

## Postoperative Evaluation of Skin Incision in External Dacryocystorhinostomy

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**Purpose:** To evaluate the appearance of the skin incision in external dacryocystorhinostomy 6 weeks and 6 months after surgery.

**Methods:** A prospective, interventional, noncomparative case series of consecutive cases of external dacryocystorhinostomy was performed by 3 surgeons. At 6 weeks and 6 months after surgery, patients were asked to grade their incision, and standardized photographs were evaluated by 3 blinded observers.

**Results:** Thirty-four consecutive patients were admitted and followed for 6 months. Six weeks after surgery, 9 of 34 patients could not see their incision site (26%), 13 of 34 graded it as minimally visible (38%), 9 of 34 (26%) graded it as moderately visible, and 3 of 34 patients (9%) graded it as very visible (grade 3). Two of 34 patients (6%) were not satisfied with the appearance of the incision. Six months after surgery, 15 of 34 patients (44%) could not see their incision site (grade 0), 16 of 34 (47%) graded it as minimally visible, 3 of 34 patients (9%) graded it as moderately visible, and no patient graded it as very visible. All patients were satisfied with the appearance of their incision. Photographic evaluation of patients 6 weeks after surgery by the 3 observers showed an average score of 1.12, 1.18, and 1.24. There was not a statistically significant difference between the observers ( $p = 0.95$ ). At 6 months after surgery, the average scores were 0.56, 0.74, and 0.79. There was not a statistically significant difference between the observers ( $p = 0.43$ ). The change in appearance of the incision at 6 weeks and at 6 months was statistically significant ( $p < 0.044$ ), as evaluated by patients and observers ( $p < 0.001$ ).

**Conclusions:** The skin incision in external dacryocystorhinostomy is satisfactory to most patients. Its appearance is improved with time; 86% of the incisions were graded invisible or minimally visible by observers and 91% by patients after 6 months.

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External dacryocystorhinostomy (DCR) is the gold standard treatment for acquired nasolacrimal duct obstruction.<sup>1</sup> It can be performed safely in elderly patients under local anesthesia, with minimal blood loss, low economic cost, and a high success rate.<sup>2–6</sup> A visible skin

incision is usually mentioned as one of the disadvantages associated with this procedure and is used as a reason to recommend endonasal or other nonincisional techniques.<sup>7–12</sup> We conducted a prospective study to evaluate the appearance of the skin incision used in external DCR at 6 weeks and 6 months after surgery in two ways: Three blinded, independent observers evaluated photographs, and the patients subjectively evaluated their own incision.

### METHODS

Thirty-four consecutive patients with acquired nasolacrimal duct obstruction were included in the study from three different practices. Patients were excluded if they

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had previous external DCR, contralateral DCR, localized trauma or skin scars on the nose, or previous acute dacryocystitis with fistulization or drainage; if they had undergone simultaneous bilateral external DCR or subsequent bilateral DCR within the previous 6 months; or if they could not be followed for 6 months.

Dacryocystorhinostomy was performed by an external incision marked with a straight line starting at half the distance between the medial canthus and the mid-point of the nasal bridge. It was carried for 10 mm to the nasal ala with a No. 15 Bard Parker blade. Blunt dissection was performed to the level of the periosteum. After the procedure was finished, the skin was closed with 3 interrupted 6-0 mild-chromic gut sutures. The periosteum and the orbicularis were not closed with separate layers. The length of the incision was measured again at the end of the procedure, and an adhesive strip (Steri-Strip, 3M, St. Paul, MN, U.S.A.) was placed to cover it. The adhesive strip and the sutures were removed 1 week after surgery.

