

MODIFIED GUNDERSON CONJUNCTIVAL FLAP COMBINED WITH AN ORAL MUCOSAL GRAFT TO TREAT AN INTRACTABLE CORNEAL LYSIS AFTER CHEMICAL BURN: A CASE REPORT

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Following a severe chemical injury, persistent corneal melting presents as a threatening condition for loss of vision or the eyeball itself. Keratoplasty (both lamellar and penetrating) and amniotic membrane transplantation have been the usual modes of therapy. However, these may not halt the persistent melting process. We introduce here an alternative surgical procedure to resolve corneal melting and preserve the globe. This case concerns the right eye of a 36-year-old male who had suffered from severe ocular alkali chemical burns and sustained intractable corneal melting, despite receiving corneal transplants three times, a limbal stem cell transplantation once, a scleral graft twice, and amniotic membrane transplantation eight times. To circumvent the impending perforation, we performed a modified Gunderson conjunctival flap combined with an oral mucosal graft. The corneal melting was halted, and the eyeball was preserved. The combination of an oral mucosal graft to the modified Gunderson conjunctival flap provided an easy alternative to resolve a case of intractable corneal melting and impending perforation.

Key Words: conjunctival flap, corneal lysis, chemical burn
(*Kaohsiung J Med Sci* 2006;22:247–51)

Intractable corneal melting is one of the severe complications after ocular chemical burn. Without adequate treatment, the contents of the eyeball will be expelled through the lytic cornea, necessitating evisceration or enucleation, and resulting in loss of the eyeball. Penetrating keratoplasty (PK) with corneal graft is one method of resolving this devastating situation. However, PK at such an acutely inflammatory stage usually leads to recurrent melting [1]. Amniotic membrane transplantation (AMT) is another alternative [2]. Nevertheless, in extremely severe cases, repeated AMT cannot save the extensively damaged and

thinning cornea. In this case study, we introduce an alternative surgical procedure to halt corneal melting and preserve the globe.

CASE PRESENTATION

A 36-year-old male suffered from a severe ocular alkali chemical burn to his right eye in July 2002. On initial examination, his best corrected visual acuity was light perception in the right eye and 20/20 vision in the left eye. The slit lamp examination of the right eye revealed a hazy cornea and veiling of the anterior chamber, iris, and lens. The limbus was 180° ischemia (from 3 o'clock to 9 o'clock), and the conjunctiva was severely chemotic and congested. For the intractable corneal lysis, he received a limbal stem cell transplantation once, a scleral graft twice, and AMT eight times, including those with multiple-layer membranes.

Received: August 18, 2005

Accepted: December 30, 2005

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The amniotic membrane lysed quickly before the cornea healed. He received corneal transplants three times for the impending perforation. Despite all of these procedures, the eyeball sustained repeated graft melting (Figure 1). However, despite the ultrasonographic examination revealing a choroidal and retinal detachment, the right eye could still visualize hand motion. He was then referred to our department for further treatment.

To circumvent the imminent perforation, we performed a modified Gunderson conjunctival flap combined with an oral mucosal graft. After a 360° peritomy, a thick conjunctival bridge was freed from the upper bulbar conjunctiva (Figure 2A) and sutured to the conjunctiva in the lower limbus (Figure 2B). The large donor defect of upper conjunctiva was covered with an oral mucosal graft (Figure 2C). After this operation, the corneal melting was relieved. Mild dehiscence of the conjunctival flap occurred in the lower limbal area 2 weeks postoperatively and was immediately mended with suture closure. The oral mucosal graft survival and wound healing were uneventful, with a satisfactory and silent ocular surface (Figures 3A, B). During the follow-up period, the visual acuity of the right eye still preserved light perception. Two months postoperatively the patient was fitted with a prosthesis on the right eye, and the cosmetic effect and prosthesis motility were satisfying (Figure 4). In a follow-up 2 years later, the conjunctival flap and the oral mucosal graft were stable and intact. The eyeball did not demonstrate significant phthisis.

