Disclosures:
Alden Optical Honoraria, Consultant
Essilor Honoraria, Consultant
Scleral Lens Education Society
Past President
No financial interests

OBJECTIVES
Brief introduction to scleral lens fit principles
Case presentations illustrating some fit principles and complications

Polymethylmethacrylate (PMMA), in the early 1900's
Made from impression mold of eye
Difficult to make
Problem with hypoxia

<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></td>
</tr>
<tr>
<td>Corneo-scleral</td>
<td>Lens rests partly on the cornea, partly on the sclera</td>
<td></td>
</tr>
<tr>
<td>Scleral</td>
<td>Lens is up to three larger than HVID</td>
<td></td>
</tr>
<tr>
<td>Mini-Scleral</td>
<td>Lens rests entirely on the sclera</td>
<td></td>
</tr>
<tr>
<td>Large Scleral</td>
<td>Lens is more than three larger than HVID</td>
<td></td>
</tr>
</tbody>
</table>

Scleral Contact Lens Fitting Principles

18.2mm  9.0mm

www.sclerallens.org
SCLERAL LENS DESIGN
Companies have proprietary lens designs
Example: Five Curve Lens
Base Curve (BC), 8.2mm Width
Corneal Curve = BC + 0.4, 2mm W
Limbal Curve = 9.0, 1mm W
Scleral Curve (Landing) = 12.25, 1.5mm W
Edge Curve = 14.5, 0.5mm W

FITTING SCLERAL LENSES IS AS EASY AS
1
2
3

1. Bridge Over The Cornea and Limbus

Base curve changes can increase VAULT (CLEARANCE, FLUID CHAMBER, SAG)

Greg DeNaeyer, OD
Horizontal AS OCT
With Corresponding Slit Images

AS-OCT and the Specialty Contact Lens
Bruce Baldwin, OD, PhD, Sarah Moyer, CRA, OCT-C.
April 2012
http://www.reviewofcontactlenses.com

Design and fit philosophies SAG

Good Limbal Clearance

2. “Landing” not too flat or steep
“Landing” aligns with sclera

3. Adequate Tear Flow Under the Lens

Severe Dry Eye-GVHD

3. Adequate tear exchange

Punctal Occlusion

Punctal Cautery
20/50

20/30

24F UNC Soccer, Keratoconus, Piggyback OU
Note chronically inflamed pingueculae

Recurrent corneal abrasions,
even with piggyback

OD

OS

Small scleral caused more pinguecula inflammation

15.6 mm

Pinguecula notch

3. A notched scleral contact lens with improved fit and appearance.

Getting Creative with Scleral Lenses: Part 1
This patient needs a scleral lens that's a notch above the rest.
Brooke Meier, O.D.
1/26/2012
http://www.reviewofcontactlenses.com/content/c/32135/

Refit to
18.6 OD
18.2 OS

OD
Upper lid

OS
Upper lid

12 mm RGP Piggyback

18.6 mm

2009

20/60

20/25

20/25
19 M, MVA
Mirror glass, corneal lac, open globe
VA: LP

July 21, 2011
Lac repair
Reposition uvea
VA: LP

July 26, 2011
Aspirate cat
Sulcus IOL
VA 20/200

18.2, 4400, -775
CL VA: ??
50yo Male

Keratoconus, GPC, blepharitis, dermatitis, trichiasis, chronic red eye, RGP OU

Referred for poor fit, redness, pain, blur

Mechanic/truck driver, BVA OD 20/100

Mhx: Asthma, COPD, obesity, sleep apnea, chronic rhinitis, HTN, immune disorder, depression, recurrent pneumonia

Meds: Advair, albuterol inhaler, Flonase, allopurinol, azithromycin, Celexa, Tramadol, chlorthalidone, CPAP

Initial exam: flat low riding 9mm RGP

Severe keratoconus OD with light central scarring, RGP VA 20/100

Moderate severe keratoconus OS, 20/40

Scleral lens trials: BVA OD 20/100, needs 20/40 for truck driver license

Fit and ordered for OS: XO, 18.2, 5300 (6.37), -16.25, steep P

Consult for PK OD

PK OD 03/30/2012, interrupted + running

Running removed after 105 days

Dsp scleral OD at 55 days PO

Using same parameters except P curves

Tighter P curves for excess debris
Initial OD lens, May 2012, 42 days PO
XO, 18.2, 4800 (7.03), 7.43/2.0, 9.0/1.0, 12.25/1.5, 14.5/5
20/30 regained truck driver lic

Hygiene a big problem
Gave box of surgical gloves

OD Aug 2012, 154 days PO
Note chamber debris
XO, 18.2, 4800 (7.03), 7.43/2.0, 9.0/1.0, 11.75/1.5, 14.0/5

OD Mar 2013, 343 days PO

OD Graft Healing
Days PO
42
77
154
343
OS Mar 2013

When pinguecula inflamed, edge lift and debris. Considered notch. Refit to toric P.

Good!

