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Utilizing Scleral Lenses to Address Ocular Complications of Acoustic Neuroma Resection

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Introduction

Acoustic neuromas are tumors which arise from the 8th cranial nerve. The 8th cranial nerve exits the brain in close proximity with the 5th, 6th, and 7th cranial nerve. Thus, it is common to have ocular complications as a result of an acoustic neuroma and from its surgical removal.¹ Common ocular sequelae include neurotrophic keratitis due to damage to the trigeminal nerve and incomplete lid closure, decreased lacrimal secretion, and poor lid apposition from damage to the facial nerve.² Neurotrophic corneas may require lifelong lubricants, may have recurrent ulceration, and can result in corneal perforation requiring corneal surgery. Patients who undergo corneal transplantation often require the use of corneal lenses in order to address poor vision after surgery secondary to induced astigmatism and anisometropia.³

Case History and Pertinent Details

A **62 year-old Caucasian female LL** presents for a scleral lens fitting in the right eye due to a history of neurotrophic keratitis secondary to acoustic neuroma resection.

Ocular History: History of neurotrophic keratitis and lagophthalmos in the right eye secondary to acoustic neuroma removal. She is status post penetrating keratoplasty and tarsorrhaphy in the right eye.

Medical History: Acoustic neuroma resection

Exam Findings	Right eye (OD)	Left eye (OS)
Visual Acuity	20/400	20/30
Anterior Segment	<ul style="list-style-type: none">LagophthalmosEntropion lower lidTrichiasis lower lidMadarosis temporalConjunctochalasis nasalCorneal graft with sutures 360Scarring and thinning of inferior corneaPunctate epithelial erosions inferior cornea	<ul style="list-style-type: none">Unremarkable

Discussion

Scleral lenses were the preferred option for our patient to vault the irregular cornea, address the neurotrophic keratitis, and provide good vision. While gas permeable (GP) lenses can be an option after corneal transplantation, post-surgical corneas often have highly irregular surfaces which can lead to GP decentration and thus mechanical irritation, epithelial disruptions, and inflammation.³ In our patient's example, LL's corneal topography indicated 12.8D of astigmatism which makes her a poor candidate for GP lenses. In addition, due to our patient's dysfunctional blinking mechanism, a larger scleral lens can help to prevent desiccation of not only the cornea but the conjunctiva as well.

Our patient had predictable ocular findings as a result of the surgical removal of her acoustic neuroma. A study looking at ocular complications due to acoustic neuroma resection found that 38 of 62 (61.3%) patients had ocular symptoms postoperatively, with 37.1% requiring long term ocular lubricants, 32.3% requiring tarsorrhaphies, and 3.2% needing penetrating keratoplasties.² Of note, presence of lagophthalmos and/or corneal hyposthesia were risk factors for incidence and severity of corneal pathology.² Our patient presented with both of these risk factors which may explain the severity of her corneal pathology, thus requiring a penetrating keratoplasty.

