Heart *of* America
Eye Care Congress

COURSE 2: SCLERAL LENSES MADE PRACTICAL

Instructor: Elise G. Kramer, OD, FAAO, FSLS, FBCLA
Conference: Heart of America Eye Care Congress 2027
Date: Friday, February 19, 2027
Time: 4:00–5:40 PM
Instructional Duration: 100 minutes
Proposed COPE Category: Contact Lenses (CL)
Course Format: Live, in-person lecture with clinical case discussions
Target Audience: Primary care optometrists, specialty contact lens practitioners, and clinicians interested in scleral lens fitting

Course Description

Scleral lenses have become an essential tool in managing irregular corneas, ocular surface disease, and complex refractive conditions, yet many practitioners remain hesitant to incorporate them into routine clinical care. This course simplifies scleral lens fitting by focusing on patient selection, diagnostic evaluation, lens design, fitting assessment, and troubleshooting. Attendees will learn practical approaches to evaluating central and limbal clearance, haptic alignment, lens settling, and common complications such as midday fogging, discomfort, and conjunctival compression. Through real-world clinical cases, the course will demonstrate how to approach scleral lens fitting systematically, recognize opportunities for advanced customization, and achieve successful outcomes with greater confidence and efficiency.

Learning Objectives

At the conclusion of this course, participants will be able to:

1. Identify appropriate candidates for scleral lens fitting based on corneal anatomy, ocular surface health, refractive needs, and clinical indications.
2. Explain the fundamental principles of scleral lens design, including sagittal depth, corneal and limbal clearance, and scleral landing zone alignment.
3. Perform a systematic evaluation of scleral lens fit using slit-lamp examination, fluorescein assessment, and anterior segment imaging when available.
4. Recognize common scleral lens complications and select appropriate fitting modifications to address mechanical, optical, and ocular surface challenges.
5. Determine when advanced scleral lens customization, including toric or quadrant-specific haptics, freeform designs, or impression-based technologies, may be indicated.
6. Apply practical strategies for patient education, lens handling, follow-up, and long-term management.

Detailed Course Outline — 100 Minutes

I. Introduction: Why Scleral Lenses? (10 minutes)

A. Evolution of scleral lens technology

- Historical development of scleral lenses.
- Advances in high oxygen-permeable materials.
- Improvements in manufacturing and fitting technology.
- Expansion of indications beyond advanced keratoconus.

B. Clinical indications

- Keratoconus and pellucid marginal degeneration.
- Post-penetrating keratoplasty.
- Post-LASIK ectasia and other irregular corneal conditions.
- Severe dry eye and ocular surface disease.
- Exposure keratopathy and selected therapeutic indications.
- Complex refractive errors.

C. Patient selection

- Identifying appropriate candidates.
- Assessing ocular anatomy and ocular surface health.
- Recognizing contraindications and situations requiring caution.
- Setting realistic expectations.

II. Understanding Scleral Lens Design and Ocular Anatomy (15 minutes)

A. Scleral lens anatomy

- Central optical zone.
- Corneal clearance zone.
- Limbal clearance zone.
- Peripheral landing zone or haptic.
- Lens diameter and sagittal depth.

B. Understanding sagittal depth

- Relationship between sagittal depth and overall clearance.
- Effect of lens diameter on sagittal height requirements.
- Relationship between corneal shape and lens selection.
- Lens settling and its effect on final clearance.

C. Scleral shape and asymmetry

- Differences between corneal and scleral geometry.
- Toric and asymmetric scleral anatomy.
- Influence of scleral shape on lens alignment and stability.
- When spherical haptics may be inadequate.

D. Lens material considerations

- Oxygen permeability and lens thickness.
- Fluid reservoir thickness.
- Surface wettability.
- Balancing optical performance with ocular physiology.

III. Step-by-Step Scleral Lens Fitting (25 minutes)

A. Pre-fitting evaluation

- Comprehensive ocular history.
- Slit-lamp assessment.
- Corneal topography and tomography.
- Ocular surface evaluation.
- Anterior segment OCT and scleral profilometry when available.
- Selecting an appropriate initial diagnostic lens.

B. Diagnostic lens application

- Filling the lens with preservative-free saline.
- Avoiding trapped air bubbles.
- Proper application technique.
- Initial assessment of lens positioning and centration.

C. Central corneal clearance

- Evaluating initial central vault.
- Recognizing excessive versus insufficient clearance.
- Accounting for lens settling.
- Using slit-lamp examination and anterior segment OCT.
- Balancing corneal protection with oxygen delivery.

D. Limbal clearance

- Importance of avoiding mechanical limbal bearing.
- Recognizing limbal touch and excessive clearance.
- Adjusting limbal zone geometry.
- Monitoring changes after lens settling.

E. Scleral landing zone assessment

- Identifying blanching and conjunctival compression.
- Recognizing edge lift and excessive movement.
- Evaluating toric or asymmetric landing patterns.
- Determining when haptic modifications are necessary.

