Hard palate graft for repair of eyelid notch deformity

ABSTRACT
A single case description of a novel surgical treatment using hard palate to correct an upper eyelid deformity after traumatic laceration. The surgical procedure is described with accompanying diagram to illustrate the technique. The eyelid margin was successfully restored with proper anatomical outcome, as seen up to at least eighteen months post-operatively in the presented case. Our technique can be applied to the correction of small eyelid defects in other patients.

Keywords: eyelid; lid notch; hard palate graft repair.

Introduction
Extensive literature exists regarding the classification and correction of eyelid defects. Improved knowledge of eyelid anatomy has created many versatile methods of reconstruction. The eyelid contains an anterior and posterior lamella. Proper repair involves restoring the anatomy of both lamellae. With proper technique, good cosmetic result can be achieved while also maintaining anatomic integrity. Adequate approximation of the tarsus is necessary to remove tension from the eyelid margin, eliminating trichiasis and lid notches in the post-operative period. However, these do still occur and need to be dealt with to restore integrity of the eyelid margin. Although the present literature does discuss the correction of small eyelid defects, the correction of lid notching after primary repair has not been reported. We present a case of eyelid reconstruction with lid notch repair using a novel technique. This case report was performed in accordance with the requirements of the US Health Insurance Portability and Accountability Act.

Case Report
A 28-year-old male presented to the emergency room after an assault with a left ruptured globe and full thickness left upper and lower eyelid lacerations. The patient was brought to the operating room where a corneoscleral laceration from the superior limbus through the inferior limbus was first repaired. Next the upper and lower eyelids were repaired with deep tarsal sutures, followed by reapproximation of the eyelid margins, and finally closure of the skin. This was performed by the general ophthalmology team. The patient’s visual acuity did not improve from no light perception, and subsequently underwent an evisceration by ophthalmic plastics one week later.

One week after evisceration, notching was noted at the intersection of the central and lateral thirds of the upper eyelid (Figure 1, top and center panel). At post-operative week six, the patient was noted to have symblepharon in the mid-lower fornix and in the upper eyelid. The subsequent contracture of the socket did not allow proper fitting of the patient’s prosthesis. At post-operative month three, the patient underwent left socket reconstruction with a graft from the hard palate for reformation of the inferior fornix as well as placement of a symblepharon ring. At post-operative month five after the inferior fornix reconstruction, examination showed new inferior symblepharon,
scarring and retraction of the lower lid, an absence of the lid crease, and continued upper eyelid notch. It was decided at this point to proceed with repeat reconstruction of the inferior fornix as well as correction of the upper lid notch.

The left upper and lower eyelids and hard palate were infiltrated with 2% lidocaine with epinephrine (1:100,000). A #12 blade was used to incise a 1.0 x 2.0 cm area of hard palate for use as a graft. The area was carefully dissected with a Westcott scissor and toothed forceps. To reconstruct the lower eyelid, careful dissection of the conjunctiva and inferior fornix was then completed, with a pocket created for the insertion of the hard palate graft, which was sutured into the inferior fornix with a #7-0 vicryl suture. Attention was then turned to the upper eyelid notch. A full-thickness incision was made just superior to the lid notch through tarsus and parallel to the proper eyelid margin (Figure 2a). A diamond-shaped piece from the remaining part of hard palate was then sutured into the surgically created incision with one of the angles of the diamond pointing towards the lid notch (Figure 2b). The eyelid margin in the area of lid notch was now noted to be advanced towards proper anatomic position with a slight eversion, as was desired (Figure 2c).

Results
During early follow-up, the graft appeared healthy and well-perfused. The upper eyelid margin progressed from the initial everted position to an even, anatomical contour by the second month of follow-up. The area of graft placement continued to appear healthy throughout the entire follow-up period. Eighteen months after surgical correction, the upper eyelid margin was well-healed with a continued smooth contour (Figure 1, bottom panel).

Discussion
The repair of primary eyelid defects has been well-described, but the correction of lid notch after repair has yet to be reported in the literature. Subramanian described that small central defects of the upper eyelid can be primarily approximated secondary to inherent flexibility of the eyelid. Further described is the common technique of converting the area of defect into a pentagon by making a perpendicular cut up to the upper border of the tarsus. If tension is present, a cantholysis of the upper crus of the lateral canthal tendon can be completed.²

Our case illustrates a successful novel method in repairing lid notch or other similar small defects. The original lid notch likely occurred secondary to tension along the eyelid margin from the primary repair, perhaps with inadequate eversion of the margin. To relieve this tension and correct the eyelid notch, a diamond-shaped piece of hard palate was sutured into a full-thickness incision made parallel to the eyelid margin and superior to the lid notch. Theoretically,
a triangle-shaped piece of hard palate should correct a triangle-shaped lid notch of the same size by filling in the same area. In time however, this could scar and recreate a notch. Insertion of a diamond advances tissue both superiorly and inferiorly allowing eversion at the prior notch site. Excess tissue was desired to create a small "everted" area at the lid margin that would flatten in the post-operative period secondary to normal tissue retraction with healing (Figure 2d).

In comparison to full-thickness excision of a lid deformity, our technique allows for quicker repair with no resultant scarring. Furthermore, shortening of the eyelid margin does not occur with our method, which can sometimes necessitate a supplementary cantholysis in previous techniques as already mentioned. This is less relevant for older patients who have excess lid laxity, but creates an advantage for our technique in younger patients where removal of tissue can cause other complications. It is also important that the lining of the posterior lamella coming in contact with the globe should be smooth, capable of producing mucus for lubrication. A hard palate graft was utilized in order to provide this tissue, as well as improve healing and support the posterior lamella by simulating the stiffness of the tarsus. In our case the graft was taken from extra tissue remaining after correction of the lower eyelid retraction. If correcting an isolated small defect, formal hard palate harvesting and grafting can be time-consuming and cause significant pain and morbidity to the patient. Alternatively in these cases, a small 2mm punch of hard palate can be taken which is both rapid and causes minor morbidity.

Our patient demonstrated excellent healing, anatomic stability, and improved cosmesis as a result of this procedure by the second post-operative month. The lid restoration remained stable up to at least eighteen month post-operatively. In conclusion, patients with lid notch or similar small eyelid deformities may benefit from the novel approach presented. Insertion of hard palate graft provides support to the eyelid to allow proper healing and brings the eyelid margin back to proper anatomic position. Quality of eyelid reconstruction is improved with decreased procedure time, maintenance of eyelid tissue, and excellent cosmetic result.

Figure 2. Line drawing of surgical technique. a. Full-thickness incision just superior to eyelid notch, parallel to anatomic eyelid margin. b. Insertion of diamond-shaped hard palate graft c. Force of additional graft tissue is exerted in all directions along the eyelid, with slight extension of the eyelid margin past the anatomic position. d. Result six months post-operatively with retraction of tissue. Illustration by Courtney A. McKenna© 2014 Mount Sinai Health System.

REFERENCES