

When a Large Diameter Lens Answers a Small Diameter Lens Problem

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INTRODUCTION

BACKGROUND

To minimize oxygen stress on the cornea with scleral lens (SL) wear, small diameter lenses have been recommended.^{1,2}

A small diameter scleral lenses may have less fluid depth, require fewer toric haptic modifications, and be easier to handle for the patient. However, common complications include excessive SL bearing on ocular structures.

OBJECTIVE

Cases are presented where a 15mm diameter SL induced complications including central corneal SL touch due to inadequate vault causing a corneal ulcer, conjunctival injection from vascular congestion, with limbal stem cell compromise due to limbal SL touch, and finally air-bubble formation with excessive edge lift due to haptic misalignment and induced visual distortion. Employing a strategy of larger diameter lenses overcome obstacles to lens success.



FIGURE 1. Successful lens fit for Case 2.

CASE 1

- 61-year-old male
- Scleral lens wear 7 months
- GHVD with severe dry eye
- Lenses 15 mm diameter OU

SCLERAL LENS PROBLEM

- Reports increased irritation OU
- Vision: OD 20/20, OS 3'/200
- Central lens touch OU
- Stopped lens wear OS and treated for ulcer; recommend SL refit



FIGURE 2. Right eye before refit (A). After lens wear in 18.0 mm lens (B).

8 months later

- Wearing same lens OD only, decreased vision, injection persists
- Ulcer resolved OS, with residual scar and corneal thinning
- VA: OD (w/SL) 20/200, OS (w/o SL) 20/100

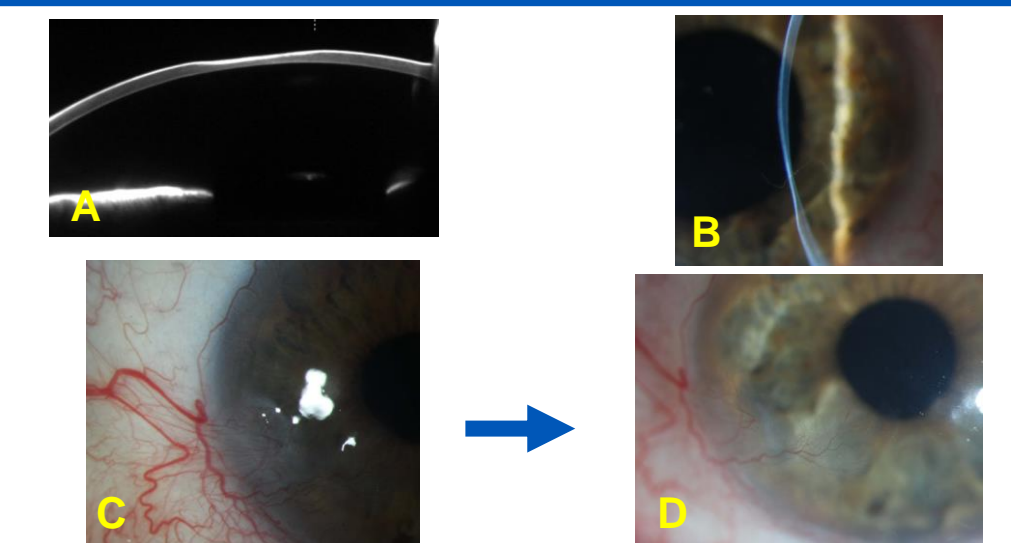


FIGURE 3. Left eye corneal thinning from ulcer (A&B). Cornea before refit (C), and after refit into 18.0 mm lens (D).

Scleral Lens Refit

- 18.0 mm lens OU, with good corneal clearance OU
- Vision: OD 20/70, OS 20/60
- Successful and comfortable SL wear for 6 years.

