
Upper eyelid rotation flap for reconstruction of medial canthal defects

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Medial canthal defects resulting from cancer resection after Mohs micrographic surgery present challenging reconstruction dilemmas. In fact, medial canthal reconstruction has been controversial because of the time-honored method of second-intention healing in wound management of this area.¹ Yet, small flaps and grafts for repair of cutaneous medial canthal defects may result in a quicker healing process with excellent cosmetic results. The main difficulties of reconstruction of the medial canthal region are the lack of local availability of similar thin eyelid skin, and the concavity of the defect to be repaired.

The area of the medial canthus includes the free tissue margins of the upper and lower eyelids, the bony attachments of the medial canthal tendon, the lacrimal puncta, and arteriovenous and neural bundles that supply and innervate the region. The literature describes a multitude of surgically complex and intricate reconstruction methods including eyelid myocutaneous transposition flaps, glabellar flaps, cheek flaps, V-Y advancement flaps, and skin grafts for repair of defects of the medial canthus.²⁻⁶ Although these reconstructive options represent tested and widely used choices for medial canthal restoration, they are limited in that these techniques often provide a less than ideal color or texture match, provide tissue that is either too thick or too thin, or place incisions that cross aesthetic units and boundaries.

We describe a novel flap that is conceptually simple to design and execute for the repair of medial

canthal defects using a superiorly based eyelid rotation flap from a contiguous cosmetic subunit with skin of identical color, texture, and thickness.

OPERATIVE TECHNIQUE

Key features that must be identified before execution of this repair technique include size, depth, and location of the defect, and whether the lacrimal duct system has been damaged by tumor excision. Indications for upper eyelid rotation are similar to those indicated for consideration of second-intention healing; namely, lesions less than 1.5 cm that do not involve the upper eyelid.⁴ Laxity of the upper eyelid skin is the essential component for rotating tissue from the upper eyelid into the recipient defect site. The flap is considered practical for patients with superficial to moderately deep wounds that do not sacrifice the lacrimal apparatus.

The procedure is performed under local anesthesia. The defect at the medial canthal region is measured and a flap of adequate size is marked at the lower margin of the eyebrow on the adjacent upper eyelid (Figs 1 and 2). The flap to defect size ratio should be 3:1 to 4:1 to ensure adequate blood supply across the flap. An incision is then made through the skin into the subcutaneous tissue of the upper eyelid below the eyebrow to facilitate movement of the flap into the recipient site (Fig 3). The flap is undermined and elevated, with the fulcrum for rotation at the medial canthal tendon, and rotated medially into the defect. A skin hook may facilitate proper placement of the flap and determines if there is enough donor skin to fill the defect (Fig 4). Subcutaneous layers of absorbable sutures are usually not necessary as there is no tension on the flap. The flap is sutured using cutaneous 6-0 nonabsorbable sutures in either an interrupted or running fashion. The secondary defect below the eyebrow is closed by lifting the eyelid skin to its new position at the lower border of the eyebrow (Fig 5). When rotating upper eyelid skin, a dog-ear is taken across the bridge of the nose within relaxed skin tension lines. This dog-ear may be avoided by using the halving technique of suturing two sides of unequal

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Fig 1. Medial canthal defect.



Fig 3. Rotation of flap into donor site.



Fig 2. Skin marking delineating the planned eyelid rotation flap.



Fig 4. Use of skin hook to ensure adequate donor tissue for rotation.

length. Finally, a bolster dressing may be used to hold the flap down securely into the concave surface. The 1-week (Fig 6) and 4-week (Fig 7) follow-up results are shown.

DISCUSSION

The medial canthus is an area that has been a historically challenging location for postoperative repair because of the concavity of the area and the

lack of similar skin in the vicinity. As a result, second-intention healing is often used as a default. The flap we describe presents a simple and relatively easy option for repair of superficial to moderately deep defects that do not compromise the lacrimal apparatus. Donor skin for medial canthal repairs includes the glabella and the adjacent upper aspect of the cheek; however, both of these donor sites provide skin that is thicker than that of the medial canthal



Fig 5. Closure of secondary defect by lifting eyelid skin to its new position at the lower border of the eyebrow.



Fig 6. One week follow-up results.

region. Given the laxity of upper eyelid skin in well selected patients described above and the vascularity of eyelid skin, the upper eyelid rotation flap is an excellent option for medial canthal repair with little or no tension.

