Scleral Lenses Basics

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1

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2

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3

Disclosures

Jason

- None

Shalu

- Alcon
- Allergan
- Bausch & Lomb
- Bayer
- Blanchard
- BostonSight
- Coopervision
- Eyeris
- Essilor
- FYI Doctors
- Gas Permeable Lens Institute (GPLI)
- JJVC Vistakon
- Novartis
- Paragon Bioteck
- Santen
- Scleral Lens Education Society
- Sjogren's Society Foundation
- STAPLE program
- Sun Pharma
- Tarsus

4

The Basics

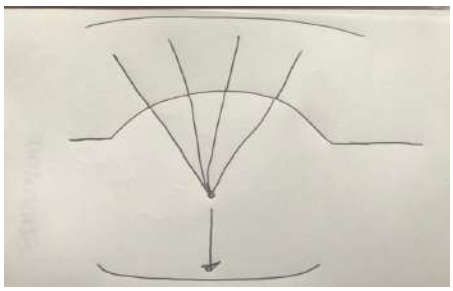
5

Advantage of Scleral lenses

- **Better Centration** - larger lens with no corneal touch
- **Better Retention** - less inferior lens standoff
- **Better Comfort** - no corneal touch
- **Better Vision** - masking corneal irregularities
- **Better Protection** – reducing exposure
- **Better Hydration** – Vault of fluid under the lens

6

How do they work?



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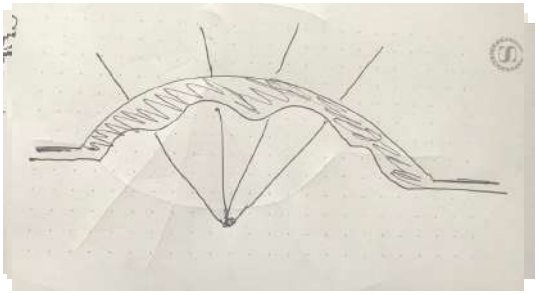
How do they work



8

Scleral Lens Indications

- Irregular Cornea

  SCOPE I Results:
  74% fit for corneal irregularity

- Ocular Surface Disease

  SCOPE I Results:
  16% fit for Ocular Surface Disease

- Healthy Eyes – Refractive Errors

  SCOPE I Results:
  10% fit for Refractive Error

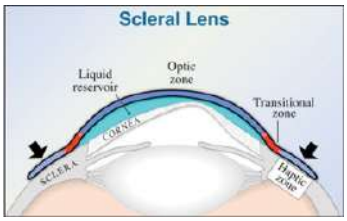
9

Fitting Scleral Lenses

10

Basic Fitting Principles

- Completely vault the cornea and limbus
- Align to the bulbar conjunctiva as gently as possible



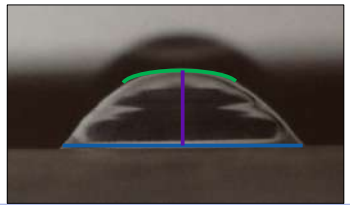
11

Scleral Lens Terms

Overall Diameter (OAD): longest diameter of lens

Total Sagittal Depth: "height" of the lens from base to apex

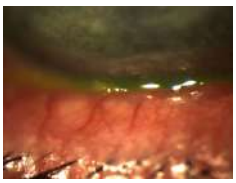
Base Curve (BC): curvature of the optic zone



12

Most Important Fitting Tip

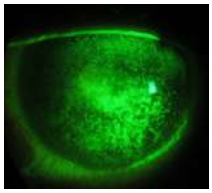
- YOU MUST CLEAN UP THE LIDS FIRST

13

2nd Most Important Fitting Tip

- Look at the cornea before you start with NaFL

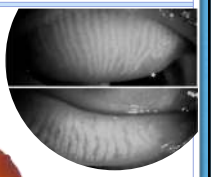
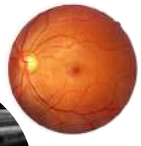
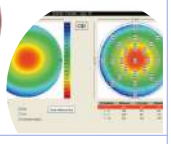
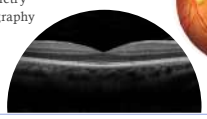


- Keep checking the cornea during your fit

14

3rd Most Important Fitting Tip

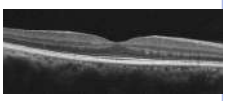
- Set up Baselines Before you begin
- Full Exam needed
- Imaging & Documentation
  - Corneal staining
  - Topography
  - Ant Photography
  - Retinal Scans
  - Pachymetry
  - Meibography

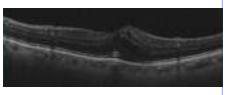





15

Why so many baselines?

