Disclosures:
In the past year, Dr. Walker has received research funding or honoraria from the following companies:
Ocular Dynamics
Vision Path, Inc
In the past year, Dr. Walker has received research funding or honoraria from the following companies:
Ocular Dynamics
Vision Path, Inc

In the past year, Dr. Lee has received research funding or honoraria from the following companies:

This talk does not contain information regarding the aforementioned companies
Contact Lens Distribution in 2015

- Silicone Hydrogel: 68%
- Hydrogel: 20%
- PMMA: 1%
- Hybrid: 2%
- Gas Permeable: 9%

Jason Nichols, CL Spectrum Annual Report 2015
Rigid Lens Fitting Trends 2015
Industry Trends in 2015
SPECIALTY CONTACT LENS FITTING IN 2016

1. Irregular astigmatism
   - Keratoconus / PMD
   - Post Corneal Transplant
   - Post Radial Keratectomy
   - Post LASIK/PRK
   - Post Intacs
   - Corneal Scarring

2. Ocular surface protection
   - Post surgical
   - Ocular surface disease (OSD)

3. Other
   - High Rx, amblyopia, myopia control, prosthetics, aphakia, and more...
SPECIALTY CONTACT LENS OPTIONS IN 2016

- Custom Soft
- Corneal GP
- Piggyback
- Hybrid
- Scleral
So how do we choose a contact lens??

- BCVA / success in spectacles
  - 20/30 or better in specs – soft lenses
  - 20/40 or worse in specs – rigid

- Corneal topography
  - 300um elevation “rule”

- Patient Characteristics
  - Occupations / vocations
  - Dexterity
  - Previous experience
DESCRIBING CORNEAL SHAPE
Steep Meridian

Flat Meridian

22 microns INTO the cornea

Elevation Display

Axial Display

46 microns AWAY FROM the cornea

68 microns
Modern Scleral Contact Lenses
Introduction to Scleral Lenses

- Defining Scleral Lenses
- Indications
- Assessment of Scleral Lenses
- Troubleshooting
- Application & Removal
- Care Regimen / Solutions
- Patient Management
# GP Lens Types

<table>
<thead>
<tr>
<th>Lens Type</th>
<th>Description</th>
<th>Definition of Bearing Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corneal</td>
<td>Lens rests entirely on the cornea</td>
<td>Lens rests entirely on the cornea</td>
</tr>
<tr>
<td>Corneo-scleral</td>
<td>Lens rests partly on the cornea, partly on the sclera</td>
<td>Lens rests partly on the cornea, partly on the sclera</td>
</tr>
</tbody>
</table>
| Scleral        | **Mini-Scleral**  
*Lens is up to 6mm larger than HVID* | Lens rests entirely on the sclera               |
|                | **Large Scleral**  
*Lens is more than 6mm larger than HVID* |                                                 |

Table adapted from the Scleral Lens Education Society
**SHOW ME THE SCLERALS!**

<table>
<thead>
<tr>
<th>Scleral</th>
<th>Mini-scleral</th>
<th>Lens bears entirely on the sclera</th>
<th>Somewhat limited tear reservoir capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Lens is up to 6mm larger than HVID</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Scleral</td>
<td><em>Lens is greater than 6mm larger than HVID</em></td>
<td>Lens bears entirely on the sclera</td>
<td>Almost unlimited tear reservoir capacity</td>
</tr>
</tbody>
</table>

![Diagram of eye anatomy](image)

Photo credit: Boris Severinksy
SAGITTAL DEPTH: THE VAULT OF THE LENS

- \( s = r - \sqrt{r^2 - h^2} \)
- Diameter dependent
- Base curve dependent

Where to start?
- Measured SAG
- Keratometry values
- Middle of the lens set
- Favorite lenses over time

http://www.oculist.net/downaton502/prof/ebook/duanes/pages/v1/v1c055.html
INDICATIONS

- Irregular Corneas
  - Ocular surface disease
  - Corneal ectasias
  - Post-surgical

- High Ametropia

- Other Uses
  - Regular corneas
  - Sports
  - Cosmesis (ptosis, aniridia, prosthesis)

- Unsuccessful with other lens modalities

Photo Credit: Greg DeNaeyer, OD
THERAPEUTIC INDICATIONS

- Ocular surface disease
  - Dry eye syndrome
  - Limbal stem cell deficiency
- Exposure keratitis
- Neurotrophic corneal disease
- Systemic disease with ocular manifestations
  - Sjögren’s syndrome
  - Grave’s disease
  - Graft versus host disease
  - Atopic dermatitis
  - Facial nerve palsy / Bell’s palsy
  - Cicatricial pemphigoid
  - Stevens-Johnson syndrome

http://www.eyesurgeryinberkshire.co.uk/information_fj/fj_facial_nerve_palsy.html
PATIENT EXPECTATIONS AND EDUCATION