F. Optical evaluation

- Performing sphero-cylindrical over-refraction.
- Evaluating residual astigmatism.
- Identifying lens flexure and decentration.
- Considering front-surface toric correction.
- Assessing visual performance and patient comfort.

IV. Troubleshooting Common Scleral Lens Problems (20 minutes)

A. Excessive or insufficient vault

- Recognizing excessive central clearance.
- Identifying corneal and limbal bearing.
- Adjusting sagittal depth and clearance zones.
- Reassessing after lens settling.

B. Conjunctival compression and blanching

- Recognizing localized versus circumferential compression.
- Evaluating landing zone alignment.
- Flattening or modifying haptic geometry.
- Using toric or quadrant-specific haptics when indicated.

C. Edge lift and lens instability

- Recognizing peripheral edge lift.
- Identifying bubble formation and discomfort.
- Adjusting peripheral alignment.
- Evaluating lens diameter and centration.

D. Midday fogging

- Recognizing particulate debris within the fluid reservoir.
- Potential contributions from ocular surface inflammation and lens alignment.
- Evaluating filling solutions and lens fit.
- Addressing meibomian gland dysfunction and ocular surface disease.

- Strategies to reduce fogging and improve wearing time.

E. Surface non-wetting and deposits

- Identifying poor surface wettability.
- Evaluating tear film and lens care practices.
- Lens cleaning and surface treatment options.
- Addressing underlying ocular surface disease.

F. Hypoxia and corneal edema

- Recognizing clinical signs of inadequate oxygen delivery.
- Relationship between lens thickness, fluid reservoir depth, and material oxygen permeability.
- Modifying lens parameters to improve physiological performance.
- Identifying patients requiring additional monitoring.

V. Advanced Scleral Lens Customization (10 minutes)

A. Toric and quadrant-specific haptics

- Managing scleral asymmetry.
- Improving landing zone alignment.
- Reducing localized compression and edge lift.

B. Freeform and impression-based scleral lenses

- Indications for advanced customization.
- Role of scleral profilometry and impression-based technology.
- Managing highly irregular ocular anatomy.
- Applications in post-surgical and complex ocular surface cases.

C. Managing anatomical obstacles

- Pingueculae and conjunctival elevations.
- Localized microvaults and notches.
- Post-surgical anatomy and filtering blebs.
- Recognizing when lens wear may pose additional risks or require surgical co-management.

D. Advanced optical options

- Front-surface toric optics.
- Multifocal scleral lenses.

- Managing residual refractive error and higher-order aberrations.

VI. Patient Education, Handling, and Long-Term Management (10 minutes)

A. Application and removal

- Proper lens application techniques.
- Avoiding air bubbles.
- Safe removal techniques.
- Strategies for patients with reduced dexterity.
- Use of application and removal aids.

B. Lens care and hygiene

- Appropriate cleaning and disinfection.
- Use of preservative-free filling solutions.
- Avoidance of water exposure.
- Storage and replacement considerations.

C. Follow-up and monitoring

- Assessing lens fit after settling.
- Evaluating corneal and conjunctival health.
- Monitoring for edema, staining, and inflammatory changes.
- Identifying when refitting is necessary.

D. Long-term success

- Patient adherence and education.
- Managing expectations regarding adaptation and maintenance.
- Recognizing signs requiring immediate evaluation.

VII. Case-Based Applications (5 minutes)

Case 1: Keratoconus

- Diagnostic lens selection.
- Managing asymmetric corneal clearance.
- Optimizing visual acuity and lens stability.

Case 2: Severe ocular surface disease

- Using scleral lenses for corneal protection.
- Managing reservoir fogging and surface wettability.

- Balancing therapeutic benefit with ocular physiology.

Case 3: Post-surgical irregular cornea

- Managing unusual ocular anatomy.
- Recognizing the need for customized landing zones.
- Evaluating advanced lens designs.

VIII. Summary and Clinical Pearls (5 minutes)

- Successful scleral fitting begins with appropriate patient selection.
- Evaluate central clearance, limbal clearance, and landing zone alignment independently.
- Account for lens settling before finalizing the fit.
- Most common complications can be addressed through systematic assessment and targeted modifications.
- Advanced customization can expand fitting possibilities in complex cases.
- Audience questions and practical take-home recommendations.

Instructional Methods

- Didactic lecture supported by clinical photographs and diagrams.
- Slit-lamp images illustrating appropriate and inappropriate lens fits.
- Anterior segment OCT and corneal imaging examples.
- Clinical case presentations with fitting assessments.
- Interactive troubleshooting and audience participation.
- Comparative examples of standard and customized scleral lens designs.

Educational Materials

- Scleral lens fitting photographs.
- Anterior segment OCT images illustrating clearance and landing zone alignment.
- Corneal topography and tomography examples.
- Diagrams of scleral lens anatomy and design.
- Clinical troubleshooting flowcharts.
- Patient education examples for application, removal, and lens care.

Disclosure Statement

The course will be presented in accordance with applicable COPE requirements. Commercial relationships and potential conflicts of interest will be disclosed as required. Educational content will be evidence-informed and designed to support independent clinical decision-making without commercial promotion.

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