- To Track Changes
- Are you creating a problem?
- Are you making things better?





16

How do you choose the first lens??

17

Which brand to start with?

- Pick one … any one
- Learn it inside and out
- Work with your lab partners to perfect vour understanding
- Become comfortable then add fit

18

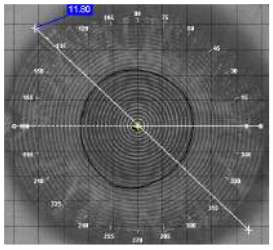
The Details of the Design

- Know the zones names, sizes and capabilities
- Know your lens fitting expectations

Evaluating Ideal FR Depth for optimal fit (µm)	Initial Application	30-45 Minutes	4+ Hours
Optic Zone	250-300	220-225	150-175
Transition Zone	150-175	125-150	100-125
	100-125	75-100	50-75
Landing Zone (Edge)	Aligned to Sclera	Aligned to Sclera	Aligned to Sclera

19

Corneal Diameter



- Diagonal vs. Horizontal
- DVID is ~0.40mm larger than HVID
- 3mm larger OAD
- Larger for DED, Large Fissures, Conj Exposure

20

Keratomet ... the cornea

43.00K

43.00K

All (4) eyes have the same Keratometry readings
Each eye calls for a completely different scleral lens

21

Diagnostic Fitting

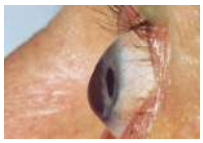
METHOD #1

- Fitting Set is needed
  - Base Curve
    - Diopters
    - mm
  - Sagittal height
- Choose the middle lens

22

Look at the profile

METHOD #2

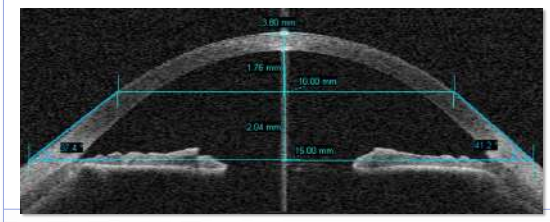


23

Anterior Segment OCT

METHOD #3

- **Sagittal Depth – Fittings sets marked this way**
- **Use OCTs to calculate SD**

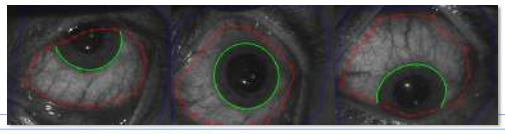


24

Eaglet EyeSurface Profiler
sMap 3D
Oculus - Pentacam

METHOD #4

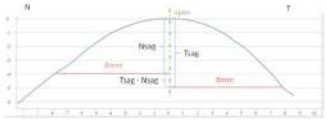
Large surface area mapped
100,000's data points
20mm diameter area

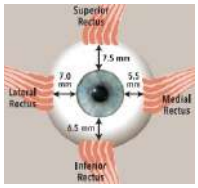


25

The Sclera – what do we know?

- Not spherical – Toric in nature
- Nasal side is flatter and higher
- Temporal side is steeper but lower
- Lenses naturally decenters infero-temporally

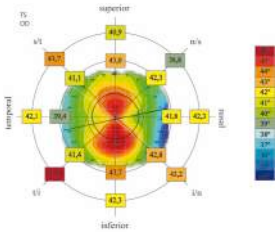




26

Understanding the Sclera

- The closer to the limbus
  - Tougher tissue – bulbar conj
  - Less irregularity
  - Less settling
- Further away from the limbus
  - Spongier sclera
  - More irregular
  - More settling
  - Toric PCs are often needed



27

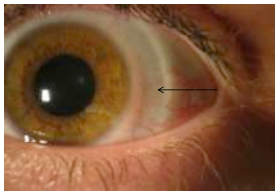
Fitting Steps Overview

- Insert with NaFL
- Quickly evaluate three zones
  - Sagital Height
  - Limbal clearance
  - Scleral landing zone (Haptic Zone)
- Let lens settle (20 - 30 mins)
- Re-evaluate the fit and three zones – 360º
- Autorefraction, Vision, Refraction, K's
- Let settle for 4 hours and re-evaluate all parameters

