Superiorly Based Bilobed Flap for Inferior Medial Canthal and Nasojugal Fold Defect Reconstruction

Julian D. Perry, M.D., and Mehryar Taban, M.D.

Department of Ophthalmology, Cole Eye Institute, Cleveland Clinic Foundation, Cleveland, Ohio, U.S.A.

Purpose: To evaluate the use of a superiorly based bilobed flap for reconstruction of nasojugal fold region defects.

Methods: Retrospective review of all patients undergoing medial canthal, nasal sidewall, and nasojugal fold region reconstruction using a superiorly based bilobed flap from October 2000 through March 2008. Charts were reviewed for patient age and gender, indication, defect size and location, flap(s) used, and follow-up time. Outcome measures included ability to completely close the defect with minimal tension, cosmetic appearance, complications, and need for further surgery.

Results: Eighteen cases of medial canthal and nasojugal fold area reconstruction were performed using a superiorly based bilobed flap in 17 patients. There were 8 male and 9 female patients with an average age of 68.2 years (range, 11–88 years) and mean follow-up time of 17.8 months (range, 1–60 months). Mean defect size measured 2.0 × 1.4 cm (range, 0.7–4 cm). One patient underwent simultaneous glabellar flap repair, 2 patients underwent simultaneous lateral lower eyelid rotational flap repair, and 1 patient underwent simultaneous upper eyelid V-Y advancement flap. All defects closed completely with no wound tension. No cases of hemorrhage, infection, dehiscence, or necrosis developed during the follow-up period. Cosmetic satisfaction occurred in 16 of 17 patients. Complications included mild medial ectropion (2 patients) and canalicular stenosis (1 patient). None of these patients elected reoperation. Trapdoor deformity did not occur in any case. Two patients underwent reoperation for local tumor recurrence.

Conclusions: A superiorly based bilobed flap adequately reconstructs inferior medial canthal, nasal sidewall, and nasojugal fold defects.

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Reconstruction of the inferior medial canthal, nasal sidewall, and nasojugal fold after surgical resection of cutaneous malignancy presents many challenges. The medial canthal region represents a multicontoured area with great variation in skin thickness, color, texture, and appendage density, and it includes contributions from the orbital and tarsal portions of the upper and lower eyelids, the nasal sidewall, and the glabella. Local landmarks, including the lacrimal drainage apparatus and eyebrows, limit flap design, as does the lack of significant horizontal tissue redundancy in this region.

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Address correspondence and reprint requests to Julian D. Perry, M.D., Cole Eye Institute, Desk I-32, Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH 44195, U.S.A. E-mail: perryj1@ccf.org

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Several flap designs adequately reconstruct the medial canthal region, including the glabellar flap, the rhomboid flap,[1,2] the V-Y advancement flap,[3,4] and the bilobed flap.[5–7] Glabellar flaps result in scars crossing relaxed skin tension lines and recruit thick glabellar skin adjacent to thin eyelid skin, which contributes to trapdoor deformity.[8,9] Although improved, the rhomboid flap variation suffers from similar limitations. The V-Y advancement flap generally allows for repair of only smaller defects.

Several flap designs reconstruct defects of the nasal sidewall and nasojugal fold, including laterally based advancement flaps,[10] inferolaterally based transposition flaps,[11] superomedially based transposition flaps,[11] and melolabial Burrow grafts.[12] Laterally based advancement flaps can close only smaller defects and recruit tissues across cosmetic subunits. The same holds true for laterally based transposition flaps. Superomedially based transposition flaps create a scar along the dorsum of the nose running perpendicular to relaxed skin tension lines, and melolabial Burrow grafts require a full-thickness graft that may result in pincushioning.

