Scleral Lens Troubleshooting: A Case-Based Walkthrough of the Scleral Fitting Process

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1. The ideal scleral fit
    a. Successful patient outcome
        i. Optimize vision
        ii. Therapeutic benefit
        iii. Comfortable wear
    b. Scleral fitting objectives
        i. Vault the cornea
        ii. Align the haptics
    c. Efficient process
        i. Utilize technology
        ii. Effectively troubleshoot
2. Diagnostic lens selection
    a. Case scenario I – part I
        i. Patient information
            1. Demographics – Female, mid 50's, Last CL experience GP's 20+ years ago
            2. Anatomy
                a. Corneal pathology – Post RK
                b. Conjunctiva – Mild conjunctivochalasis
            3. Topography
                a. Corneal shape – oblate
                b. HVID
        ii. Poll question: Which of these considerations factor most heavily into diagnostic lens selection?
    b. Considerations
        i. Diameter
            1. HVID
            2. Anatomy
                a. Corneal pathology
                b. Conjunctival abnormality
                c. Eyelid anatomy
        ii. Design capabilities
            1. Toric haptics
            2. Peripheral lens customization
            3. Advanced optics
3. Scleral Fitting Approach – Inside-Out Approach
    a. Central clearance – Apical and mid-peripheral
        i. Case Scenario I – part II (same patient as 1 a)
            1. Dx lens 1 - Excessive clearance (image or slit lamp demo)
                a. Decentered
                    i. Loose haptics
                        1. Easy push up
                b. Tear layer
                    i. May be asymmetric
            2. Dx lens 2 - Insufficient clearance (image or slit lamp demo)
                a. Touch
                    i. Apical or midperipheral
                b. Poor comfort
                    i. Edge lift possible

ii. Evaluating central clearance
    1. Slit lamp demo (if available)
    2. Poll question: Central clearance w/ white light assessment (image)
    3. Ideal vault
    4. Lens settling
iii. Complications
    1. Excessive clearance
        a. Hypoxia → Hypoxia case later
        b. Epithelial bogging
    2. Insufficient clearance
        a. Mechanical damage

b. Limbal clearance
    i. Evaluating limbal clearance
        1. Techniques
    ii. Case scenario I – Part III
        1. Minimal clearance (slit lamp image) – possible or likely touch
        2. Poll: Would you dispense this lens?
            a. If dispensed, when would you follow up?
        3. Follow up visit
            a. Limbal staining
        4. Troubleshooting insufficient limbal clearance
    iii. Excessive limbal clearance
        1. Complications
            a. Neovascularization
            b. Injection and limbal congestion
            c. Microcystic edema
            d. Conjunctival prolapse
        2. Troubleshooting

c. Scleral alignment
    i. Evaluating the haptics
        1. Outside the slit lamp
        2. Slit lamp
        3. OCT
    ii. The ideal alignment
    iii. Scleral landing challenges
        1. Too tight
            a. Blanching
            b. impingement
        2. Too loose
            a. Edge lift
        3. Conjunctival irregularities
            a. Elevations
            b. Conjunctivochalasis
    iv. Case scenario I – Part IV
        1. Show the four quadrants of the Dx lens (spherical haptics)
            a. Assume no profilometry data
            b. No visible blanching or impingement and good initial comfort
        2. Poll: Would you order the lens and dispense?
            a. Assume lens is dispensed

d. Case scenario I – Conclusion
    i. 2-week FU results
        1. Patient feedback
            a. Redness and “dry sensation”
            b. Vision less clear

2. Show four quadrants again
    a. Blanching or impingement on vertical meridian (ATR)
        i. Watch for emerging hypertrophy
3. Slight spherocylindrical OR (~ 0.75 D cyl)
4. Faint limbal staining post removal (assume central clearance still sufficient)

ii. Poll: What's the next step?
1. Increase diameter only
2. Increase diameter and add toric haptics
3. Add toric haptics and increase limbal clearance
4. Add toric haptics, increase limbal clearance, and add front surface toric

iii. Toric and quad specific haptics
1. Decision making for how to add
2. Follow up protocol
    a. Consistency of rotation – lens markings

iv. Case wrap
1. Address limbal clearance
2. Front surface toricity
    a. Rule out flexure/torque – toric haptics can reduce
        i. May also be from decentered lenses
    b. Stabilized by ballast or toric haptics

