (n=1), who had evidence of tumor recurrence by flexible nasal endoscopy before testing (n=0), or who refused to participate (n=7). Of the 7 patients who refused to participate, all stated reasons of inconvenience related to the significant travel distance to the tertiary medical center.

The remaining 21 consecutive surgical patients (14 men [67%] and 7 women [33%]) were the subjects of this study. Consistent with the literature,5,9,11,13 their mean age was 58.5 years (range, 34-72 years).

OUTCOME MEASURES

Patient-Rated Facial Disfigurement Analogue Scale

Item 1
Place a mark on the line below representing the extent to which your facial appearance has been altered by surgery.

Not at All _______ Worst Possible

Item 2
Place a mark on the line below representing the extent to which your surgery is apparent to other people.

Not at All _______ Worst Possible

Figure 1. Patient-Rated Facial Disfigurement Analogue Scale.

While the psychiatrist’s (M.R.K.) mean rating was 2.1 points (range 1-5 points; SD, 1.07 points). The difference between these 2 observers was not statistically significant (P>.05). The surgeon’s and psychiatrist’s ratings of facial disfigurement correlated highly for the subjects as a whole (R=0.74, P=.001, N=21), and for the male (R=0.67, P=.008, n=14), female (R=0.84, P=.02, n=7), older (R=0.62, P=.03, n=12), and younger (R=0.90, P=.001, n=9) patient subsets. There were no significant differences between male and female observer-rated disfigurement scores and between old and young observer-rated disfigurement scores (P>.05 for both).

ASSOCIATION BETWEEN PATIENT AND OBSERVER FACIAL DISFIGUREMENT RATINGS

The patients’ rating of the extent to which their facial appearance had been altered by surgery did not correlate

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Observer-Rated Facial Disfigurement
9-Point Likert Scale

The disfigurement scale used was a single-item 9-point Likert scale measuring the degree of postoperative facial disfigurement (Figure 2).15 Disfigurement is defined as a visible and negative alteration in appearance caused by disruption of skin, soft tissue, or bony structure. It possesses discriminant and convergent validity. It also possesses interobserver reliability, with a high surgeon and nonsurgeon concordance (intraclass correlation coefficient of 91%).15

The projected images of standard anterior (passive and natural smile), oblique, and lateral view 35-mm color photographs were rated independently by a head and neck surgical oncologist (J.C.I.) and a psychiatrist specializing in psychosocial oncology (M.R.K.). Both observers were familiar with this disfigurement scale.15 The subject’s unoperated-on side provided an internal control of the patient’s preoperative aesthetic state against which the observers could compare the disfigurement imparted by the lateral rhinotomy. The first 9 patients were examined by the surgeon twice, approximately 3 years apart, to assess the degree of intraobserver stability (test-retest) of this novel rating scale.

### STATISTICAL ANALYSIS

All statistical analyses were performed from the original raw data by a professional statistician using SAS statistical software (SAS Institute Inc, Cary, NC). Simple univariate analysis was performed for all data sets. Associations between analogue patient-rated (parametric) data were determined using a Pearson product moment correlation test. Associations between observer-rated (nonparametric) data were determined using a Spearman rank correlation test. Correlation matrices were performed for all subjects (N=21), men (n=14), women (n=7), patients 60 years and older (n=12), and patients younger than 60 years (n=9). Given the well-known differences in skin quality, thickness, texture, laxity, healing, and disfigurement tolerance between male and female patients and between older and younger patients, we analyzed these subsets independently for correlations and significant differences between them. Comparisons of differences between male and female patients and between older and younger patients were performed by the Wilcoxon 2-sample rank sum t test.

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**Figure 2. Observer-Rated Facial Disfigurement 9-Point Likert Scale.**

<table>
<thead>
<tr>
<th>Example of “1”</th>
<th>Example of “5”</th>
<th>Example of “9”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disfigurement Area/Scar Small</td>
<td>Disfigurement Area/Scar Moderate</td>
<td>Disfigurement Area/Scar Large</td>
</tr>
<tr>
<td>Shape of Face/Neck Not Distorted</td>
<td>Shape of Face/Neck Somewhat Distorted</td>
<td>Shape of Face/Neck Very Distorted</td>
</tr>
<tr>
<td>Facial Expression Not Affected</td>
<td>Facial Expression Somewhat Affected</td>
<td>Facial Expression Very Affected</td>
</tr>
<tr>
<td>Disfigurement Minimally Visible (Close Range Only)</td>
<td>Disfigurement Moderately Visible</td>
<td>Disfigurement Very Visible (Visible From Afar)</td>
</tr>
</tbody>
</table>

To assist you in making your rating, the following examples or guideposts are provided.

- **Example of “1”**
  - Minimal Disfigurement
  - 1

- **Example of “5”**
  - Moderate Disfigurement
  - 5

- **Example of “9”**
  - Severe Disfigurement
  - 9

Disfigurement may be defined as a visible and negative alteration in appearance resulting from disruption of skin, soft tissues, or bony structures.

The degree of disfigurement may be represented on a continuum ranging from minimal to severe.

Please rate each patient you see in terms of face and/or neck disfigurement on the 9-point rating scale provided, in which 1 refers to minimal disfigurement and 9 refers to severe disfigurement. To assist you in making your rating, the following examples or guideposts are provided.

