Analysis and Comparison of Scleral Lens Fitting Techniques

History
- Scleral lenses first described in late 1800s; Impression molding done in the 1970’s

Uses
- Irregular Cornea
  - Keratoconus
  - Pellucid Marginal Degeneration
  - Post Surgical
  - Post Corneal Transplant
  - Refractive Surgery
  - Post trauma
  - Salemann's Nodular Degeneration
- Dry Eye
  - Stevens Johnson Syndrome
  - Graft versus host
  - Pemphigoid

Disclosure Statement:
• Nothing to disclose

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These slides were prepared in advance of this meeting.

If you would like an updated version of this presentation please contact me at lotoczky@ferris.edu
Analysis and Comparison of Scleral Lens Fitting Techniques

BostonSight PROSE Treatment
- Prosthetic Replacement of the Ocular Surface Ecosystem (PROSE)
- Restores a health stable ocular surface
- Improves visual acuity
- Protects

What are the Main Concerns for the New Scleral Lens Fitter?
- Are GP lenses that are this large comfortable?
- How are these large lenses applied to the eye?
- How are the lenses removed?

Are Scleral Lenses Comfortable?
- Yes, and the comfort factors are:
  - Lens design
  - Large enough to position underneath both lids
  - Limited (if any) lens movement

Understanding Corneal Shape

Corneal Scleral Angle

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How big can we go?

Lens Designs
- Some bearing on cornea and sclera
  - SozClear (Dakota Vision Science/Art Optical) 13-15mm
  - Perimeter (Essilor) 14.0-14.8mm
- Some bearing on limbus and sclera
  - One Fit (Blanchard) 14.3
  - Rose K2 XL (Art Optical) 13.6-15.6

Corneal Scleral lenses
- Designed to equally distribute pressure along corneal and scleral surfaces
  - Don’t have to completely vault the cornea
- Fit just outside limbus and can be used on all types of corneas
- Some designs distribute weight on limbus

Clearance
- Excessive central bearing, edge lift and or limbal bubbles indicate a flat fit.
- Deep central pooling or central bubbles indicate a steep fit.
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Fenestration?
- Has a significant effect on the fit
  - Results in a lens that "sits down"
  - Allow bubble formation
  - Non-fenestration will allow the lens to "float"
    - Trap more tears
    - Come in less contact with the cornea
    - Better choice for fragile ocular surfaces.

Scleral Lens Design
- 3 Zones
  - Optical zone
    - Just like standard GPs
    - Houses the optical correction
  - Transition zone
    - Controls sagittal depth
    - Landing Zone (haptic zone)
      - Area where lens "fits"
      - Needs to align with sclera
      - Needs to be ≥ 2mm

Lens Brands
- Custom Stable (Valley Contax) 15-18 mm
- MSD (Blanchard) 15.8 mm
- Maxim (Acculens) 16.0 mm -17.5 mm
- Comfort SL (Acculens) 16.2 (for normal eyes)
- DigiForm (TruForm) 13.5-16.0 mm
- TruScleral (TruForm) 18.0 mm
- Jupiter (Essilor) 15.0-20.8 mm
- Normal Eyes (Paragon) 15.5 mm
- Europa (Visionary Optics) 16, 18, or 20 mm
- Atlantis (X-cel Contacts) 15-18mm

Scleral Fitting
1. Choosing diameter
   - Based on:
     - Anatomy
     - Should be at least 2mm larger than limbal area of the eye.
- Fitting sets
- Corneal size
- Ocular disease/Degree of irregularity
- Amount of clearance needed

2. Clearance
   - Amount is design and practitioner dependent
     - Varies from 100 to around 400 microns
     - Allow for 100-200 of lens settling after initial fitting

Selecting the Proper Sagittal Depth
1. Use OCT
2. Based on Topography
3. Using Corneal Profile
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Slit Lamp Evaluation

Slit Lamp Evaluation

Slit Lamp Evaluation

Slit Lamp Evaluation

How much central clearance is shown in these photos?

a) 100 microns
b) 300 microns
c) 500 microns
d) 800 microns

Lens Parameters
- Power: -3.00
- BC: 7.30
- Sag: 4.78
- CT: 0.35mm

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Scleral Fitting
3. Landing Zone assessment
   - Goal is to align with corneo-scleral transition
   - Lens awareness can occur if there is too much edge lift.
     - Excessive edge lift is caused by either the PC’s being too flat or the lens SAG being too low.
     - Proper edge should not lift off of the sclera or more importantly impinge into it
       - Blanching

“Push-in” test
- Nudge the lower lid just below the lens edge in order to indent the sclera gently
- Determine how much pressure is needed to cause slight stand off
  - A good edge will need a gentle push
  - A tight periphery requires a firm push
  - Very little pressure is indicative of a flat edge

Excessive Edge Lift

Edge Assessment
- White light assessment
  - Look to see if lens "sinks" in
  - Look for tear exchange??

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Impingement Ring
- Indentation left after lens removed
- Will negative stain
- Not a concern as long as no discomfort or positive staining is occurring

Movement
- Scleral lenses usually do not move

Scleral Fitting
4. Over-refraction
- Done after allowing lens to settle for at least 25 minutes
- Vertex any powers over 4.00 before adding them to the trial lens power
- Tear lens power not always predictable

Troubleshooting
- Lens awareness
  - Potential causes:
    * Excessive Edge lift
    * Low SAG
    * Flat peripheral curves
    * Tight peripheral curves
    * Conjunctival injection or blanching
    * High SAG

Troubleshooting
- Decreased VA during lens wear
  - Potential causes:
    * Metabolic debris
    * Remove lens, clean, reinsert
    * Filling lens with wrong solution
    * Lens not wetting
    * Incorrect SAG
    * Too low causes SPK
    * Too high can cause edema
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Michigan College of Optometry Scleral Lens Settling Evaluation
- 6 Different Lens Designs
- Settling measured using OCT at initial fit, every hour for the first 4 hours and at 1 week
- Results

Scleral Lens Publications

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