



# Scleral Lens Fit for Extremely Flat Cornea Post Globe Rupture

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Presentation/Poster # 73

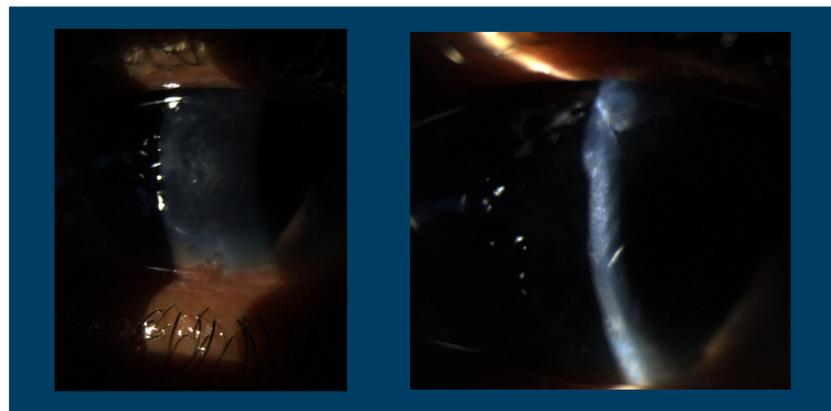
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## INTRODUCTION

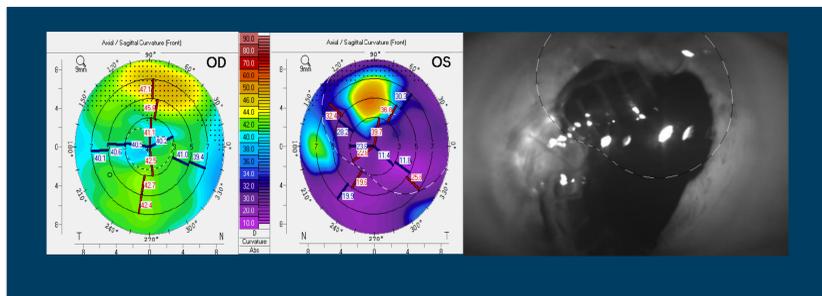
Scleral lenses provide a way to manage irregular corneas after sustained globe injuries. However, problems arise when presented with extremely flat corneas and aphakia. This clinical case details how challenges of balancing the optimum fit, patient comfort, and corneal health with sclerals are overcome by the aid of anterior segment imaging.

## CASE

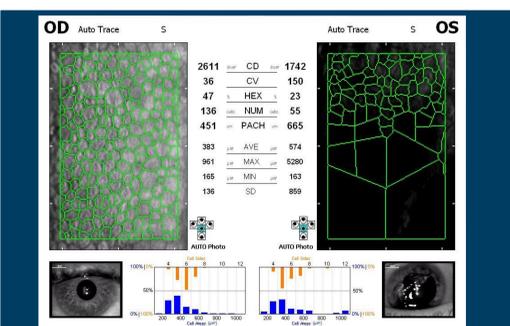
A 54-year-old black male was referred for a scleral lens fitting for an irregular cornea in the left eye, status-post globe rupture.



The injury involved the cornea, iris and lens, but not the retina. The unaided acuity was OD 20/20 and OS Counting Fingers at 2 ft. Slit lamp of the OS revealed a pinguecula, corneal stitches, endothelial folds, irregular and fixed traumatic pupil, and aphakia. Systemic health is unremarkable.



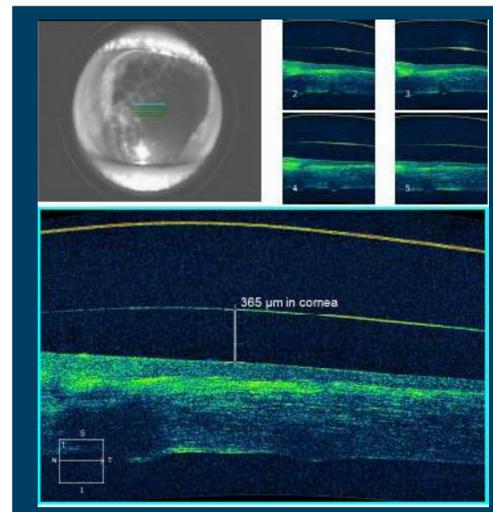
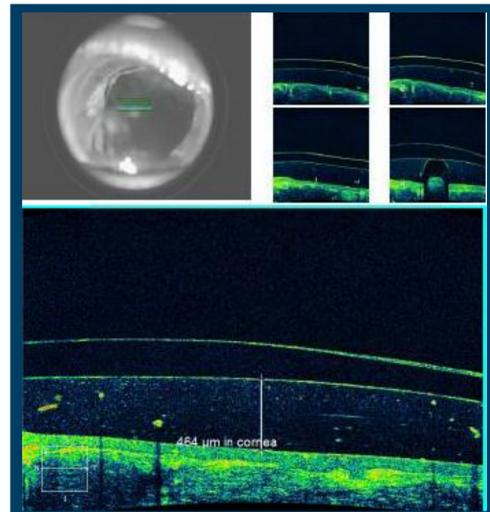
Scheimpflug images revealed an average power for OD 40.6D, and OS 25.4D, and max power for OD 43.2D and OS 55.0D.



