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Scleral Lens Fitting in a Post-Keratoplasty Patient with Severe Visual Impairment

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BACKGROUND

Post-keratoplasty patients can present significant challenges for contact lens fitting due to changes in corneal shape, irregular astigmatism, and asymmetric graft-host junctions. These corneal changes can limit the effectiveness of spectacles and make traditional RGP lenses difficult for clinicians to fit or patients to tolerate. Scleral lenses provide an alternative for these patients by vaulting the irregular corneal surface and creating a stable refractive surface over the cornea. In patients with a history of corneal transplantation, lens design and fit must also be carefully evaluated to maintain adequate corneal and limbal clearance while avoiding contact with graft-host junctions. This case demonstrates the use of a customized toric scleral lens design in a patient with multiple corneal transplants, significant corneal irregularity, visual impairment, and previous RGP lens intolerance.

CASE DESCRIPTION

62-year-old female referred from low vision for scleral lens fitting.

CC: Poor distance vision, glare sensitivity, reduced contrast, and morning haze. Prior to scleral lens fitting, patient reported fluctuating vision OS secondary to corneal edema.

Ocular Hx: Multiple corneal transplants, chronic iridocyclitis, glaucoma, corneal edema, and severe visual impairment/legal blindness. Ocular Medications: Difluprednate BID OU; Simbrinza BID OU.

CL Hx: Approximately 40 years total of contact lens wear. Previous RGP wearer; discontinued wear in 2012 following two corneal ulcers and lens intolerance. Co-managed by both corneal and low vision services.

Entering VA: OD 20/500 (PH 20/300), OS HM, OU 20/400

Initial lens Parameters (customized toric scleral lenses in hyper dK material OU):

	BC (mm)	DIA (mm)	Sagittal Depth (µm)	Power (D)
OD	8.43	15.0	3000	+4.00
OS	9.00	15.0	3000	+6.00

Lens Assessment: OD showed 200 µm central clearance with adequate limbal clearance and no graft-host junction touch. OS showed 150 µm central clearance with adequate limbal clearance and no graft-host junction touch. No adjustments were needed.

Final VA: OD 20/60+, OS 20/100+, OU 20/70+. The patient reported good comfort and stable vision with the lenses. Due to her post-transplant status, she was instructed to remove the lenses every four hours and to use preservative-free saline for insertion.