Originally described by Esser[13] in 1918, the bilobed flap has gained recognition in the ophthalmic literature as a versatile transposition flap for medial canthal reconstruction. Esser described a flap of 2 lobes of the same size, angled at 90 and 180 degrees to the site of the defect. More recent modifications use narrower angles to avoid dog-ear formation and create less tension.[14]

Sullivan and Bray[5] described 36 bilobed-flap medial canthal reconstructions in which the primary lobe recruited tissues predominantly from the dorsum of the nose and the secondary lobe recruited tissues predominantly from the glabellar region. Mehta and Olver[6] described a bilobed technique using tissues from the infraglabellar region to create more uniform skin thickness of the secondary defect. Meadows et al.[7] described a more precise method of construction that creates more rotation through the secondary flap and less advancement. The methodical approach of Meadows et al. may limit versatility by decreasing the amount of tissue movement to smaller angles and may allow for closure of only smaller defects.

We have used a bilobed flap technique to repair not only medial canthal defects but also nasojugal and nasal sidewall defects for many years. Our technique differs in design from previous descriptions in that it is always superiorly based for closure in these regions, and the angles are larger, allowing for recruitment of tissues up to 180 degrees away from the defect. This allows for the secondary lobe scar to fall closer to the relaxed skin tension lines along the dorsum of the nose and recruits redundant vertical tissues along the dorsum of the nose without affecting brow position. We sought to evaluate our technique using a medially and superiorly based bilobed flap for reconstruction of larger defects in the inferior medial canthus, nasojugal fold, and nasal sidewall.

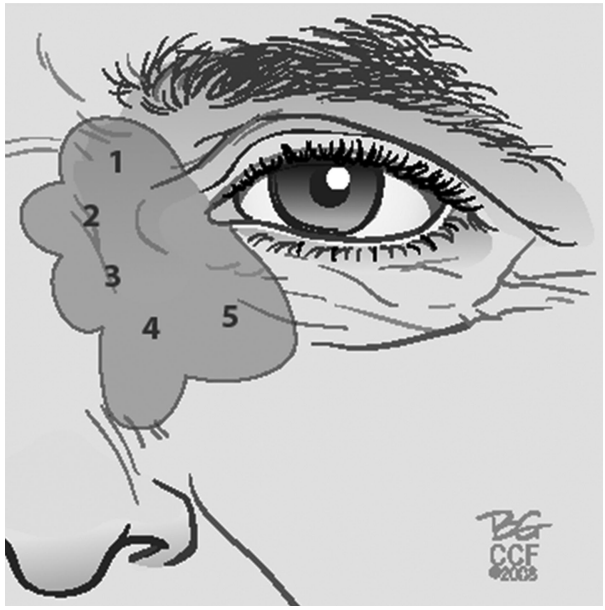

FIG. 1. Line drawing illustrates areas reconstructed using a bilobed flap in this study. (Reprinted with the permission of The Cleveland Clinic Center for Medical Art & Photography © 2009. All rights reserved.)

METHODS

We conducted a retrospective review of all patients undergoing inferior medial canthus, nasojugal fold, and nasal sidewall defect reconstruction using a superiorly based bilobed flap by one surgeon (J.D.P.) from January 2000 through March 2008. Charts were reviewed for patient age, gender, tumor type, defect size and location, flap(s) used, and follow-up time. Location was divided in zones, similar to a previous study[6]: zone 1 represented the region just superior to the medial canthal tendon; zone 2, over the medial canthal tendon; and zone 3, just inferior to the medial canthal tendon. We added 2 more zones to describe other locations where bilobed flap repair was used: zone 4, the nasal sidewall; and zone 5, the region of the nasojugal fold (Fig. 1). Outcome measures included ability to completely close the defect with minimal tension, cosmetic appearance, complications, and the need for further surgery.

The bilobed flap was constructed similar to that described by Zitelli.[14] The first lobe was approximately 75% of the size of the defect, and the second lobe was 75% of the size of the first lobe. The base of the bilobed flap was placed superiorly and medially in all cases to better utilize excess tissue from the dorsum of the nose. Each flap was transposed by 45 to 90 degrees to place the secondary lobe scar roughly parallel to the horizontal relaxed skin tension lines along the dorsum of the nose. Flaps were designed along an arc extending to the outer rim of the defect with each flap rotating the same amount. Undermining to the base and beyond allowed for good movement.