Photographs were taken with a digital camera with an optical zoom of  $\times 3$  (Sony DSC-S70). The frame included the brow and the nasal tip and was taken at a  $45^\circ$  angle, following the example of a standard photograph included in the design of the study. Care was taken to avoid the presence of fluorescein in the tear lakes, so that photographic evaluation remained masked. Fluorescein was instilled in both eyes for the same reason before the photograph was taken. Illumination was provided by the camera's built-in flash. Digital photographs were taken with a resolution of  $1280 \times 960$  pixels and saved in a JPG format with a compression of not more than 10% and were not modified or edited in any way. Photographs of each patient were taken from both sides before surgery, at the 6-week postoperative visit, and at the 6-month postoperative visit.

Images were processed with a "mirror" effect so that the observers would see them all as belonging to the right side. Photographs of each patient were randomly shown to 3 blinded observers on a 15-inch computer monitor with a screen resolution of  $1280 \times 960$ . The observers were carefully instructed to look for the incision in its appropriate location. Two observers were ophthalmologists and one was a surgical technician.

The examiners rated each photograph by using the following scale: 0: invisible incision; 1: minimally visible incision; 2: moderately visible incision; and 3: very visible incision. At 6 weeks and at 6 months after surgery, all patients received a survey (Table) to rate their incision as invisible (grade 0), minimally visible (grade 1), moderately visible (grade 2), or very visible (grade 3). They were then asked if they were satisfied

**TABLE.** Patient survey to rate incision

1. Can you see your incision site?
● No (grade 0)
● Yes, it is minimally visible (grade 1)
● Yes, it is moderately visible (grade 2)
● Yes, it is very visible (grade 3)
2. Are you overall satisfied with the scar?
● Yes
● No
3. Regarding the scar, would you have this same operation done again?
● Yes
● No

with the appearance of the incision (yes or no reply) and if, regarding the incision appearance, they would undergo the operation again (yes or no reply).

Data were analyzed with the use of nonparametric tests. In categorical observations, the chi-square test, Fisher test, and Wilcoxon signed rank test for paired numbers were used. The Kruskal-Wallis test was used to compare the results obtained by the three observers. For tables of contingency of  $2 \times 2$ , the relative risk and the 95% confidence interval between evaluation at 6 weeks and 6 months ( $p < 0.05$ ) was considered significant. The data were analyzed with the use of Statistix 7.0 software.

## RESULTS

Thirty-four consecutive patients were admitted to the study between April and July 2001 from the practices of three of the authors in Buenos Aires, Milan, and Genoa. The same three authors performed all surgeries.

Twenty-three patients were female and 11 were male. All patients were white. The age ranged from 10 to 75 years, with a mean of 61 years. The incision length measured 10 mm at the end of the procedure in 29 cases, 11 mm in 4 cases, and 12 mm in 1 case.

Six weeks after surgery, 9 of 34 patients could not see their incision site (26%), 13 of 34 graded it as minimally visible (38%), 9 of 34 (26%) thought it was moderately visible, and 3 of 34 patients (9%) graded their incision as very visible (grade 3) (Fig. 1). One of these 3 patients was not satisfied with it, and 2 were satisfied with its appearance. Of all 34 patients, 2 (6%) were not satisfied with the appearance of the incision at 6 weeks after surgery.

Photographic evaluation of patients 6 weeks after surgery by the 3 observers showed an average score of 1.12, 1.18, and 1.24. There was not a statistically significant difference between the observers (Fig. 1) ( $p = 0.95$ ).

Six months after surgery, 15 of 34 patients (44%)

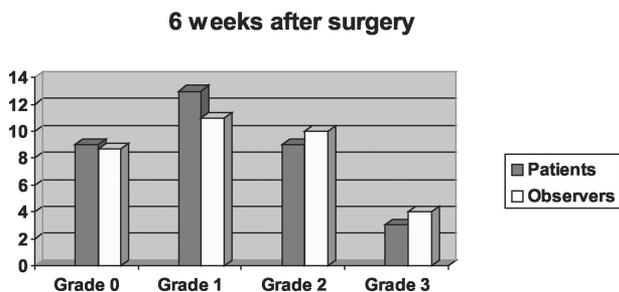


FIG. 1. Incision site 6 weeks after surgery.

