Non-Pharmacological Intervention for a Neurotrophic Cornea: The Emerging Use of Scleral Lenses in Healing Ocular Surface Disease

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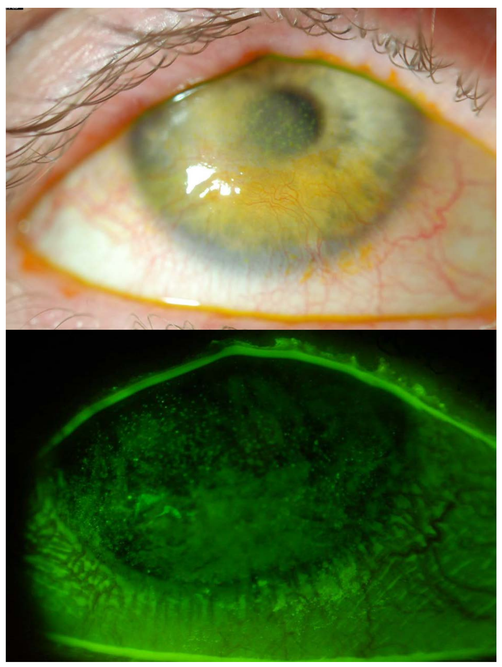
Abstract

While advances in scleral lenses have proven to enhance vision in anterior segment disease, this study examines the emerging use of scleral lens devices as a viable alternative to long term pharmaocological use.

Case History

56 yo F reports to Boston Foundation for Sight for PROSE consultation. Patient complains of increasingly blurry vision in right eye over the last year that is constant. Patient has been low vision, OS, since childhood from unknown etiology.

Medical History: The patient was diagnosed with an acoustic neuroma in 2003, which was treated with brain tumor decompression and stereostatic radiation. Treatment resulted in right-side bells palsy and femoral nerve palsy, limiting overall motility and causing neurotrophic keratitis, exposure keratitis, and radiation keratitis OD. The patient has a longstanding diagnosis of Neurofibromatosis Type II and significant hearing impairment.
Ocular History: Neurotrophic keratitis OU, exposure keratitis OU, radiation keratitis OU; VA OS LP since childhood
Previously attempted ocular treatments OD: Topical lubricants, topical cyclosporine, topical steroids, RLL punctual plug, and RUL gold weight implant.
Previous lens wear: A scleral lens (d=14.9 mm) was fit, OD, 1 year prior. The lens use was discontinued due to poor fit resulting in increased corneal neovascularization OD.
Current ocular medication regime: Pred Forte QID OD, Refresh PM, qhs OD, Restasis OD BID, Retaine MGD q2h OD.

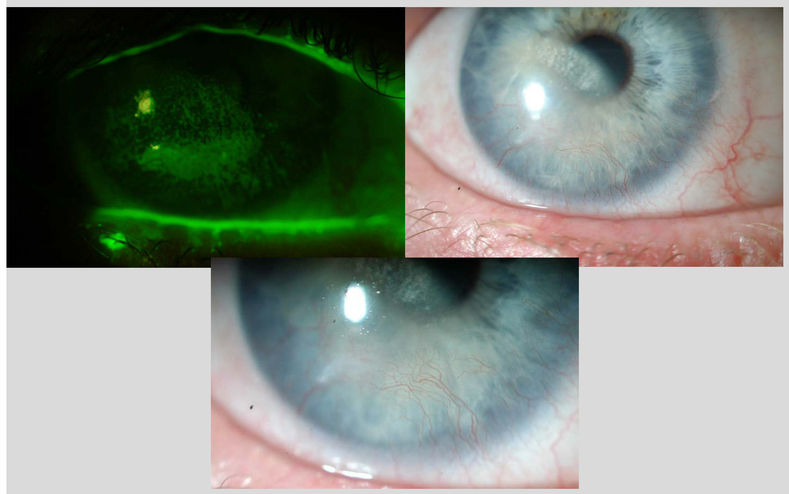


Images of OD at initial presentation

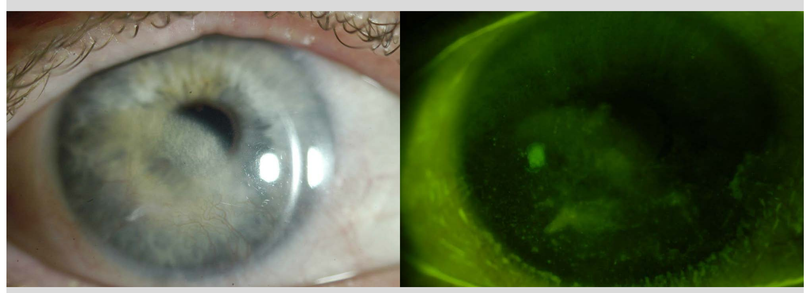
Clinical Presentation

Clinical Findings at initial presentation- Visit 1:
OD sc VA: 20/200 PH: 20/150, 3+ inferior corneal neovascularization, inferior arcuate leash of vessels, nummular subepithelial haze extending into visual axis, 3+ SPK inferior in exposure pattern, central lipid keratopathy
OS sc VA: LP, 3+ central stromal haze, 3+ corneal neovascularization
-*PROSE Device 1* diagnostic lens: D=18.5 mm, BCVA OD with ORx: 20/60
Plan:
-Decrease pred to TID OD
-Will fit with PROSE with goal of supporting the ocular surface OD

