

Scleral Contact Lens Management of a Case of Irregular Corneas Secondary to Chemical Burns

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Abstract

A 67 year-old female was referred by ophthalmology for a scleral gas permeable (GP) contact lens fitting secondary to irregular corneas from chemical burns that occurred during a complicated cosmetic rhytidectomy nine years prior. Scleral GP contact lenses have become the method of choice for providing optimal visual correction and comfort in patients with irregular corneas because their unique design allows them to vault over surface abnormalities and rest on the scleral providing a stable platform.

Case History

• Patient Demographics

- 67 year-old white female

• Chief Complaint

- Referred for a scleral GP lens fitting due to longstanding blurry vision in both eyes after getting chemical burns during a complicated cosmetic rhytidectomy nine years earlier.

• Ocular History

- Descemet's Stripping Endothelial Keratoplasty (DSEK) and cataract extraction with a posterior chamber intraocular lens implant (PCIOL) OS in 2009.
- Inadequate vision and comfort with prior corneal GP lenses.
- Dry eye syndrome with meibomian gland dysfunction and blepharitis.

• Ocular Medications and Therapies

- Restasis 1 gtt BID OU / Refresh Gel 1 gtt QHS OU / Refresh PF 1 gtt PRN OU / Warm compresses and lid scrubs QHS OU

Clinical Findings

• Distance VA SC

- OD 50/60+1 and OS 20/200

• MRx with Distance VA

- OD -0.50 -5.50 X 018 (20/40) and OS -3.25 -6.00 x 016 (20/70)

• Simulated Keratometry

- OD 44.40 / 50.70 @ 96.2 and OS 47.10 / 57.10 @ 104.6

• Pachymetry

- OD 526µm and OS 629µm

• Biomicroscopy

- Lids, Lashes, and Conjunctiva
 - Mild debris on the lashes OD and OS / Capped meibomian glands OD and OS / Concretions on the palpebral conjunctiva OD and OS

