

Effect of Post-penetrating Keratoplasty Suture Removal on Corneal GP Lens Fitting

Jessica Sun, OD, FAAO and Katherine Zhang, OD, FAAO

BACKGROUND

This case evaluates the effect of topographic and refractive changes on corneal rigid gas permeable (RGP) lens fitting following removal of sutures s/p penetrating keratoplasty (PK). Corneal RGP lenses can significantly aid in visual rehabilitation following PK by masking irregular astigmatism and minimizing additional endothelial stress. However, fitting challenges can arise as a result of suture removal following surgery due to alterations in corneal shape. Although some patients can experience improvement in visual acuity and a reduction in refractive astigmatism after suture removal, this is not always the case.

CASE HISTORY

Demographics	JB, 38 year-old Hispanic female.
Chief Complaint	Presented for contact lens fitting 1 week after removal of exposed PK suture OD.
Ocular History	Keratoconus OU, s/p PKP OD in 2019
Ocular Medications	Pred Forte QD OD
Medical History	None

CLINICAL FINDINGS

Distance Visual Acuity (DVA)	OD	PH
DVA (sc) - prior to suture removal	20/30-2	20/25+1
DVA (sc) - after suture removal	20/80-1	20/40-1
DVA (cc MRx) - after suture removal	20/50+1	
DVA (cc RGP)	20/20-2	

Slit Lamp Evaluation	OD
Cornea	s/p PK with continuous running sutures, clear central button with 2 mm circumferential opacification along Graft-host junction (GHJ). 1 mm superior neovascularization.
Conjunctiva	Trace diffuse injection

TREATMENT & MANAGEMENT

- Diagnostic fitting with a prolate tri-curve intralimbal GP lens (10.8 mm diameter, 8.23 mm base curve) revealed good vision (20/20), comfort, and appropriate lens fitting relationship with fluorescein pattern evaluation 1 week after initial suture removal (Fig. 1)
- The patient underwent additional partial corneal suture removal OD and subsequent follow-up revealed a shift in topography with focal midperipheral steepening and a slight trend towards sphericalization (Fig. 2)
- Significant inferior decentration, poor comfort, and reduced vision (20/25) was noted with the initial lens two weeks after second suture removal. Refit with a steeper base curve (Table 1) improved vision, comfort, and overall lens position (Fig. 3)
- Additional changes to corneal morphology were observed in the following month with associated shifts in subjective lens comfort (Fig. 4 and 5)
- Topography pattern stabilized (Fig. 6) - bitoric GP lens design implemented to improve lens centration (Table 1)

