Piggy's Back: Contact Lens Management of Neurotrophic Keratitis following Penetrating Keratoplasty

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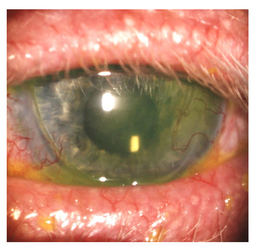
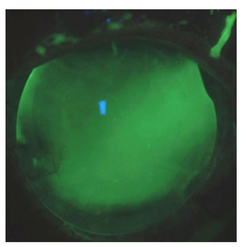
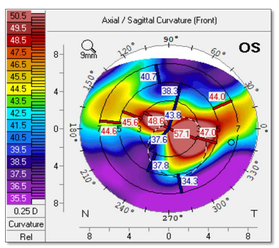
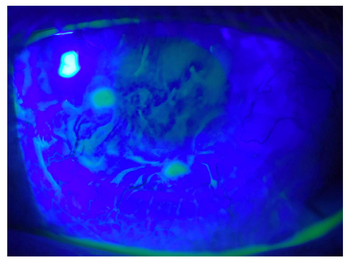
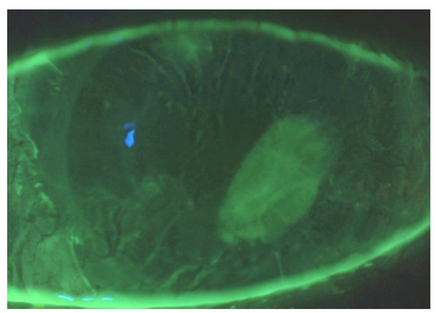
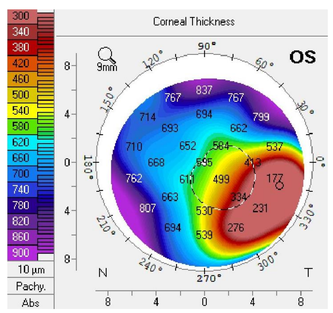
- A 60-year-old Caucasian male presented to the clinic March 18, 2020, for a contact lens consultation for his left eye. He was referred by a corneal specialist following subsequent penetrating keratoplasty OS in 2018.
- Pertinent history included blindness OD since 1970 following trauma and PK OS 2008 following trauma in 1990. Following repeat PK, he suffered from neurotrophic keratitis OS with persistent epithelial defects for which he had undergone 2 amniotic membrane transplant procedures and an 8-week course of Oxervate in 2019. Current medications included Pred Forte 1% BID OS, doxycycline 50mg po qd, Restasis BID, and artificial tears as needed.
- Entering acuity was NLP OD and counter fingers at 8 feet OS without correction. Pupils were abnormal being fixed as result of injury and surgery. Intraocular pressure was 19 mmHg OD and 16 mmHg OS with iCare. Confrontation visual fields were full OS.
- Slit lamp examination of the right eye revealed conjunctival scarring present nasally, band keratopathy and corneal scarring, peripheral anterior synechiae and significant iris atrophy present. The right eye was aphakic. The left eye showed 3+ blepharitis and meibomian gland dysfunction, conjunctival scarring with subconjunctival sutures present at 2 and 8 and a tube shunt at 2. The corneal transplant was mildly edematous with neovascularization extending to the graft-host junction from 1-9 o'clock and the overlying epithelium was irregular with 3+ superficial punctate keratopathy.
- The patient was initially diagnostically fit with a reverse geometry corneal gas permeable design lens (Valley Contax, Rev Geo, BC: 8.44, Dia: 11.0, Pwr: -2.00).
- External white and fluorescein images are presented below demonstrating the diagnostic lens on the patient's eye. Visual acuity improved to 20/50 OS with +6.50D over-refraction. Corneal topography of the left eye shows the irregularity of the patient's cornea.