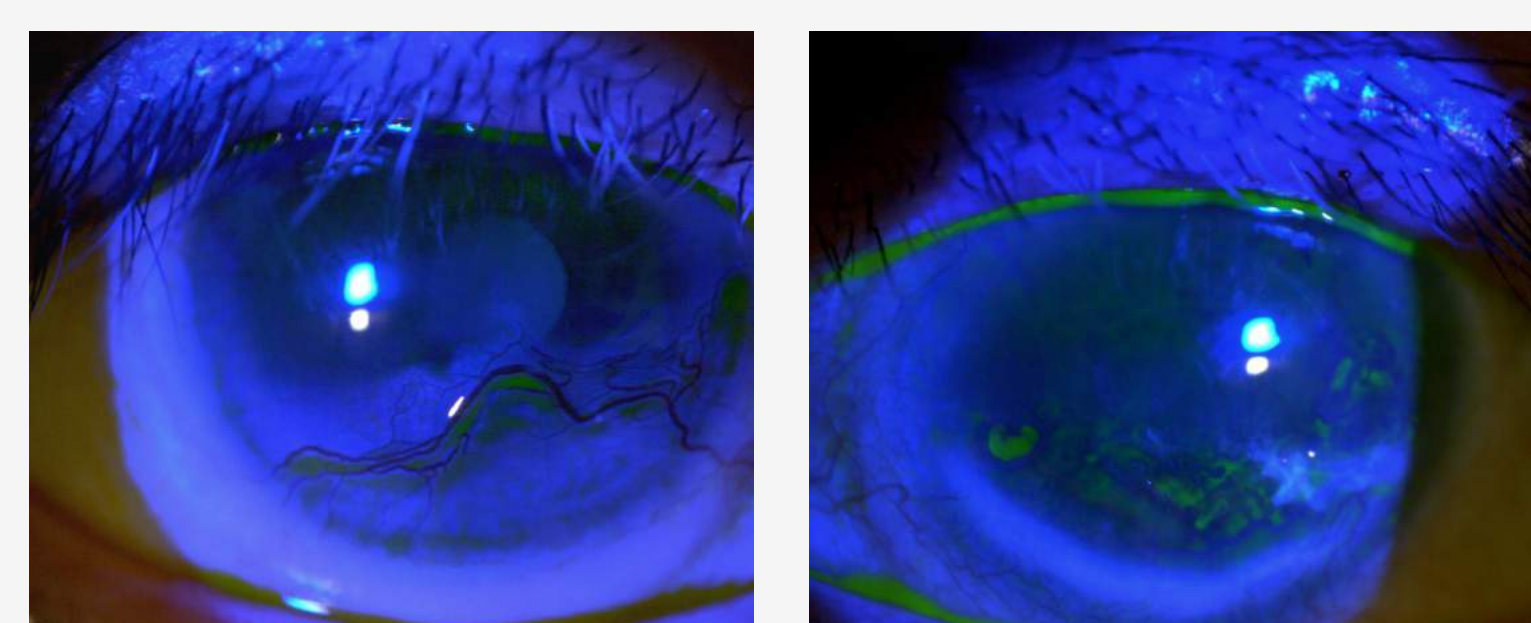
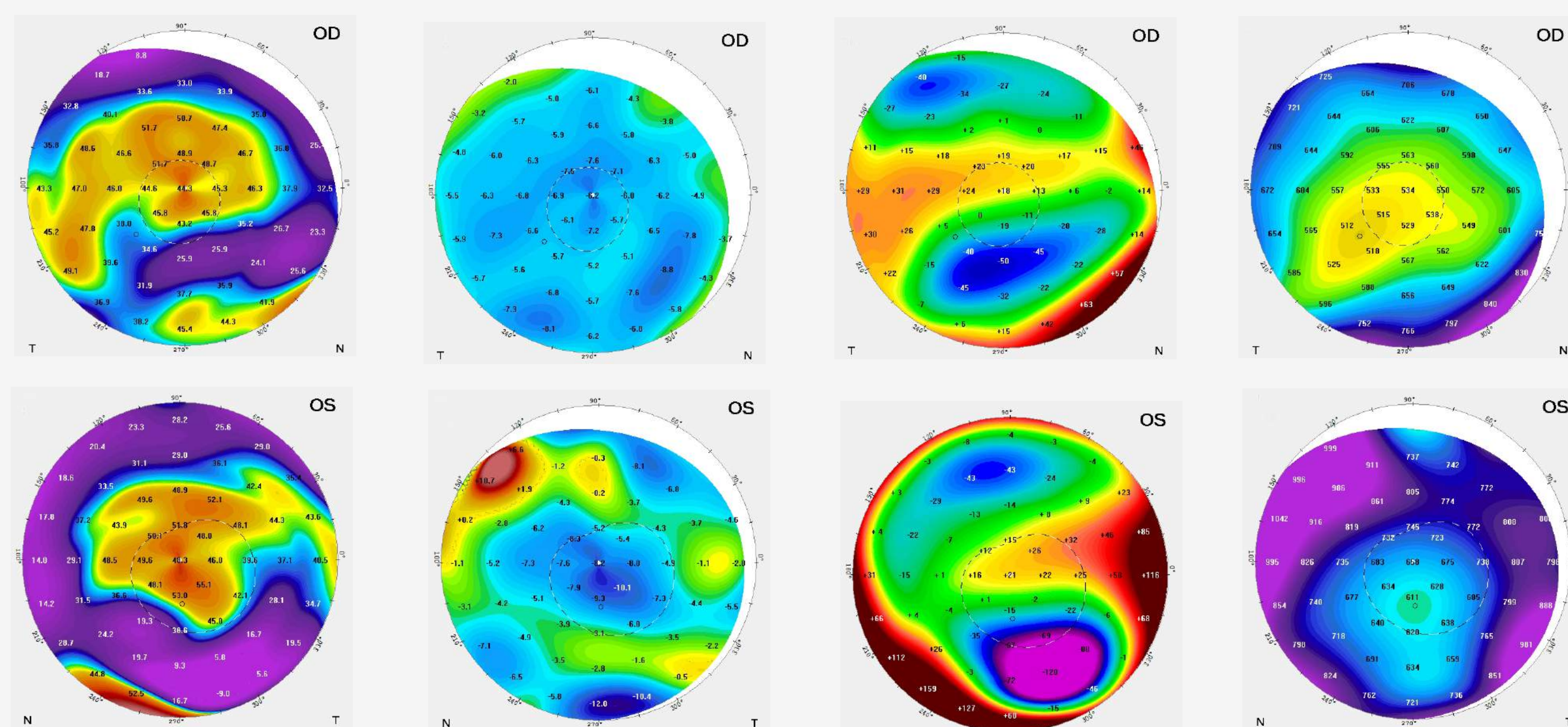


Figure 1: Severe neovascularization, pannus, and stromal haze, with areas of positive and negative NaFL staining OD and OS. Note the NaFL pooling in the nasal dellen OS.

• Biomicroscopy (continued)

- Cornea
 - OD: 2-3+ neovascularization and pannus extending from 3:00-7:00 / 1+ stromal opacification / Endothelial pigmentation / Hudson-Stahli Line / Scattered positive and negative punctate staining with NaFL / Instantaneous TBUT
 - OS: 2+ neovascularization and pannus extending from 3:00-8:00 / 2+ stromal opacification / Moderate sized nasal dellen / Hudson-Stahli Line / Scattered positive and negative punctate staining with NaFL / Instantaneous TBUT / DSEK
- Lens
 - OD: 1+ nuclear sclerotic cataract
 - OS: PCIOL well centered with mild inferior opacification



Front Tangential Curvature Back Tangential Curvature Front Elevation Corneal Thickness

Figure 2: Corneal topographic maps taken with OCULUS Pentacam®.