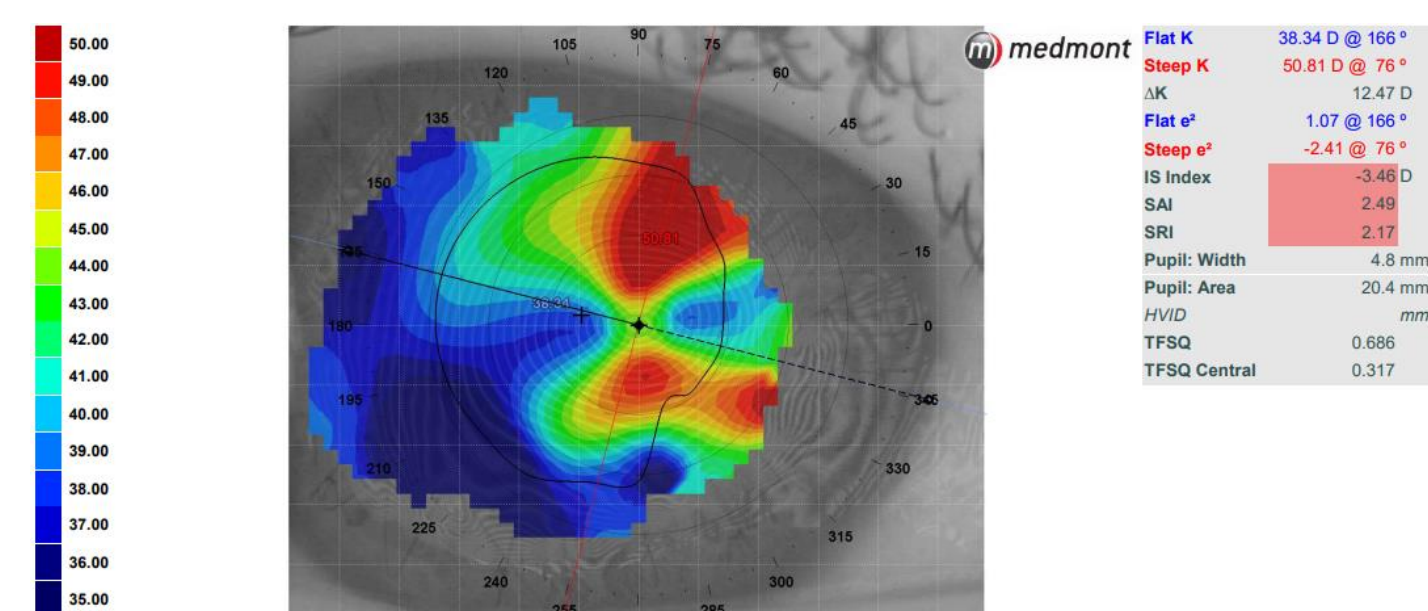


Fig. 1. Corneal topography s/p suture removal

OD 08/21/2021

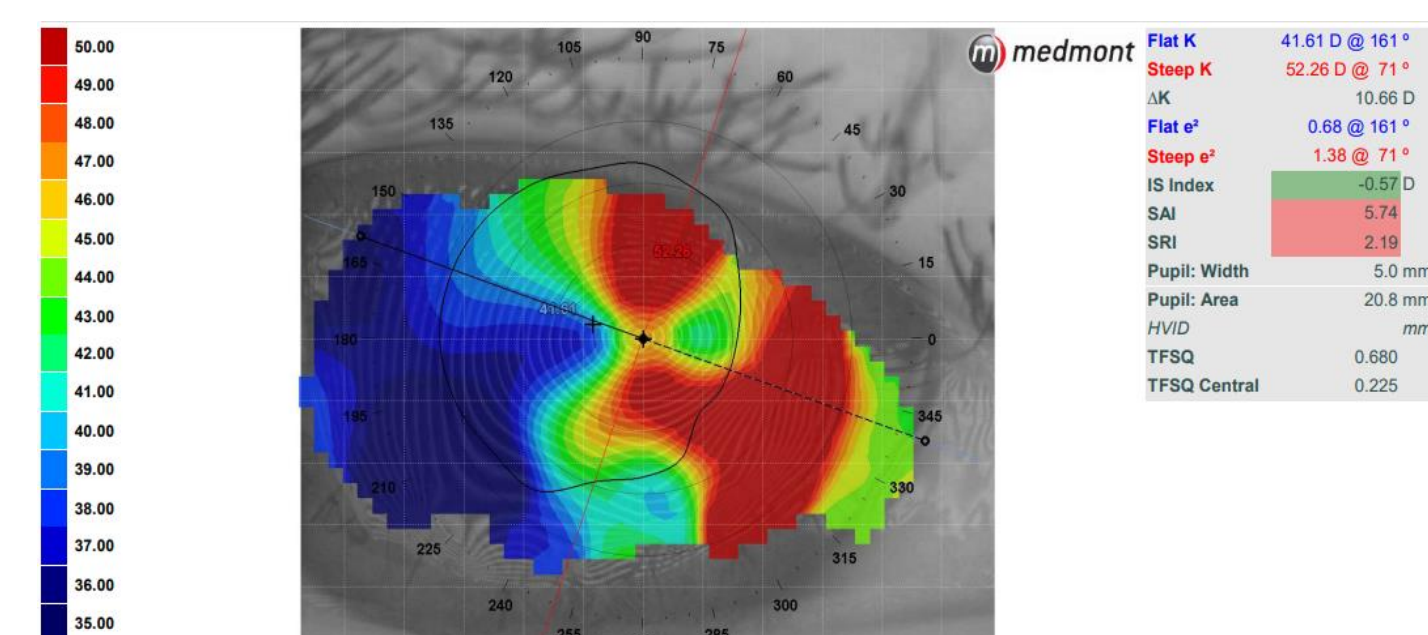


Fig. 2. Corneal topography OD 9/04/2021

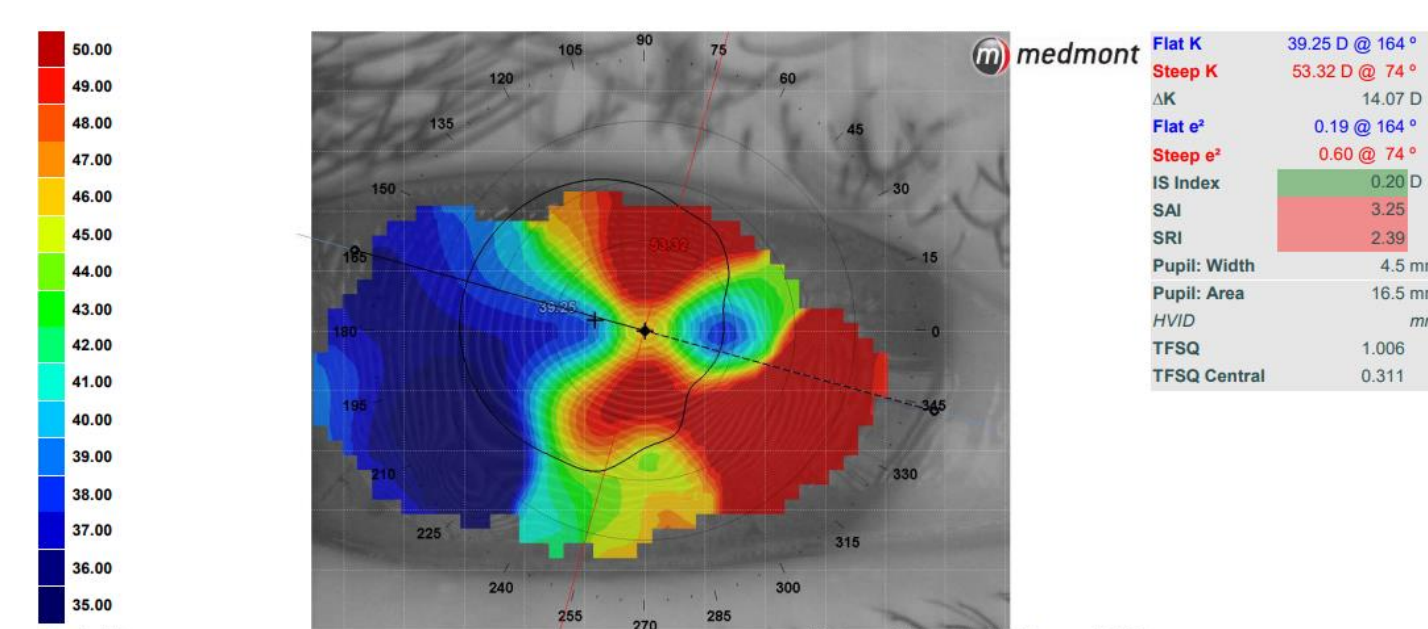


