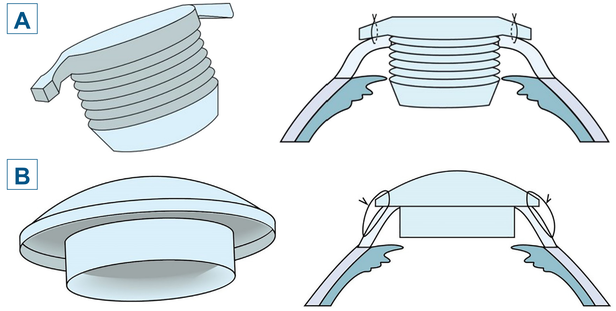
Temporary keratoprosthesis and primary corneal graft for ocular trauma: a systematic review and meta-analysis

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Background

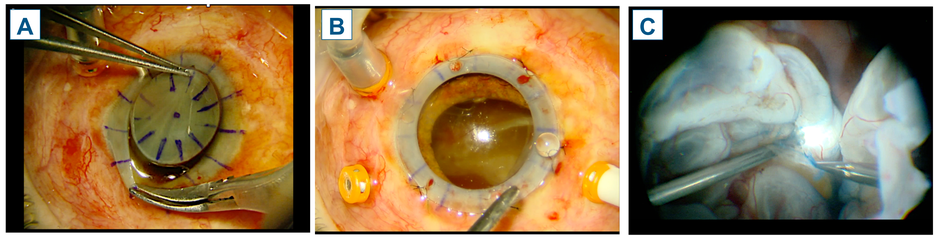
In cases of ocular trauma where severe corneal and retinal injury occur together, a temporary keratoprosthesis (TKP) is often a last resort to allow posterior segment visualisation, enabling vitreoretinal surgery which can then be combined with a penetrating keratoplasty (PKP) to restore corneal clarity in a single operation. We aimed to assess visual outcomes following combined PKP and vitreoretinal surgery with the use of a TKP for cases of ocular trauma.



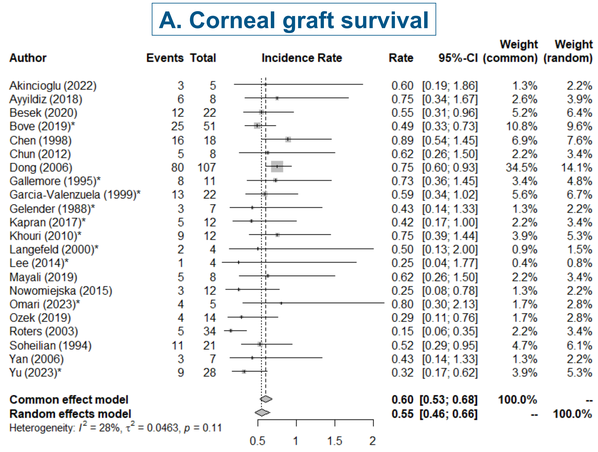
Temporary keratoprosthesis models. Angled and placement views of the (A) Landers-Foulks type 2 model, and the (B) Eckardt model. Images adapted from from Moshirfar *et al*. (2023)[1].

