

Glaucoma Surgical Technique Modifications for Patients Wearing Scleral Lenses

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Background

- **Ocular surface disease (OSD) occurs independently with glaucoma or as a result of glaucoma therapy.^{1,2}**
- **Concurrent OSD contributes to the poor quality of life in patients with glaucoma.³**
- **Scleral lenses play an important role in the management of OSD and irregular corneas.⁴ The Prosthetic Replacement of the Ocular Surface Ecosystem (PROSE) device is a scleral lens that utilizes computer-aided design and manufacturing program to create a customized fit.⁵**
- **In eyes with glaucoma drainage implants (GDI) with anterior chamber tube shunt, the architecture of sclera may change as a result of surgical technique or may deteriorate due to complications associated with GDI.⁶**
- **Cases of scleral lens wearing patients with GDI have been reported where fittings have been more challenging.⁷**

Purpose

- **To describe the challenges of fitting PROSE scleral lenses in patients with glaucoma drainage implant (GDI)**
- **To describe the surgical management of patients with the concurrent need for GDI and PROSE devices**

Methods

- **A retrospective case series of 6 patients requiring both PROSE lens wear for OSD and/or irregular corneas and Baerveldt glaucoma implant (BVI) for intraocular pressure (IOP) control.**
- **Group A consisted of 2 patients where PROSE lens wear was precluded by the modified scleral surface following anterior chamber (AC) tube shunt placement.**
- **Group B consisted of 2 patients where previously placed GDI led to challenging lens fittings.**
- **Group C consisted of 2 PROSE lens wearing patients who needed glaucoma surgery and were able to continue lens wear after GDI placement in the pars plana (PP).**
 - **With this procedure, the tube was inserted into PP through a tract 3.0 to 3.5mm from corneal limbus formed by a 23-G needle.**

Results

- **Group A**
 - Patient 1: PROSE lens cannot be fitted due to elevation of scleral patch graft adjacent to corneal limbus.
 - Patient 2: Two AC tube shunts located superotemporal and superonasal cause lens edge lift resulting in air bubble formation (Figure 1).
- **Group B**
 - Patient 3: OD, Edge of scleral patch graft is 1mm from corneal limbus resulting in the PROSE lens overlaying the graft (Figure 2).
 - Patient 3: OS, With scleral patch graft 2mm from corneal limbus, the edges of the graft and PROSE lens are in contact (Figure 3).
 - Patient 4: Edges of the scleral patch graft and PROSE lens are in contact. Scleral patch graft is 2mm from corneal limbus (Figure 4).
- **Group C**
 - Patient 5 (Figure 5) and 6: Tube shunt was inserted 3.0 to 3.5mm from corneal limbus into PP. The ocular surface upon which the PROSE lens rests is not altered significantly.

Results: Two Anteriorly-Placed Tube Shunts Prevent Good PROSE Scleral Lens Fit

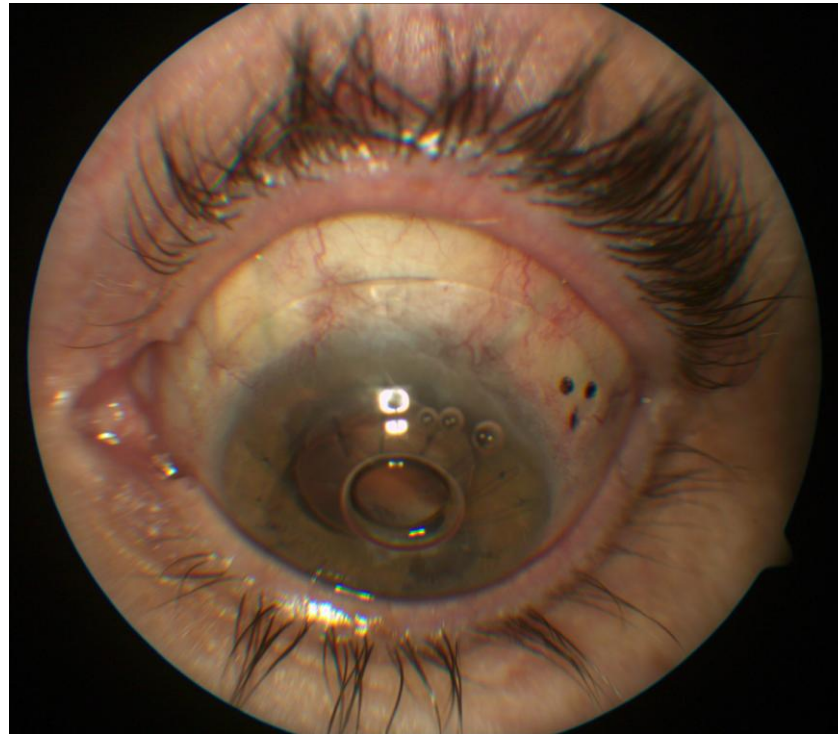


Figure 1: Patient 1 was unable to wear the PROSE lens for an extended amount of time due to persistent bubble formation that disrupts vision and causes discomfort. The bubbles are introduced into the lens due to the lack of an adequate seal of the lens with the ocular surface.