Fig. 3. Corneal topography OD 9/18/2021

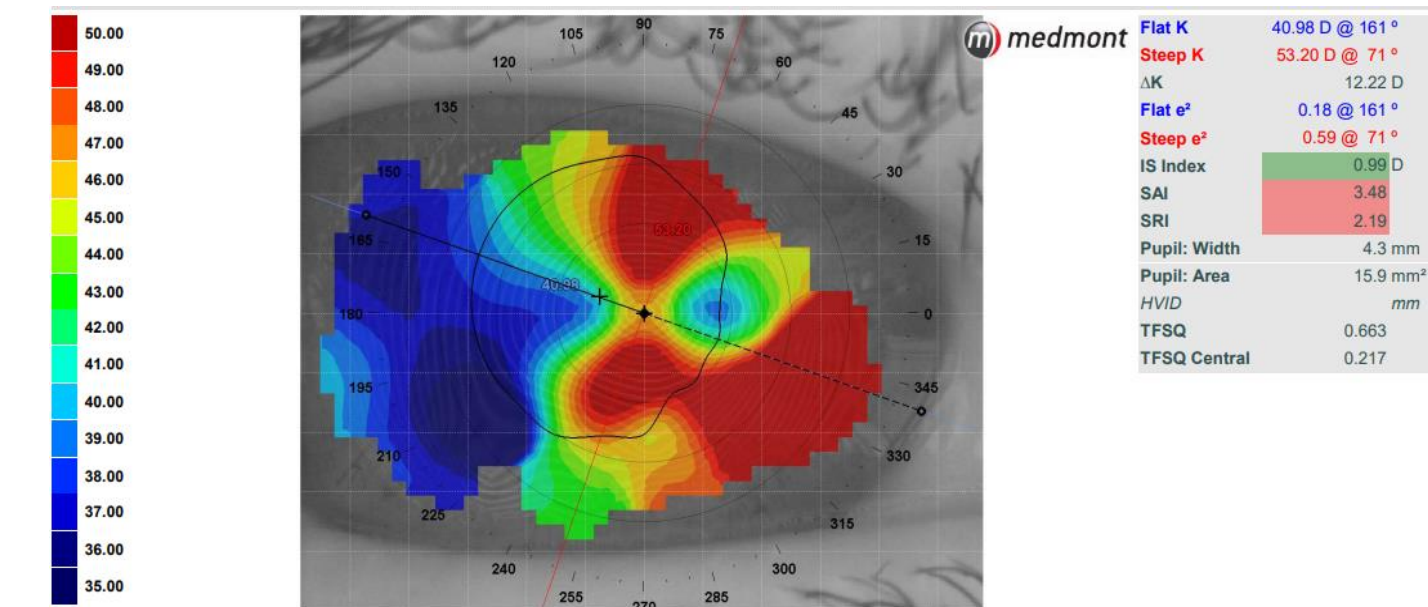


Fig 4. Corneal topography OD 09/25/2021

Table 1. Lens Parameters	Spherical GP Lens (Intralimbal Design)	Bitoric GP Lens (Intralimbal Design)
Overall Diameter (OAD)	10.8 mm	10.8 mm
Optic Zone (OZ)	9.0 mm	9.0 mm
Base Curve	7.85 mm (43.00)	8.44 x 7.34 mm (40.00 x 46.00)
Power	Plano	+3.00 x -3.00
Secondary Curve	9.00 mm	8.40 x 9.75 mm
Tertiary Curve	12.00 mm	12.00 mm

