Scleral Lenses for Really Sick Eyes
Lynette K. Johns, OD, FAAO, FSLS

Disclosure Statement:
• Paid consultant to B+L Custom Lab Channel

Overview
• Sclerals for OSD in the literature
• Exposure Keratopathy
• Sjogren’s Syndrome
• Graft versus Host Disease
• Steven’s Johnson Syndrome
• Scleral Lens Challenges

History of Sclerals for Ocular Surface Disease

- PMMA
  - 1963 Ridley, et al. 5% OSD of 3,000 fits
  - 1994 Foss, et al. 50% of 41 with OSD

- GP
  - 1990 Schein, et al. 13% of 15
  - 1992 Kok, et al. 15/47 eyes with OSD
  - 2000 Rosenthal, et al. 76 eyes with OSD
  - 2005 Pullum, et al. 11% with OSD

GP materials in Scleral Lenses

- Journal of the British Contact Lens Association. 6(4) 158-161. 1983
- Boston II Dk 16.4
- Fenestrated
- 37 eyes (1 protective)

First scleral paper dedicated to OSD

- Treatment of Ocular Surface Disorders and Dry Eyes with High Gas-Penetrable Scleral Lenses
  - Journal of Cataract and Refractive Surgery. 18(5) 876-880. 1992
Goals of Treatment with Scleral Lenses

• Visual Rehabilitation
• Attenuation of pain and reduction of symptoms:
  ◦ Protection
  ◦ Lubrication
• Support the ocular surface:
  ◦ Protection
  ◦ Lubrication
• NOT
  ◦ Achieving 20/20 vision
  ◦ Curative
  ◦ Elimination of artificial tears or supplemental treatments

Exposure Keratopathy

• Neurogenic etiology
  • Bell’s Palsy
  • Acoustic neuroma
  • Möbius syndrome

Exposure Keratopathy

Bell’s Palsy

• Mononeuropathic Paralysis CN VII
• Idiopathic
• Unilateral sometimes bilateral
• Incidence: 20 per 100,000
• 60-80% of cases resolve
• Inability to close eye or blink
• Decreased/absent lacrimation
• Ectropian


Exposure and craniofacial Trauma


Acoustic Neuroma

http://www.mayoclinic.org/acoustic-neuroma/enlargeimage5277.html
Acoustic neuroma

Eyes closed

s/p resection, perforation, PK, tarsorrhaphy, LK, PK #2, BSCL

Orbital Disease

- Thyroid/Graves proptosis
- Orbital Tumors

Graves Orbitopathy and Progressive External Ophthalmoplegia

Eyes Open

Eyes Closed

Post-operative Lagophthalmos

- s/p bad blepharoplasty
- s/p Botox therapy

Bad Blepharoplasty
Therapeutic Benefits of Scleral Lenses

Initial Presentation  After 4.5 hours scleral lens wear

Constant Surface Lubrication

Scleral lenses in burn victims

Use of the Boston Ocular Surface Prosthesis in the Management of Severe Periocular Thermal Injuries - A Case Series of 10 Patients

- Ophthalmology 119(3) 516-521, 2012

Trauma


Severe Dry Eye and Autoimmune Disease

Sjögren’s Syndrome

- Keratoconjunctivitis sicca
- Xerostomia
- May be associated with serologic autoantibodies
  - Rheumatoid factor
  - Anti-nuclear antibody
  - SS factor A
  - SS factor B
- Secondary Sjögren’s associated with autoimmune disease

Graft versus Host Disease

- Transplanted bone marrow/stem cells recognize recipient tissue as foreign
- Acute form within the first 90-100 days after transplant
- Affects skin, liver, mucosa, gastrointestinal tract
- Dry eye affects 50% patients who had allogeneic bone marrow transplant
Graft versus Host Disease

- Keratoconjunctivitis sicca
- Cicatricial lagophthalmos
- Conjunctivitis
- Corneal ulceration/melt
- Uveitis
- Ectropian
- Cataract

Graft versus Host Disease

Acute perforation s/p glue

Chronic Graft versus Host Disease

Gunderson Flap

Persistent Epithelial Defect 20 years after BMT

Scleral Lenses and cGVHD

Use of Fluid-Ventilated, Gas-Permeable Scleral Lens for Management of Severe Keratoconjunctivitis Sicca Secondary to Chronic Graft-versus-Host Disease

- Boston Scleral Lens
- n = 9
- Retrospective review
- Reduction in OSDI from 81 to 21 after 2 weeks
- Further reduced to 12 after 1 – 23 months

Biology of Blood and Bone Marrow Transplantation. 13: 1016-1021. 2007
Scleral Lenses and cGVHD

- n = 33
- retrospective review 2002-2005
- Survey regarding pain (52% reduction), photophobia (63% reduction), quality of life (73% improvement)
- 22 wearing devices for 3 months – 2 years

Helpful Hints

- Anesthetize severely photophobic and painful eyes.
- Use Celluvisc or a preservative-free liquigel for first application to minimize bubbles
- Start with small diameters and increase diameter after patient is comfortable with trials (should you desire to increase diameter
- Desensitize reflexes to application.