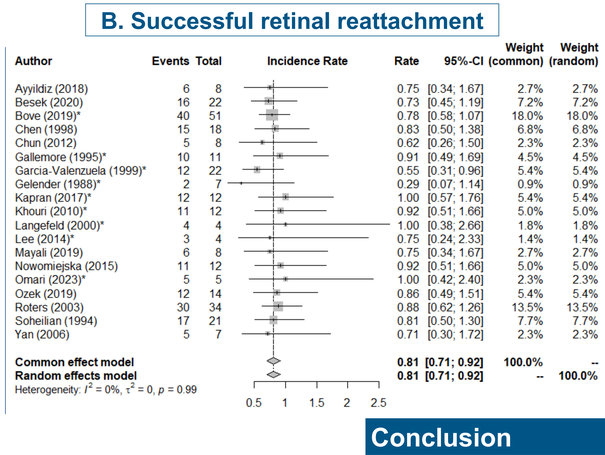
Methods

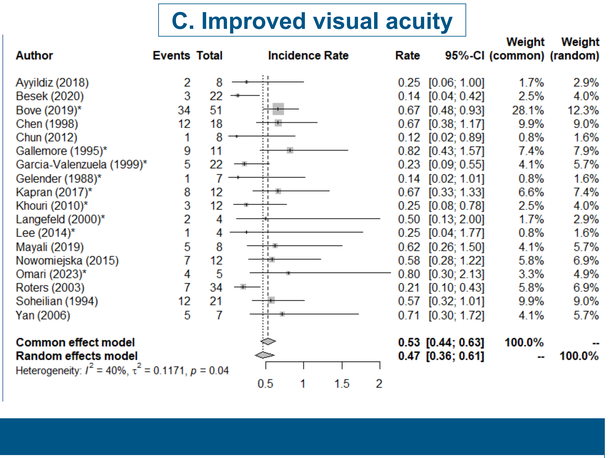
A systematic literature review was performed following PRISMA guidelines. CENTRAL, MEDLINE, Embase, ISRCTN registry and ClinicalTrials.gov were searched from inception to 27 April 2023. Randomised and non-randomised studies assessing visual outcomes after combined surgery were eligible for inclusion. Outcomes included change in best-corrected visual acuity, corneal graft survival and retinal reattachment at final follow-up. Proportional meta-analysis was used to estimate the overall rate of the primary outcomes. The risk of bias in non-randomised studies was assessed using the Joanna Briggs Instituted (JBI) checklist.[2]



Example of (A) total corneal trephination, (B) placement of Eckardt temporary keratoprosthesis, and (C) vitrectomy in a case of penetrating trauma. Images adapted from Bové *et al.* (2019)[3].







Proportional meta-analyses of included studies reporting visual outcomes at final follow-up after combined vitreoretinal surgery and penetrating keratoplasty with temporary keratoprosthesis. (A) corneal graft survival; (B) successful retinal attachment at follow-up; (C) improved visual acuity.

Summary of findings

Outcomes	Incidence (95% CI)	No. of eyes (studies)
Clear corneal graft	0.55 (0.46-0.66)	420 (22)
Successful retinal attachment	0.81 (0.71-0.92)	280 (19)
Improved visual acuity	0.47 (0.36-0.61)	266 (18)

Results

A total of 22 studies met inclusion criteria reporting 420 eyes. All studies were retrospective and non-randomised with follow up times ranging from 2 to 91 months, with at least 79% of outcomes reported after 6 months. After combined surgery the rate of corneal graft survival was 55% (95% CI 0.46-0.66; I^2 28%, p<0.11), successful retinal attachment was 81% (95% CI 0.71-0.92; I^2 0%, p <0.99) and improved visual acuity, when compared to no change or decrease in visual acuity, was 47% (95% CI 0.36-0.61; I^2 40%, p = 0.04).

Conclusion

We found that when vitreoretinal surgery using a TKP and PKP are combined, anatomically successful retinal reattachment is likely, approximately half of corneal grafts survive and a similar proportion of patients benefit in terms of improved visual acuity, compared to their preoperative function. This systematic review of the available literature may help inform surgeons making risk-benefit decisions around the use of a TKP in ocular trauma management.

References

1. Moshirfar M, Peterson C, Ronquillo YC, Hoopes PC. Temporary keratoprostheses in anterior and posterior segment surgery: A narrative review of their history and development. *Surv Ophthalmol*. 2023:S0039-6257(23)00033-4.
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3. Bové Álvarez M, Arumí CG, Distéfano L, et al. Comparative study of penetrating keratoplasty and vitreoretinal surgery with Eckardt temporary keratoprosthesis in ocular trauma versus non-trauma patients. *Graefes Arch Clin Exp Ophthalmol*. 2019;257(11):2547–58.