Results: Compromised Fit with Anterior Patch Graft

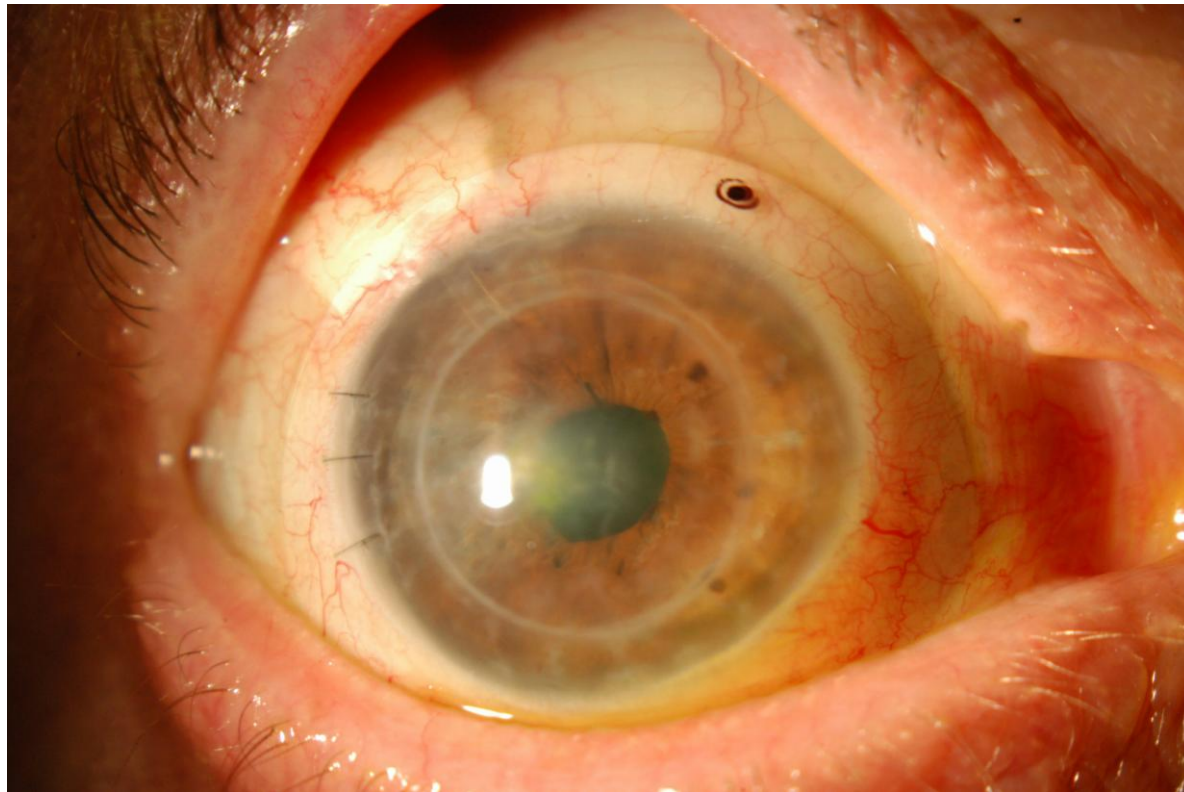


Figure 2: The PROSE lens overlays a section of the anterior placed scleral patch graft. Occasional debris intrusion under the lens causes blurry vision and some mild discomfort during wear. Re-cleaning the lens through the day is necessary.