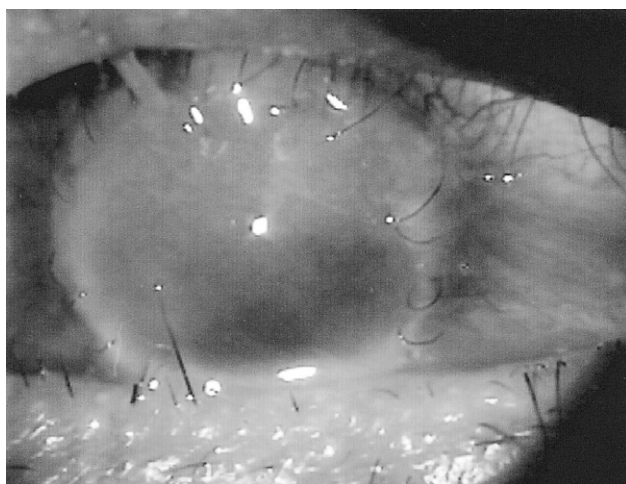


Figure 1. Intractable corneal melting of the right eye could not be prevented by all the managements with amniotic membrane transplantation and penetrating keratoplasty. The eyeball was threatened by an impending perforation.

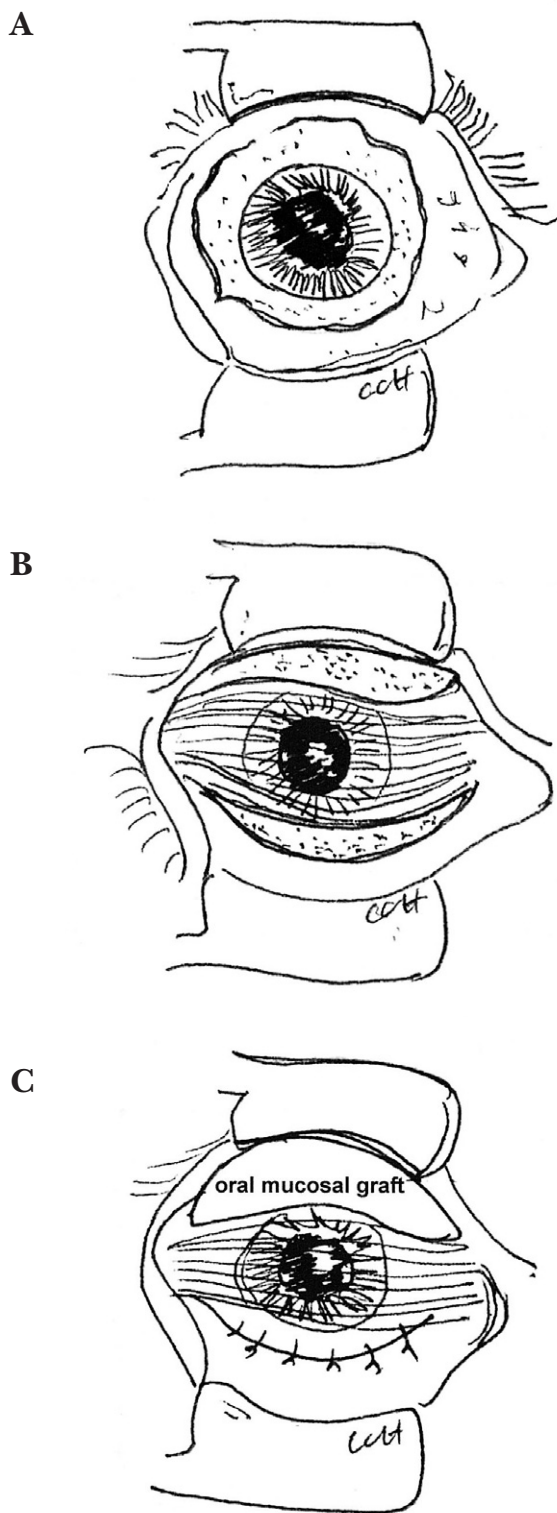


Figure 2. (A) The eyeball was fully exposed, using a traction suture for the greatest exposure of the upper bulbar conjunctiva. The limbal conjunctiva was opened through a 360° peritomy. (B) A thick conjunctival flap bridge was freed from the upper bulbar conjunctiva to cover the lysed cornea. (C) The lower border of the conjunctival flap was sutured to the lower bulbar conjunctiva. The donor defect of the upper bulbar conjunctiva was covered with an oral mucosal graft.

