Revisiting the single-eyelid Hughes reconstruction – A report of two cases

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ABSTRACT

Keywords: Modified Hughes
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Purpose: The reconstruction of near-total upper eyelid defects is challenging and complicated. There are multiple possible techniques, including multi-stage lower eyelid flaps (such as Mustarde’s lid-switch flap and the Cutler-Beard techniques) as well as single-stage techniques with free grafts. Here we present two patients requiring near-total upper eyelid repairs that were accomplished by a single-eyelid, single-stage technique using a tarsoconjunctival flap.

Observations: Two cases of near-total upper eyelid defects are described, one secondary to resection of a basal cell carcinoma and the other secondary to resection of a Merkel cell carcinoma. Both cases had sufficient residual tarsus to supply a single-eyelid tarsolconjunctival flap. Results were excellent.

Conclusions: When there is sufficient tarsus remaining, the illustrated technique provides an excellent repair of near-total upper-eyelid defects. It is a simpler procedure than its alternatives, spares other tissue sites, eliminates free grafts, and does not require multiple stages.

1. Introduction/background

Reconstructing large eyelid defects can be complicated, as it is crucial to maintain the support of the tarsus to maintain eyelid shape, stability, and function. Historically, Mustarde’s lid-switch flap and the Cutler-Beard techniques have been used for large upper eyelid defect repairs. Since their introduction, multiple variations have been proposed which use different compositions of flaps and tarsus. All of these techniques use lower eyelid tissue to reconstruct the upper eyelid defect.

Multiple single-stage techniques have been proposed for large eyelid defect reconstruction. These techniques usually use a myocutaneous flap for the anterior lamella with a rigid graft to replace the missing tarsus (creating a posterior lamella), such as cartilage (chondromucosal, buccal mucosa, hard palate, or auricular sources), sclera from eye banks, or tarsus from the lower lid or contralateral upper lid. For these techniques, the rigid graft (no matter the source) is a “free graft.” An alternative to using free grafts to recreate the posterior lamella is the use of a regional flap (reverse auricular, chondromucosal island, pericranial, and peristomal flaps).

In 1989, Jordan et al. described a technique using a tarsolconjunctival flap from the same eyelid as the defect for reconstruction of the posterior lamella (recessing levator and Mueller’s muscle to free the flap) and then a myocutaneous eyelid flap to reconstruct the anterior lamella. Irvine et al. replicated this technique with good results in 2003, and in 2014 Malik et al. described a modified technique used for smaller eyelid defects where they rotated the tarsolconjunctival flap obliquely. In our literature review, additional reports utilizing this method were not identified. We present two cases of eyelid reconstruction using this technique with a myocutaneous flap and posterior approach Mueller’s muscle and levator aponeurosis recession with excellent outcomes.

2. Findings

Case 1, Basal Cell Carcinoma. An 87-year-old woman with a biopsy-proven basal cell carcinoma underwent surgical excision with frozen sections and lid reconstruction. After achieving adequate excision with negative margins (1 mm of clear margin was obtained, verified on both permanent and frozen section analysis), the full thickness defect involved approximately 95% of the upper eyelid margin, though the defect was only 4 mm in vertical height and did not involve the punctum.

The upper eyelid was everted over a Desmarres retractor. Vertical incisions made with a #15 Bard Parker blade freed the conjunctiva and tarsus superior to the defect. This tissue was dissected as possible from overlying Mueller’s muscle and levator aponeurosis. Both structures were recessed to avoid postoperative eyelid retraction. This created a Hughes-type eyelid pedicle flap containing the residual superior tarsus. The flap was mobilized inferiorly into the upper eyelid defect and

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sutured to the remaining upper eyelid tissue surrounding the original defect. The anterior lamella was then created using a sliding transposition flap of skin. The orbicularis was dissected from underlying orbital septum and advanced to aid in the blood supply and aesthetics of the reconstruction.

Postoperatively, the cosmetic result was pleasing. There was no lagophthalmos. See Fig. 1 for visualization of each step and postoperative results. It has now been 6 months since surgery and the patient has no recurrence, retraction, or corneal surface complications.

**Case 2: Merkel cell carcinoma.** An 83-year-old male with Merkel cell carcinoma required resection of the upper eyelid to achieve clear margins. The same technique as described above was employed, with excellent results. See Fig. 2. This case was completed 10 years ago and is still without recurrence, retraction, or corneal surface complications.

### 3. Discussion/conclusion

Total or near-total eyelid reconstruction is complex, and current surgical techniques have limitations and drawbacks. While multi-stage repairs work well, they require that the eye be completely occluded until the second surgery is completed (usually two weeks later at the earliest).

Single-stage techniques eliminate the occlusion problem, however grafts, especially those that utilize donor tissue may have complications including graft failure or necrosis, albeit uncommonly. Leibovitch et al. found that free tarsal grafts have fewer complications than hard palate grafts, though most complications were temporary.

The technique illustrated here is both single-stage and single-eyelid. It provides an identical tissue match and eliminates the need for a free graft, thus simplifying the procedure and sparing other tissue sites. There are limitations to such a repair. The defect to be reconstructed must be less than 7 mm in vertical height (assuming a 10 mm tarsal height) to allow for at least 3 mm of remaining tarsus to ensure eyelid stability, and the patient must have sufficient eyelid laxity/redundant tissue to allow for a myocutaneous flap. However, when the defect/anatomy fits these parameters, this technique is an excellent choice and
should be considered due to its simplicity, efficiency, safety, and excellent outcomes.

4. Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

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Authorship

We confirm that the manuscript has been read and approved by all named authors.

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Declaration of competing interest

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We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

Research ethics

We further confirm that any aspect of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

IRB approval was obtained (required for studies and series of 3 or more cases)

Written consent to publish potentially identifying information, such as details or the case and photographs, was obtained from the patient(s) or their legal guardian(s).

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