Management of Severe Cicatricial Entropion Using Shared Mucosal Grafts

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Objective: To retrospectively analyze our experience using nasal turbinates and hard palate mucosal grafts as shared buttress grafts between the upper and lower eyelids for reconstruction in severe cicatricial entropion.

Surgical Techniques: A horizontal tarsectomy is performed in the upper and lower eyelid approximately 2 mm posterior to the gray line. The distal tarsal segments are then dissected and rotated 180°. A graft of nasal turbinates or hard palate mucosa measuring 1.5 × 3 cm is harvested. The graft is sutured to the cut edge of tarsus in the upper and lower eyelid. The rotated distal tarsal segment is stabilized against the graft using 5 mattress sutures. After 3 weeks, the graft is split by sharp dissection between the upper and lower eyelids.

Methods: The medical records of 12 consecutive patients, representing 15 shared buttress grafts, were reviewed. There were 5 hard palate and 10 nasal turbinates mucosal grafts placed. Follow-up ranged from 2 months to 7 years.

Results: The amount of corneal stipple, as well as subjective patient comfort, improved after eyelid margin reconstruction in 12 of the 15 eyes. One patient’s visual acuity improved by more than 2 lines after surgery. There were no cases of failure of graft survival and no complications directly related to the shared graft technique. Recurrent entropion and trichiasis were noted in 3 eyelids more than a year after graft placement, reflecting ongoing cicatrization in these eyelids. Hard palate mucosal grafts were irritating to the corneal surface, requiring removal of the epithelium using a diamond burr and bandage contact lens wear. Nasal turbinates mucosal grafts were better tolerated by the corneal surface and had the added benefit of mucous production.

Conclusions: Eyelid reconstruction using nasal turbinates and hard palate mucosal tissues as a shared buttress graft is a viable treatment option for patients with severe cicatricial entropion. Resolution of trichiasis and mechanical corneal abrasion was noted in 13 (86%) of 15 patients with no specific complications related to the technique. The shared buttress technique successfully autostents the healing eyelid margins, makes good use of the large turbinates mucosal graft, and minimizes trips to the operating room. When the mechanical requirements of eyelid margin reconstruction do not require the sturdiness of hard palate mucosa, nasal turbinates mucosa is a preferable graft tissue because it is better tolerated by the corneal surface and produces mucus.


Cicatricial entropion is characterized by tarsocconjunctival scarring and inward rotation of the muco-cutaneous junction, often associated with trichiasis and distichiasis. Diseases that cause conjunctival scarring are often associated with fornical shortening and symblepharon formation.

Surgical treatment of cicatricial entropion is directed at restoring the natural position of the muco-cutaneous junction. To achieve this, passive rotation with tarsal fracture, blepharotomy, and rotational sutures have been advocated. Alternatively, posterior buttress surgery can be used to reconstitute the cicatrized posterior lamella and reconstruct the eyelid margin, adding tissue to prevent recurrent entropion.

Autologous tissues that can be used to reconstruct the posterior eyelid margin include buccal mucosa, nasal turbinates mucosa, hard palate mucosa, and tarsus (as a free graft or as an advancement). Compared with hard palate mucosa, nasal turbinate mucosa may cause less corneal irritation, especially during the initial period of stenting. This may be due to the natural abundance of goblet cells as well as the smooth surface of the non-keratinized mucosa.

Both the upper and lower eyelids are often involved. Nasal turbinate mucosa and hard palate can be harvested in portions large enough for reconstruction of the upper and lower eyelid simultaneously. This allows for autostenting of the eyelids, upper to lower, during the healing phase. Simultaneous surgery minimizes the number of trips to the operating room. The graft should be sutured securely to the eyelid margin to prevent recurrence.
gets blood supply from both the upper and lower eyelid circulation.

We retrospectively analyzed the medical records of 12 consecutive patients (15 eyes) who underwent shared upper and lower eyelid margin reconstruction using hard palate or nasal turbinate mucosa as a posterior lamellar buttress.

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**MATERIALS AND METHODS**

To successfully harvest the turbinate graft, the nose must be properly prepared. The inferior turbinate is tightly packed with ½-in cotton gauze soaked and wrung out in either 4% cocaine or a 50:50 mixture of 4% lidocaine and oxymetazoline hydrochloride. The packing is removed and the turbinate is injected with a 1:100,000 mixture of 5 to 10 mL of 2% lidocaine and epinephrine. The turbinate is then repacked with the gauze.