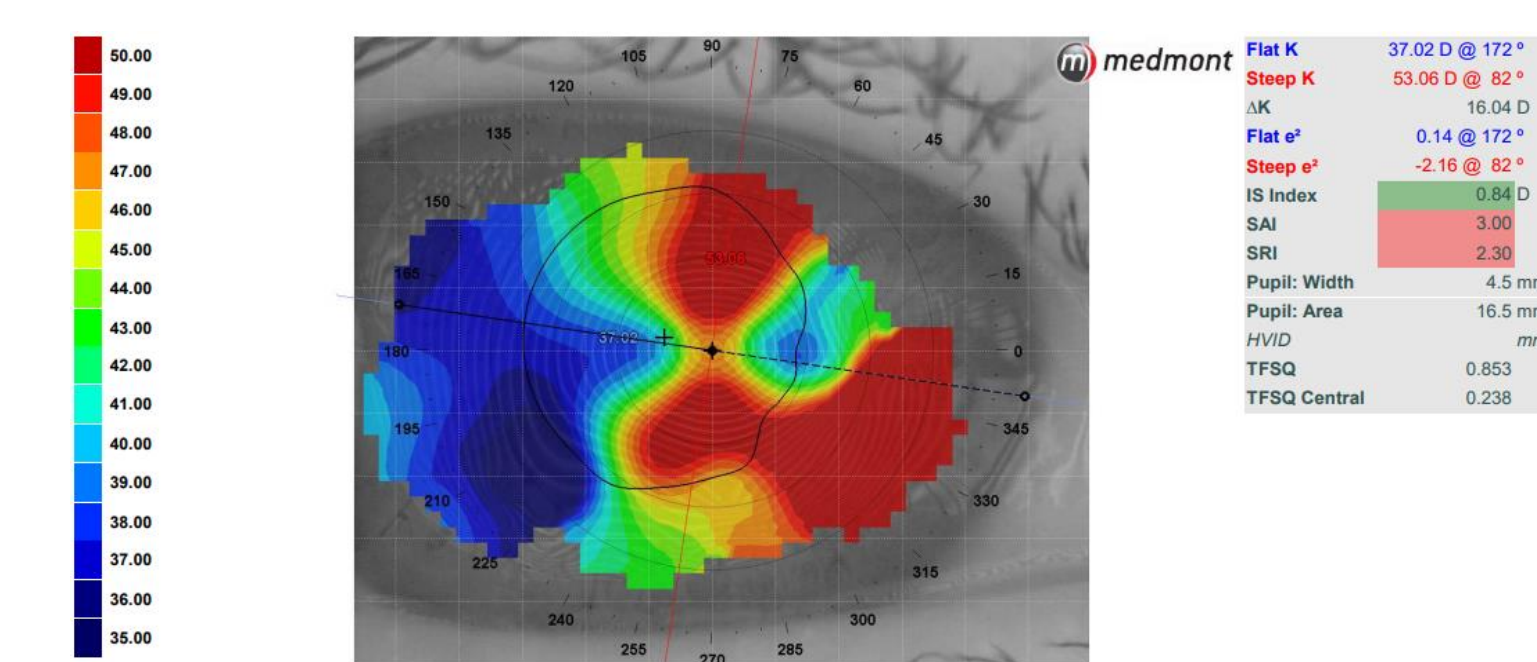


Fig 5. Corneal topography OD 10/02/2021

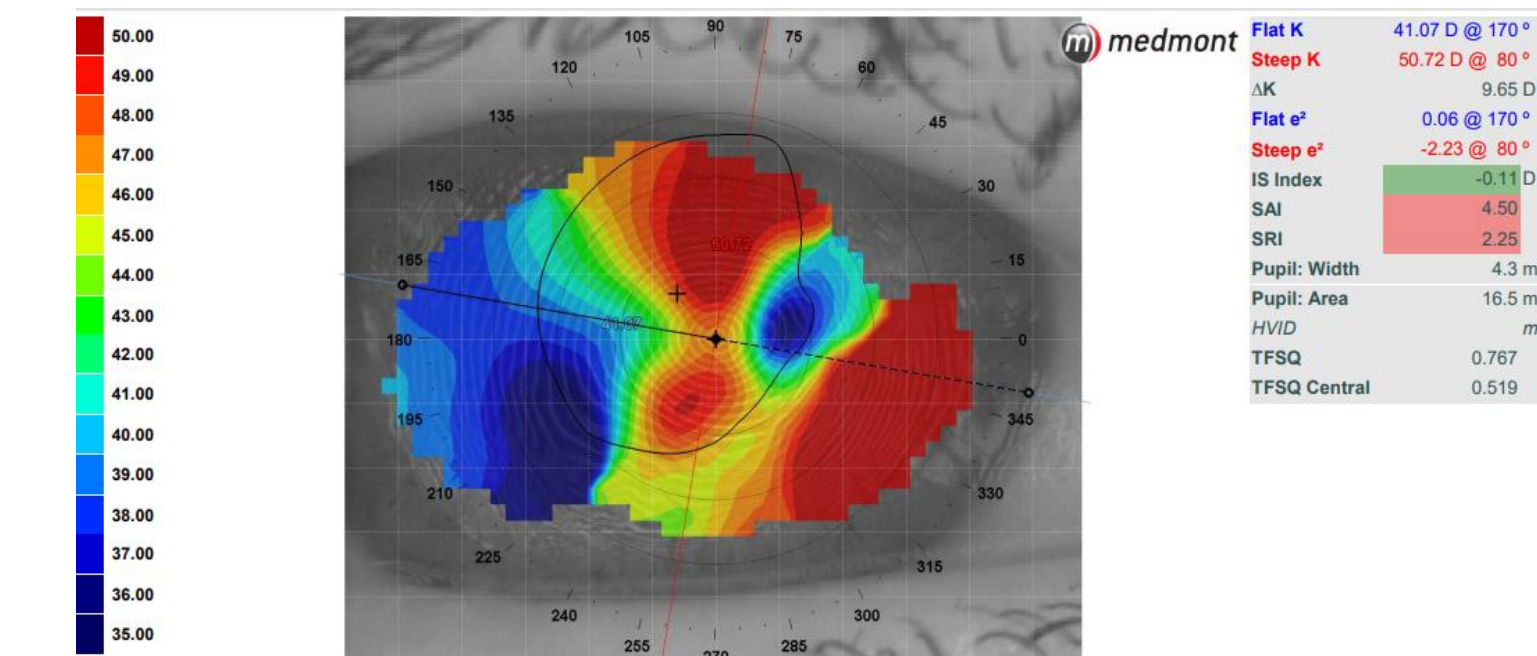


Fig 6. Corneal topography OD 10/23/2021

DISCUSSION

- Sutures s/p PK can induce a bulging effect in the center of the corneal graft. Removal of sutures can cause reduction of subjective cylinder and increase the subjective spherical equivalent (trend towards hyperopization) via a decrease in corneal power.
- Topographical changes following suture removal can occur as early as 15 minutes following the procedure, and any induced astigmatism can recover/stabilize after 1 hour.
- Some cases comparing keratometry and manifest refraction measured at 1 hour after suture removal and after 6 months reveal minimal changes, but this is not always the case
- Suture removal can ultimately alter corneal topographic pattern and shape. Visual acuity improvement after suture removal can be largely attributed to a reduction in subjective astigmatism.