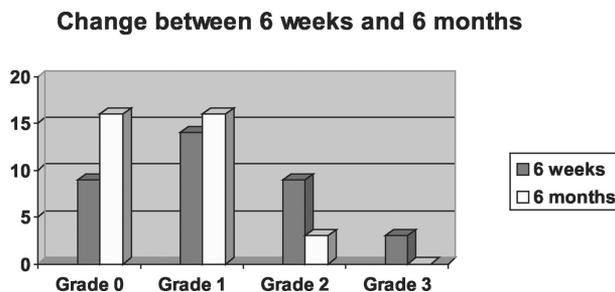


FIG. 3. Incision site: Change between 6 weeks and 6 months after surgery.

could not see their incision site (grade 0), 16 of 34 patients (47%) thought it was minimally visible, 3 of 34 patients (9%) graded their incision as moderately visible, and no patient found the incision very visible. The average incision score evaluated by patients was 0.65 (Fig. 2).

Photographic evaluation at 6 months after surgery showed an average score of 0.56, 0.74, and 0.79 by the 3 observers. There was not a statistically significant difference between the observers (Fig. 2) ( $p = 0.43$ ).

The change in the rank of appearance of the incision at 6 weeks and at 6 months was statistically significant (chi-square test for 3 degrees of freedom, 8.093;  $p < 0.044$ ), as the average score graded by patients improved from 1.18 to 0.65. The change between the photographic evaluation of the 3 observers at 6 weeks and 6 months was also statistically significant ( $p < 0.001$ ), with a reduction in the average score from 1.18 to 0.70 (Fig. 3).

The relative risk between 6 weeks and 6 months for "unfavorable" results (grades 2 and 3) shows a significant reduction (relative risk, 0.33; 95% confidence interval, 0.11 to 0.93). There was no statistically significant difference among the 3 observers and among the 3 centers. There was not a statistically significant difference between women and men in their evaluation of the incision (chi-square test and rank sum test).

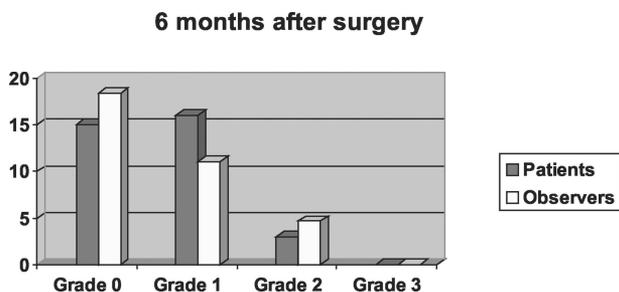


FIG. 2. Incision site 6 months after surgery.

### DISCUSSION

External DCR is the gold standard treatment for nasolacrimal duct obstruction because of patient acceptance, low cost, and high success rate. It can be performed safely under local anesthesia, on an outpatient basis, in elderly individuals.<sup>1-6</sup>

Endoscopic and other nonincisional techniques mention the lack of a skin incision as one of the advantages over external DCR.

This prospective study was designed to evaluate the skin incision in external DCR at 6 weeks and 6 months after surgery in 2 ways: by patient self-evaluation and by examination of standardized photographs by blinded observers.

At 6 weeks after surgery, 9 of 34 patients could not see their incision site (26%) and 13 of 34 patients graded it as minimally visible (38%). Therefore, almost two thirds of patients after 6 weeks could not see the incision or thought it was minimally visible. Three patients of 34 (9%) thought that the incision was very noticeable, but only 1 of these patients was dissatisfied by its appearance. Photographic evaluation showed a higher incidence of visible incisions according to the observers, with incisions not visible in 34% of cases, minimally visible in 25%, moderately visible in 28% of cases, and very evident in 12% of cases.