Under headlight illumination, an alligator-curved scissors with the blade pointing towards the lateral nasal wall engages the tip of the turbinate to begin transection (Figure 1). The transection is carried out essentially at the root of the turbinate, although if the turbinate is large, it is sometimes possible to leave a substantial portion of the turbinate in the nose. The blade is advanced posteriorly, with the goal of removing at least 3 cm of the turbinate. This deeper part of the transection is performed with somewhat limited visualization, but once the scissors is in the track, the surgeon can continue to advance by combination of visualization and feel. Once the scissors has advanced 3 cm, the surgeon switches to the scissors curved away from the lateral wall of the nose, and turbinate can be transected by continuing the cuts in the direction of the nasal septum. Before making the final cut, a silk suture can be passed through the tip of the turbinate using a half-circle needle, and in this traction suture can be gently pulled forward by the assistant to provide countertraction as the last bit of mucosa is lysed and the turbinate freed from its attachments. Bleeding from the turbinate stump is generally self-limited and we prefer not to pack the nose if possible, but occasionally a nasal pack or tampon is necessary to control postoperative bleeding. The nasal mucosa is stripped off any bony turbinate that has been resected, and the graft is thinned, leaving some submucosa on the graft to provide a robust tissue for eyelid margin reconstruction.

If hard palate mucosa will be used as a graft, it is harvested using a previously described technique. An incision is made along the tarsocutaneous surface of the eyelid, 2 to 3 mm posterior to the gray line, across the entire length of the eyelid (Figure 2). The horizontal tarsectomy is deepened to the level of orbicularis. The distal segment of the eyelid margin is then dissected so that it rotates 180° (Figure 3). This often requires substantial dissection, with care being taken to avoid eyelash follicles as much as possible. Eyelash loss is sometimes an unavoidable adverse effect of the extensive dissection that is required to adequately achieve 180° rotation of the distal segment of the upper and lower eyelids.

The nasal turbinate or hard palate mucosal graft, which has been trimmed to approximately 1.5 × 3
cm, is sutured into position with the mucosal surface towards the cornea. The superior and inferior edges of the graft are sutured to the proximal edges of tarsus using a serpentine externalized suture such as 6-0 polypropylene. The distal segment with the misdirected lashes is then stabilized and rotated by placing approximately 5 mattress sutures of 6-0 in both the upper and lower eyelids (Figure 4 and Figure 5). These mattress sutures pass through the graft in a lamellar fashion.

After 2 to 3 weeks, the shared graft can be opened (Figure 6). The cornea is anesthetized with topical eye drops and the graft and eyelid margin receives local anesthetic injection. A straight scissors is used to cut across the intermarginal segment of mucosal graft. At the time of surgery, approximately 2 mm of graft is left between the upper and lower eyelid, by cutting across the intermarginal segment of the graft, an overabundant marginal posterior lamella is created. In the 1- to 2-month period after eyelid opening, this redundant segment of posterior lamella gradually resorbs, leaving a smooth eyelid margin with adequate posterior lamella to start the rotated lashes away from the cornea (Figure 7).

RESULTS

The patient data are summarized in the Table. We performed shared buttress grafts on 15 eyes of 12 patients between July 1994 and July 1998. Five hard palate grafts and 10 nasal turbinate grafts were placed. There were no cases of failure of graft survival, although 2 patients developed substantial recurrent entropion 12 months or more after surgery and 1 patient required a second graft.

Early in the series, we were using hard palate mucosa as the first-choice graft. Hard palate mucosa is keratinized and is more irritating to the cornea when it is used to resurface the eyelid margin. With time and sometimes with multiple diamond burr de-epithelializations, the hard palate mucosal grafts eventually become better tolerated by the cornea, although in all cases in this series, there was some epithelial stipple present postoperatively (which is difficult to differentiate from the underlying disease). The nasal turbinate grafts as a group showed less corneal irritation and were more moist in appearance. Several patients complained of excess

Figure 3. Dissection of scar tissue in supratarsal plane allows 180° rotation of distal tarsal segment of upper and lower eyelids.

Figure 4. Placement of mattress sutures to stabilize and rotate the distal margin of the upper and lower eyelids across the shared mucosal graft, which is sutured to the cut edges of tarsus.

Figure 5. Graft sutured in place with 5 mattress rotational sutures in the upper and lower eyelids. Reprinted with permission from the Regents of the University of California. Copyright 1999.
mucous production even 1 year or more after the graft was placed, suggesting continuation of mucous production by the graft in its new host site. We view this as a positive aspect of nasal turbinate mucosal grafts in this group of patients with dry eye in part caused by loss of the conjunctival goblet cells.