RESULTS

Eighteen cases of inferior medial canthal, nasal sidewall, and nasojugal fold area reconstruction were performed using a superiorly based bilobed flap in 17 patients. The indication for surgery was cutaneous malignancy after Mohs micrographic excision in 17 cases and sinus fistula repair in an exenterated socket in 1 case. There were 8 male and 9 female patients, with an average age of 68.2 years (range, 11–88 years) and mean follow-up time of 17.8 months (range, 1–60 months). Mean defect size measured 2.0 × 1.4 cm (range, 0.7–4 cm). One patient underwent simultaneous glabellar flap repair for a large contiguous defect involving the superior medial canthus and infraglabellar tissues. One patient underwent simultaneous lateral lower eyelid rotational flap repair for a defect involving adjacent full-thickness lower eyelid. One patient underwent simultaneous lateral lower eyelid rotational flap repair and upper eyelid V-Y advancement flap repair for a defect involving adjacent upper and lower eyelid anterior lamella.

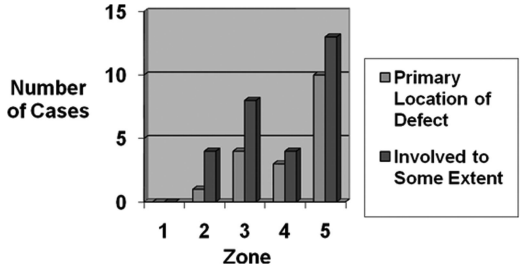

FIG. 2. Graph summarizes the location of defects repaired by superiorly and medially based bilobed flap.

The primary location of the defect resided in zone 2 in 1 case, zone 3 in 4 cases, zone 4 in 3 cases, and zone 5 in 10 cases. The defect resided to some extent in zone 2 in 4 cases, zone 3 in 8 cases, zone 4 in 4 cases, and zone 5 in 13 cases. Figure 2 summarizes defect location.

All defects were closed with minimal wound tension. There were no cases of hemorrhage, infection, dehiscence, or necrosis during the follow-up period. Sixteen of 17 patients were satisfied with their cosmetic outcomes (Figs. 3 and 4). Complications included mild medial ectropion (2 patients) and canalicular stenosis (1 patient). None of these patients elected reoperation. No patient developed trapdoor deformity.

Two patients underwent reoperation for local tumor recurrence. One patient developed disease approximately 5 mm from the operative site 3.5 years after excision. This patient underwent a second successful bilobed flap repair after Mohs excision. The other patient developed a deep recurrence 13 months after primary excision and required wide excision for tumor control.

DISCUSSION

Any reconstruction method of the lower medial canthal region must address several unique challenges, including the steep skin-thickness gradient, the multiple contours and curvilinear relaxed skin tension lines, the paucity of subcutaneous fat relative to immediately surrounding areas, variations in skin color, texture, and appendage density, and the structural limitations presented by the adjacent brows and lacrimal drainage system. The adjacent cutaneous tissues from the dorsum of the nose match the recipient tissues in these regions well.

The location of defects repaired in this study differed from previous reports describing bilobed flap repair of the medial canthus.[6,7] Most defects in this study primarily involved or extended in the nasal sidewall and nasojugal fold regions. These regions represented the area primarily involved in 13 of 18 defects. These regions were involved to some extent in 17 of 18 cases. Thirteen defects involved the nasojugal fold region and 4 involved the nasal sidewall to some extent. Only 5 of 18 cases involved areas reported by Mehta and Olver,[6] who demonstrated good results for smaller defects, and defects primarily in the medial canthus. The report by Mehta and Olver[6] and other previous reports describe mainly inferiorly based bilobed flaps that recruit skin primarily from the glabellar or infraglabellar regions. We used a superiorly and medially based flap to recruit skin from the dorsum of the nose in defects primarily involving tissues inferior and lateral to those primarily described in previous reports. Skin from the dorsum of the nose contains fewer skin append-

