



# Use of dried amniotic membrane with glue to manage a corneal perforation

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## To the Editor:

Corneal perforations may result from a variety of disorders including infection, inflammation and trauma. Use of tissue adhesives is a simple method for sealing small perforations in the acute setting. Hence, there is a growing interest around the combination of cyanoacrylate with different scaffold materials that provide additional tectonic support and prevent cyanoacrylate entry in the anterior chamber [1].

Amniotic membrane contains numerous growth factors that favour epithelial healing [2], and a reduction in inflammation [3]. There can be a delay in obtaining frozen amniotic membrane, whereas dried amniotic membrane is more readily available and lends itself to use in an outpatient setting. We describe using glue and a dried amniotic membrane to close a corneal perforation to obtain a relatively smooth corneal profile.

## Technique

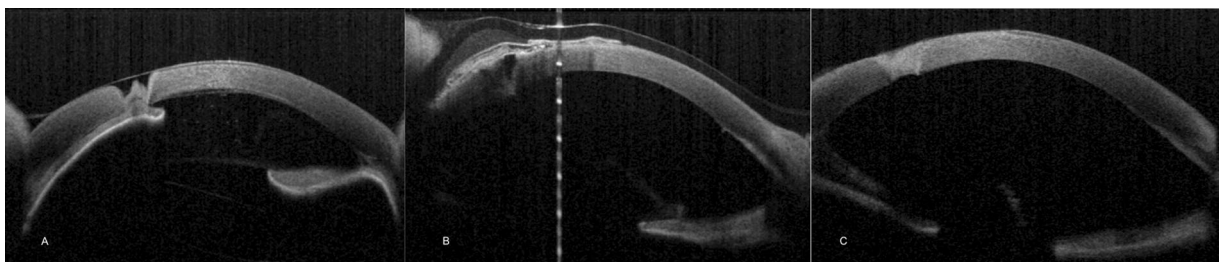
A patient presented with a 2 mm corneal perforation of his right eye following trauma (Fig. 1A). After drying the

corneal surface, a drop of Histoacryl® glue was applied followed by immediate application of a dried amniotic membrane (OmniGen®).

The glued membrane was allowed to set for a few minutes, following which a 20 mm diameter bandage contact lens was inserted (Fig. 1B). The glue and OmniGen membrane remained in position and the globe remained formed throughout the follow-up period. The glue was removed 3 months after application leaving a smooth corneal surface. There was no leak and an anterior segment OCT confirmed healing of the corneal wound with a corneal thickness of 460 µm (Fig. 1C).

## Discussion

Various gluing techniques have been reported in the literature including direct application of the glue and use of sterile drape cut outs [4]. One disadvantage with these techniques is that the resulting surface is not smooth which can lead to patient experiencing discomfort and an increased risk of infection. In addition, there is a risk of glue dislodging if the surface is



**Fig. 1** Anterior segment OCT of the cornea. **A** Anterior segment OCT of the eye before gluing with iris plugging the wound. **B** Appearance immediately after gluing. **C** Image showing appearance 3 months post gluing with dried Amniotic membrane.

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uneven. Amniotic membrane can adapt to the contour of the underlying surface, leading to a smoother surface, better tolerance and the need for re-gluing. A tissue punch can be used to cut the dried amniotic membrane to the desired size depending on the size of the perforation and applied immediately following the glue using straight tying forceps. A variation of the technique could be utilised in cases of corneal perforation with iris incarceration similar to the double disk method [5]. We have found this method easy to perform both in theatre and in an outpatient setting. A disadvantage, however, is the added cost of using dried amniotic membrane and other materials that can be used for patching need to be considered or developed.

**Author contributions** MA, MB, and LP wrote the manuscript in consultation with VR and SK. SK supervised the project.

### Compliance with ethical standards

**Conflict of interest** The authors declare no competing interest.

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### References

1. Hirst LW, Smiddy WE, Stark WJ. Corneal perforations. Changing methods of treatment, 1960–1980. *Ophthalmology*. 1982;89:630–5.
2. Sotozono C, Kinoshita S, Kita M, Imanishi J. Paracrine role of keratinocyte growth factor in rabbit and corneal epithelial growth. *Exp Eye Res*. 1994;59:385–92.
3. Boudreau N, Werb Z, Bissell MJ. Suppression of apoptosis by basement membrane requires three-dimensional tissue organization and withdrawal from the cell cycle. *Proc Natl Acad Sci USA*. 1996;93:3509–13.
4. Khalifa YM, Bailony MR, Bloomer MM, Killingsworth D, Jeng BH. Management of nontraumatic corneal perforation with tectonic drape patch and cyanoacrylate glue. *Cornea*. 2010;29:1173–5.
5. Gandhewar J, Savant V, Prydal J, Dua H. Double drape tectonic patch with cyanoacrylate glue in the management of corneal perforation with iris incarceration, *Cornea*. 2013;32:e137–e138.