Endothelial cell count revealed OD 2611/mm<sup>2</sup> and OS 1742/mm<sup>2</sup>.

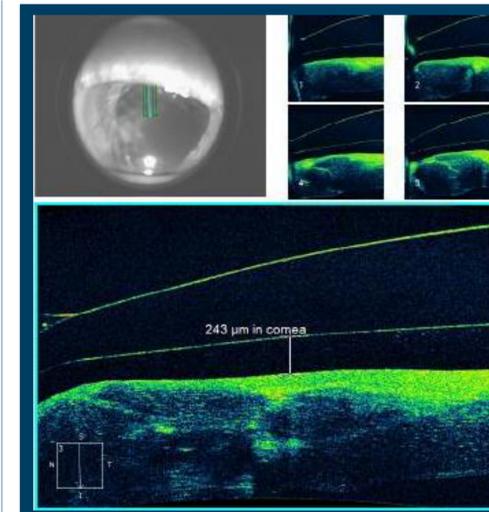
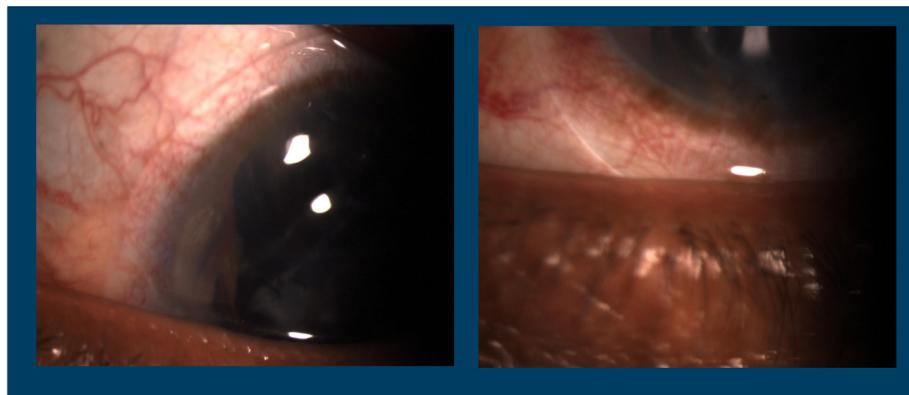
Blanchard's One-Fit "A" scleral lens offered the flattest base curve of 9.4mm. The central vault showed a one-to-one relationship. However due to the +19.75D Rx, it increased the center thickness of the lens.

Anterior segment optical coherence tomography (OCT) of the eye showed a central clearance of 464 microns, and limbal clearance. Despite a one-to-one fit, a concern for corneal hypoxia remained.



Modified diameter from 14.7mm to the smallest 14.4mm to reduce sagittal height, and thus reduce central vaulting.

Despite all modifications, the lens still had a tendency to be displaced down and temporal, mainly due to the overall weight of the lens from the significant plus Rx (+19.75DS).



The final lens design included the flattest base curve (9.4mm) the smallest diameter (14.4mm), and the highest Dk material Optimum Infinite (200 Dk).

Type	Power	BC	DIA	CT	Edge
Blanchard-One Fit "A"	+19.75 DS	9.4 mm	14.4 mm	0.65	STD/STEEP 1

## DISCUSSION

Work by Michaud et al (2012), layout considerations for predicting oxygen transmissibility in scleral lenses of varying thickness, Dk, and post lens clearance. The reference criteria established by Holden and Mertz ("H/M"), considered Dk/t of 24 over the central cornea to alleviate hypoxia for daily wear.<sup>1</sup> We follow their recommendation of using the smallest diameter lens and highest Dk material. More recent works by Vincent et al (2018, 2019), have shown that after 8 hours of scleral lens wear, central clearance can decrease approximately 76 microns, and that a greater initial central clearance may result in reduced oxygen getting to the cornea.<sup>2,3</sup> All these observations were made in young participants with healthy and normal corneas.

## CONCLUSION

In extremely flat and irregular corneas, scleral lenses have great potential to improve quality of vision. With the aid of imaging technology from corneal topography and anterior segment OCT, fitting success is improved while maintaining corneal health.

## REFERENCES

1. Michaud L, Worp EVD, Brazeau D, Warde R, Giasson CJ. Predicting estimates of oxygen transmissibility for scleral lenses. *Contact Lens and Anterior Eye*. 2012;35(6):266-271. doi:10.1016/j.clae.2012.07.004.
2. Vincent, Stephen J., Alonso-Caneiro, David, and Collins, Michael J. "The Temporal Dynamics of Miniscleral Contact Lenses: Central Corneal Clearance and Centration." *Contact Lens and Anterior Eye* 41.2 (2018): 162-168. Web.
3. Vincent, Stephen J., Alonso-Caneiro, David, and Collins, Michael J. "The Time Course and Nature of Corneal Oedema During Sealed Miniscleral Contact Lens Wear." *Contact Lens and Anterior Eye* 42.1 (2019): 49-54. Web.