



# RADIAL KERATOTOMY PATIENTS KEEP THINGS INTERESTING



A multifocal scleral lens can be a great option to help stabilize vision in these difficult-to-treat cases.

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**R**adial keratotomy (RK) cases can either be fun or nerve-wracking, depending on the day. These patients typically present to our clinic with several visual complaints that cannot be solved with traditional modalities, such as glasses or soft contact lenses. In this article, I discuss specialty lenses as a wonderful option for these patients to achieve multiple visual goals with one solution.

## MULTIPLE FACTORS AT PLAY

A male patient was referred for a specialty contact lens evaluation by a local ophthalmologist. His medical history was unremarkable and his ocular history was positive for RK OU and cataract surgery OU with single-vision posterior chamber IOLs (PCIOLs) targeted for distance correction. The patient was experiencing fluctuating and inconsistent vision at distance, and blurry vision at near without the use

of reading glasses. He was interested in exploring options to be glasses-free. Slit-lamp examination revealed blepharitis, dermatochalasis, meibomian gland dysfunction, RK scars with a central corneal scar, and PCIOLs OU.

The patient's previous surgeries and anterior segment findings alone can make it difficult to improve vision in this case, and the fact that he was seeking a multifocal option only added to the complexity. The patient's expectations were addressed first, including a lengthy conversation about possible visual compromise and adaptation associated with multifocal optics. We also discussed the possibility of multiple changes being necessary, given the complexity of his case. I advised him that "perfect vision" at all distances may not be achieved and that our target would have to be functional vision. The goals we set were for him to be comfortable with driving during the

day and to be able to read a tablet at near. After this education, the patient understood the situation and still wanted to proceed, so we got started.

## TRYING MULTIFOCAL SCLERAL LENSES

Given the patient's ocular surface disease, his visual goals, and his prior surgeries, we decided to move forward with a scleral lens. His ocular surface disease was managed both by our office and the referring ophthalmologist prior to our scleral lens evaluation.

A diagnostic evaluation was performed to target best distance visual acuity and good overall fit (Figure 1). Centration is key in any scleral lens design, but especially so in multifocal lenses. When a scleral lens is decentered, it can induce unwanted astigmatism and, in the case of multifocal optics, the design's near optics will not center properly over the pupil.

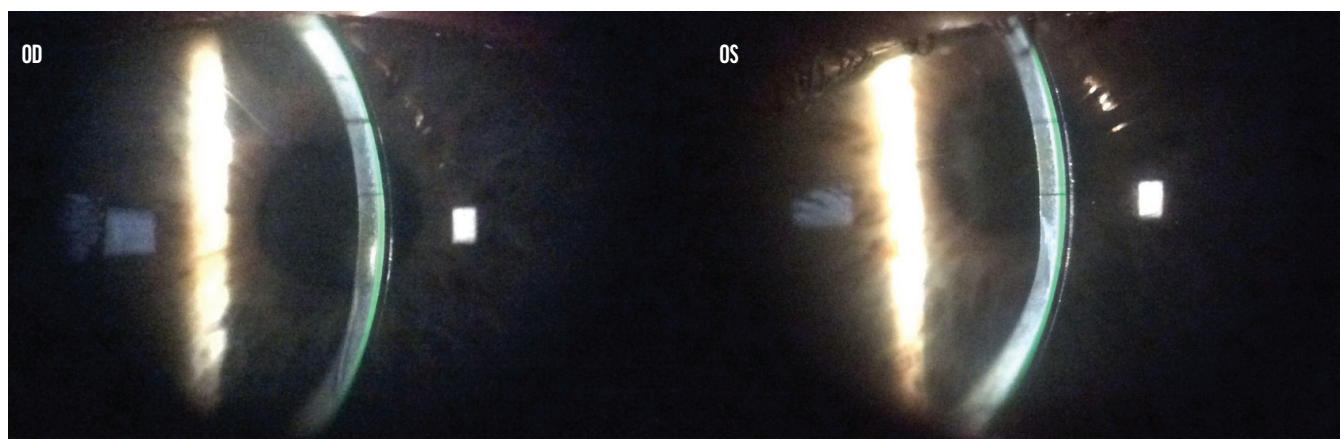


Figure 1. Slit-lamp evaluation showed the central corneal reservoir at the diagnostic evaluation. Note the corneal scarring in the corneal cross section view of the optic section. The scleral lenses appeared well-centered, and some modifications were made to increase the sagittal depth to allow adequate central clearance for all-day wear.

Once a well-centered design could be obtained, multifocal optics were incorporated. The patient was right eye dominant, so a slight undercorrection was done for the left eye to achieve a slightly modified multifocal effect. Slit-lamp findings and corneal topography confirmed a flat central corneal area surrounded by steepening in the midperiphery, which is often the case with post-surgical corneas. Given this finding, an oblate scleral design was chosen to provide an optimal fit (Figure 1). The custom lens design incorporating power changes, multifocal optics, and fit changes was ordered, and the patient returned to our clinic in 2 weeks for a dispense.

At the dispense visit, the patient was pleasantly surprised with his vision. He was able to see 20/20 OU at distance and near. The referring ophthalmologist was also pleased with the results of the first design. The overall fit of the lenses showed good centration, with approximately 250  $\mu$ m of central clearance on initial insertion.