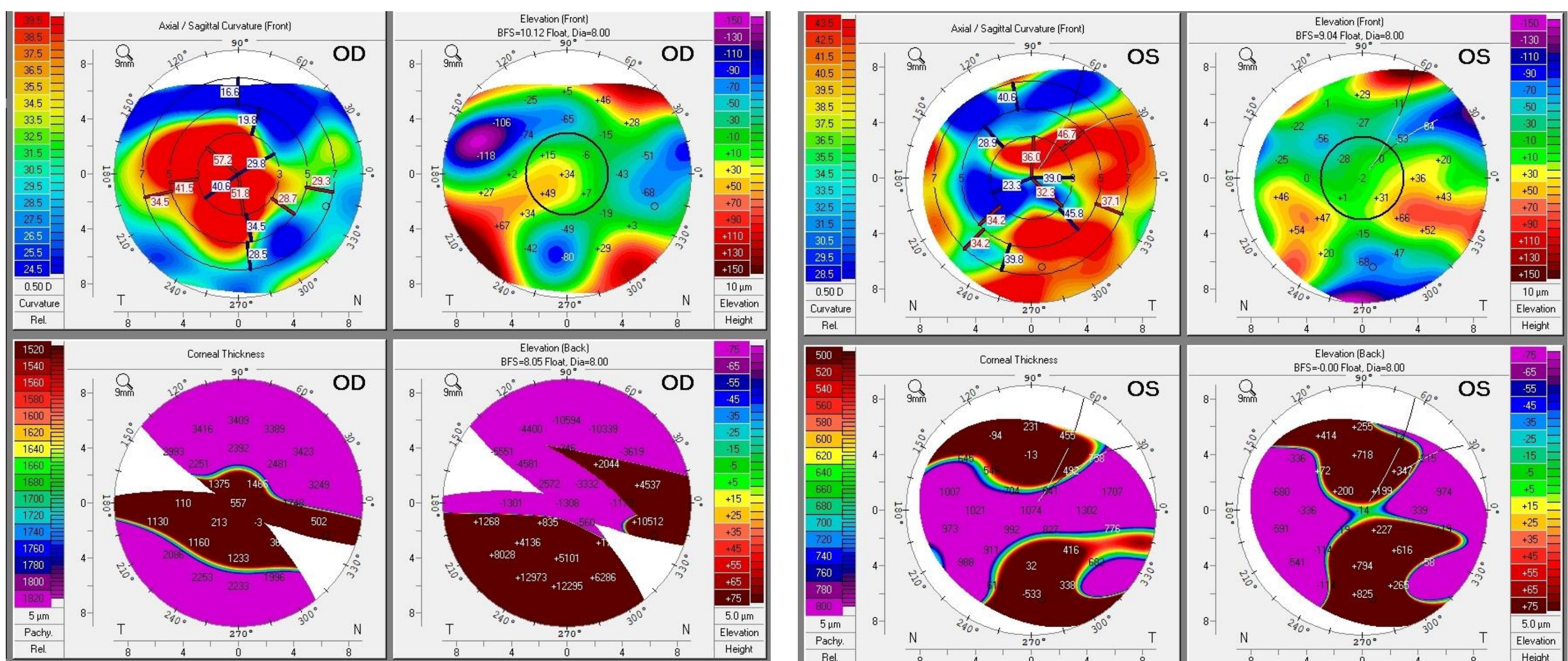


Figure 1. 4 Map Refractive Display of corneal topography demonstrating significant corneal irregularity and edema (Left Photo OD, Right Photo OS).

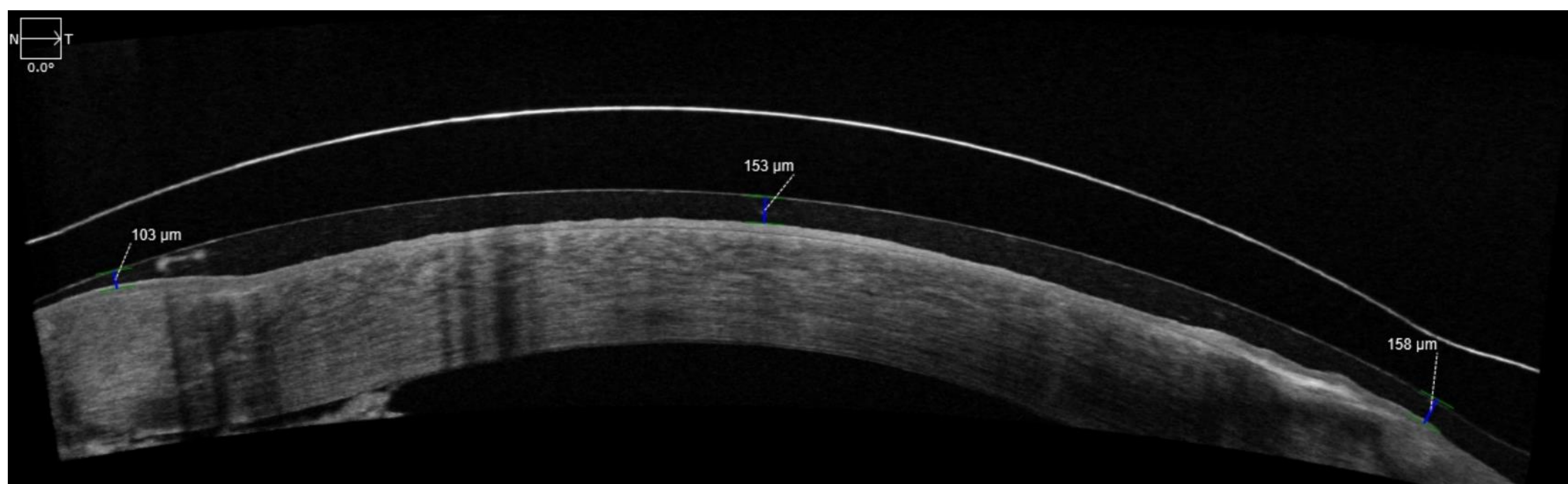


Figure 2. AS-OCT demonstrating the final scleral lens fit with approximately 153 µm of central clearance and adequate clearance over the limbal region. Low clearance optimized oxygen transmission while still avoiding the GHJ.

DISCUSSION

Fitting scleral lenses in eyes with multiple corneal transplants requires balancing visual improvement with protection of the transplanted cornea. Irregular corneal anatomy at the graft-host junction can make achieving consistent clearance more difficult. In this case, a 15 mm toric scleral lens design allowed the fit to be tailored to the individual corneal shape, as seen in the topographical analysis (Figure 1), while maintaining adequate corneal and limbal clearance (Figure 2) and avoiding graft-host junction touch (Figure 4). A small thin lens maximized oxygen transmission to the graft.

The relatively low sagittal depth was important in this case because adequate clearance could be achieved while accommodating the patient's relatively flat corneal profiles. The base curves were flattened to achieve optimal clearances over the central and graft host junction areas (Figure 2). The toric design also provided stable lens positioning, creating a consistent optical surface over the irregular corneas.

