Use of a Scleral Lens for Independent Living in Context of Ocular Catastrophe

Madeleine Hacker, OD; Andrew Kornaus, OD, FAAO, FSLS
SSM Health Davis Duehr Dean- Optometric Residency Affiliate of Illinois College of Optometry
Madison, Wisconsin

Background

Scleral lenses have been on the rise recently due to the advent of new lens materials and their versatility in managing a variety of anterior segment conditions. Many companies now allow you to customize these lenses to accommodate each individual's unique ocular anatomy in order to give them back their sight. This case will review the use of a scleral lens on a recent penetrating keratoplasty to rehabilitate a patient after surgical misfortune. Long-term management after corneal healing will be discussed as well.

Case Details

- **85 year old Caucasian male**
- **CC:** Presenting for specialty lens fitting of the right eye (Table 2)
- **Medical History:** Chronic atrial fibrillation, right bundle branch block
- **Allergies:** Penicillins, Naproxen, Piroxicam, Quinidine
- **Medications:** Atorvastatin, clonidine, colchicine, diltiazem, docusate sodium, furosemide, hydralazine, jantoven, polyethylene glycol powder, tizanidine, warfarin, prednisolone acetate ophthalmic suspension, and maxitrol ophthalmic ointment.
- **Ocular History:**
  - **Right eye:** Severe pseudoexfoliative glaucoma. S/p: ALT 360, CE/IOL, Express shunt w/ suprachoroidal hemorrhage and ciliary block, vitrectomy, Ahmed tube shunt. Borderline hypotony, pseudophakic corneal edema w/ stromal/DM scarring requiring penetrating keratoplasty (PKP) (Image 1).
  - **Left eye:** Recently NLP due to glaucoma surgery complications. Band keratopathy with persistent epithelial defect.

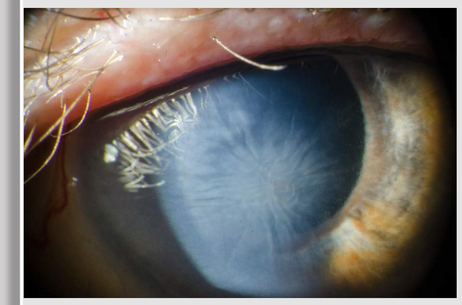


Image 1 (left): Pseudophakic corneal edema with stromal/DM scarring prior to PKP. DSAEK was considered, however due to hypotony there was a higher risk for dislocation of the graft.

- After a recent, severe decline in vision, the patient started experiencing symptoms of Charles Bonnet syndrome. This syndrome results in the patient seeing scenery, people, and objects that aren't really there.

Clinical Findings

- Initial examination findings are shown in Table 1:

TABLE 1	Right Eye	Left Eye
Visual Acuity (Glasses)	20/350	NLP
Conjunctiva/Sclera	Tube shunt sup/temp	Injection, shunt nicely covered
Cornea	PKP w/ all sutures intact; flat graft appropriate for month 2.5	Few endo deposits, mild edema
Anterior Chamber	Deep and quiet	Slight open space centrally, blood clot slightly inferior/central
Iris	PI sup/nasal	Oval, PI, suture superiorly

- Patient reported "seeing things that are not there" roughly two weeks after losing vision in the left eye (around the time of initial scleral fit for right eye).
- For example: papers on the kitchen counter, multiple rocking chairs, antique bicycles, parlor chairs, tables, and occasionally blankets on the ground in front of him. He would often try to walk around these things. Would sometimes see corn fields on the side of the street where buildings actually were. He also reported seeing people standing around him, most notable was the 7 foot tall man wearing bib overalls or a checkered suit and a straw hat. He stated "I could be in the bathroom and he could be standing next to me."