Discussion

Scleral GP lenses have become the preferred choice for management of both irregular corneas and ocular surface disease. Because they vault the cornea, they are able to neutralize irregularities and improve vision in a way that corneal GP and soft lenses cannot. In addition, the fluid reservoir bathes the cornea in saline, promoting surface health.¹⁻² High patient satisfaction has been reported with these lenses because of improvement in visual function and more comfortable wearing time.²⁻³

Careful attention was given during the fitting process to not exacerbate the corneal dellen in her left eye because it has been shown that rigid lens mechanical interaction with irregular corneal architecture can lead to microtrauma, epithelial and anterior stromal disruptions, and inflammation.⁴ A high oxygen permeable material was chosen, and the patient was educated to clean and re-apply her contact lenses mid-day with fresh saline to improve comfort and vision. It has been shown that stagnation of the reservoir may lead to punctate epithelial keratopathy, ischemia, and edema, so fresh fluid can provide additional oxygen supply⁵ to prevent these problems as well as graft complications.

Discussion (continued)

Although few studies have investigated the interaction of scleral lenses with the corneal tissue after endothelial keratoplasties, studies by Barnett et al. and Severinsky et al. have shown these lenses to be a safe and effective option for managing post-penetrating keratoplasty (PK) patients.⁶⁻⁷ Corneal clarity is dependent upon healthy endothelial cells and maintaining a high endothelial cell density is imperative after transplantation because these cells cannot proliferate. Many surgeons use larger graft diameters with endothelial keratoplasties compared to PKs that allows for a larger area of healthy donor endothelial cells to maintain a high cell density.⁸

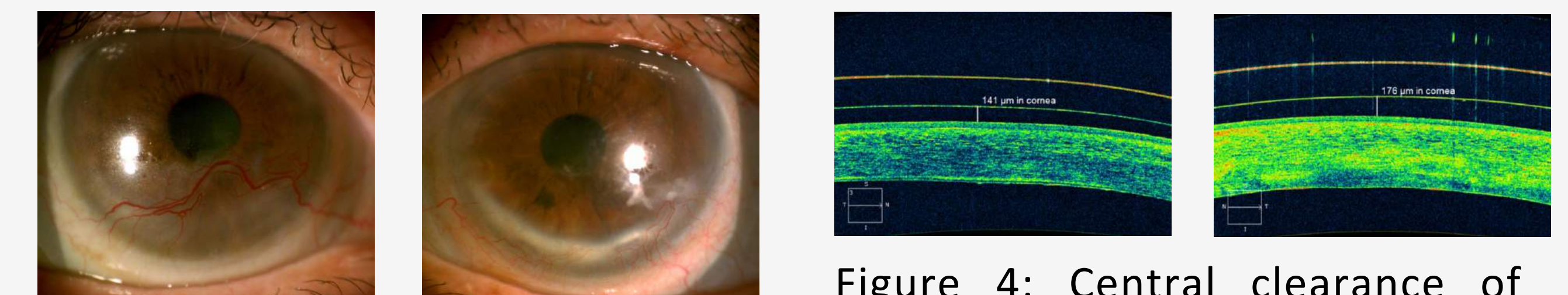


Figure 3: The patient wearing X-Cel Atlantis™ Scleral GP lenses OD and OS.

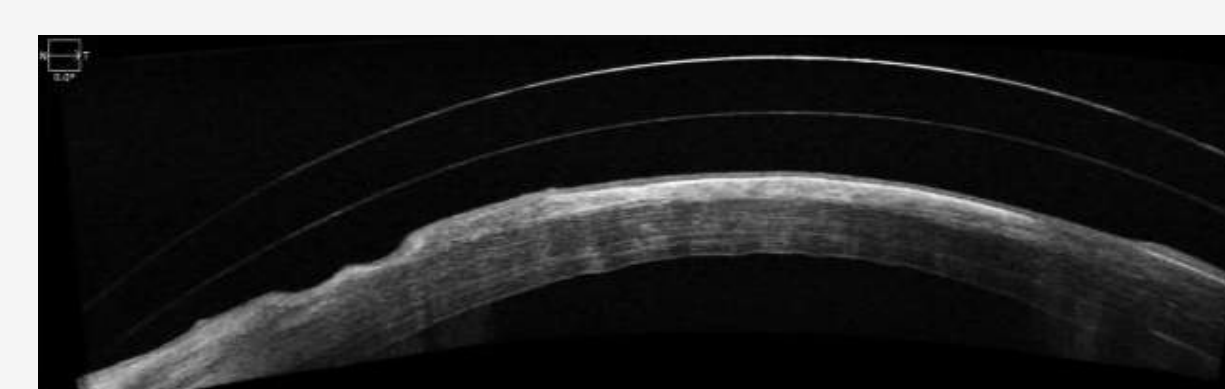


Figure 5: Wide view of the scleral lens over cornea OS.

