## **Ophthalmic Pearls**

### **OCULOPLASTICS**

# Reconstruction of Full-Thickness Lower Eyelid Defects

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ower eyelid defects result from various causes, most commonly trauma and eyelid tumor excision. Once the eyelid margin is violated, only surgical repair can restore the lid's integrity. Repairing and reconstructing lower eyelid defects can be a challenge for even the most experienced surgeon.

#### **Preoperative Considerations**

When repairing lower eyelid defects, one must ensure proper eyelid closure while avoiding the complications of eyelid notching, entropion and ectropion. Because there are many surgical methods to repair and reconstruct the eyelid, the surgeon must determine which technique is most appropriate to restore the natural eyelid contour for each clinical scenario.

For instance, the surgeon must assess the need for anterior or posterior eyelid lamella reconstruction and decide whether a graft is necessary. The surgeon must also consider how to close the defect while 1) maximizing horizontal tension, 2) minimizing vertical tension and 3) maintaining canthal fixation.

Other issues to be considered include the size, location and orientation of the defect; the patient's age; the blood supply to the tissue; how old the wound is; and the integrity of the tissue (e.g., history of prior radiation, scar tissue, etc.). If a graft is needed to repair the skin defect but the tarsus is relatively intact, lower eyelid defects



**MODERATELY SIZED DEFECT.** To repair this defect, the surgeon performed lysis of the inferior crus of the lateral canthal tendon and made a full-thickness pentagonal wedge. The next steps were approximation of tarsus and then reapproximation of tarsus, skin and eyelid margin.

are best filled with preauricular or retroauricular skin grafts.

#### **Surgical Reconstruction**

**Small defect.** Lower eyelid defect repair algorithms vary based on the size and location of the defect. A small defect encompasses less than one-third of the lower eyelid and can usually be repaired by primary closure.

If it is needed, one can perform an inferior or superior cantholysis to mobilize the lateral eyelid margin 3 to 5 mm. This is performed by first making a horizontal incision between the two limbs of the lateral canthal tendon, then separating the skin and conjunctiva through the incision. A cut is made through the appropriate limb of the tendon, leaving the other limb of the tendon intact. If necessary, the orbital septum can be freed from its insertion to obtain optimum closure of the defect.

Moderately sized defect. Lower

eyelid defects involving between onethird and one-half of the eyelid margin are considered to be of moderate size. To repair a moderately sized defect, a modified Tenzel semicircular rotation flap can be performed.

This procedure is most successful if there is remaining tarsus on each side of the defect to support the reconstruction. This repair is accomplished by performing a lateral canthotomy and cantholysis, which is done beneath the flap separating the orbital rim from the inferior limb of the lateral canthal tendon as well as its lateral and inferior attachments. This is followed by cutting a semicircular flap of skin and muscle at the lateral canthus. The surgeon must undermine the temporal and inferior portion to allow sufficient advancement of the lateral eyelid medially.

Once the flap is rotated, the lateral canthus must be fixated with enough tension to reshape the eyelid without

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**LARGE DEFECT.** Preop photo of a large lower eyelid defect (2A). And a postop photo after the eyelid reconstruction (2B).

causing an ectropion. The surgeon should use three 6-0 silk sutures on the eyelid margin while suturing the lateral segment of the evelid to the medial segment so as to approximate the two segments of the eyelid. The tarsus should be closed with interrupted 6-0 chromic catgut or Vicryl sutures. Subcutaneous tissue can be closed with interrupted 5-0 or 6-0 plain or chromic catgut sutures. The surgeon can then use a 5-0 polyester suture through the medial tarsal segment and attach it to the lower limb of the lateral canthal tendon to reestablish the lateral canthus. Skin closure can be performed with 6-0 running silk stitch or nylon suture.

Large defect. For a horizontal lower eyelid defect that extends beyond half of the eyelid, the surgeon must reconstruct the posterior lamella and rely on a combination of the previously used lower eyelid repair techniques to close the remaining skin. A graft is necessary to reconstruct the posterior lamella. The best posterior lamellar graft is the patient's own tarsoconjunctiva, which can be harvested from the upper evelid or the contralateral evelid to fill the lower eyelid defect. Regenerative tissue matrix (Alloderm) can be used as an alternative if harvested material is not available at the time of surgery.

A Hughes tarsoconjunctival flap is fashioned by bringing down a portion of the upper eyelid tarsus as a pedicle. The upper eyelid is first everted, and the flap pedicle graft is started 5 or 6 mm from the eyelid margin. The flap graft must be the same size as the lower eyelid defect. Mueller's muscle is disinserted from its tarsal attachment. The flap of the superior eyelid is then sutured using a 6-0 polyester, 6-0 Vicryl or 5-0 chromic catgut suture where the three edges meet the lower defect. It may be necessary to undermine skin and to create Burrow's triangles to allow skin advancement to close the defect anteriorly, subsequently restoring anterior lamella. The lower eyelid defect is then sutured.

Once the upper eyelid tarsus pedicle is sewn to the remaining tarsus of the lower eyelid, the surgeon can carry out direct closure. This can be accomplished by undermining, cantholysis, skin graft or a semicircular rotation flap to close the skin and complete the repair. The surgeon should leave 4 mm of tarsus in the upper eyelid to ensure that the upper tarsal plate will not be deficient after the pedicle is cut open. A disadvantage of this procedure is that the patient cannot see out of this eye while the graft is healing, for six to eight weeks, before undergoing the eyelid fissure opening step of the procedure. Thus, this procedure may not be an option for a monocular patient or a patient who cannot tolerate the evelid being closed that long.

In the second step of the procedure, the surgeon incises the skin such that it bows upward in the center, and then makes sure the conjunctival edge is slightly higher than the edge of the skin. Once the eyelid has been opened during the second step of the procedure, patients generally do very well and are satisfied with the cosmetic outcome.

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