

# Unintended Consequences of Elective Surgery: Therapeutic Scleral Lens Fit for Post-LASIK Ectasia



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### Introduction

A patient presents with progressing reduced vision in the left eye and increased glare sensitivity. Corneal topography reveals significant corneal ectasia. This case report explores risk factors associated with post-LASIK ectasia and benefits of therapeutic scleral lens fit.

### Case History

A 52-year-old African American male reports progressive reduced vision OS>OD worsening over the past year as well as increased symptoms of glare at nighttime. His activities of daily life are being affected by his vision.

- Ocular History: LASIK 2003 OU without complication with BCVA 20/20 OD and OS post-surgery
- Medical History: Type 2 diabetes, asthma, hyperlipidemia
- Medications: metformin, atorvastatin, ibuprofen
- Social History: non-smoker

### Examination Findings

**Entrance Testing:**  
Visual acuity (corrected): OD: 20/20  
OS visual acuity history:

Date	BCVA	Pinhole	PAP
6/01/17	20/80	20/40	20/25
7/27/18	20/250	20/60	20/30
8/20/18	20/100	20/40	20/30

\*Pinhole acuity potential (PAP)

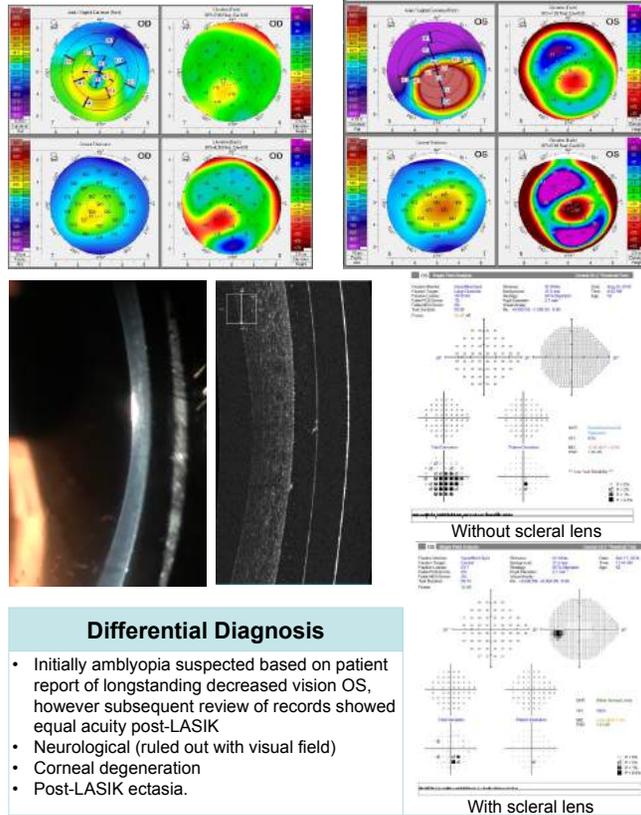
- Pupils, extraocular motilities unremarkable
- Retinoscopy: bright reflex OD; dim reflex OS
- Manual keratometry: difficult to accurately acquire due to irregular mires OS>OD
- Intraocular pressure: 18/16mmHg at 12:49 GAT

**Anterior segment:**  
OU: 2+ inferior punctate epithelial erosion  
OS: remarkable steepening of central cornea

**Posterior segment:** unremarkable OU

**Humphrey Visual Field 24-2**  
OD: unremarkable  
OS: overall depression on total deviation with unremarkable pattern deviation; repeat field with scleral lens with no defect.

**Corneal topography:**  
OD: crab claw pattern with mild inferior steepening and asymmetric superior and inferior axial curvatures  
OS: marked inferior steepening with +107um back elevation, 63D greatest curvature



### Differential Diagnosis

- Initially amblyopia suspected based on patient report of longstanding decreased vision OS, however subsequent review of records showed equal acuity post-LASIK
- Neurological (ruled out with visual field)
- Corneal degeneration
- Post-LASIK ectasia.

### Discussion

- Incidence of post-LASIK ectasia ranges from 0.04-0.6% with common encounters anecdotally by corneal specialists and specialty contact lens providers<sup>1</sup>. Can occur soon after or years after surgery<sup>1</sup>.
- Pre-operative risk factors depend on predicting how tissue ablation will affect corneal integrity. These include<sup>1,2</sup>:
  - Abnormal preoperative topography (forme fruste keratoconus)
  - Younger age
  - High myopia
  - Thin preoperative corneal pachymetry
  - Thin residual stromal bed thickness
- Structurally, the tensile strength of the anterior third of the corneal stroma is strongest as the irregular lamellar fiber orientation offers better support; the posterior two thirds of the stroma offers better optical quality due to organized lamellar fiber orientation but offers poor tensile strength. LASIK reduces tensile strength by about 27% through creation of flap and ablation of stromal tissue<sup>1</sup>.
- Red flags during preoperative testing:
  - Screening of anterior and posterior surface topography for  $\geq +1.40D$  superior vs. inferior corneal dioptric asymmetry<sup>4</sup>
  - $>10-15\mu m$  of posterior corneal elevation<sup>3</sup>
  - Corresponding areas of thin pachymetry<sup>4</sup>

### Treatment & Management

- After receiving post-LASIK records, referral to corneal specialist who diagnosed bilateral post-LASIK ectasia OS>OD.
- Continues to be followed for progression of ectasia with plan for corneal cross-linking if progression.
- Fit in therapeutic scleral contact lens with significant improvement in acuity OS to 20/30.

**Final Scleral Lens Fit: Custom Stable Prime**

OD: sag 4.280 / BC 41.00D / 8.23mm / +0.25D / dia 15.8mm / CT 400um / SLZ +4 BCVA 20/20  
OS: sag 4.540 / BC 43.00D / 7.86mm / -1.75D / dia 15.8mm / CT 400um / SLZ +4 BCVA 20/30

**Other Therapeutic Options<sup>1,4</sup>**  
Goal: vault cornea and reduce optical aberration

- Rigid gas permeable lens: aspheric, multicurve, reverse-geometry
- Tandem soft contact lens-rigid gas permeable lens
- Hybrid contact lens
- Prolate scleral contact: accommodates central corneal steepening
- Intracorneal ring segments (ICRS)
- Corneal cross-linking
- Penetrating Keratoplasty

### Conclusion & Clinical Pearls

- Careful topographic screening prior to LASIK can identify many patients at risk for post-operative ectasia
- Rehabilitative treatment includes specialty contact lens fitting, corneal cross-linking, or penetrating keratoplasty.
- Consider this differential if presentation of reduced acuity without other remarkable posterior segment findings.

### References

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