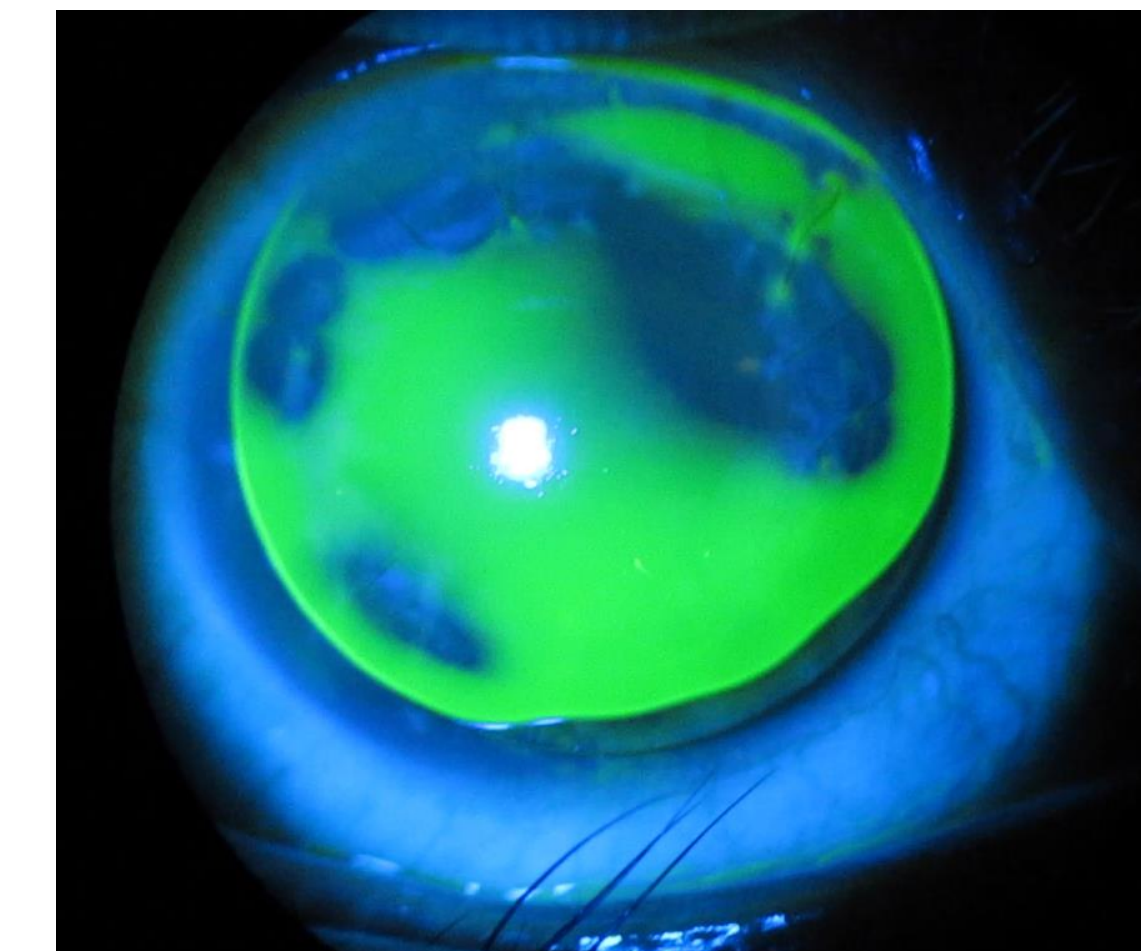


Fig 7. Spherical GP lens fit relationship (manually centered) - 09/2021

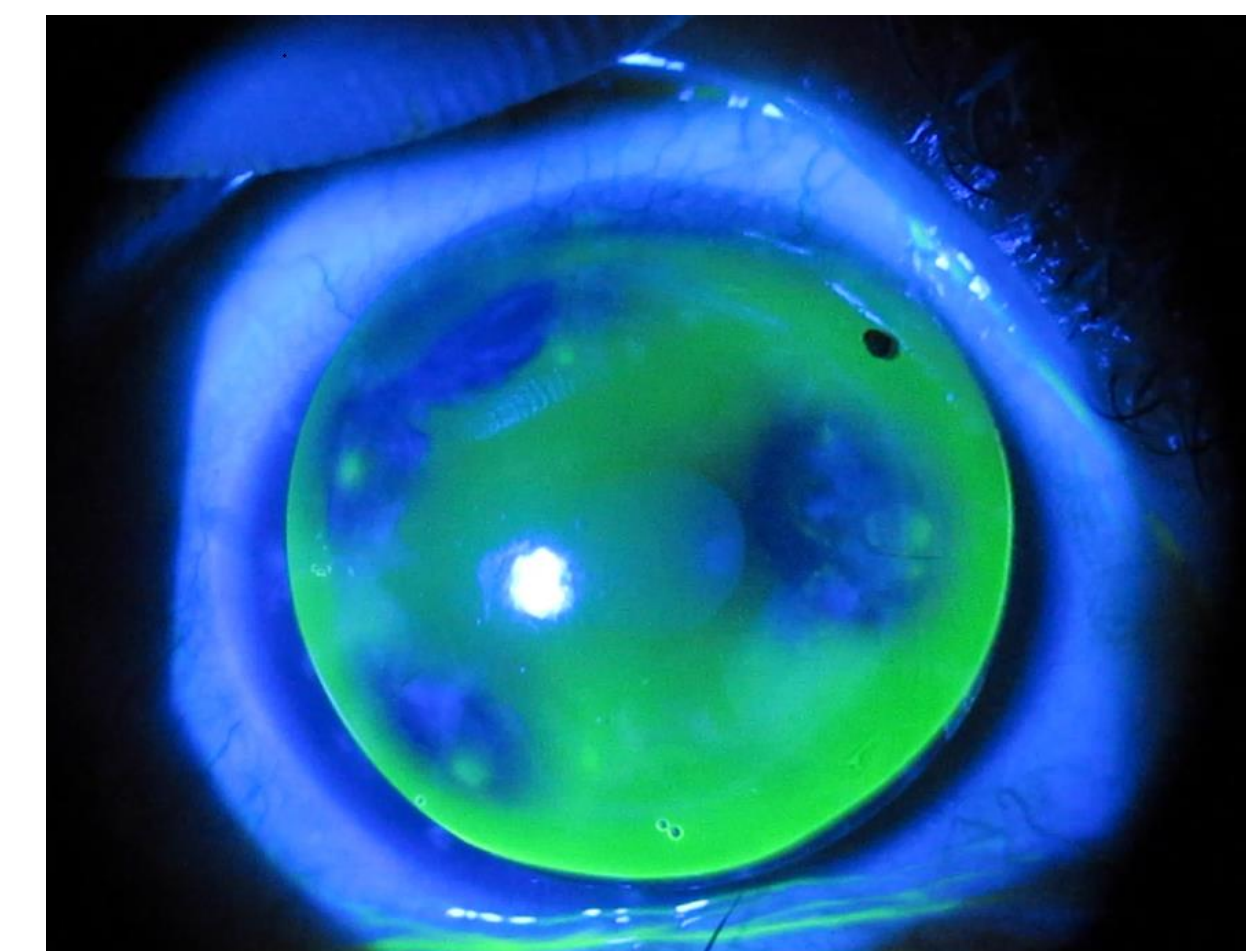


Fig 8. Bitoric GP lens fit relationship (manually centered) - 10/2021

CONCLUSIONS

- Intralimbal RGP lens designs can be utilized to improve stability and minimize mechanical interaction with the graft-host interface to reduce risk for trauma, inflammation, or infection.
- Implementation of a larger optic zone can also help optimize visual acuity by improving centration and reducing glare.
- Thorough evaluation of corneal topography is indicated to determine the location and magnitude of irregularity and asymmetry to select between aspheric/tri-curve, prolate/oblate, and spherical/bitonic designs.
- Corneal suture removal can induce changes in both corneal topography and refractive power which could require significant modifications in lens design.
- Although prescribing intralimbal RGP lenses can lead to optimal visual outcomes s/p PK, frequent monitoring of corneal health is indicated to avoid complications that could potentially lead to allograft rejection, such as punctate keratitis secondary to chafing, additional suture exposure/loosening, and neovascularization.

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