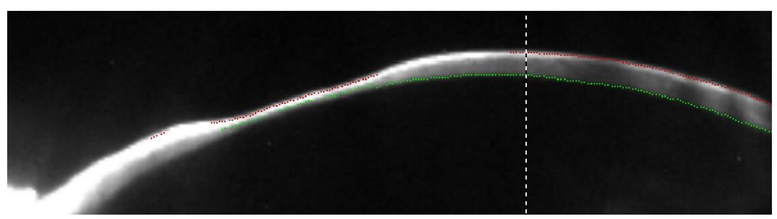




- Utilizing the diagnostic lens parameters. Images, and corneal topography, the first lens was ordered (Valley Contax, Rev Geo, BC: 8.44, Dia: 10.0, Pwr: +5.00, Optimum Comfort, ice blue).
- He was seen multiple times over the next 3 months with adjustments made to the lens fit, however, he struggled with comfort, stability, and persistent visual ghosting secondary to residual astigmatism. He wished to trial a scleral lens, and during the diagnostic evaluation on June 16, he reported improved comfort and was able to achieve improved acuity with a toric over-refraction which was incorporated in the lens ordered (Valley Contax, Custom Stable Elite, BC: 8.23, Dia: 15.8, Pwr: +4.75 -1.75 x 175, standard central and limbal clearance zones, scleral landing zone 5/-2, Optimum Extra, ice blue).
- On June 25, the patient successfully completed handling training for the scleral lens, and it was deemed appropriate for dispense. He was instructed to limit wear to 4-6 hours at a time with a minimum 2-hour break between wearing periods. He was then scheduled to return in 2 weeks for monitoring.
- At the follow up appointment on July 14, he reported being able to wear the scleral lens for about 2 hours at which point he noticed fogging of his vision that gradually cleared following lens removal. The time for his vision to clear increased as he wore the lens repeatedly, so he had stopped wearing the scleral lens 4 days prior and had returned to wearing the corneal lens.
- Entering acuity with the corneal GP lens was 20/30-2. All other entrance testing was stable. Corneal evaluation of the left eye revealed highly irregular epithelium with 2 1-mm ulcers present, shown below. He was diagnosed with neurotrophic keratitis OS, a bandage soft contact lens (AO N&D 8.6/+1.00/13.8) was placed, and he was instructed to increase the Pred Forte 1% to QID OS and start ofloxacin 0.3% BID.
- Following 2 days of BSCL wear there was minimal improvement noted in the ocular surface appearance. Therefore, it was decided to pursue cryo-preserved amniotic membrane therapy.

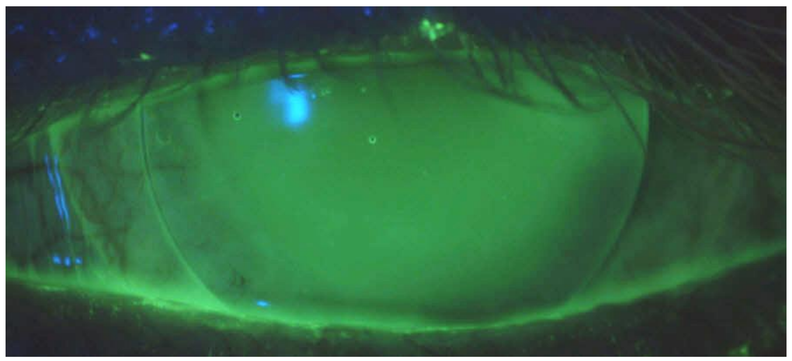


- The membrane was removed after 5 days, and the epithelium was still noted as mildly irregular but intact. A BSCL was placed, and the patient was approved to wear his corneal lens over the bandage lens. He was instructed to continue Pred Forte 1% TID and Ofloxacin 0.3% BID at that time.
- An UltraHealth hybrid lens was ordered empirically as an alternative to provide improved comfort and stability for the patient (UltraHeatlh, BC: 8.4, Flat Skirt, Pwr: +5.50, THP). The lens was dispensed following handling education and evaluation on August 14 with the patient scheduled to return in 2 weeks for monitoring.
- The patient returned 3 days later complaining of blurred vision. He reported wearing the hybrid lens for approximately 6 hours on the 14th, did not wear it on the 15th, and wore for1 hour on the 16th after which his vision become very blurry and was not improving. Entering acuity with the hybrid lens was 20/40.
- Corneal evaluation revealed highly irregular epithelium with larges patches of epithelial swirl. A 3x6mm epithelial defect was present inferior temporal with approximately 60-70% stromal thinning noted and no infiltrate present. External photos corneal pachymetry was obtained for baseline measurements.



- A cryo-preserved amniotic membrane was placed on the left eye at this appointment and the patient was scheduled to return in 5 days for removal. He was instructed to continue Pred Forte 1% TID and oflxoacin 0.3% BID.
- Following removal of the amniotic membrane transplant on August 21, corneal evaluation revealed irregular epithelium with patches of epithelial swirl present. The epithelium was otherwise fully intact. The stromal thinning was estimated to be less than 30% within the area of ulceration.
- A BSCL placed (AO N&D +0.75) and the patient was approved to wear his corneal lens over the BSCL. He was instructed to decrease the Pred Forte 1% to BID, ofloxacin 0.3% to QD, restart Restasis BID, and continue artificial tears as needed.
- He returned August 28 as directed for monitoring. Entering acuity was 20/30-2 OS. He was happy with the vision but continued to struggle with significant lens movement on eye despite utilizing a piggyback carrier lens.
- Following removal of both lenses, the corneal epithelium was noted as highly irregular, but fully intact and no stromal thinning was present. The BSCL was replaced, and the patient was scheduled to follow up for corneal monitoring in 2 weeks. A new corneal GP lens was ordered with tightened peripheral edges to reduce on eye movement.
- On September 11, the patient returned as scheduled. He reported improved stability with the new corneal lens. Entering acuity was 20/30-2 and he still complained of visual ghosting present.
- The lens was fitting well over the piggyback BSCL. Over-refraction revealed similar residual astigmatism which improved his acuity to 20/20. Glasses were prescribed to wear over the contact lens for both visual correction and ocular protection.



- Slit lamp examination revealed the corneal epithelium was intact and overall smooth with no stromal thinning present. Other ocular health findings were stable.
- The patient was instructed to continue BSCL (AO N&D 8.4/+0.75/13.8) wear for long term corneal protection, removing the BSCL at night, replacing every 3-4 weeks and wearing the corneal lens over top for vision correction during the day. He continued Pred Forte 1% BID, ofloxacin 0.3% QD, and Restasis BID OS.
- His ongoing care has included scheduled appointments every 4-6 months monitoring corneal health.
- Despite failing two other contact lens modalities, the patient has utilized this regimen of piggyback lens wear successfully for approximately 2 years at this time.