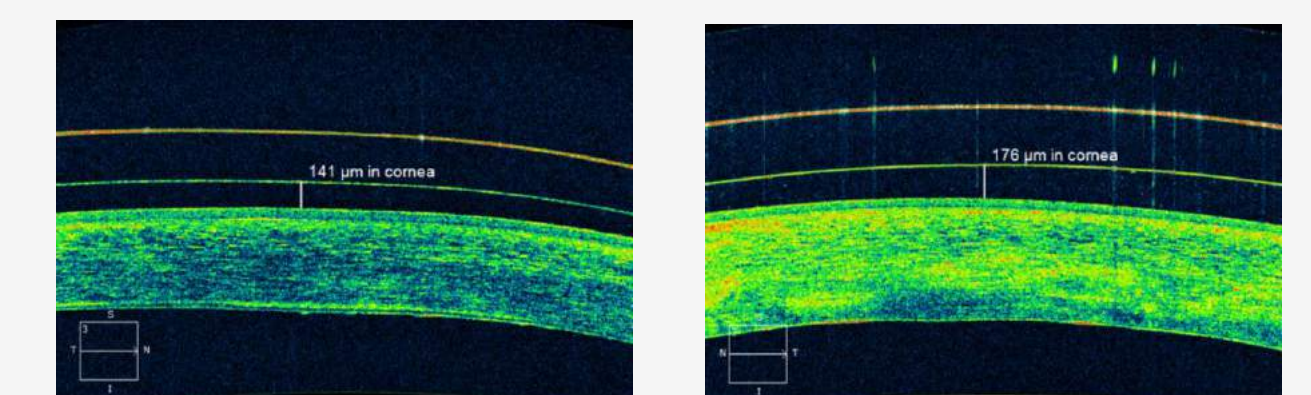


Figure 4: Central clearance of 141µm OD and 176µm OS.

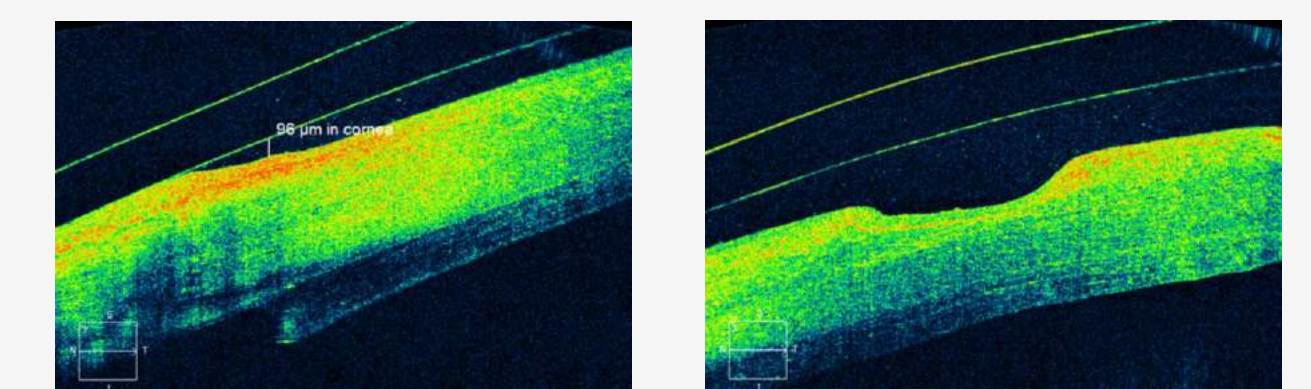


Figure 6: Nasal clearance of 96µm over the DSEK graft OS. Adequate clearance for the corneal dellen OS.

Treatment and Management

- The patient was successfully fit with X-Cel Atlantis™ Scleral GP lenses with Contamac™ Optimum Extreme material OU utilizing anterior segment optical coherence tomography (OCT). Her distance VAs improved to 20/25 OD and 20/30 OS and she will be using spectacles over her contact lenses for near vision activities.
- The patient's cleaning regimen includes Clear Care® in the evenings, Boston Simplus® mid-day, and filling the bowl of the lens with PuriLens™ preservative free saline.
- The patient was instructed to continue seeing her ophthalmologist every 3 months. She was asked to return for a contact lens follow-up in 6 months.

Conclusion

- Irregular corneas can reduce visual acuity enough to severely impact a patient's quality of life. Soft and corneal GP lenses cannot provide the acuity and/or comfort expected by our patients. That is why scleral GP lenses have become the mainstay in treatment of these conditions.

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