Second-intention healing is a time-honored method of healing that is especially useful for older patients with loose skin. Contracture and healing of defects is often expected in 4 to 6 weeks and results are often excellent with lack of postoperative pain and infections. Further advantages of this technique are in its simplicity and lack of need for further surgical manipulation of tissue for reparative needs especially in a growingly elderly population with cutaneous neoplasms. Disadvantages include length of time for complete healing and need for meticulous wound care and bulky bandages for a prolonged period that is often frustrating for patients. In addition, healing may lead to pulling of the lid anteriorly off the globe as a result of wound contraction leading to ectropion formation, an elevation of the canthus to a higher position as a result of scar formation, or both. These complications may result in the need for a second reconstructive procedure at a later date for surgical correction.

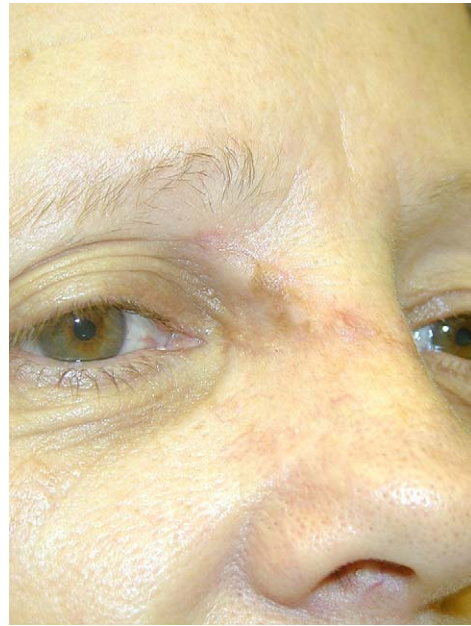


Fig 7. Four week follow-up results.

A full-thickness skin graft is an option that is useful for larger defects and especially in younger patients with superficial defects whose lack of upper eyelid skin laxity precludes the use of rotation flaps as a reparative choice. Skin may be harvested from the retroauricular, supraclavicular, or often the opposite upper eyelid. Disadvantages of full-thickness grafting includes the need for a donor site resulting in a secondary wound, possibilities of poor graft take, poor color and texture match at the recipient site, and the need for a bulky and prolonged bolster dressing for at least 1 week.

The use of flaps, the most popular of which have historically been from the glabellar region, offer good color and texture match to the medial canthal area. Yet, this flap is limited by that fact that it is inherently thicker skin from a second cosmetic unit that is often bulky and distorts the naturally concave shape of the medial canthus. In addition, secondary debulking and pedicle takedown procedures are often needed.

The upper eyelid rotation flap described above does have limitations in that defects that are particularly large or deep may not be amenable to this reparative technique. Canthal webbing may result if there is not enough upper eyelid donor skin for rotation into a defect at hand. Rotation puckers may appear toward the caruncle and may be routinely excised during reconstructive repair. However, because of the thin and loose skin present at the inner canthus, the authors have found that puckers are very forgiving and often stretch out on their own in

this region. In addition, the medial canthus is a concave surface, and the flap should have a bolster dressing applied for 1 week to hold the flap in place, which may be disconcerting to some patients. Basting sutures are not routinely placed as the bolster dressing stays in place for 1 week by which time the base of the flap has firmly adhered to the underlying tissue. Nonetheless, it would not be incorrect to place basting sutures if the surgeon thought they would be of benefit in a particular case. Yet, the upper eyelid rotation flap is from the same cosmetic subunit as the defect for medial canthal reconstruction; thus, it has the same skin texture, color, and thickness as the original defect, resulting in excellent cosmetic outcomes. Patients must be individually evaluated and selected to ensure that there is adequate excess eyelid skin to optimize healing and anatomic restoration of the medial canthus.

In summary, we believe that the upper eyelid rotation flap is a reliable, technically practical, and aesthetic method for medial canthal repair that provides superb color, texture match, and tissue

thickness. Evaluation of defect and upper eyelid laxity will determine if this flap is feasible in a selected patient, and may provide the dermatologic surgeon with an option other than prolonged second-intention healing, grafting, or more intricate flaps leading to rapid and outstanding results for his/her patients.

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