Only 1 patient’s visual acuity improved more than 2 lines after surgery. This was a patient with Stevens-Johnson syndrome who underwent nasal turbinate mucosal grafting. Before surgery he had a very irritated ocular surface with a poor tear film and substantial epithelial stippling, which had reduced his vision to counting fingers at 1.2 m. Two months after surgery, the graft provided a much smoother margin between the eyelid and the tear film. The tear film also appeared increased in height. The resulting improvement in the ocular surface properties increased his visual acuity to 20/50 in the operated eye. Objectively, virtually all patients reported improved comfort of the operated eye, correlating our own observations of elimination of trichiasis and improved lubrication of the ocular surface.

There were no complications specifically related to the shared grafting technique. In 2 cases, the harvested graft was shorter than desired. In each of these cases, it was possible to reconstruct at least two thirds of the eyelid margin and the reconstruction was successful. Bleeding from the nose was common during the first 24 hours after nasal turbinate harvest, but no patient required hospital admission or nasal packing.

COMMENT

Patients with severe cicatricial entropion represent one of the most challenging oculoplastic problems. Surgical reconstruction is performed only in the setting of maximal medical therapy, particularly immunosuppressive therapy for diseases such as ocular cicatricial pemphigoid that may continue to be active and can be worsened by surgical intervention.16

The primary mechanical problem relates to keratinized skin and eyelashes rubbing on the corneal surface, causing a mechanical keratopathy. Surgery must be designed to rotate the irritative tissues completely away from the corneal surface. We have found that a complete eyelid margin reconstruction that incorporates the buttress graft against recurrent entropion is more effective than surgery such as tarsal fracture or rotational suture placement, which simply rotate the existing margin.6,10,17

Various materials are available for the creation of this buttress. Hard palate mucosa and nasal turbinate mucosa have been the most useful in our experience. Hard mucosa is extremely robust and maximally prevents recurrent entropion, but it is covered by a keratinized mucosa and can be irritating for the corneal surface. This irritation can require mul-

Figure 6. Graft cut in interpalpebral fissure 3 weeks postoperatively. Reprinted with permission from the Regents of the University of California. Copyright 1999.

Figure 7. Preoperatively (left) and 3 years postoperatively (right) demonstrating robust reconstruction of the eyelid margin (patient 1). Reprinted with permission from the Regents of the University of California. Copyright 1999.
Multiple de-epithelializations with the diamond burr and sometimes use of a bandage contact lens. Nasal turbinate mucosa is mechanically less sturdy than hard palate mucosa, but it is much smoother and less abrasive to the corneal surface. It has the additional advantage of mucous production by transplanted goblet cells.

The shared grafting technique has several advantages. First, it minimizes trips to the operating room because the upper and lower eyelid can be reconstructed simultaneously. Second, nasal turbinate grafts are usually harvested in an amount adequate for upper and lower eyelid reconstruction so that tissue is not wasted. The shared graft gets its blood supply from the upper and lower eyelid, which may possibly increase the chances for graft acceptance and graft survival.

Severe cicatricial entropion is best treated by complete reconstruction of the eyelid margin and placement of a buttress graft to resurface the margin and to provide a mechanical buttress against recurrent entropion. When healthy nasal turbinate is available and when mechanical requirements for eyelid margin do not require hard palate mucosal tissue, nasal turbinate is probably preferable because of its smoother surface against the cornea and because of the possibility of introducing increased lubrication to the ocular surface. We noted no specific complication related to the shared buttress technique and find that it successfully autostents the healing eyelid margins, makes good use of the large nasal turbinate mucosal graft, and minimizes trips to the operating room.

Accepted for publication April 10, 1999.

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REFERENCES


Summary of Patient Data for 12 Patients (15 Eyes)*

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<th>Patient No./Age, y/Sex</th>
<th>Diagnosis</th>
<th>Duration, y</th>
<th>Graft</th>
<th>Preoperative Visual Acuity</th>
<th>Postoperative Visual Acuity</th>
<th>Follow-up, mo</th>
<th>Recurrent Trichiasis</th>
<th>Comments</th>
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<td>1/42/M OCP</td>
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<td>5</td>
<td>HPG</td>
<td>20/25</td>
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<td>Improved corneal surface, mucous production</td>
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</tbody>
</table>

* OCP indicates ocular cicatricial pemphigoid; HPG, hard palate graft; CTL, contact lens; NTG, normal tension glaucoma; HM, hand motion; NLP, no light perception; LP, light perception; and CF, counting fingers.