● Advantages
  ● Vision
    ● Similar or enhanced vs. corneal
  ● Lens stability
  ● No lens ejection
  ● Comfortable
  ● Protection
  ● Improvement in dry eye signs/symptoms

Photo Credit: BostonSight
PATIENT EXPECTATIONS AND EDUCATION

- Disadvantages
  - Cost (fitting + lenses)
    - Medically necessary?
  - Handling difficulty
  - Extra solutions
  - Time investment for you and the patient
PATIENT EXPECTATIONS AND EDUCATION

• Prepare the patient and avoid surprises!
  • Expect to remove and reapply lens once during the day
  • May need to use rewetting drops during use and prior to lens removal
  • Expect some redness to occur after lens removal
FITTER BEWARE!

- Pingueculae
- Bleb or tubeshunt
- Symblepharon
- Conjunctivochalasis
- Excessive ocular reflex
- Higher order aberrations

It’s important to set realistic expectations!
GET IN THE ZONE

- Every lens design is different
  - Central curve, base curve, optic zone
  - Peripheral curves

- Every lens design is the same
  - Corneal curves
  - Limbal curves
  - Scleral curves
  - “Corneal chamber”

Photo courtesy of Boris Severinksy
APPLICATION AND REMOVAL

- Application
  - Plunger
  - Tripod
  - Custom devices

- Removal
  - With or without “plunger”

Video: https://www.sclerallens.org/how-use-scleral-lenses
Problems with Removal?

Almost always associated with technique
RARELY because of fit or patient anatomy

Patient Education is KEY
SCLERAL LENS CLEANING SOLUTIONS

- Need for less abrasive cleaners
  - Boston Simplus
  - Optimum by Lobob
  - Clear Care
  - Unique pH
SCLERAL LENS FILLING SOLUTIONS

- Sodium Chloride Inhalation Solution 0.9% (100 vials)
- Purilens 30-day preservative free saline
- Lacripure (unit dosed saline) *FDA Approved**
RECOMMENDATIONS

• Preservative-free artificial tears
  • For use inside or outside of lenses

• Remove lenses prior to instillation of medicinal drops
  • Wait 10 minutes before applying lenses

• No sleeping in lenses unless indicated
  • Minimal research yet
Fitting Technique: Fluorescein
HOW TO FIT SCLERAL LENSES

1. Complete corneal vault
2. Clear the limbus
3. Scleral alignment

http://www.reviewofcontactlenses.com/content/d/irregular_cornea/c/33645/dnnprintmode.true/?skinsrc=%5B!%5Dskins/rccl2010/pageprint&containersrc=%5B!%5Dcontainers/rccl2010/simple
HOW TO FIT SCLERAL LENSES

1. Complete corneal vault
2. Clear the limbus
3. Scleral alignment
**Ideal Corneal Vault**

- **Literature:**
  - Low = 50-100 um
  - Moderate = 100-250 um
  - High = 250-400 um

- **Manufacturers:**
  - Design dependent

Photo credit: Karen Lee, OD
**Ideal Corneal Vault**

- Does the lens clear or touch the apex?
**WHITE LIGHT – HIGH MAG**

- Tear Layer on front surface of lens
- Lens CT = .35mm
- 350 microns
- Corneal Thickness
- Central Clearance
Central Clearance

50 Microns

150 Microns

300 Microns

500 Microns

600 Microns
HOW TO FIT SCLERAL LENSES

1. Complete corneal vault
2. Clear the limbus
3. Scleral alignment
IDEAL LIMBAL CLEARANCE

- Vault the peripheral cornea and limbus

Photo credit: Greg DeNaeyer, OD
Limbal Clearance

- ? clearance
- 50-100 clearance
- 100-150 clearance
Limbal Clearance
HOW TO FIT SCLERAL LENSES

1. Complete corneal vault
2. Clear the limbus
3. Scleral alignment
IDEAL SCLERAL ALIGNMENT

- No blanching of blood vessels
- No impingement
- No edge lift

Photo credit: Greg DeNaeyer, OD
Avoid Scleral Bearing

Blanching

Impingement
Haptic Alignment

Edge lift

Ideal Landing

Hint of impingement

Significant impingement
IDEAL OVERALL FIT

- **Ocular signs**
  - Healthy cornea
  - No staining

- **Wear time**
  - Patient dependent

- **Removal**
  - Semi-seal, not suction
GETTING CUSTOM

• Check with your lab for specific ranges/design limitations

• Ask about ability to customize:
  ● Front-surface toric
  ● Back-surface toric periphery
  ● Aberration control
  ● Fenestrations
  ● Notches
  ● Multifocal
FOLLOW-UP EXAMINATIONS

• Fit and vision
• Evaluate tear exchange
• Beginning of day vision and comfort
• End of day vision and comfort
QUESTIONS?
REFERENCES & RESOURCES