Khodadoust line

09/18/2012

Endothelial rejection

11/02/2012

Rejection resolved

12/04/2012

Epi/subepi rejection

10 days on PF QID

Rejection resolved

02/01/2013

Epi rejection returns

05/17/2013

Endo rejection returns

Graft Rejection History

<table>
<thead>
<tr>
<th>PK</th>
<th>3/30/2012</th>
<th>PO Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endo 1</td>
<td>172</td>
<td></td>
</tr>
<tr>
<td>Epi 1</td>
<td>249</td>
<td></td>
</tr>
<tr>
<td>Epi 2</td>
<td>308</td>
<td></td>
</tr>
<tr>
<td>Endo 2</td>
<td>413</td>
<td></td>
</tr>
</tbody>
</table>

Management

Acute: Prednisolone Acetate hourly, with taper
Glaucoma drops for steroid response
Currently maintained on
Furometholone one drop daily
Dorzolamide three times daily
67M, Trauma with skull/brain damage
Exposure keratopathy OD x 25+ years
Lateral tarsorrhaphy OD
Poor risk for PKP
BSCVA: OD 20/100 OS CF (RD, XT)

Corneal thinning to about 200 microns

Original
15.6, 47.50 (7.11), -3.75, 20/60+

First remake
15.6, 49.00 (6.89), -5.25, 20/60+

Before wear

After two months of wear

Extremely happy with vision, and grateful
Hemiplegia, wife inserts lens for husband
Celluvisc reduced insertion bubble problem

47.50 (7.11) 49.00 (6.89)

March 2014
49M, Post LASIK Keratectasia

Feb 2006
Aug 2008
Prior to Lens Wear.
Ectasia Compared to
2006 OD>OS.
Jan 2010
OD Stable.
OS Some Overall
Steepeening.

11/11/2014
Baldwin.AFOS.Denver.2014.HO

2008

OD
OS

18.2, 47.00 (7.18), -10.00
20/25

18.2, 47.00 (7.18), -10.50
20/20

Note less tear exchange OS

Jan 23, 2009
C/O Irritation OS
Note small abrasion

Superior touch OS and lack of tear flow superior. (Arrows)
Lens needs refit with greater vault

Apr 9, 2009
Pt called from airport with two day hx of
severe pain and photophobia OS.

Treatment: Cycloplege, antibiotic, start steroid after first two days.
Pt scheduled to fly across country and told to remove the right cl during flight.
Apr 15, 2009
One week f/u.
Symptom free.
Small infiltrate scar.

Larger, reverse geometry lens vaults over limbus.

Jul 20, 2009: OS, 4D Reverse Geometry
19.0, 7.63, 6.99/2.0, 20/20
Larger lens vaults well over limbus.

Evaluate edge profile for Adequate limbal vault

51F, RK
BSCVA 20/25 OU but
dry eye, poor contrast, and extreme spectacle blur from hybrid lens

Note small decentered OZ
Refit to scleral lens but developed corneal edema from poor fit
C/O: halos around lights, spec blur

Note microcystic corneal edema

18.2, (5000), 6.75, 6.62, -14.50
“4D reverse”

So how do we redesign
For more limbal vault?

Different companies have different design and fit techniques

Custom changes at BFS or partner clinic

ICD
ABB Concise
Essilor
Valley Contax
Modify limbal curve

ACCU Lens Maxim
Diameter change
Optic zone size

AVT AVT RC
Sagital depth
Diameter
Landing curve

Blanchard MSD
Sagital depth
Limbal curve

Tru-Form Digiform 18
Limbal curve markings

Essilor & Visionary Jupiter
Custom Dia, BC, CC
Trial Prolate 5200 sag OR -6.50

Trial Oblate 5100 sag OR +3.25

Alden Zenlens

18.6, (4800), 7.03/6.55 -1350 True 3D reverse

Larger True 3D reverse

18.6, 3D reverse, 20/20 OU 12+ hrs wear time, no spectacle blur

45F, Keratoconus OS>>OD OD 20/20, OS Hybrid Flat/tight

“Unilateral” keratoconus

Horizontal

Vertical

Original

Remake

Note limbal clearance

Original

Remake

12+ hrs wear time, no spectacle blur

3D reverse, 20/20 OU
Wearing 15.6, 56.00, -15.00, 20/20
Refit to larger lens with more vault. Mailed to pt but she continued to wear this lens for six months.

Developed hydrops, BVA CF

Conjunctiva under the lens

- Cause
  - Conjunctival chalasis
  - Suction under the lens
  - Decentered lens
  - Too much limbal clearance
- Remedy
  - Conj resection
  - Ignore
  - Refit

Conjunctival entrapment
OS Conjunctival Entrapment
Redness Irritation

30 yo F, Keratoconus

RGP intolerant OD for 1 yr
Referred for PK
RGP VA OD 20/100
RGP VA OS 20/40, flat fit
Only wanted scleral for OD

Flat 9mm RGP, refit 18.2mm scleral

Scleral Lens for ptosis control
Scleral contact lens usage in patients with complex blepharoptosis.

Developed red, painful chemical keratitis
Rxed this
Got this

69yo M, Lamellar Ichthyosis
AR inheritance

Severe exposure keratopathy
Pain
Scarring
Poor vision
Multiple skin grafts to lids
No "normal" skin left

Options?

Scleral lens full time for two years

uncod@nc.rr.com

Scleral Lens Education Society

uncod@nc.rr.com