**Table:** Observer-Rated Facial Disfigurement 9-Point Likert Scale.

correlated highly with their rating of how apparent their surgery was to others (P<.001).

For the observer-rated measure, we used a novel, valid, and reliable observer-rated facial disfigurement Likert scale.15 Before the development of this scale, the best available measures used only coarse categorical ratings (eg, minor vs extensive) and grouped all patients with a specific surgical procedure into a single rating. This new observer-rated scale defines disfigurement on the rating sheet as a visible and negative alteration in appearance caused by disruption of skin, soft tissue, or bony structure. Raters are then asked to assess a patient’s disfigurement, taking into account the size of the disfigured area, the degree of face/neck shape distortion, the extent of impairment in facial expression, and the visibility of the disfigured area. Unlike many head and neck surgical incisions, lateral rhinotomy is entirely unilateral. This means that the unoperated-on side provides an internal subject control of the preoperative aesthetic state against which the observer can rate the disfigurement caused by surgery. This observer-rated disfigurement scale has demonstrated discriminant and convergent validity. The former refers to a low correlation with sociodemographic variables such as income level, which one would not reasonably expect to be associated with disfigurement, while the latter refers to a high correlation with clinical variables such as postoperative complications, which one would reasonably expect to be associated with disfigurement. It has also been shown to have
a high degree of interobserver reliability, with an inter-
rater concordance between surgeon and nonsurgeon
observer of 91%.13 This indicates that independent observ-
ers using this scale will rate a patient’s degree of disfigure-
ment similarly. However, while a significant improve-
ment over previous observer-rated facial disfigurement
scales, it does have certain shortcomings. First, it was origi-
nally developed and tested among patients with head and
neck cancer, a group that might reasonably be expected to
judge their own disfigurement differently than patients with
benign tumors. However, in this study, patient-observer con-
cordance (convergent validity \(P = .04\)) and observer-
observer concordance (interobserver reliability \(P = .001\)) was
significant. These findings support the fact that this observer-
rated facial disfigurement scale is also valid and reliable for
patients undergoing surgery for benign tumors. Second, the
intraobserver reliability (test-retest stability) of this mea-
sure had not previously been determined. Within this study,
the surgeon’s earlier ratings of facial disfigurement for the
first 9 subjects almost correlated significantly with his rat-
ings 3 years later \((R = 0.63, P = .07)\), suggesting that this rat-
ing scale also possesses intraobserver reliability.

The surgeon (mean, 1.7 of 9.0 points) and psychia-
trist (mean, 2.1 of 9.0 points) rated the lateral rhi-
notomy as minimally disfiguring (visible only from close
range). Their ratings were also highly correlated for the
group as a whole and for the male, female, older, and
younger subsets. Almost half the patients (10/21) were
given the lowest possible disfigurement rating (1 point,
minimally disfigured, visible only from afar) by either the
surgeon or the psychiatrist. Only 2 patients were rated
above 3 points by either the surgeon or the psychiatrist.

The patients’ rating of the extent to which their facial
appearance had been altered by surgery did not correlate
significantly with either the surgeon’s or the psychiatrist’s
ratings of facial disfigurement. However, the patients’ rat-
ing of the extent to which their surgery is apparent to oth-
er people did correlate significantly with the surgeon’s facial
disfigurement rating \((P = .04)\), and almost significantly with
the psychiatrist’s facial disfigurement rating \((P = .10)\). This
supports the finding by Katz et al13 that patients rate the
extent to which their facial disfigurement is apparent to oth-
ers in a fashion similar to observers.

The most important finding in this study, which sup-
ports what is already widely accepted by experienced fa-
cial surgeons, is that well-planned facial incisions do not
necessarily impart significant aesthetic morbidity in them-
selves. The quantitative evidence presented in this study
should be reassuring to any patient undergoing facial inci-
sions. However, several factors did seem to increase the
risk of perceived or actual aesthetic morbidity. Being
young and female, probably related to differences in skin
quality and disfigurement tolerance, were 2 factors that
were associated with an increased likelihood of rating one-
self as more altered and apparent after surgery. The ob-
servers in this study also noted that most of the more visi-
able disfigurement was the result of failure to obtain perfect
superior-inferior alignment of the wound closure at ei-
ther the medial canthus or the ala and the late alar re-
traction. Interestingly, the youngest patient, a woman,
who appeared to have a technically imperfect superor-
inferior alar closure and significant late alar retraction,

was the only subject to rate her appearance toward the
severely disfigured end of the scale (altered, 80 of 100
mm; apparent, 50 of 100 mm). She also received the single
highest observer facial disfigurement ratings (surgeon,
4 of 9 points; psychiatrist, 5 of 9 points).

Patients rate their own appearance from a lateral rhi-
notomy as minimally altered and significantly less ap-
parent to others. Observers also rate the facial disfigure-
ment as minimally visible. Patients appear to rate how
apparent their disfigurement is to others in a similar way to
observers. The observer-rated facial disfigurement scale
used in this study appears to have discriminant and con-
vergent validity and interobserver and intraobserver reli-
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ment measures suggest that a lateral rhinotomy does not
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