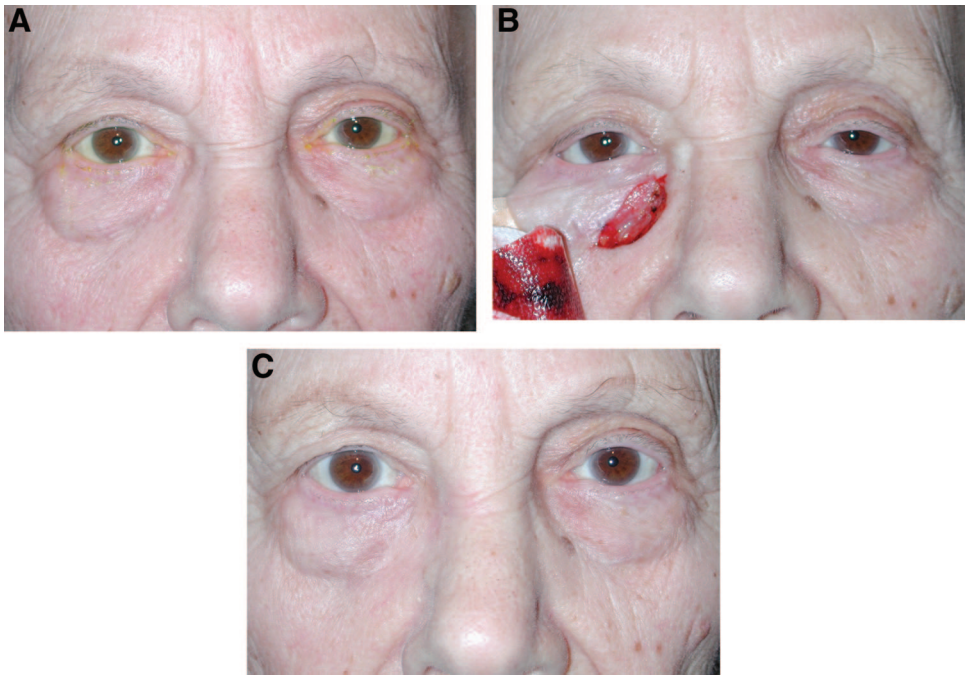

FIG. 3. Preoperative **(A)**, immediate postoperative **(B)**, and 1-year postoperative **(C)** photographs of a patient who underwent successful reconstruction of a typical nasojugal region defect using a superiorly based bilobed flap.

ages and less subcutaneous fat and appears to blend well with host tissues in the nasojugal fold region. This study demonstrates the versatility of the bilobed flap for reconstruction of defects inferior and lateral to the medial canthal region.

Our flaps were superiorly based, and our angle of rotation was greater than some previous reports.[5,7] Although the average defect described by Mehta and Olver approached a circular configuration, ours was more elliptical, requiring

