Amniotic membrane graft in a recurrent re-fusing temporal tarsorrhaphy: a case report

G. Bryant Giles, Donovan S. Reed, Timothy A. Soeken and Brett W. Davies

Abstract: Amniotic membrane grafts (AMGs) are commonly used to treat a variety of ophthalmologic conditions. Complications exist with permanent tarsorrhaphies, including the risk of re-fusion following tarsorrhaphy separation. We report a novel application of amniotic graft in lieu of skin grafts to protect the exposed marginal surface during the initial re-epithelialization period following release of a permanent tarsorrhaphy. We present a 24-year-old man who sustained an 80% total body surface area burn from a motor vehicle accident 16 months prior to presentation at our Oculoplastic service for evaluation of residual lagophthalmos. His original permanent tarsorrhaphies were removed; however, re-fusion occurred temporally in both sides. During a second attempt, AMGs were secured over the eyelid margins, leading to a successful tarsorrhaphy takedown without re-fusion. Periocular burn injuries present particular challenges, as cicatricial changes continue to evolve and viable skin graft areas diminish with each successive graft. In the setting of recurrent auto-tarsorrhaphy, the AMG has shown to be a viable alternative to standard skin grafting. This case demonstrates excellent results in a skin graft sparing procedure that is effective and efficient. Amniotic membrane grafting reduces morbidity by foregoing skin graft donor sites and can achieve similar functional and cosmetic results to standard skin grafting with reduced overall surgical time. As such, AMGs have the potential to supplant standard skin grafting in cases of recurrent auto-tarsorrhaphy, particularly in the setting of diminished available healthy skin tissue.

Keywords: amniotic membrane, amniotic membrane graft, tarsorrhaphy, tarsorrhaphy re-fusion

Received: 14 April 2020; revised manuscript accepted: 12 October 2020.

Background
Amniotic membrane grafts (AMGs), first introduced for ophthalmic use in 1940 and reintroduced in 1995, are now commonly used to treat a variety of ophthalmologic conditions, including exposure keratopathy, corneal ulcers, reconstruction of the conjunctiva surface, limbal stem cell deficiencies and bullous keratopathy. While the majority of AMGs are used in anterior segment surgeries, more recent studies have reported on AMG use in eyelid reconstruction procedures as well as the recreation of the mucocutaneous junction along with full-thickness skin grafts for epithelial growth. AMGs are also commonly utilized in the treatment of severe inflammatory conditions such as Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis (SJS/TENs). AMGs have proven to be an acceptable alternative to autologous grafts because of its ease-of-use and anti-inflammatory properties. A new technique utilizing cyanoacrylate glue has allowed for full ocular and periorbital surface graft protection without the need for general or local anesthetic. In light of such clinical success, the authors report a novel application of amniotic graft in lieu of skin grafts to protect the exposed marginal surface during the initial re-epithelialization period following release of a permanent tarsorrhaphy.

Temporary tarsorrhaphies, which involve suturing of upper and lower eyelids, are used in the treatment of persistent epithelial defects and other ocular surface disorders typically
associated with neurotrophic ulcers, exposure keratopathy, and other inflammatory diseases such as ocular cicatricial pemphigoid and SJS/TEN. Temporary tarsorrhaphies can be released easily in the clinic setting when the desire and need for expanded field of vision outweigh the concern for corneal protection and after the initial exposure–related risks are minimized. Such release typically results in restoration of normal eyelid form and function; however, reported complications include trichiasis (18%), adhesions between the upper and lower lids (2.6%), pyogenic granuloma (1.3%) and keloid formation (1.3%). Similar complications exist with permanent tarsorrhaphies, including the risk of re-fusion following tarsorrhaphy separation. Skin grafts and bolsters can be used to protect the raw marginal surface to prevent re-fusion. A Gor-Tex® stent has also been reported in the management of an unsuccessful tarsorrhaphy separation. The authors present a case of amniotic membrane grafting as a successful alternative to skin grafts and stents for the prevention of fusion following release of a recurrent re-fusing temporal tarsorrhaphy.

**Patient presentation**

A 24-year-old man who sustained an 80% total body surface area burn from a motor vehicle accident 16 months prior to presentation at our Oculoplastic service for evaluation of residual lagophthalmos. Initial treatments at the outside facility included bilateral permanent temporal tarsorrhaphies. Two months later, the patient presented to our hospital Burn Clinic from his acute rehab facility. Lagophthalmos of 2 mm was noted in the right eye and 1 mm in the left eye (Figure 1). One month later (3 months after initial burn), the patient underwent bilateral full-thickness skin grafts of the lower lids (supraclavicular graft), during which the tarsorrhaphies were released and bolsters were placed. By postoperative day 5, lateral lid adhesions were noted and released at the slit lamp (Figure 2) after bolster removal. Unfortunately, re-fusion occurred again by postoperative month 2 (Figure 3).

After a period of observation, the patient desired rerelease of his tarsorrhaphies. Intraoperatively, AMGs were draped over the marginal surfaces to prevent re-fusion and bolsters were placed (Figures 4–6). On postoperative day 5, the bolsters were removed and successful release of tarsorrhaphy was noted without re-fusion. At postoperative month 9, no re-fusion had occurred (Figure 7) and patient was happy with the cosmetic outcome.

The patient involved provided written informed consent to publish all related medical data and images.