The patient demonstrated a substantial improvement in visual acuity despite severe baseline visual impairment, multiple corneal abnormalities, and previous RGP intolerance. Binocular VA improved from 20/400 to 20/70+ with good comfort and stability. Given her post-transplant status, lens wear instructions and continued monitoring were also important. The patient was instructed on limited wear time and use of preservative-free saline to support safe lens wear.

Figure 3. On-eye evaluation of the lens demonstrating good centration and even landing on the sclera

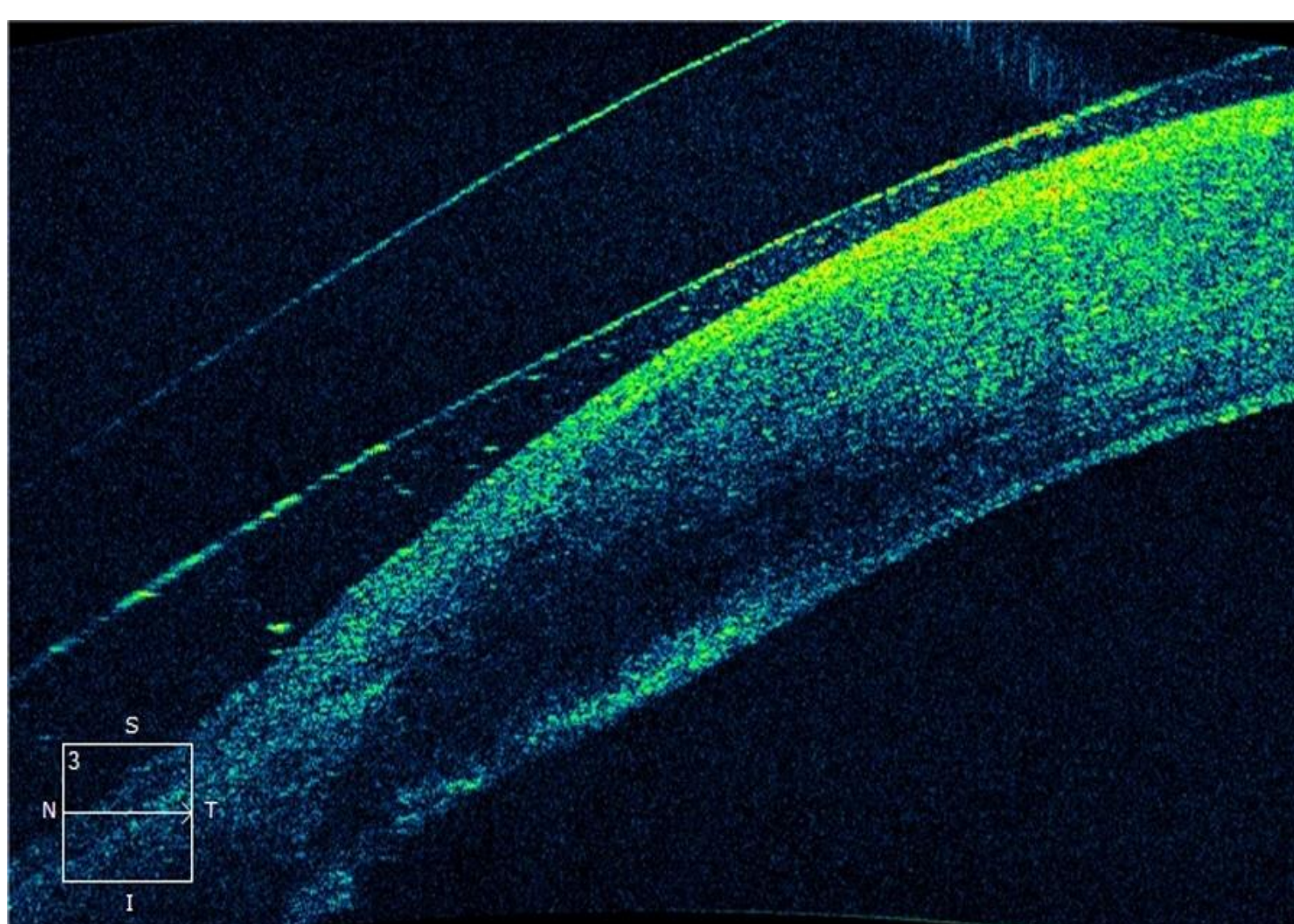
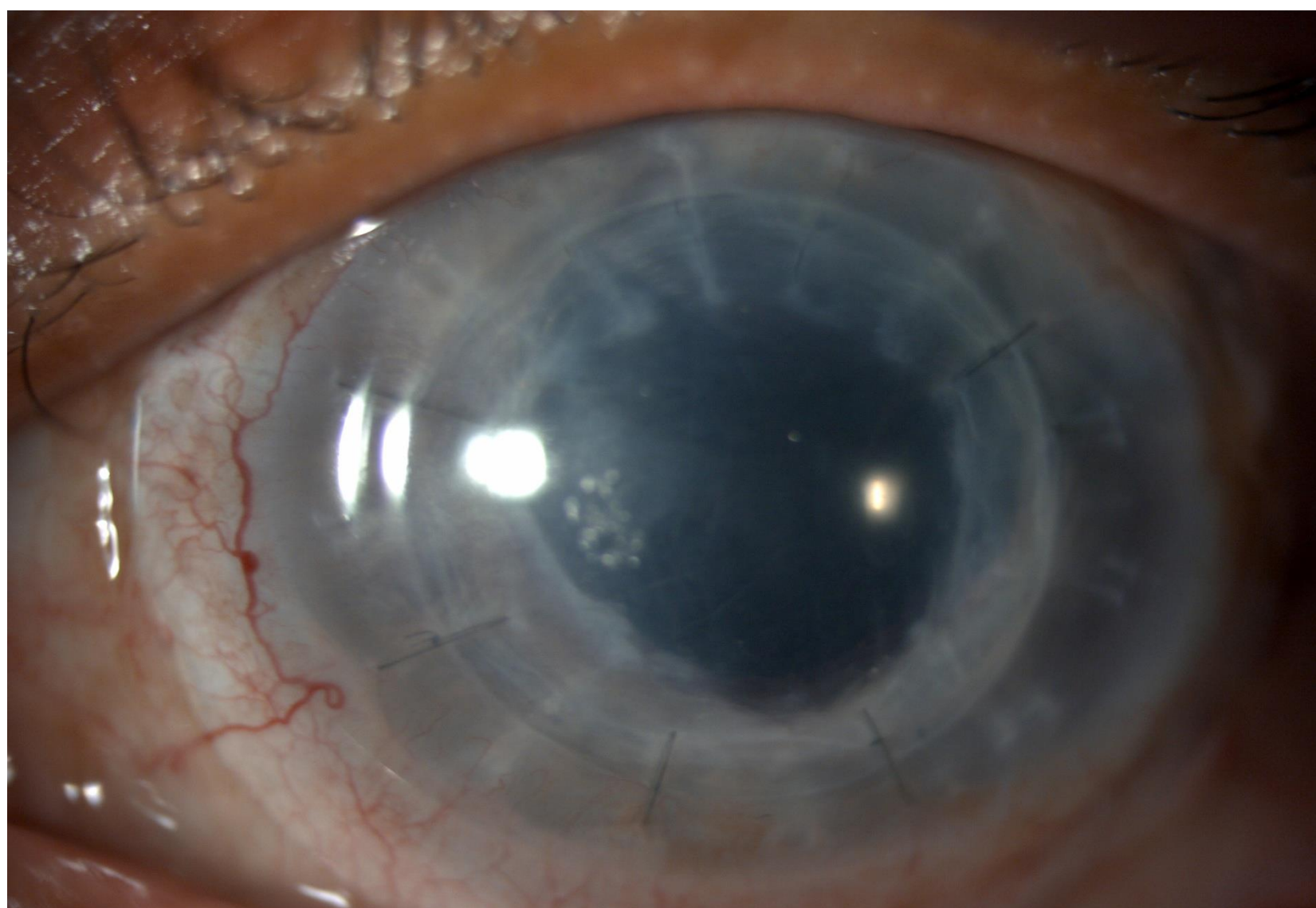


Figure 4. AS-OCT showing final lens with optimal clearance over graft host junction.

CONCLUSION

This case demonstrates the potential role of customized scleral lenses in patients with complex post-keratoplasty corneas and limited options for traditional contact lens correction. Despite severe baseline visual impairment and previous RGP intolerance, the patient achieved improved visual acuity with good comfort and lens stability.

The improved vision allowed her to enjoy running her marathons more, highlighting the potential visual benefit of providing a stable optical surface over an irregular post-keratoplasty cornea. Individualized fitting, careful evaluation of corneal and limbal clearance, and avoidance of GHJ touch were important to successful wear.

In post-transplant patients, successful scleral lens fitting also requires consideration of corneal physiology and appropriate patient education. Continued monitoring and proper lens-wear instructions are important to support long-term lens tolerance and ocular health.

REFERENCES & ACKNOWLEDGEMENTS

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