

BACKGROUND

LASIK is a surgical refractive procedure that provides patients with a decreased dependence on glasses. Corneal ectasia is a noted complication that may follow the procedure. The belief is that ectasia results due to a decrease in structural integrity of the cornea. Topography can show the irregular astigmatism resulting from the ectasia. Patients complain of blurred vision and visual disturbances, such as glare. This case report shows the use of specialty contact lenses, such as sclerals, to provide improved vision to patients with post-LASIK ectasia. Our patient in this case also has a history of collagen cross-linking (CXL) performed to halt progression of the ectasia.

CASE REPORT

A 33 year old African American female presented for a specialty contact lens fitting. She was diagnosed with ectasia following LASIK performed in 2014 and had CXL OS in 2019 to decrease the progression of the corneal thinning. Her chief complaint was blur, OS > OD. Her other symptoms include light sensitivity, and difficulty driving at night OS > OD. She noted that she was “too young not to see.”

She presented in glasses with visual acuities of 20/40 OD and 20/60 OS. Her refraction revealed irregular astigmatism: OD 0.75 -1.75 x 095, 20/25 and OS +2.25 -5.25 x 130, 20/40. Topography confirmed the ectasia and showed inferior steepening of the cornea OU.

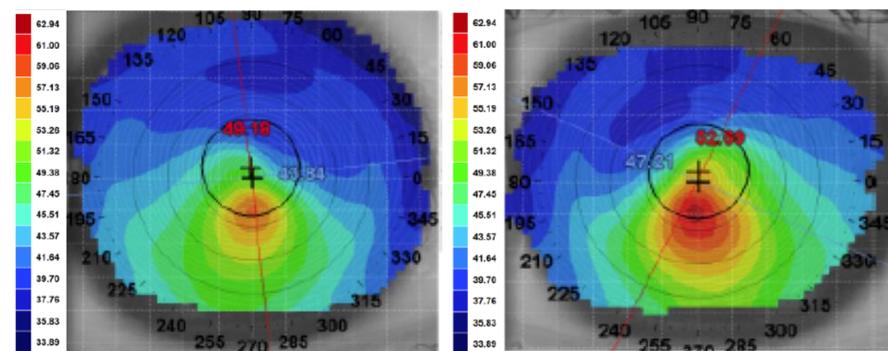


Figure 1: Axial maps (OD left, OS right) reveal inferior steepening OS > OD and large amounts of irregular astigmatism. Keratometric values are OD 43.64 @ 006 / 40.18 @ 096 and OS 47.21 @ 155 / 52.69 @ 65. Cornea cylinder values are OD 5.33D and OS 5.49D.

Initial Lens Parameters

| | Overall Diameter | Base Curve | Sag | Power | Peripheral Curve |
|----|------------------|------------|------|-------|------------------|
| OD | 15.8 mm | 41.00 D | 4390 | Plano | Toric |
| OS | 15.8 mm | 41.00 D | 4390 | Plano | Toric |

RESULTS



Figure 2: An optic section showing the clearance OD with the initial lens.

The initial lens OD showed 600 microns of clearance with a 1:1 ratio of lens thickness to tear reservoir clearance limbally. The lens was decentered inferiorly and showed blanching inferiorly and superiorly. The toric markers were at 4:00 and 10:00 showing a 30° rotation of the lens clockwise from the intended 3:00 and 9:00 positions. The over-refraction was plano and the VA was 20/20. The patient was aware of the lens superiorly. Changes were made to flatten the scleral landing zone in the vertical meridian and steepen the limbal clearance zone by one step.

The initial lens OS showed 600 microns of clearance with adequate limbal clearance of at least 50 um. The edges showed no edge lift or blanching. The toric markers were rotated 10° counterclockwise. After settling, no changes were needed to be made to this lens.

After an hour of settling, the lenses showed a little less than a 1:1 ratio of the lens thickness to tear reservoir. Anterior segment OCT images showed 285 microns central clearance OD and 211 microns central clearance OS. This amount of clearance offers good vision and allows for further settling of the lens over time.

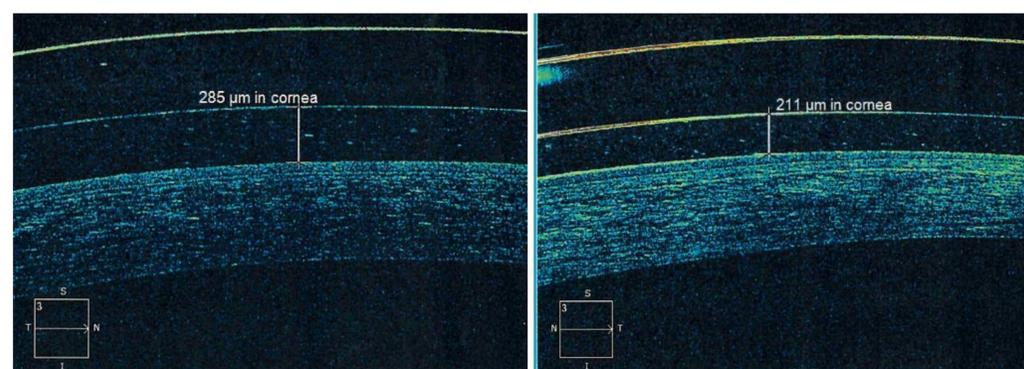


Figure 3: Anterior segment OCTs (OD on the left, OS on the right) showing clearance after an hour of settling with the initial lenses (400 microns thick).

Dispense appointment: The scleral lenses OD & OS were fitting well with 300 um of clearance. Both lenses were slightly decentered inferior and temporal. The patient had no vision or comfort complaints. The VA was 20/20 OD & OS with the lenses. The changes made to the lens OD did improve the fit at the edges, as there was no blanching.

2-week f/u: The patient was very happy with the lenses. After several hours of settling, there was adequate central clearance of 100 um and adequate limbal clearance. There were no signs of blanching.

DISCUSSION

The complaints of blur, halos, glare, and issues driving at night coupled with irregular astigmatism and steepening of the inferior cornea all suggested ectasia. Due to the history of LASIK, the patient was diagnosed with post-LASIK ectasia. There are more cases of ectasia following LASIK than that with PRK. Cases of ectasia can present rapidly following surgery or it can be years later. 50% of post-LASIK ectasia cases occur a year after surgery, whereas the majority of cases (80%) present within the first two years after surgery. The patient in the case noted changes in vision almost four years following the procedure. Early signs of ectasia include decrease in vision and increasing magnitudes of myopia following the refractive procedure. Later signs of ectasia include irregular astigmatism and steepening of the cornea usually inferiorly noted on topography.

Risk factors that predisposes a patient to developing ectasia after LASIK include higher amounts of myopia, thin corneal thickness, and abnormal topographies.

CXL can be performed for post-LASIK ectasia to prevent progression. It not only stabilizes the cornea, but also causes some regression of the ectasia and improvements in VA.

Sclerals can improve vision in post-LASIK ectasia. They not only correct irregular astigmatism, but also treat dry eye, which is a common complaint following LASIK.

CONCLUSION

The patient in this case presented with classic symptoms of post-LASIK ectasia. A mini-scleral lens provided correction for the large amounts of irregular corneal astigmatism. Only minimal changes needed to be made to the lens to provide an adequate fit. Her vision was corrected to 20/20 and her symptoms of glare were greatly improved.

Sclerals provided the patient with adequate vision and comfort. CXL was performed OS to prevent further progression. The patient will be monitored closely for progression and to observe the effectiveness of the CXL procedure and to determine whether CXL is necessary OD.

REFERENCES

Available upon request.