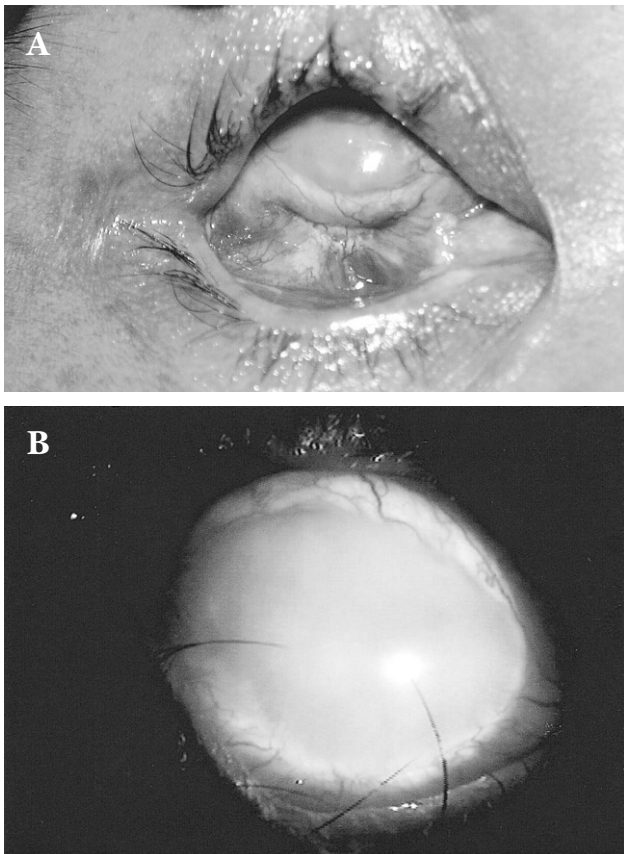


Figure 3. (A) One month postoperatively, the conjunctival flap healed. The melting of the cornea ceased. (B) The oral mucosal graft survived and the inflammation of the eye subsided.

DISCUSSION

Rehabilitation of the ocular surface following severe chemical or thermal injury is frequently desired after initial management. The conjunctival flaps have proven useful in treatment of numerous disparate corneal diseases that accompany a persistently compromised ocular surface. The flaps prevent recalcitrant corneal melting and secondary infection. They also control pain, lower the frequency of topical medications, improve cosmetic appearance, and provide an alternative to invasive treatment such as evisceration [3].

Gunderson introduced his technique for thin conjunctival flap in the treatment of corneal disease in 1958 [4]. The importance of the conjunctival flaps is well respected, and many ophthalmologists adopt it for managing persistent ocular surface disease. In this case, we modified Gunderson's surgical procedures to treat our patient. We followed most of the surgical procedures of the traditional Gunderson conjunctival flap, except that, in addition, we covered the bare donor bulbar conjunctiva with an oral mucosal graft. This method has several advantages over the traditional Gunderson conjunctival flap.

First, the thick conjunctival flap lowers the incidence of flap retraction, which is the most frequently reported complication of conjunctival flap. The incidence ranges from 11.4% [3] to 85% [5]. The retraction can be avoided at