Clinical Exam Findings

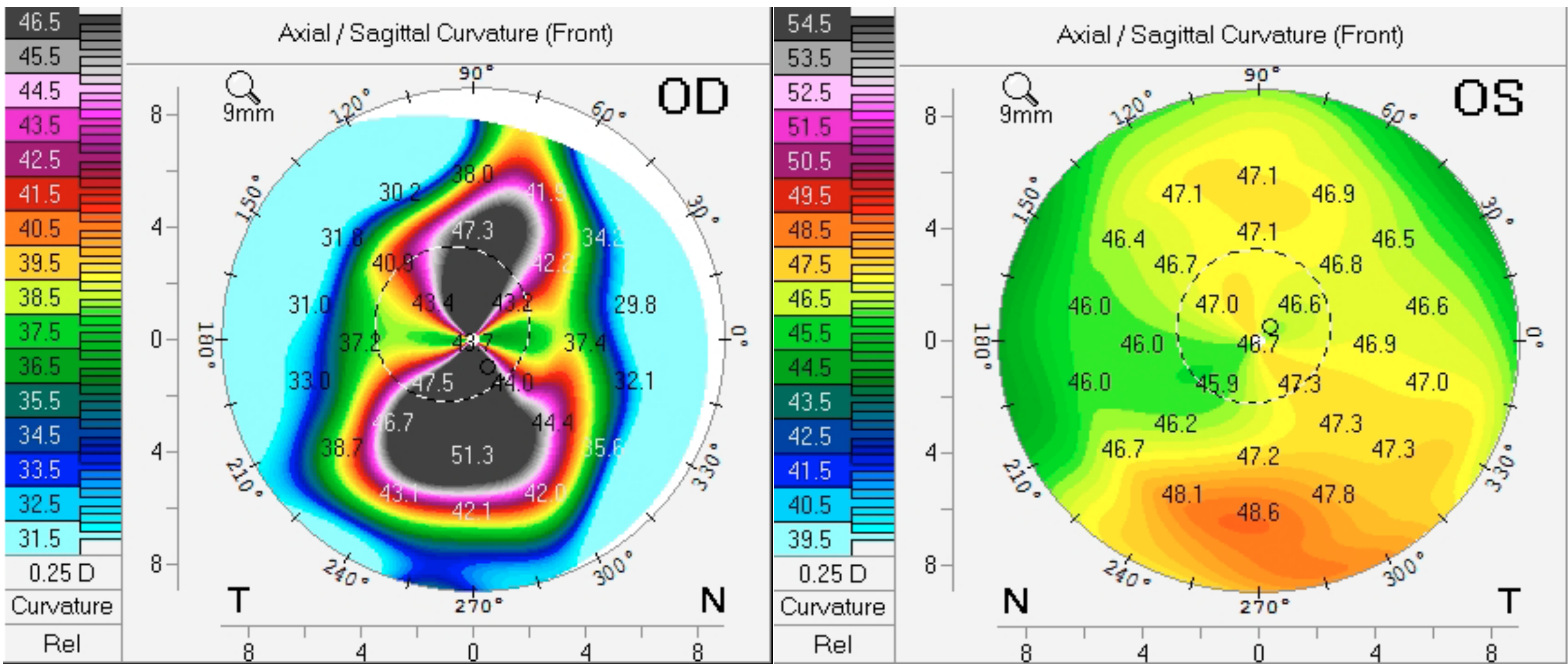


Figure 1. Pentacam corneal topography with excessive astigmatism in the right eye and normal corneal curvature in the left eye