**Procedure**

Following anesthetic injection, field sterilization with 5% betadine, sterile draping, and corneal shield placement, the permanent tarsorrhaphy was incised with a #15 scalpel blade. The handle end of 0.5 forceps was inserted under the tarsorrhaphy, which provided a posterior cutting guide. Beginning at the medial edge and continuing laterally until the previous lateral canthal area was

![Figure 1. Initial presentation with bilateral temporal tarsorrhaphies.](image1)

![Figure 2. Post-operative day 5, after removal of lateral lid lesions.](image2)

![Figure 3. Refusion of lateral tarsorrhaphies.](image3)
reached, a full-thickness incision was made. Using the scalpel and the metal surface of the inserted instrument, additional margin tissue was removed so as to best approximate the contour of the adjacent normal eyelid. A 3.5 × 3.5 mm sheet of cryopreserved human amniotic membrane (AmnioGraft®, Bio-Tissue, Miami, FL) was placed next to the wound edges to gauge width. Two rectangles were cut using the measured width and approximately 12 mm in length. The first graft section was placed on the lower eyelid, stroma side down onto skin with proper orientation of the two surfaces (the side attached to the paper back being laid down on the eyelid skin). The upper lower edge of the graft was then positioned superiorly inferiorly until the lower edge was approximately 4 mm below the margin. Using forceps and Weck-Cels®, the tissue was gently spread until flat and clean. A few drops of cyanoacrylate glue were carefully placed at the border interface between graft and skin. The remaining superior edge of AMG tissue was then draped over the lower eyelid margin and tucked under the lid using a muscle hook, allowing the AMG to drape over the margin and palpebral surface of the lower lid. The superior lid was grafted in the same fashion. A bolster
was placed using foam against the AMG/skin and butterfly intravenous (IV) tubing between the eyelid margins. The corneal shield was removed before the final tie down of bolster. Maxitrol® ointment was placed judiciously over the grafts and bolsters. Postoperative care included ointment application four times a day until bolster removal at postoperative week 1.

Discussion

Periocular burn injuries present particular challenges to the oculofacial surgeon, as cicatricial changes continue to evolve and viable skin graft areas diminish with each successive graft. In the setting of reduced skin tissue availability and recurrent auto-tarsorrhaphy, the AMG has shown to be a viable option to prevent readhesion of the margins. Current alternatives include full-thickness skin grafts and mucosal tissue grafting; however, both require donor sites and are more invasive procedures. In addition, spacer grafts or synthetic material can be used to prevent readhesion, alternative to standard skin grafting.

This case demonstrates excellent results in a skin graft sparing procedure that is effective and efficient. Amniotic membrane grafting reduces morbidity by foregoing skin graft donor sites and can achieve similar functional and cosmetic results to standard skin grafting with reduced overall surgical time. As such, AMGs have the potential to supplant standard skin grafting in cases of recurrent auto-tarsorrhaphy, particularly in the setting of diminished available healthy skin tissue.

Conflict of interest statement

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

G. Bryant Giles https://orcid.org/0000-0002-3493-558X
Donovan S. Reed https://orcid.org/0000-0002-7209-4646
Timothy A. Soeken https://orcid.org/0000-0002-6827-4767

References

1. De Roth A. Plastic repair of conjunctival defects with fetal membrane. Arch Ophthalmol 1940; 3: 522–525.
2. Kim JC and Tseng SCG. Transplantation of preserved human amniotic membrane for surface reconstruction in severely damaged rabbit corneas. Cornea 1995; 14: 473–484.
3. Sohrab M, Abugo U, Grant M, et al. Management of the eye in facial paralysis. Facial Plast Surg 2015; 31: 140–144.
4. Tseng SCG. Amniotic membrane transplantation for ocular surface reconstruction. Biosci Rep 2001; 21: 481–489.
5. Sorsby A and Symons HM. Amniotic membrane grafts in caustic burns of the eye. Br J Ophthalmol 1946; 30: 337–345.
6. Jirsova K and Jones GLA. Amniotic membrane in ophthalmology: properties, preparation, storage and indications for grafting—a review. Cell Tissue Bank 2017; 18: 193–204.
7. Aggarwal S, Shah CT and Kirzhner M. Modified second stage Hughes tarsoconjunctival reconstruction for lower eyelid defects. Orbit 2018; 37: 335–340.
8. Singh M, Gautam N, Kaur M, et al. Role of amniotic membrane and full-thickness skin graft in reconstruction of kissing nevus of eyelids. Indian J Ophthalmol 2017; 65: 1219–1221.
9. Honavar SG, Bansal AK, Sangwan VS, et al. Amniotic membrane transplantation for ocular surface reconstruction in Stevens-Johnson syndrome. Ophthalmology 2000; 107: 975–979.
10. Tsubota K, Satake Y, Ohyama M, et al. Surgical reconstruction of the ocular surface in advanced ocular cicatricial pemphigoid and Stevens-Johnson syndrome. Am J Ophthalmol 1996; 122: 38–52.
11. Shanbag SS, Chodosh J and Saeed HN. Sutureless amniotic membrane transplantation with cyanoacrylate glue for acute Stevens-Johnson syndrome/toxic epidermal necrolysis. Ocul Surf 2019; 17: 560–564.
12. Cosar CB, Cohen ElJ, Rapuano CJ, et al. Tarsorrhaphy: clinical experience from a cornea practice. Cornea 2001; 20: 787–791.
13. Glatt HJ. Management of unsuccessful tarsorrhaphy separation with polytetrafluoroethylene (Gor-Tex) stent. Am J Ophthalmol 1993; 115: 264–265.
14. Astori IP, Muller MJ and Pegg SP. Cicatrical, postburn ectropion and exposure keratitis. Burns 1998; 24: 64–67.