4. Case scenario II
    a. Patient information
        i. Early 30's male with corneal ectasia
        ii. Previously tried sclerals, but lenses were always uncomfortable and "foggy"
        iii. Topography
            1. Moderate cone OU
            2. Average HVID
    b. Select a typical Dx lens w/ OAD of 15.6 to 16.5 mm but w/ toric haptics by default
        i. Findings - Edge lift 360 and easy push up
            1. When holding lens centered, central clearance is ~ 300 microns
    c. What next?
        i. Case sidebar – Discuss profilometry
            1. Ideal situation to use profilometry if no perfect Dx lens is available
            2. Brief discussion on three available platforms
        ii. What is the scleral shape?
            1. Steepen 360 or guess toricity?
                a. Order lens and see what happens
        iii. Dispense appointment
            1. Horizontal alignment, but slight edge lift on vertical meridian
            2. Minimal movement, good comfort
            3. Ok to dispense?
    d. Initial follow up
        i. Patient complaint – comfort decreases over time and lenses get foggy
            1. Does note that these are better than previous attempt ☺
        ii. How to assess lens fogging
            1. Anterior vs posterior lens
            2. Vital dye uptake – discuss technique
    e. Mid-day fogging
        i. Causes
        ii. Troubleshooting
    f. 1 year follow up
        i. Patient complaint – nasal redness and discomfort
        ii. Findings – conjunctival hypertrophy (OCT image)

iii. What can we do about this?
1. Increase toricity
2. Change diameter
3. Add peripheral customization (notch, vault, channel)

g. Peripheral Customization
i. Options
ii. How to incorporate

5. Case Scenario III
a. Patient Information
i. Mid 50's female, post LASIK, former high myope
ii. Hates readers wants to get back into CLs, but has struck out with all soft lenses
1. Residual cyl of 1.25 D and an oblate cornea
2. +1.75 add

b. Scleral fit
i. Diagnostic fit – textbook fit, good DV
ii. Multifocal considerations
1. Centration critical
2. Clear visual axis
3. Zone selection
a. Decentered optics
b. Zone sizes

c. Follow-up
i. Patient complaint – cloudy vision not long after applying lenses
ii. Findings – Poor wetting lens
iii. Poll: common causes for poor wetting (all the above type of question)

d. Poor wettability
i. Causes
ii. Troubleshooting
1. Material change
2. Coatings – HydraPeg
3. Eliminate cosmetics and non-essential products
4. Treat underlying OSD
5. Re-evaluate scleral care products

e. Care products
i. Cleaning and disinfection
ii. Filling solutions

6. Case scenario IV
a. Patient information
i. 75-year-old male with neurotrophic cornea secondary to HZV
ii. Contact lens neophyte
iii. Arthritis
iv. Moderate dermatochalasis

b. Scleral lens selection
i. Poll: Would you choose large diameter or small?

c. Scleral handling
i. Application and removal aids
ii. Potential issues
1. Bubbles
a. What's acceptable?

d. Corneal staining
i. Stain prior to scleral wear – Scleral induced or already present?
ii. Differentiating staining patterns

7. Case scenario V – If time permits
a. Patient information

i. Mid 20's patient with mild KCN, Post CXL
    1. BCVA w/ specs 20/30 – 20/50
ii. Central nipple cone OU
iii. Has worn GP lenses before, but works in law enforcement and worried about lens dislodgement
iv. Topo file (image)

b. Scleral fit
    i. Textbook fit, but VA only 20/25
    ii. Pt c/o shadowing
c. Higher order aberration
    i. Discuss wavefront correction