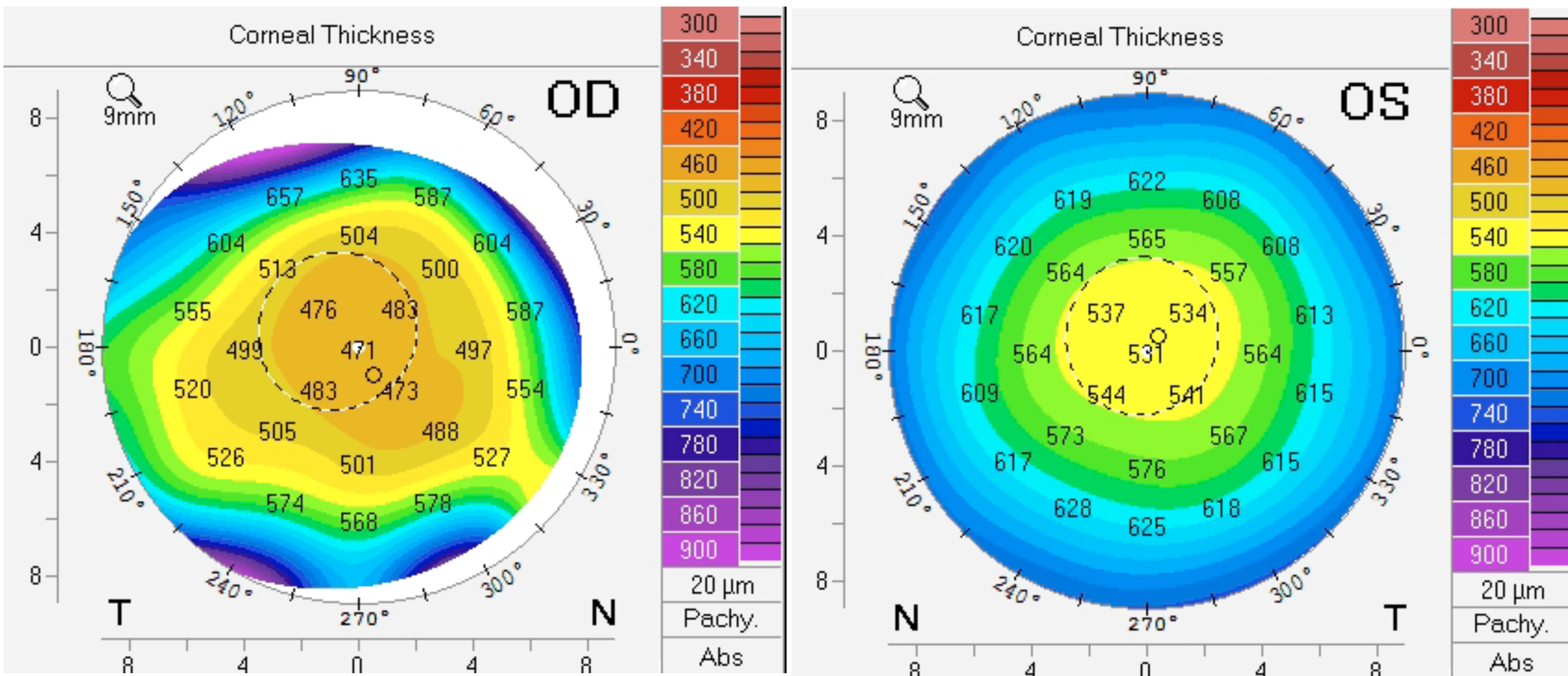


Figure 2. Corneal thickness map highlights thinner cornea centrally in location of graft in the right eye compared to patient's normal corneal thickness in the left eye

