

# IS NEO A NO-GO?

## A SCLERAL FIT IN A PATIENT WITH CHRONIC NEOVASCULARIZATION SECONDARY TO SOFT LENSES

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### Purpose

Soft contact lenses are a known cause of corneal hypoxia when overworn and tightly fit, leading to neovascularization and warpage. Scleral lenses may play a role in rehabilitating this condition, but their effects on neovascularization are not fully understood. This case demonstrates the impact of a scleral fit on a patient with chronic neovascularization and irregular astigmatism secondary to soft lens wear.

### Methods

A 25-year-old Caucasian female was referred for a specialty lens fit due to suspected pellucid marginal degeneration. She complained of blurred vision and a long history of soft lens intolerance. She had not worn any contact lenses for one month. Her ocular history was otherwise unremarkable. Her medical history was significant for depression and medications included Lexapro and an oral contraceptive.

Best corrected acuities with spectacles were 20/30 OD and 20/25 OS. Slit lamp exam revealed four millimeters of hazy corneal neovascularization superiorly in both eyes with two millimeters in all other quadrants. There were no areas of lipid deposition, thinning, or scarring. Corneal topography revealed irregular superior steepening, worse in the left eye. Anterior segment OCT confirmed the absence of corneal thinning in either eye. Records requested from a previous eye care provider revealed that these findings had been present for at least two years and the patient had a long history of hydrogel contact lens wear.

Differential diagnoses included Terrien's marginal degeneration, limbal stem cell deficiency, blepharitis, and chronic hypoxia and warpage secondary to contact lens wear.



Figure 1: Anterior segment photo of the right eye while wearing a scleral lens. Note the circumferential neovascularization, which is significantly worse superiorly. The left eye appearance was nearly identical.

### Results

The patient was treated with a slow taper of topical prednisolone acetate in both eyes before and after lens wear for two months. Scleral lenses were fit with the goal of correcting for the irregular astigmatism while maximizing oxygen permeability to the cornea. The following were the most pertinent lens and fit parameters:

- Material: Menicon Z, Dk ~163
- Center thickness: 300 um
- Central clearance: ~100 um
- Minimal limbal clearance

Best corrected visual acuities improved to 20/20 OD and 20/15 OS with the scleral lenses. The neovascular vessels showed mild regression in response to corticosteroid therapy. Serial anterior segment photos demonstrated that there was no exacerbation of the vessels with regular lens wear. Repeat topographies after three months revealed that bilaterally the superior steepening had decreased in severity, suggesting that the patient's corneal shape was beginning to normalize.

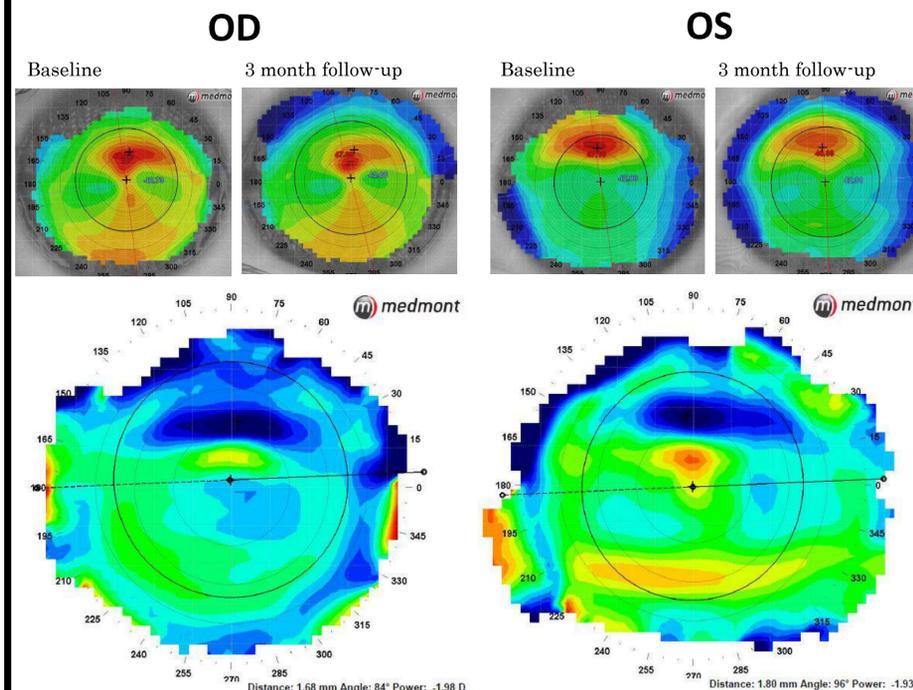


Figure 2: Corneal topographies of each eye measured at initial visit (baseline) and at 3 month follow-up with resultant comparison maps. Note that the superior areas of irregularity had flattened by nearly 2 diopters in each eye. These changes suggest the cornea is normalizing after the discontinuation of soft lens wear.

### Discussion

Chronic contact lens-induced hypoxia can lead to pannus, stromal neovascularization, and changes in corneal morphology. Patients may complain of lens intolerance and spectacle blur secondary to the induced irregular astigmatism. Left untreated, neovascularization can lead to the development of inflammation, deep fibrovascular pannus, and intracorneal hemorrhage.

The standard treatment for mild lens-induced hypoxia is simply discontinuation of lens wear, with expected resolution in 2-6 weeks. However, in more severe cases, scleral lenses may be useful to improve acuity and should not exacerbate signs of hypoxia if attention is given to maximizing oxygen permeability. Studies show that using a high-Dk lens material with minimal center thickness (~250 um) and vault (<200 um) is ideal. More recent studies even suggest a focus on lens material and lens thickness is more important than the thickness of the post-lens tear layer.

### Conclusions

- Corneal neovascularization is not a contraindication to scleral lens wear.
- For these patients, maximize oxygen permeability to the cornea via a high or hyper-dK lens material, minimal lens thickness, and minimal corneal clearance.
- Scleral lenses can play a role in the care of patients with chronic changes secondary to a poor soft lens fit or soft lens abuse, allowing the corneal shape to normalize without exacerbating hypoxia.

### References

- Abdelfattah N, Amgad M, et al. Clinical correlates of common corneal neovascular diseases: a literature review. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4325264/>. Accessed 14 October 2018.
- Carrasquillo K, Byrnes S. Corneal Edema and Scleral Lenses. Available at: <https://www.clspectrum.com/issues/2018/november-2018/corneal-edema-and-scleral-lenses>. Accessed 18 November 2018.
- Chiang H, Hemmati H. Treatment of Corneal Neovascularization. Available at: <https://www.aao.org/eyenet/article/treatment-of-corneal-neovascularization>. Accessed 13 October 2018.
- Gupta D, Illingworth C. Treatments for Corneal Neovascularization: A Review. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/21389854>. Accessed 10 October 2018.
- Malooley M, Sonsino J. Scleral Lenses in Action: Solving Problems with Specialty Lenses. Available at: <http://www.reviewofcontactlenses.com/article/scleral-lenses-in-action-solving-problems-with-specialty-lenses>. Accessed 13 October 2018.
- Mannis M, Holland E. Cornea. 4th edition.
- Weissman B. The Issue of Contact Lens Related Corneal Neovascularization. Available at: <https://www.coavision.org/i4a/pages/index.cfm?pageID=3913>. Accessed 18 October 2018.20