

Case Report

Title- Scleral Lenses Management of Keratoconus

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Introduction- Keratoconus is a progressive, non-inflammatory disease that affects the biomechanics of the cornea ultimately compromising corneal integrity leading to thinning and steepening of the cornea. Keratoconus is a relatively rare condition, with a recent study reporting a prevalence of 0.04% in 2019 (1). The reduced corneal integrity due to this condition can lead to visually significant effects in patients including higher order aberrations, corneal scarring, and in severe cases corneal perforation (2). Early in this condition, glasses may be significant enough to improve functional vision, however, due its progressive nature, spectacle correction often becomes insufficient. Keratoconus leads to progressive thinning of the cornea, which creates irregular astigmatism that cannot be corrected for with glasses alone. Therefore, specialty contact lenses such as scleral gas permeable lenses can offer crisper vision to patients with this condition, as they vault over the irregular cornea, creating a smooth optical surface.

Case Presentation-

Initial Visit, Problem Focused Eye Exam, 07/17/2025

A 29 y.o African American female, new patient, reported for a problem focused eye exam secondary to a progressive reduction in vision with current prescription. Her chief complaint was a noticeable bilateral reduction in vision at all ranges with 2 month old glasses acquired from an eye exam at Target. She denied any physical ocular signs. Additionally, she denied ocular pain, headaches, and diplopia, along with flashes and floaters. There was no history of trauma. She reported nothing gave relief of blurry vision.

The patient's last eye exam was a routine visit at Target for new glasses secondary to blurry vision; this was her first time being seen at this clinic. The patient reported no known systemic condition or previously known ocular conditions. The patient is not currently taking any medications, systemic or ocular. She has no known drug allergies. Additionally, the patient has no significant family history of systemic or ocular disease. She was alert and oriented to time, place, and person.

Uncorrected visual acuity at distance were 20/400 OD, 20/400 OS, and 20/400 OU; near visual acuities were 20/50 OU. Her presenting spectacle prescription was OD -1.75 -0.25 x 143 and OS -3.00 -0.75 x 013. Ocular motility, pupils, confrontational fields,

and color vision were normal. Manifest refraction showed a significant increase in astigmatism bilaterally. The results were as follows: OD: -2.00 -3.00 x 115 and OS -3.00 -1.25 x 006. A comparison between the existing and newly obtained spectacle correction showed a 2.75D increase and 0.50D increase in astigmatism in the right and left eye respectively. The patient was able to achieve a best corrected vision of 20/100 OD and 20/40 OS with the new prescription. The significant change in astigmatism along with the asymmetry of the astigmatism between eyes prompted topographic testing. The results of this test in the right eye were 46.00 @ 167 / 47.25 @ 77. The results of this test in the left eye were 45.00 @ 179/ 46.25 @ 89. Examination of the anterior segment revealed bilateral stromal thinning more prevalent in the right eye. There were no additional remarkable anterior segment or posterior segment findings.

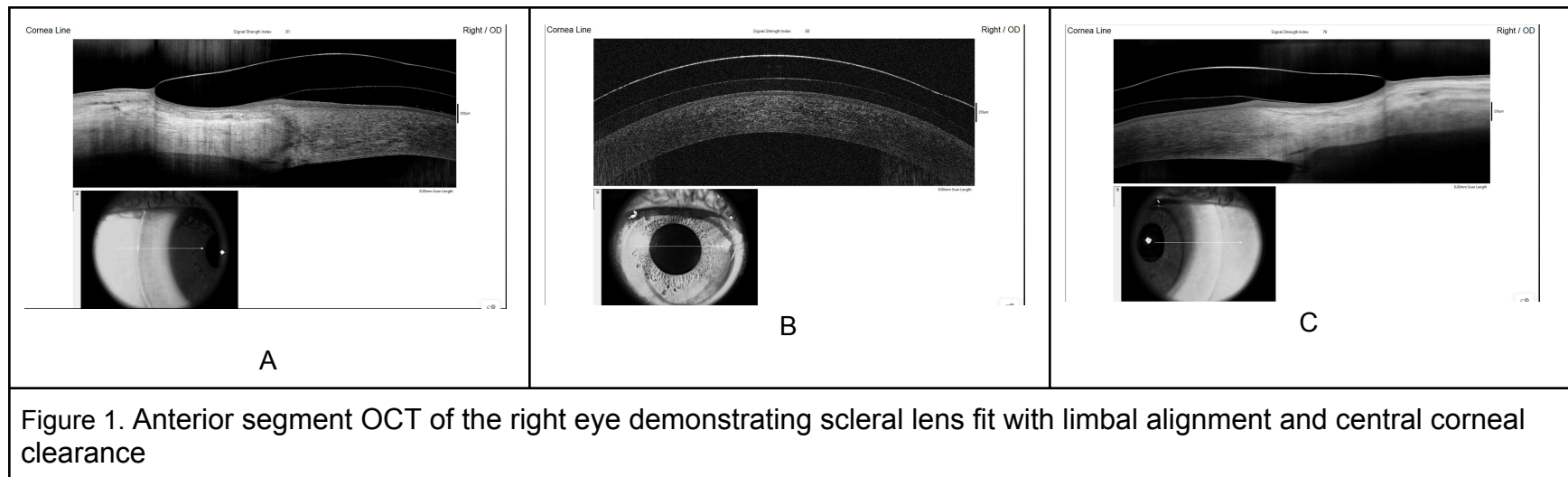
The findings of this exam are consistent with Keratoconus OU, more advanced in the right eye. The patient was educated on the condition. Based on the patient's chief complaint and reduced vision with spectacle correction, it was deemed medically necessary for the patient to receive Ampleye Scleral gas permeable contact lenses in order to restore vision to a functional level. The following parameters for the scleral lenses used were as follows:

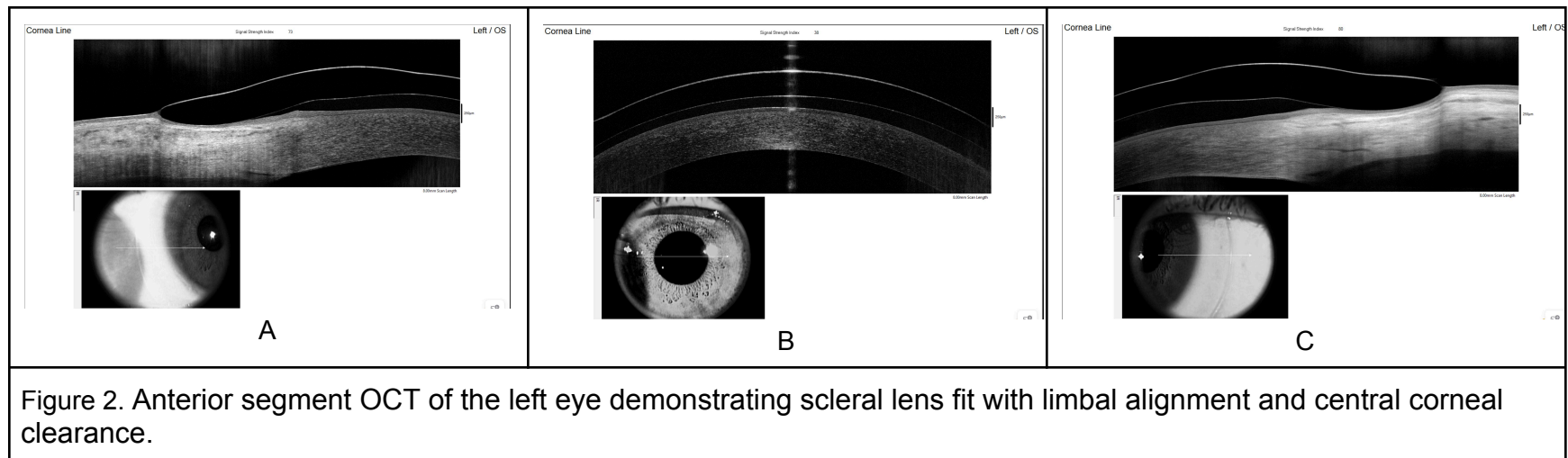
Parameter	OD	OS
Sag	4200	4200
Base Curve	8.04	8.04
Diameter	16.50	16.50
Power	-2.00	-2.00
Overrefraction	+2.75 -0.50 x 144 BCVA: 20/20-1	+1.75 BCVA: 20/15
Toric Marker Location	3:30	N/A
Adjustments	None	Drop central vault 50 microns

Follow Up, Scleral Lens Check, 08/21/2025

The patient returned for their one week follow up after receiving the lenses. She reported that she noticed fogging of the lens on the first day of wear; however, fogging ceased by the second day of wear. She has been using the lenses for a majority of the day with no complaints regarding vision or comfort. Patient reported compliance with lens hygiene, including no swimming, sleeping, or showering with the lenses on.

The following images show the fit of the Scleral lens:





Vision tested with the lenses revealed a BCVA of 20/20- in the right eye and 20/15 in the left eye. A slit lamp exam revealed adequate central corneal clearance, with no areas of cornea touch. The limbal region exhibited adequate vaulting of the limbus, without any bearing on the limbal stem cells. The landing zone showed even alignment with the conjunctival surface. No blanching, impingement, or edge lift was noted in either eye. There were no signs of bubbles or debris on the lenses. The patient was instructed to return as directed for subsequent follow up visits. Additionally if experiencing any redness, pain, irritation, or other symptoms that re concerning the patient they should return right away.

Discussion/ Conclusion

This case report is a prime example of what the addition of scleral contact lenses can do for the functional vision of a patient with moderate to advanced Keratoconus. It highlights that spectacle correction is insufficient to provide patient with usable vision. By providing the patient with a smooth refractive surface and masking irregular astigmatism, the scleral lenses can significantly improve visual acuity. Scleral lenses are an importance key in providing the best patient care to patients with Keratoconus. They offer not only significant visual outcomes, but also protection of the patients eye.

1. [https://www.ajo.com/article/S0002-9394\(23\)00464-6/abstract](https://www.ajo.com/article/S0002-9394(23)00464-6/abstract)
2. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10511017/>