Treatment and Management

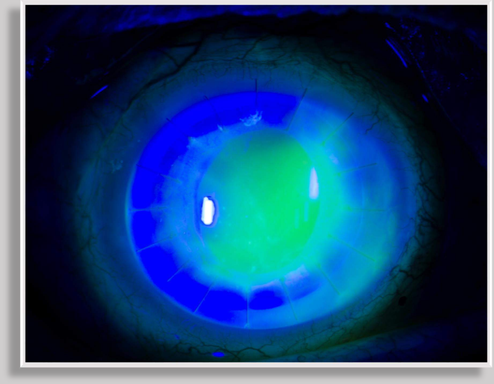


Image 2: Intermediate Lens 1; Bearing on graft-host junction

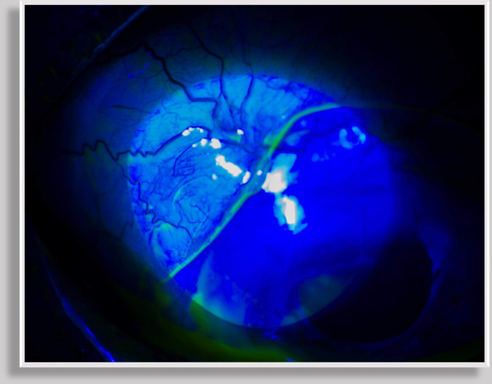


Image 3: Intermediate Lens 2; Bleb prolapse

TABLE 2	Initial Lens	Intermediate Lens 1	Intermediate Lens 2	Final Lens
Brand	Digiform N1	Digiform N1	Digiform N1	Digiform N1
Base Curve	7.60	7.60	7.60	7.60
Diameter	14.8	14.8 with 1.0 truncation	14.8 with 1.0 truncation	14.8 with 1.0 truncation
Power	-3.00 sph	-3.00 sph	-3.00 sph	-3.00 sph
Lens	Acuity 100 Ice Blue	Acuity 100 Ice Blue, Plasma treatment	Acuity 100 Ice Blue, Plasma treatment	Acuity 100 Ice Blue, Plasma treatment
Thickness	0.22	0.22	0.18	0.18
Additional	Dot located at steep edge (3:00) Steep bottom, flat top	TF/truncation sup/temp Dot at 6:00, 1.5 Prism	TF/truncation sup/temp w/ more truncation 10-11:00 Dot at 6:00, 2.0 Prism PC1 enhanced to avoid GHJ	TF/truncation superiorly. Dot at 6:00, 2.0 Prism PC1 enhanced to avoid GHJ
Comments	Impinging bleb at 9:30 to 10:30. Edge lift under inferior edge of bleb allowing fluid exchange. 200-300µm central vault and clearance of GHJ.	Bearing on 5-7:00/11:00 GHJ. Fast fluid exchange at gap under bleb. Mild prolapse of bleb over notch but no impingement Good central clearance	200µm central vault. Close to inferior GHJ but clears-some interaction. Slower fluid exchange 9:00 Mild bleb prolapse over notch superiorly (may be difficult to resolve due to eyelid)	300µm central vault. Clears GHJ. Minimal exchange at 9:00. Mild bleb prolapse superiorly, but minimal blood vessel misdirection
Modifications	Will order w/ notch as drawn on lens. Dot will be put at 6:00	Will enhance PC1 to avoid GHJ. Increase truncation 10-11:00	Further adjust PCs to avoid GHJ.	None!