1 week f/u:
OD: cc spectacles VA: 20/40 NIPH. After being fit with PROSE device lens utilizing adequate vault and haptic alignment, BCVA OD with PROSE: 20/40+
2 week f/u:
OD with PROSE: 20/25. Pred Forte reduced to BID OD.



1 month f/u:
Wearing lens for 10 hrs/day . OD with PROSE: 20/25, 2+ corneal neovascularization with ghost vessels, arcuate leash of vessels inactive, regression of subepithelial haze, 1-2+ SPK inferior.
-Reduce Pred Forte to QD OD.



6 month f/u:
Wearing lens for all waking hours, patient pleased with comfort and vision in PD.
OD with PROSE: 20/25, 2+ corneal neovascularization with ghost vessels, arcuate leash of vessels inactive with no fanlike fronds, regression of subepithelial haze, 1+ SPK inferior. Discontinue Pred Forte and begin FML 0.1% QOD OD.

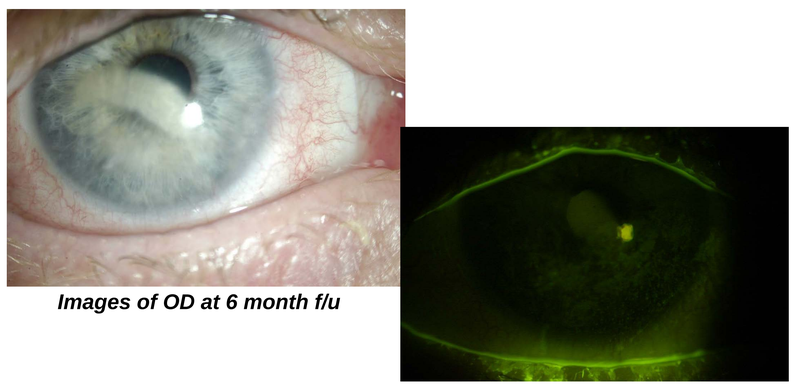
Treatment and Management

The patient is directed to continue everyday wear of the PROSE device and continue proper lens care. In addition, the patient continues to use PFAT's prn, Restasis BID OD, Refresh ung qhs OD, and **FML QOD OD**, but is able to discontinue use of all other ocular medications. The patient is instructed to continue care with ophthalmology for ocular health as directed and to return for lens re-evaluation in 3 months at Boston Foundation for Sight. If eye continues to respond well to current treatment regime, steroid use will be discontinued completely at f/u.

Discussion

The patient presented with dense corneal haze, neovascularization, and dryness in the setting of exposure keratitis in a neurotrophic ocular surface OD. After six months of PROSE device wear, subjective and objective vision greatly improved, corneal haze lessened, and active neovascularization decreased greatly. The patient's overall dryness lessened and the device continues to assist in supporting the ocular surface health in the patient's only functional eye. In addition, with the support of the device, the patient was able to discontinue her long-term frequent steroid use, now only using FML 0.1% QOD OD. It is expected that the patient will continue to benefit from device wear and will discontinue all pharmacological steroid treatment at next f/u.

Ocular surface healing utilizing scleral lenses is an emerging alternative therapy, and in many instances, can help patients improve both comfort and vision. Regarding this specific patient, scleral lens use greatly improved clarity of vision and assisted in the support of a neurotropic, degrading ocular surface. Although frequent steroid use was previously utilized to manage the patient's corneal haze, PROSE device wear allowed steroid use to be significantly reduced and continues to provide the patient with a non-pharmacological treatment alternative for improved vision and ocular health. Follow up examinations with this patient confirm progressive improvement in corneal health with increased use of the scleral lens; the patient currently reports exceptional vision with improved overall ocular health.



Images of OD at 6 month f/u

References

Jacobs, Deborah S., and Perry Rosenthal. "Boston scleral lens prosthetic device for treatment of severe dry eye in chronic graft-versus-host disease."*Cornea* 26.10 (2007): 1195-1199;
Rosenthal, Perry, and Janis Cotter. "The Boston Scleral Lens in the management of severe ocular surface disease." *Ophthalmology Clinics of North America* 16.1 (2003): 89-93.;
Takahide, Kikuchi, et al. "Use of fluid-ventilated, gas-permeable scleral lens for management of severe keratoconjunctivitis sicca secondary to chronic graft-versus-host disease." *Biology of Blood and Marrow Transplantation* 13.9 (2007): 1016-1021.