Extreme Dry Eye Considerations

- Systemic health status may render a patient intolerant, not the lens fit.
- Fit is typically straightforward
- Scleral wear in conjunction with topical steroid use
- Debris is the biggest challenge

Corneal Stem Cell Deficiencies

- Stevens-Johnson Syndrome
- Ocular Pemphigoid
- Chemical/Thermal Injuries
- Aniridia
- Radiation Keratopathy

Stevens-Johnson Syndrome

- Severe reaction to antibiotic or drug
- 48-72 hour fever
- Malaise
- Sore throat and cough
- Vomiting
- Acute macular erythematous rash with bullae
- 2 ring target lesions
- Shedding of sheets of skin

Stevens-Johnson Syndrome

- Involvement of at least two mucous membranes
- Target lesions
- Fever
- Skin biopsy compatible with erythema multiform
- Skin loss < 20% total body surface area
- Mortality 1-5%

Toxic Epidermal Necrolysis

- Involvement of at least two mucous membranes
- Loss of confluent sheets of epidermis
- Fever
- Skin biopsy compatible with TEN
- Skin loss >20% total body surface area
- Mortality 25-30%
Symblepharon management

- Some eyes cannot be fit—keratoblepharon
- Fit inside of symblepharon to prevent inflammation of the tissue
- Notch/scallop/cut-out the edge to accommodate the symblepharon
- Be mindful of decentration of the lens
- Symblepharon Lysis surgery
Note location of Symblepharon

Advancing Symblepharon
- November 2006
- January 2007
- November 2008
- February 2010 s/p Lysis

Keratinization and Conjunctivalization

Congenital Corneal Anesthesia
- Familial Dysautonomia
- Mobius syndrome
- Goldenhar syndrome
- Hereditary autonomic sensory neuropathy

Congenital Anesthetic Corneas

Management of Persistent Epithelial Defects
- Photography white light and cobalt filter
- Extended wear of scleral device
- Daily monitoring
- Antibiotic prophylaxis
- Daily disinfection of device and replenishment of fluid
- Longstanding PED’s can be managed with exchange of 2 devices q12 hours
- Weekend monitoring
- DOCUMENTATION!!!!!!
Scleral Lens Challenges

Persistent Epithelial Defect

Debris, Dry Eye, Scleral Lenses

- Debris is the most common problem with scleral lens wear and severe dry eye
- Inform patients of this problem before beginning the fit (informed consent)
- Predict front surface debris pattern based on underlying staining.
- Front surface debris and chamber debris are managed differently

Troubleshooting: Front Surface Debris

- Polish front surface of lenses BUT plasma surface will be polished off
- Plasma or re-plasma treat the lenses—do not re-plasma crazed lenses
- Scheduled mid-day removal and refreshing or as needed
Troubleshooting: Front Surface Debris

- On-eye surface cleaning using a saline moistened cotton swab or eye shadow applicator
- Increased lubrication use over the lens throughout the day
- Re-evaluate care and handling of lenses. Add enzymatic cleaner
- Punctal occlusion

Constant Wetting Defects
Consider Plasma

Plasma Treatment

Lid Management

Troubleshooting: Chamber Debris

- Find the Path of Debris
  - Apply fluorescein to determine where there is excessive tear exchange
  - If the exchange is 360 at edge tighten your outer curves
  - Look for a toric pattern and design toric peripheral curves
  - Use a viscous preservative-free artificial tear to fill lens
  - Evaluate solutions and care system and eliminate any preserved solutions
Troubleshooting: Chamber Debris

- If complaints of debris are only in the morning, soak the eye with an eye cup before applying lenses. Disinfect eye cup after use
- Treat underlying lid disease
- Pull the (punctal) plug

Toric Pattern of Fluorescein Exchange

Oblique Pattern of Fluorescein Exchange

Microbial Keratitis: Risk for both soft lenses and scleral lenses

Documented Infectious Keratitis

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johnsl@neco.edu

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