At 6 months after surgery, 15 of 34 patients (44%) could not see their incision site (grade 0), 16 of 34 patients (47%) thought it was minimally visible, 3 of 34 patients (9%) graded their incision as moderately visible, and no patient found the incision very noticeable. At this point, 91% of patients thought their incision was invisible or minimally visible. Photographic evaluation at 6 months after surgery also showed a higher incidence of visible incisions, with 45% of invisible incisions, 41% of minimally visible incisions, 13% of moderately visible incisions, and 3% of very visible incisions.

Photographic examination of the skin incision yielded

a higher incidence of visible incisions than the patient's own perception. This may be due in part to the high definition and magnification used at the examination: The 1280 × 980 pixel photographs displayed on a 15-inch monitor have a ×3 magnification factor, showing the 10-mm incisions as measuring 30 mm on the screen.

The change in appearance of the incision between 6 weeks and 6 months after surgery was statistically significant, both as evaluated by patients (average score improved from 1.18 to 0.65) and observers (reduction in the average score from 1.18 to 0.70). Patients were highly satisfied with the appearance of the incision: 32 of 34 at 6 weeks (94%) and all 34 at 6 months (100%). At 6 weeks after surgery, only 1 patient stated that he would not have the procedure done again, but after 6 months, no patient found the incision to be a reason to change the type of procedure.

All patients included in this study were white. This is probably a favorable condition because it is known that other ethnic groups may have more prominent scarring. Likewise, all of our patients except for one were adults, who are known to have better incision healing than children. Our results, therefore, should not be generalized to other patient populations.

These results are similar to those of another previously reported study<sup>1</sup> in which 97% of patients rated their incisions "good" to "excellent" and all patients stated that they would recommend the procedure to others.

The skin incision in external DCR is satisfactory to the vast majority of white adult patients at 6 weeks and 6

months after surgery. The incision site improves during this period, achieving 86% of invisible or minimally visible incisions according to observers and 91% according to patients.

## REFERENCES

1. Tarbet KJ, Custer PL. External dacryocystorhinostomy: surgical success, patient satisfaction, and economic cost. *Ophthalmology* 1995;102:1065–70.
2. Benger R. Day-surgery external dacryocystorhinostomy. *Aust N Z J Ophthalmol* 1992;20:243–5.
3. Hurwitz JJ, Merkur S, DeAngelis D. Outcome of lacrimal surgery in older patients. *Can J Ophthalmol* 2000;35:18–22.
4. Jordan DR. Avoiding blood loss in outpatient dacryocystorhinostomy. *Ophthal Plast Reconstr Surg* 1991;7:261–6.
5. Kratky V, Hurwitz JJ, Ananthanarayan C, Avram DR. Dacryocystorhinostomy in elderly patients: regional anesthesia without cocaine. *Can J Ophthalmol* 1994;29:13–6.
6. McNab AA, Simmie RJ. Effectiveness of local anaesthesia for external dacryocystorhinostomy. *Clin Exp Ophthalmol* 2002;30:270–2.
7. Boush GA, Lemke BN, Dortzbach RK. Results of endonasal laser-assisted dacryocystorhinostomy. *Ophthalmology* 1994;101:955–9.
8. Cokkeser Y, Evereklioglu C, Er H. Comparative external versus endoscopic dacryocystorhinostomy: results in 115 patients (130 eyes). *Otolaryngol Head Neck Surg* 2000;123:488–91.
9. Massaro BM, Gonnering RS, Harris GJ. Endonasal laser dacryocystorhinostomy: a new approach to nasolacrimal duct obstruction. *Arch Ophthalmol* 1990;108:1172–6.
10. Watkins LM, Janfaza P, Rubin PA. The evolution of endonasal dacryocystorhinostomy. *Surv Ophthalmol* 2003;48:73–84.
11. Woog JJ, Metson R, Puliafito CA. Holmium:YAG endonasal laser dacryocystorhinostomy. *Am J Ophthalmol* 1993;116:1–10.
12. Zilelioglu G, Tekeli O, Ugurba SH, et al. Results of endoscopic endonasal non-laser dacryocystorhinostomy. *Doc Ophthalmol* 2002;105:57–62.