28

Lens Settling

- The scleral lens rests on the spongy bulbar conj and will settle up to 200 microns
- The larger the lens the more settling occurs (spongier sclera)
- Caroline/Andre 2012
  - 16.5mm 96 microns 8h
- Kaufmann et al. 2013
  - 15.8mm 133 microns 8h
  - 18.2mm 88 microns 8h
- Nau/Schornack 2013
  - 15.0mm 107 microns 2h



- The lens continues to settle over hours and up to one month post wear

29

Lens Prep

- Clean the lens with Boston Advance Cleaner/Simplus/ClearCare
- Condition Lens with – Biotrue/Boston Cond.
- Rinse lens with with non-preserved sodium chloride
- Position lens on large DMV scleral – no suction
- Overfill the bowl with non-preserved NaCl
- Add fluorescein from a strip to the bowl

30

Cleaning Solution

31

Application Solutions

32

Rinse and Application Saline

NaCl 0.9% Inhalation Solution	LacriPure (Menicon)	ScleralFil (B+L)	Nutrifill (Contamac)	VibrantVue Scleral Saline (ABB)	Purilens (The LifeStyle Company)
No buffers, no preservatives	No buffers, no preservatives	Contains borate buffer, no preservatives	Phosphate buffer, no preservatives, contains electrolytes	No buffers, no preservatives	Contains borate buffer, no preservatives
Off-label	FDA approved	FDA approved	FDA approved	FDA approved	FDA approved
3 ml or 5 ml vials	5 ml vials	10 ml vials	10 ml vials	5 ml vials	4ml bottle

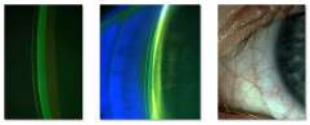
33

Don't forget global views

34

Assessing the Fit

- Fluid Reservoir
  - Cobalt Blue vs White Light
  - NaFl in the bowl
- Landing Zone
  - White Light
  - NaFl on top of the lens



35

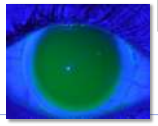
Assessing the Fit

Optic Zone | Limbal Zone | Landing Zone

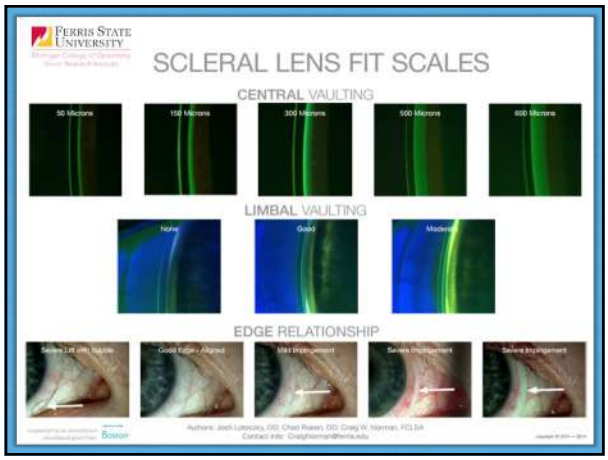
36

Optic Zone

- No bubbles
- No bearing/No Touch
- Completely vault the cornea
- Outermost dark band is lens
- Middle green band is tear lens
- Inner band is cornea



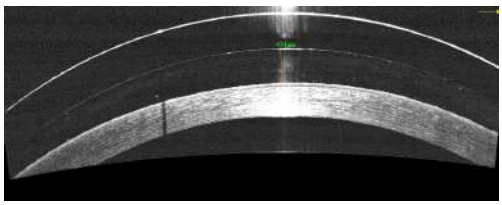
37



38

Optic Zone on OCT

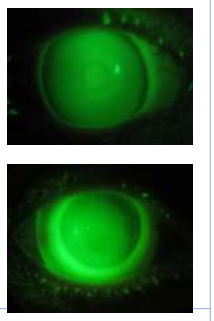
- You can use an OCT to measure the clearance in the OZ



39

Limbal Zone

- The limbus contains stem cells and this area should be adequately vaulted.
- You want 20 -100 Microns
- Shadows may look like touch – look right and left