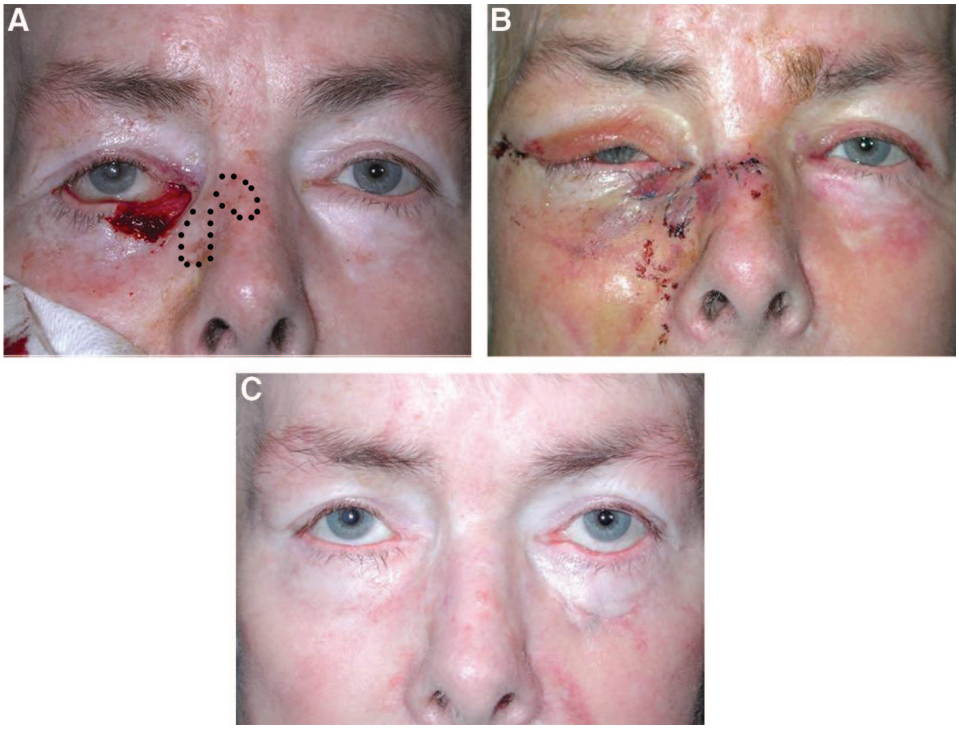

FIG. 4. Preoperative **(A)**, immediate postoperative **(B)**, and 5-month postoperative **(C)** photographs of a patient who underwent bilobed flap and simultaneous lateral lower eyelid rotational flap repair for a defect involving the medial canthus, nasojugal fold region, and adjacent lower eyelid anterior lamella. Part **(A)** illustrates the flap design. The patient developed contralateral cicatricial ectropion after cutaneous malignancy excision and repair at an outside facility.

longer pedicles and pedicles approximately 50% larger in area. We attempted to place the secondary flap as parallel as possible to the relaxed skin tension lines along the dorsum of the nose. This often required greater rotation angles, especially for more superiorly based defects. Despite using longer pedicles, larger rotation angles, and larger flaps, we found no untoward scarring.

Two patients developed mild ectropion. Both cases involved larger defects, with greatest defect dimension measuring 1.7 cm in one case and 3 cm in the other. One case required concomitant lateral rotational flap repair of a lower eyelid anterior lamellar defect, which likely contributed to the ectropion. Both cases were mild and resulted in no symptoms or complaints. Neither patient elected further surgery. One patient developed canalicular stenosis after unsuccessful concomitant canalicular repair for a defect involving two thirds of the lower canaliculus. This patient did not elect further surgery.

We found no cases of trapdoor deformity. Our technique called for undersizing of the flap to prevent contour deformity, while avoiding any wound tension that might result in flap necrosis. Undermining continued beyond the base of the flap and in the surrounding skin only enough to allow for adequate rotation. A light pressure dressing placed for 1 week after surgery maintained contact of the flap base with the recipient base to encourage contact inhibition of flap contraction. Interestingly, the superiorly based flap did not seem to inhibit lymphatic drainage or impede healing.

Weaknesses of this study include a small sample size and its retrospective, noncomparitive nature. We repair defects superior to the medial canthal tendon using inferiorly based infraglabellar bilobed flaps or glabellar flaps for larger defects. Despite finding no trapdoor deformity for repair of more inferior defects, we have found mild trapdoor effect after repair of more superior defects, which may be due to local tissue factors. We agree with the assertion of Harris and Logani[15] that defects crossing multiple aesthetic units require concomitant adjacent flaps for best cosmesis, and we performed adjacent flap reconstruction in 3 patients with larger defects.

Superiorly based bilobed flaps adequately reconstruct the medial canthal and nasojugal fold regions. The flap allows for closure of larger and more elliptical defects than previously described and for defects inferior and lateral to the medial canthal region.

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