CASE 2

- 36-year-old male
- Scleral lens wear 4 years (same lenses)
- Keratoconus OU
- Lenses 15.0 mm diameter OU
- Dependent on lenses for functional vision

SCLERAL LENS PROBLEM

- Increased irritation and decreased vision OU
- Referred for conjunctivitis
- Vision: OD 20/70, OS 20/60
- Limbal touch OU
- Injection OU
- Limbal stem cell stress OU

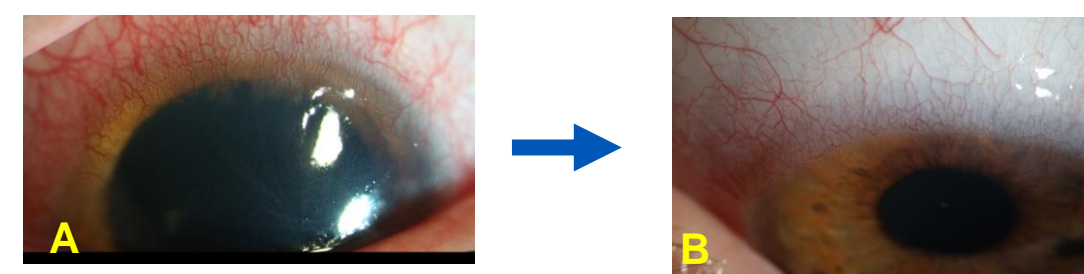


FIGURE 3. Right eye before refit (A). After lens wear in 18.0 mm lens (B).

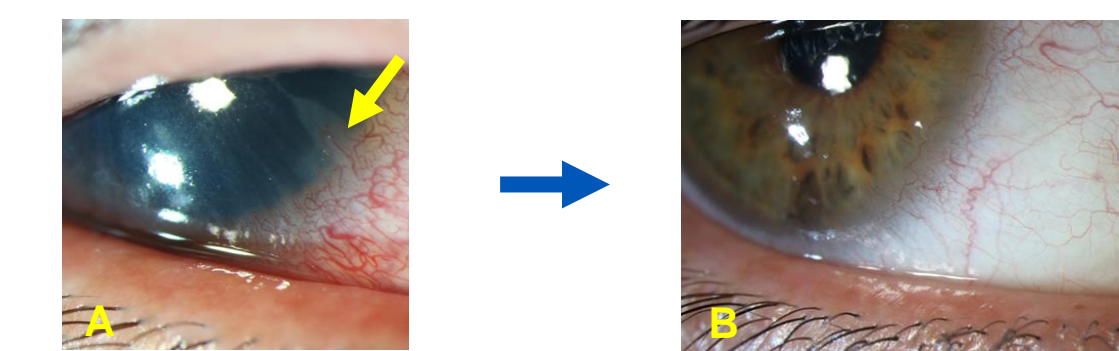


FIGURE 4. Left eye before refit (A). Limbal stem cell stress (yellow arrow). After lens wear in 18.0 mm lens (B).

Scleral Lens Refit

- 18.0 mm lens OU, with good corneal and limbal clearance OU
- Vision: OD 20/20, OS 20/20
- Successful and comfortable SL wear for 3 years.

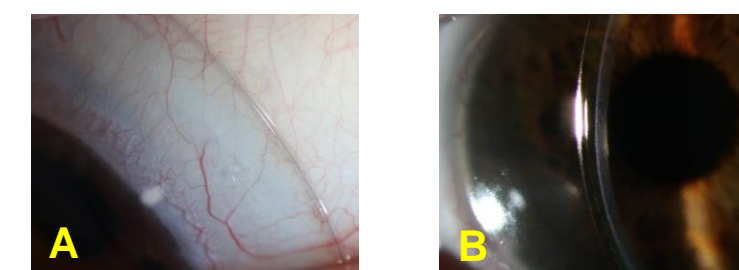


FIGURE 5. 18.0-mm lens with excellent edge alignment (A). 18.0-mm lens with excellent corneal (and limbal) clearance (B).

CASE 3

- 44-year-old male
- Scleral lens wear 9 years
- Keratoconus
- Current lenses are 4 years old
- Dependent on lenses for functional vision
- Lenses 15.0 mm diameter OU

SCLERAL LENS PROBLEM

- Noticing visual distortion with left lens
- Vision: OD 20/70, OS 20/100
- Corneal touch OU
- Edge lift OU
- Bubble under lenses OU

