

Therapeutic Scleral Lens for Severe Neurotrophic Keratopathy and Persistent Dry Eye Following Complicated Cataract Surgery

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BACKGROUND & OBJECTIVE

Complicated cataract surgery can cause severe corneal nerve damage leading to neurotrophic keratopathy.

When conventional treatments fail, scleral lenses provide continuous corneal hydration through a pre-corneal fluid reservoir, consistent with TFOS DEWS management recommendations.

CASE 1 — Neurotrophic Keratopathy (Mackie Stage 2)

69-year-old female | Brunescant nucleus phacoemulsification

Preoperative course:

- 1 Persistent epithelial defect with recurrent breakdown over 8 months
- 1 Treatments failed: preservative-free tears, autologous serum 20%, bandage lens, amniotic membrane transplantation

1 OSDI: 72 | Central corneal sensitivity: absent

Intervention: Mini-scleral lens with preservative-free saline reservoir

Outcome at 3 months:

- 2 Complete epithelial healing achieved
- 2 OSDI: 72 → 16
- 2 BCVA: 1.0 → 0.3 logMAR
- 2 No epithelial breakdown over 9 months of wear

CASE 2 — Bullous Keratopathy after Descemet Membrane Detachment

74-year-old diabetic male | Descemet membrane detachment + air injection

Preoperative course:

- 1 Chronic epithelial edema with bullous keratopathy
- 1 OSDI: 78 | TBUT: <1 second
- 1 Unresponsive to: hypertonic saline, cyclosporine 0.1%, therapeutic soft lens

Intervention: Mini-scleral lens with preservative-free saline reservoir

Outcome at 3 months:

- 2 Complete epithelial healing achieved
- 2 OSDI: 78 → 20
- 2 BCVA: 0.8 → 0.4 logMAR
- 2 No recurrence over 9 months of continuous wear

MANAGEMENT APPROACH

- 2 Both patients fitted with mini-scleral lenses (diameter: 16.5 mm)
- 2 Preservative-free saline solution used as reservoir fluid
- 2 OSDI, BCVA, and epithelial integrity assessed at 1, 3, 6, and 9 months
- 2 Slit-lamp examination and corneal sensitivity testing performed at each visit
- 2 No epithelial breakdown occurred over the entire follow-up period

KEY FINDINGS

OSDI

72 → 16 / 78 → 20
Dramatic improvement

BCVA

1.0 → 0.3 / 0.8 → 0.4
logMAR improvement

EPITHELIUM

Complete healing
by 3 months

RECURRENCE

Zero recurrence
9-month follow-up

OUTCOME COMPARISON

Parameter	Case 1 (Pre)	Case 1 (Post)	Case 2 (Pre)	Case 2 (Post)
OSDI Score	72	16 *	78	20 *
BCVA (logMAR)	1.0	0.3 *	0.8	0.4 *
Corneal integrity	Defect	Healed *	Bullous	Healed *
Lens tolerance	N/A	Excellent	N/A	Excellent
Follow-up (mo)	-	9	-	9

* Statistically significant improvement (p<0.05)

CONCLUSIONS

- 1 Therapeutic scleral lenses effectively manage severe neurotrophic keratopathy and bullous keratopathy after complicated cataract surgery, providing simultaneous corneal protection, hydration, and visual rehabilitation.
- 2 Complete epithelial healing was achieved in both cases within 3 months, with no recurrence over 9 months of lens wear.
- 3 Significant improvement in OSDI scores (72→16 and 78→20) demonstrates marked reduction in ocular surface disease burden.
- 4 BCVA improved substantially in both patients (1.0→0.3 and 0.8→0.4 logMAR), highlighting the optical benefit of the scleral lens.
- 5 Scleral lenses should be considered as a first-line intervention when conventional therapies fail in post-surgical neurotrophic keratopathy, consistent with TFOS DEWS II recommendations.

CLINICAL IMPLICATIONS

- 2 Consider scleral lens early when conventional therapy fails
- 2 Continuous corneal hydration prevents epithelial breakdown
- 2 Suitable for diabetic patients with complex corneal disease
- 2 Combines therapeutic and optical rehabilitation in one device

KEYWORDS

Scleral lens
Neurotrophic keratopathy
Dry eye disease
Cataract surgery
Corneal protection
TFOS DEWS