Our scleral lens training was initiated, and the patient was dispensed with the lenses and instructed to return to our clinic after 2 weeks of wear. He was asked to schedule an appointment towards the end of the day. (I prefer end-of-day appointments for this type of visit because it is easier to see how the lens settles after several hours of wear.)

### Follow-up

The patient returned in 2 weeks, at which time slit-lamp images were taken (Figure 2). The patient reported great comfort throughout the day and clear vision at distance and near.

He presented with a VA of 20/20 OU at distance and near with the lenses, and slit-lamp examination confirmed a well-centered lens with alignment in the periphery with the sclera and no impingement or edge lift. The ocular surface was then examined with fluorescein after lens removal to ensure there were no signs of corneal or conjunctival staining. This step is important to ensure that no limbal keratitis from inadequate limbal zone clearance was present, in addition to any conjunctival hypertrophy from a steep peripheral haptic. The patient's ocular surface showed no signs of staining, and the patient and referring ophthalmologist were happy with the results.

### PATIENT MOTIVATION IS KEY

RK is a refractive surgical procedure that was first developed in the 1970s by Syvatoslave Fyodorov, MD.<sup>1</sup> In this procedure, radial incisions are made into the cornea to help correct the refractive error. RK was popular during the 1980s and early 1990s, but is nearly nonexistent in today's surgical practices. Those of us who have seen a decent

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## AT A GLANCE

- ▶ Radial keratotomy (RK) was popular during the 1980s and early 1990s but is nearly nonexistent in today's surgical practices.
- ▶ Many post-RK patients who were myopic pretreatment have ended up hyperopic with astigmatism, and their refractions behind the phoropter tend to be inconsistent, often varying from visit to visit.
- ▶ When an RK patient is highly motivated to try multifocal lenses and their expectations are set appropriately, it is possible to have a successful outcome with multifocal scleral lenses.

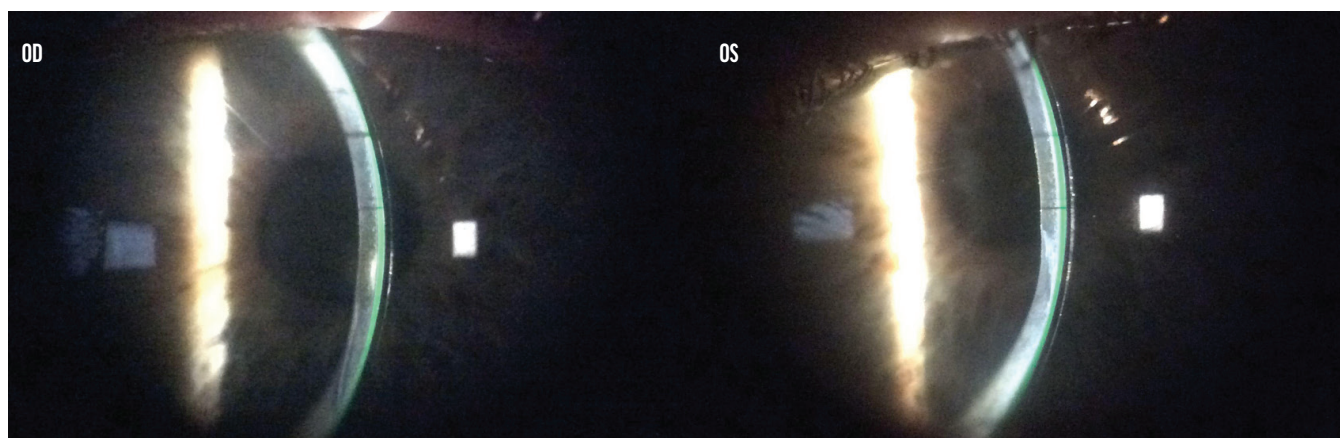


Figure 2. These images were taken sans fluorescein, as the patient came in wearing the lenses for approximately 8 hours. Even without fluorescein, the central clearance of the scleral lens in relation to the corneal tissue is notable. RK scars are also visible.

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share of post-RK patients can attest that many of them now complain of blurry and often fluctuating vision. A number of these patients who were myopic pretreatment have ended up hyperopic with astigmatism, and their refractions behind the phoropter tend to be inconsistent, often varying from visit to visit. Many of these patients have multiple spectacle prescriptions that they use throughout the year, depending on their day-to-day refractive status.

I have often been surprised with the success RK patients

experience with scleral lenses, not only in improving visual acuity, but providing more stable vision. In this particular case, I was hesitant to add multifocal optics to the design, given the patient's history of RK and PCIOL that may confound the visual outcomes post lens wear. However, when an RK patient is highly motivated to try multifocal lenses and their expectations are set up appropriately, such as the patient in the case presented here, it is possible to have a successful outcome. So, the next time an RK case is driving you crazy behind the phoropter, consider

discussing the potential benefits of trying multifocal scleral lenses to help correct and stabilize vision. ■

1. Fu L, Patel BC. Radial keratotomy correction. StatPearls Publishing. Updated November 2, 2021. [www.ncbi.nlm.nih.gov/books/NBK559162/](http://www.ncbi.nlm.nih.gov/books/NBK559162/). Accessed June 28, 2022.

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