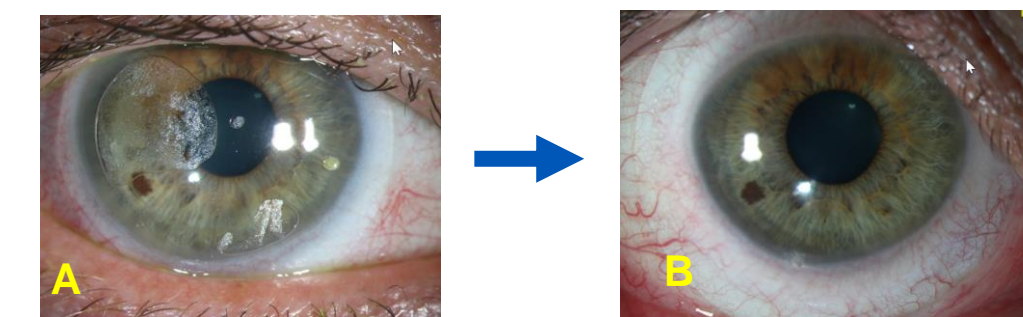


FIGURE 6. Right eye with habitual lens (A). After lens wear in 18.0 mm lens (B).

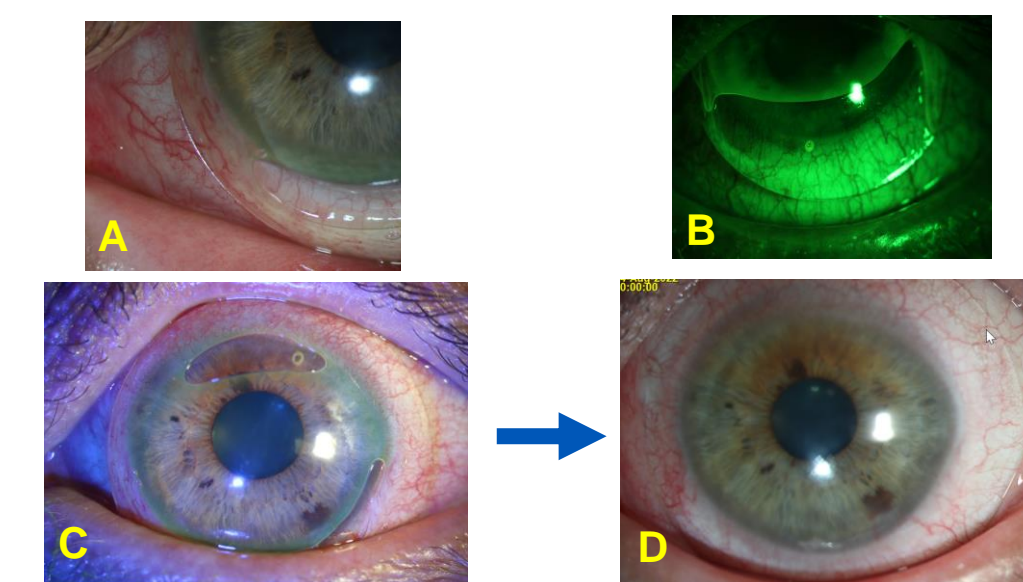


FIGURE 7. Left eye with excessive edge lift of habitual lens (A&B). Habitual lens (C). After lens wear in 18.0 mm lens (D).

Scleral Lens Refit

- 18.0 mm lens OU, with good corneal and limbal clearance OU
- Vision: OD 20/20, OS 20/20 (no distortion)
- Successful and comfortable SL wear for over 1 year.

DISCUSSION

- Small diameter SL can cause congestion of conjunctival and limbal tissue, and risk negative corneal lens interactions due to lower vaults.
- Increasing lens diameter increases sagittal depth, reducing interaction with corneal and limbal zones
- After refitting into larger diameter SL, complications were eliminated in each case and have not recurred.

CONCLUSIONS

- Small diameter lenses do not guarantee a problem free fit.
- Adequate corneal and limbal clearance is critical to success with a scleral lens.
- Scleral lenses should have good conjunctival alignment, and adequate haptic width to spread load bearing weight.

Regardless of lens diameter

- Maintain regular and frequent follow-up.
- Adjust lenses as soon as possible when complications arise.

REFERENCES

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- Giasson CJ, Morency J, Melillo M, Michaud L. Oxygen tension beneath scleral lenses of difference clearances. Optom Vis Sci 2017; 194:466-475.