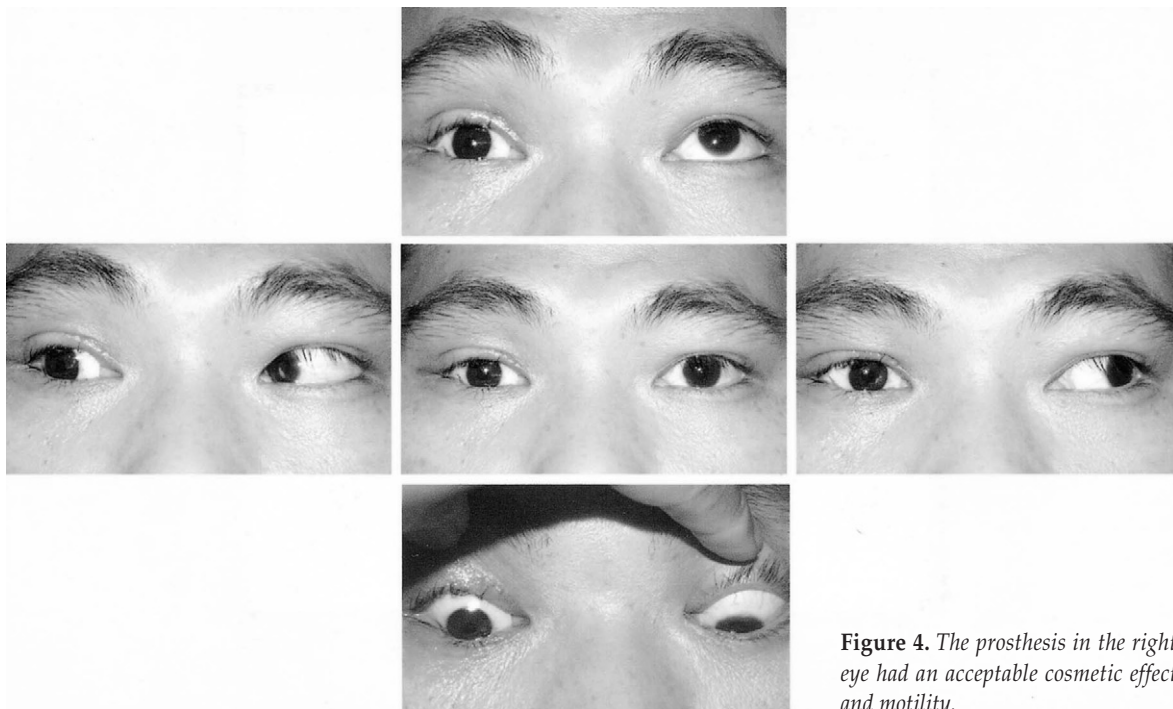


Figure 4. The prosthesis in the right eye had an acceptable cosmetic effect and motility.

the time of surgery by decreasing the tension on the conjunctival flap, using the oral mucosal graft to supply enough tissue for the large conjunctival defect in the adjacent donor site and to reduce the sewn tension of conjunctival bridge. As in our case, although the dehiscence of conjunctival flap occurred 2 weeks postoperatively, the wound healed well after immediate primary repair of the dehiscence.

Second, a thick conjunctival flap, rather than the traditional thinner Gunderson conjunctival flap, was used as a barrier for corneal melting. Due to its increased thickness, the conjunctival flap provided more resistance to the tendency to lysis.

Third, the grafting of oral mucosa prevented any adhesion or scleral lysis after detaching the large, thick donor conjunctival flap.

Modified Gunderson conjunctival flap combined with an oral mucosal graft is an alternative surgical procedure that stabilizes the corneal melting that occurs in severe chemical burns. It has several advantages over the traditional

Gunderson conjunctival flap, such as generating lower rates of flap retraction, providing more resistance to the tendency to lysis, and avoiding any adhesion or scleral lysis after detaching the large, thick donor conjunctival flap.

REFERENCES

1. Kuckelkorn R, Redbrake C, Schrage NF, et al. Keratoplasty with 11–12 mm diameter for management of severely chemical-burned eyes. *Ophthalmology* 1993;90:683–7.
2. Arora R, Mehta D, Jain V. Amniotic membrane transplantation in acute chemical burns. *Eye* 2005;19:273–8.
3. Alino AM, Perry HD, Kanellopoulos AJ, et al. Conjunctival flaps. *Ophthalmology* 1998;105:1120–3.
4. Gunderson T. Conjunctival flaps in the treatment of corneal disease with reference to a new technique of application. *Arch Ophthalmol* 1958;60:880–8.
5. Paton D, Milsaukas AT. Indications, surgical technique, and results of thin conjunctival flaps on the cornea: a review of 122 consecutive cases. *Int Ophthalmol Clin* 1970; 10:329–45.

利用改良式的甘德森結膜皮瓣 合併口腔黏膜移植來治療因化學灼傷 而引起的角膜溶解：病例報告

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遭受嚴重的化學灼傷之後，持續的角膜溶解會對視力或眼球造成極大的威脅，層狀角膜整型術、角膜移植術和羊膜片移植術是最常用的治療方法。然而這些療法並不一定會使持續性的角膜溶解緩解下來。我們介紹另一種手術方法來處理角膜溶解的問題，使得眼球得以保留下來。本文描述一位 36 歲的男性其右眼遭受嚴重的鹼性化學性灼傷，在接受 3 次角膜移植術、一次輪狀幹細胞移植術、2 次鞏膜片移植術及 8 次羊膜片移植術，其角膜還是一直持續性的溶解。為了避免造成眼球破裂，我們使用改良式的甘德森結膜皮瓣合併口腔黏膜移植術來治療病人，術後角膜溶解的現象停止，而病人的眼球才得以保留下來。由此顯示改良式的甘德森結膜皮瓣合併口腔黏膜移植是另一種簡單的手術方法可用來解決棘手的角膜溶解及伴隨而來的眼球破裂。

關鍵詞：結膜皮瓣，角膜溶解，化學性灼傷
(高雄醫誌 2006;22:247-51)

收文日期：94 年 8 月 18 日
接受刊載：94 年 12 月 30 日
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