Optimizing Acuity with a Scleral Lens in a Young Patient with Dense Scarring from Pseudomonas Ulcer

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Introduction

Pseudomonas is the most common single organism related to contact lens induced microbial keratitis (MK). Typically infection is correlated to known risk factors such as overnight wear, poor contact lens storage case hygiene practice and exposure to water.[1] Stromal necrosis and thinning can occur within 24 to 48 hours leading to permanent vision loss due to corneal scarring and/or irregular astigmatism. Visual rehabilitation can be achieved with the use of rigid gas-permeable contact lenses such as scleral lenses.

Purpose

To report a case in which a scleral contact lens was fit to improve vision in a young patient with dense corneal scarring and neovascularization in the left eye (OS) secondary to pseudomonas ulcerative keratitis.

Case Presentation

A 14-year-old Caucasian female was referred to our clinic by a corneal specialist specifically for scleral lens fitting OS.

POH: Pseudomonas ulcerative keratitis OS x 2016.
The patient was a habitual monthly soft lens wearer at the time of infection, but denied any overwear, hygiene noncompliance or exposure to water.

PMH: Unremarkable Medications: None Allergies: NKDA
Family history: Unremarkable

BCVA (SRx)
OD: +1.25-1.50x180 DVA: 20/20
OS: +2.25-5.00x040 DVA: 20/60+2

Endothelial Cell Count OS: 2345 cells/mm2

Anterior Segment Exam: OS

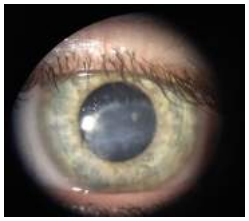
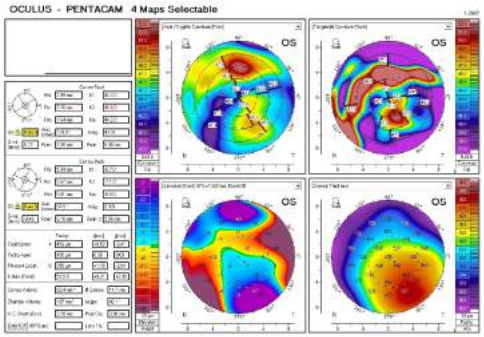


Fig 1 and 2: 7mmV x 8mmH central stromal scar and neovascularization

Posterior Segment: Unremarkable

Case Presentation

Topography OS:



Trial #1 Dispense: Art Optical Ampleye ®/8.04/+3.00DS/16.5/4200

Fit: AC 250/good MP/min LC 360/centered/no blanching 360
DVA: 20/20-3

Trial #1 Follow Up

Fit: AC <50, greater inferiorly and temporally. Appears to be touching centrally on OCT (30 microns temporally) / min MP / min LC / Centered / no blanching 360
ADRs: Patient reported adverse reaction to Purilens and had been using Boston Simplus to fill lens.
Management: Increase sag by 200 microns. Patient educated to only use recommended solutions to fill lens. Switched from Purlilens to Addipak.

Trial #2 Dispense: Art Optical Ampleye® / 8.04 / +3.00 DS / 16.5 / 4400

Fit: AC 300 (OCT) greater inferiorly and temporally / good MP / good LC 360 / centered / no blanching 360
ADRs: Patient reported reaction to Addipak. Began filling lens with artificial tears.
Management: Dispense and follow up in 1 week. Reviewed hygiene routine with patient. Recommended only use of preservative free tears.

Trial #2 Follow Up:

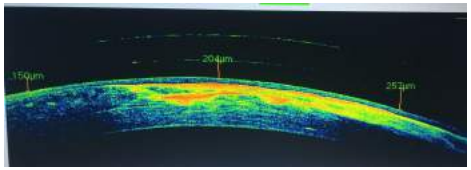
Fit: AC 200 (204 OCT), 150 nasally, 257 temporally / good MP / good LC 360 / centered / no blanching 360/**Mucus debris on front surface and trapped under lens*
ADRs: Patient reported adverse reaction with Blink Tears used to fill lens.
Management: Reviewed hygiene routine with patient. Educated to change hand soaps, and avoid handling lens after using makeup/facial products. Emphasized proper cleaning regimen and to try Purilens again. RTC in 1 week for follow-up.

Trial #2 Follow Up:

DVA: 20/20-3
Fit: consistent to above.
No ADRs with Purilens after changing hand soaps and initiating new routine. Finalized lens.

Case Presentation

No hypoxia or other adverse corneal changes were observed throughout the fitting process. While the patient and mother reported no form of noncompliance with previous soft lens wear, numerous attempts at re-education were required during the scleral lens fitting process before the patient was fully compliant in lens care and handling. She will continue to be monitored at three month intervals.



Final lens: Art Optical Ampleye® / 8.04 / +3.00 DS / 16.5 / 4400

Discussion

In patients with reduced vision secondary to microbial insult, scleral lenses are an effective method of visual rehabilitation even in cases with dense corneal scarring like our patient. Pseudomonas specifically is the most common single organism related to contact lens induced microbial keratitis and while patients may perceive and report compliance to contact lens wear and practices, it has been shown as little as 0.4% actually demonstrate full compliance.[1-2] Hence, it is important to not only ensure proper lens fitting but also educate and stress proper lens hygiene and wear instructions with every contact lens patient. Furthermore, as with our patient, complicating preexisting conditions such as neovascularization require that steps be taken to minimize hypoxic environments such as fitting with minimal reasonable corneal clearance, hyper Dk material and minimal lens center thickness. [3-4]

Conclusion

Scleral lenses are an effective method to correct visual impairment due to corneal irregularities even with significant corneal scarring. However, proper fitting, hygiene education and compliance and close follow up is imperative in managing these patient's ocular health.

Acknowledgements

1. Stapleton F, et al. Risk factors and causative organisms in microbial keratitis in daily disposable contact lens wear. Li W, ed. *PLoS ONE*. 2017;12(8):e0181343.
2. Robertson, Danielle M., and H. Dwight Cavanagh. "Non-Compliance with Contact Lens Wear and Care Practices: A Comparative Analysis." *Optometry and vision science : official publication of the American Academy of Optometry*88.12 (2011): 1402–1408.
3. Michaud L, et al. Predicting estimates of oxygen transmissibility for scleral lenses. Contact lens & anterior eye. J Br Contact Lens Assoc 2012; 35 (6)
4. Compañ V, et al.. Modeling Corneal Oxygen with Scleral Gas Permeable Lens Wear.
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