Results: Compromised Fit with Anterior Patch Graft

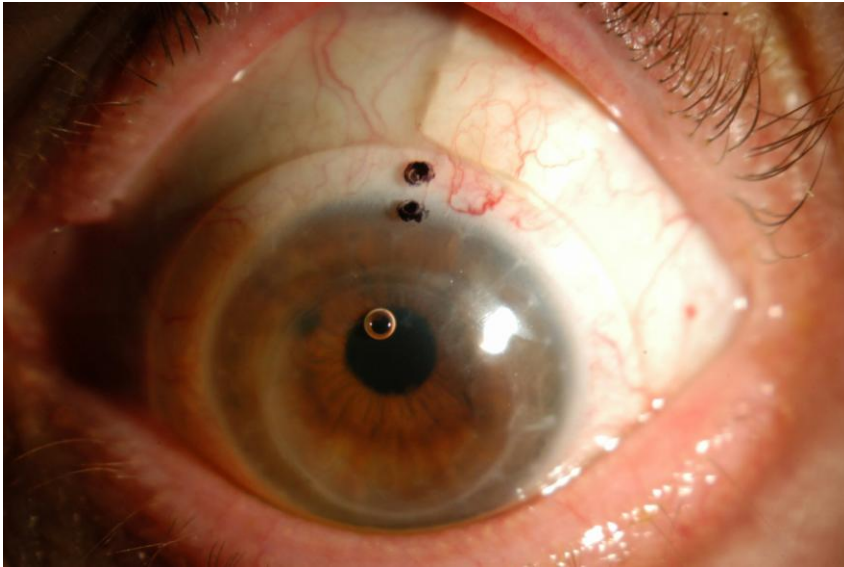


Figure 3: The PROSE lens is adjacent to scleral patch graft. The patient must be monitored closely for conjunctival erosion, inflammation, and possible infection.

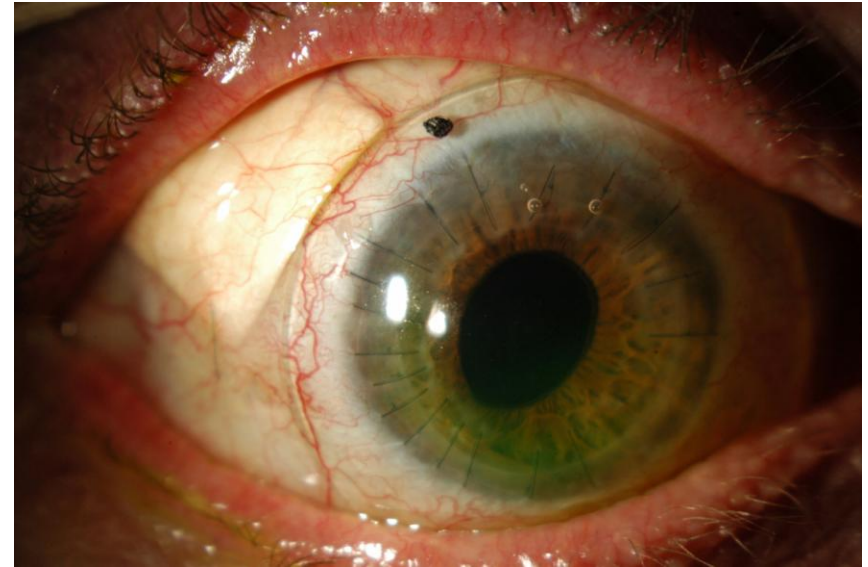


Figure 4: PROSE lens touches edge of scleral patch graft. With this patient, debris accumulation within the lens and discomfort inhibit prolonged lens wear.