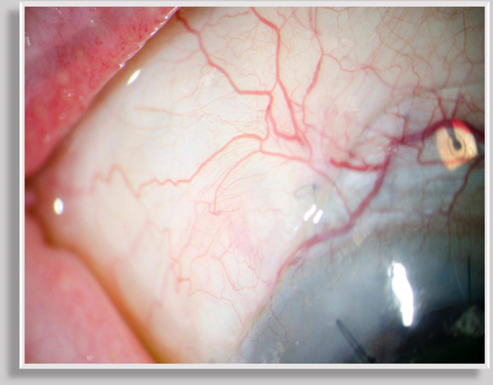


Image 4: Intermediate Lens 2; Bleb prolapse

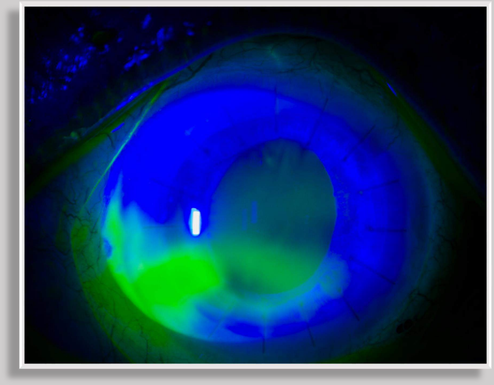
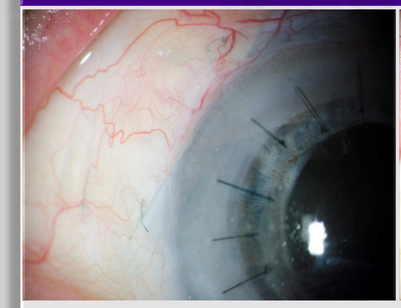


Image 5: Intermediate Lens 2; Slow tear exchange below bleb

Treatment and Management



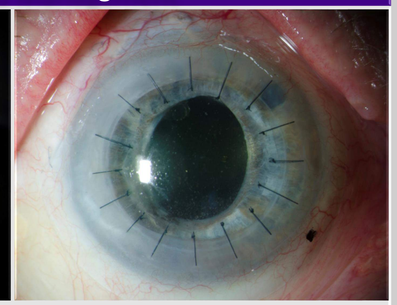


Image 6: Final lens; Minimal bleb prolapse

Image 7: Final lens overall fit

- The final lens has 300µm central vault, no interaction with the graft-host junction, trace bleb prolapse, and results in 20/40 VA (improved from 20/350).
- With the lens in place he no longer has symptoms of Charles Bonnet and is able to lead a functional life again.
- The patient does require family members to help with insertion and removal daily; due to the strain this has on the family, the long-term goal is to get the patient back into glasses with careful manipulation of the PKP.
  - At the most recent appointment, it was determined that suture removal may be started in attempts to normalize corneal topography. Image 8 shows the topography of the right eye prior to removal of sutures.
  - A manifest refraction was also taken into account when deciding which sutures were most appropriate to be removed.

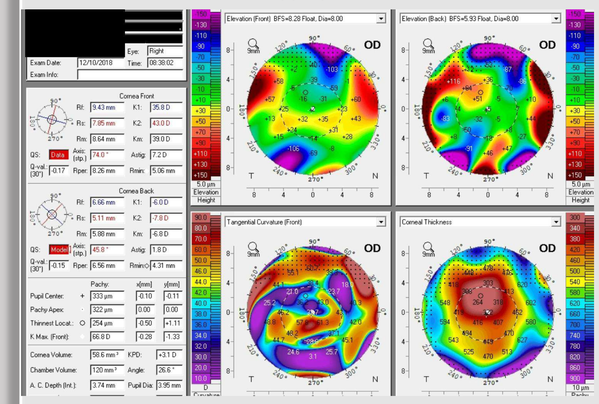


Image 8 : Pentacam topography of the right eye prior to suture removal. These scans show irregular corneal contour with high induced astigmatism

- A total of seven sutures were removed along the steepest meridians in order to reduce the irregularity of graft contour as the graft-host junction continues to heal.
  - This normalization will ideally reduce the patient's dependence on the scleral lens.

Discussion and Conclusion

This case is interesting because it emphasizes just how significant scleral lenses can be in improving patient's quality of life. Prior to this lens the patient was unable to perform any of his typical activities of daily living. Given the sudden loss of vision in the fellow eye, it was important to complete the fit quickly yet carefully. Familiarizing ourselves with the various ways scleral lenses may be modified can streamline the fitting process. In addition, consultants can serve as an invaluable resource when it comes to adjusting some of the more complicated fits. If we educate ourselves and use the resources available to us, it is possible to be successful in restoring sight to even our most challenging patients.

Acknowledgements

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References

Available upon request