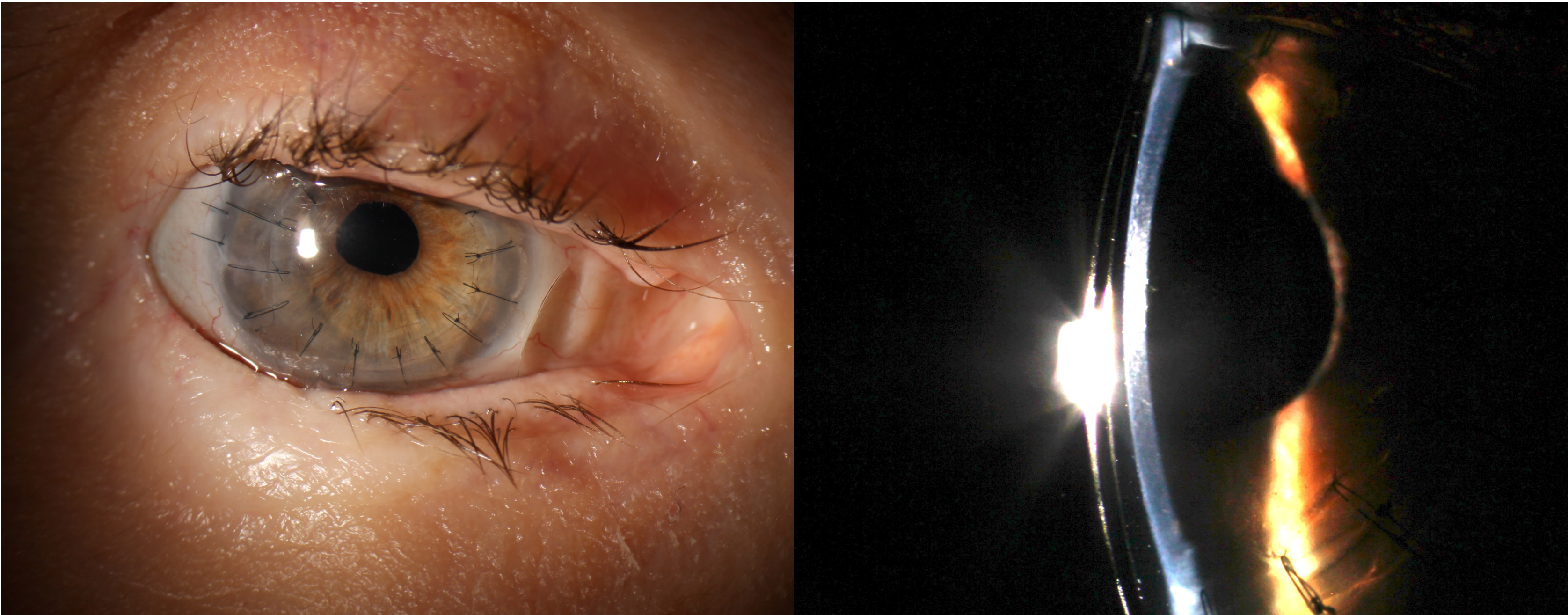


Figure 3. Slit lamp photos: external view (left) and optic section of scleral lens over central cornea (right).

Scleral Lens Fitting

Lens	Parameters	Lens Assessment	Visual Acuity	Modifications
Boston Sight (Trial)	Power: +0.25DS Diameter: 18.0mm Sag: 2600 um Base curve: 8.0	Excessive central clearance, limbal touch superior nasal/nasal, temporal lens decentration due to conjunctival bunching, poor wettability after 30 min of wear	20/40 Over-refraction: +3.75 DS	<ul style="list-style-type: none">- Decrease Sag- Smart channel- HydraPEG- Over-refraction
Boston Sight #1	Power: +4.00DS Diameter: 18.0mm Sag: 2070 um Base curve: 8.0 (+) Smart channel, HydraPEG	Adequate central clearance, limbal touch superior nasal, temporal decentration, nasal impingement of conjunctivochalasis	20/30 Over-refraction: +0.75 DS	<ul style="list-style-type: none">- Notch- Over-refraction
Boston Sight #2	Power: +4.75DS Diameter: 18.0mm Sag: 2070 um Base curve: 8.0 (+) Notch, HydraPEG	Adequate central clearance, limbal clearance 360, mild inferior decentration, trace edge lift 360	20/20- Over-refraction: +0.50 DS	<ul style="list-style-type: none">- Steepen peripheral curves- Over-refraction
Boston Sight #3	Power: +7.72DS Diameter: 18.0mm Sag: 2070 um Base curve: 8.5 (+) Notch, HydraPEG	Adequate central clearance, limbal clearance 360, good centration, alignment	20/20 Over-refraction: Plano DS	<ul style="list-style-type: none">- None

Comments: This fitting was particularly challenging due to the smaller aperture size and conjunctivochalasis which resulted in excessive temporal decentration of the lens. The decentration resulted in a false appearance of inadequate limbal clearance nasally as well as decreased visual acuity due to decentered optics. Although adding a notch solved the issue of decentration, depending on the size of the notch, it can also introduce unnecessary edge lift and reduced lens stability. Caution must be taken when adding a notch as to not introduce unwanted tear exchange, bubbles, and tear debris.

Conclusion

Scleral lenses can be a challenging but rewarding fit for patients with ocular complications secondary to acoustic neuroma resection. These lenses provide much improved vision in post-surgical corneas which often exhibit an irregular corneal surface. In addition, the lenses can address the ocular surface desiccation which is secondary to neurotrophic keratopathy. Lastly, in cases of entropion and trichiasis, scleral lenses provide a protective barrier for the cornea which helps to prevent epithelial defects and infections.

References

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- Mulhern, M. G., et al. "Ocular complications of acoustic neuroma surgery." British journal of ophthalmology 83.12 (1999): 1389-1392.
- Severinsky, Boris, et al. "Scleral contact lenses for visual rehabilitation after penetrating keratoplasty: long term outcomes." Contact Lens and Anterior Eye 37.3 (2014): 196-202.