Results: Good PROSE Lens Fit with Pars Plana Tube

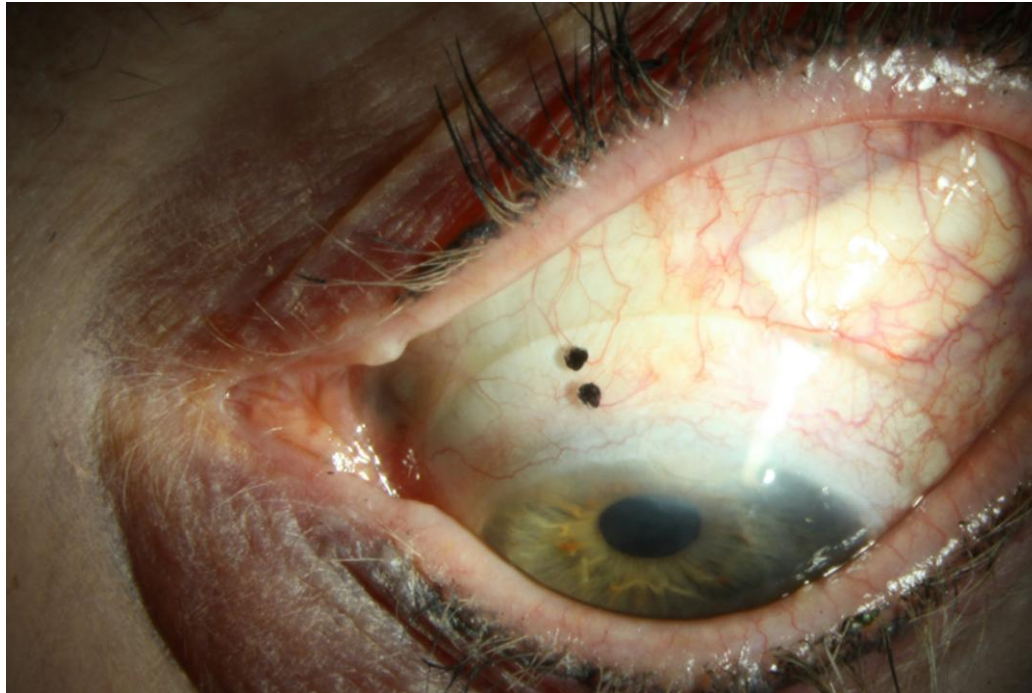


Figure 5: With the PP tube shunt, the posteriorly-placed scleral patch graft does not overlay the scleral surface near the corneal limbus. The PROSE lens can be fitted without much interference by the graft. The edges of the PROSE lens and the scleral patch graft have minimal contact.

Discussion

- **Irregularity of the conjunctival surface introduced by the presence of AC tube shunt and scleral patch graft prevents the PROSE lens from achieving a complete seal with the ocular surface.**
- **Poor or compromised fitting of the PROSE lens may cause patient discomfort and may affect daily lens wear.**
- **In situations where the anterior patch graft is in contact with the PROSE lens, there is increased risk for infection, inflammation, and erosion of conjunctiva overlying the scleral patch graft.**
- **With the pars plana approach for aqueous shunt implantation, the ocular surface near the corneal limbus is not disrupted by the tube shunt or scleral patch graft, allowing better PROSE scleral lens positioning and fitting.**

Conclusion

- **Anterior chamber tube placement with anteriorly-placed scleral patch graft can hinder proper lens fit and may interfere with lens wear.**
- **Pars plana Baerveldt glaucoma implant with posteriorly-placed scleral patch graft should be considered for PROSE scleral lens dependent patients.**
- **Pars plana BVI has been shown to appropriately achieve target IOP and have comparable IOP control to anterior chamber BVI.^{8,9}**

References

1. Garcia-Feijoo J, Sampaolesi JR. A multicenter evaluation of ocular surface disease prevalence in patients with glaucoma. *Clin Ophthalmol*. 2012;6:441–6.
2. Mathews PM, Ramulu PY , Friedman DS, Utine CA, Akpek EK. Evaluation of Ocular Surface Disease in Patients with Glaucoma. *Ophthalmology*. 2013 Nov;120(11):2241-8.
3. Skalicky SE, Goldberg I, McCluskey P. Ocular surface disease and quality of life in patients with glaucoma. *Am J Ophthalmol*. 2012 Jan;153(1):1-9.e2.
4. Jacobs DS. Update on scleral lenses. *Curr Opin Ophthalmol*. 2008 Jul;19(4):298-301.
5. Rosenthal P, Cotter J. The Boston Scleral Lens in the management of severe ocular surface disease. *Ophthalmol Clin North Am*. 2003 Mar;16(1):89-93.
6. Minckler DS, Francis BA, Hodapp EA, Jampel HD, Lin SC, Samples JR, Smith SD, Singh K. Aqueous shunts in glaucoma: a report by the American Academy of Ophthalmology. *Ophthalmology*. 2008 Jun;115(6):1089-98.
7. Tanhehco T, Jacobs DS. Technological Advances Shaping Scleral Lenses: The Boston Ocular Surface Prosthesis in Patients with Glaucoma Tubes and Trabeculectomies. *Semin Ophthalmol*. 2010 Sep-Nov;25(5-6):233-8.
8. Kolomeyer AM, et al. Pars plana Baerveldt tube insertion with pars plana vitrectomy for refractory glaucoma. *Oman J Ophthalmol*. 2012 Jan;5(1):19-27.
9. Rososinski A, Wechsler D, Grigg J. Retrospective review of pars plana versus anterior chamber placement of Baerveldt glaucoma drainage device. *J Glaucoma*. 2013 Jun 18. [Epub ahead of print]