40

Limbal Zone on OCT

41

Landing Zone

- Too Flat
- Aligned
- Too Steep

- This zone determines comfort
- This zone determines centration of the lens

42

Landing Zone on OCT

Too Flat

Too Steep

43

Insertion & Removal

Is the Biggest Fear of Patients

44

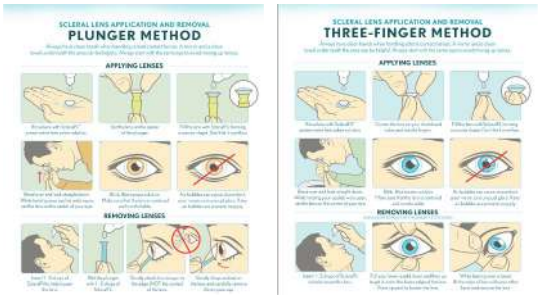
Insertion Prep

1. Prepare them before their dispense
2. Make them feel relaxed

Scleral | YouTube

45

PREPARE THE PATIENT

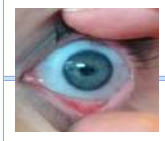


46

Insertion Tools

47

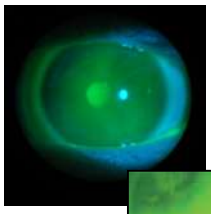
Lens Insertion



- Cover patient's lap with paper towels and position patient's face parallel to the ground. OR have patient stand and bend at the hip.
- Have patient retract lower lid and look straight down towards the ground
- Doctor will retract upper lid and raise the lens onto the eye in one continuous motion
- Release lids before lowering plunger

48

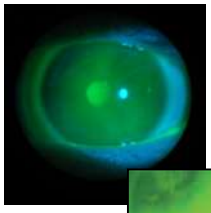
Insertion Bubbles



- Lens was tilted
- Lens was not completed filled
- Lens was not inserted in one continuous motion
  - Must re-insert
  - One attempt per fill
  - Bubbles will affect vision and comfort

49

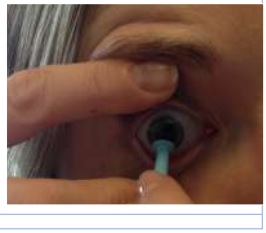
Insertion Bub



- Lens was
- Lens was
- Lens was continuo

50

Removal



- Apply DMV below the center pupil
- Pull "down and out"
- Lids out of the way
- Apply Biotrue or AT's to DMV to improve suction

51

Lens Removal with fingers

- Apply PF-ATs to hydrate the eye
- Loosen the lens prior to removal
- Break the lens/cornea suction – push on lower lid below the lens edge
- Secure the superior lid
- Pop lens out onto finger

52

Panic Level 1000!!!

- Keep Calm
- Do not continue to pull
- Breathe
- Release the plunger
- Release the suction
- Plunger on lower part of lens

53

What is Possible with Scleral Lenses

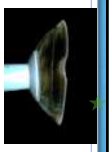
- Prism Correction
- Obstacle avoidance – Vaults, notchs, channels
- Multifocals
- Front Torics
- Decentered Optics
- HOA optics

54

Obstacles

- Pterygium, Pinguecula, Blebs, asymmetrical conj
- Avoid or go over
- Vaults, notches, recesses, channels,



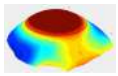



55

Profilometry Devices

- Eaglet Eye Surface Profiler (ESP)
- Visionary Optics sMap3D
- Oculus Pentacam Cornea Scleral Profile (CSP), (AXL), (AXL Wave)


- Ocular surface imaging
- Anterior elevation data
  - Rasterstereography
  - Scheimpflug Tomography

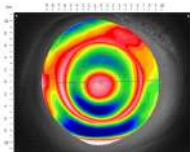



- 16-22mm scan size
- Emerging technologies


56

Free-Form Scleral Lenses

- Designed by profilometry
  - Eaglet Eye Surface Profilier
  - CSP Pentacam
  - sMap3D



- BostonSight Scleral Smart 360 (Boston Sight)
- Gaudi HyperGeometric Scleral (Valley Contax)
- Latitude (Visionary Optics)
- Maxim 3D (Acculens)
- Scan Fit Pro (EyePrint Prosthetics/Synergeyes)
- Wave Scleral Lens (Wave)

57

Impression Based Lenses

- Eye Print Prosthetics
  - Create a mold of the eye (No anesthetic needed)
  - Use the impression to design a computer generated scleral
  - 1-2 microns of accuracy
- EyePrint – Original Most data points, most customizable
- EyeFit - Less complex cases
- EyeScan – using profilometry to design



58

We Can't Do It Alone

59

Where to get help

- Your Lab
- GPLI - CLMA
- Scleral Lens society
- Meetings
- Associations
- Friends

60

Remember ….

We have incredible jobs that give us the ability to impact and change people's lives for the better

61

Thank You!

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ShaluPal@hotmail.com

62