Course Objectives

1. Recognize the indications and learn new techniques for anterior segment surgery

2. Gain a better understanding of surgical options for anterior segment repair

3. Understand the advantages and disadvantages of different intra-ocular capsular stability devices

Course Faculty

W. Barry Lee, MD
George Waring IV, MD
John Berdahl, MD
Brandon Ayres, MD
Jeremy Kievel, MD
Elizabeth Yue, MD
Faculty

• Boston Native
• Medical school and Residency in Ophthalmology at Boston University and Boston University Medical Center
• Fellowship training in Cornea, External Disease, and Refractive Surgery at Bacom Palmer Eye Institute
• Practices at Lexington Eye Associates with offices in Lexington and Concord, MA
• Interests include corneal transplantation, presbyopic correction, and complex cataract surgery
• Serves on the clinical committee for ASCRS

Jeremy Kievel, MD

Faculty

• Specializes in advanced Cataract, Corneal and Glaucoma Surgery, in addition to Refractive Surgery
• Medical school at the Mayo Clinic in Rochester, MN
• Residency at Duke University
• Cornea and glaucoma fellowship at Minnesota Eye Consultants
• Research interests include CSF pressure in Glaucoma, Minimally Invasive Glaucoma Surgery, and Refractive Laser Assisted Cataract Surgery (ReLACS).

John Berdahl, MD

Faculty

• Assistant Professor of Ophthalmology and Director of Refractive Surgery at MUSC Storm Eye Institute
• Medical Director at Magill Vision Center
• Founding Member of the Vanguard Ophthalmic Society
• Too many publications to mention
• Residency at State University of NY
• Fellowship with Daniel Durrie, MD in Overland Park, KS

George Waring IV

Faculty

• Residency at Rush University Medical Center in Chicago, IL
• Fellowship in Cornea, Anterior Segment and Refractive Surgery at Cullen Eye Institute, Baylor College of Medicine
• Assistant Professor of Ophthalmology at Cullen Eye Institute, Baylor College of Medicine
• Virginia Eye Consultants

Elizabeth Yeu, MD
Faculty

• Board of Directors and Scientific Chair of the Cornea Society
• Medical director of the Georgia Eye bank
• Partner at Eye Consultants of Atlanta
• Fellowship training at University of California, Davis in Sacramento CA in Cornea, External Eye Diseases, and Refractive Surgery

The Complex Cataract

W. Barry Lee, MD

Faculty

• Residency training at UMDNJ, New Jersey Medical School
• Fellowship in Cornea, External Disease, and Refractive Surgery at Wills Eye Institute, Philadelphia PA
• Cornea Service at Wills Eye Institute, Philadelphia, PA
• Private Practice at Ophthalmic Partners of Pennsylvania

Iris Repair

Brandon Ayres, MD

Sclerally Fixated Akreos AO60

John Berdahl

Disclosures: Alcon, Allergan, Bausch & Lomb, Glaukos

Hydrophilic Acrylic
Very Soft Material
Zero Asphericity
4 point Fixation
Small Incision
No Sharp Edges

Akreos AO 60

Akreos AO 60

Hydrophilic Acrylic
Very Soft Material
Zero Asphericity
4 point Fixation
Small Incision
No Sharp Edges

Scleral Fixation

Advantages
Everybody has a sclera
IOL Fixated First
Good Stability with DSEK
No Correctopia
No Iris Chaffing
No Cheesewireing

Disadvantages
Long Procedure
Avoid blebs
Poor Reimbursement
External Sutures could be cut

Steps

1. Block
2. Take down Conj (6 to 8 and 12 to 2 Surgeons view)
3. Cauterize
4. Mark suture locations 4.5mm apart
5. Insert AC maintainer
6. Create 4mm incision at 5 o’clock
7. Remove Old IOL and Vitrectomy
8. Thread distal loops with double armed CIF 9-0 Prolene for mattress suture
9. Externally place docking 27g needle through sclera at suture locations.
10. Repeat 8 & 9 at proximal loops
11. Fold and insert IOL
12. Tighten sutures to center
13. Tie and bury knots
14. Close Conjunctiva
Thank you

Financial Disclosures

- No financial interests to disclose related to this talk
### Capsular Tension Devices

- **Standard ring**
  - Alcon ReFORM™ CTR
  - Abbott StabilEyes™ CTR (formerly Ophthec)
  - Morcher CTR
  - Henderson CTR
- **Sew-in Ring**
  - Cionni CTR
- **Ring segment**
  - Ahmed capsular tension segments

### Capsular Tension Rings

- **Indications**
  - <3-4 clock° of zonular loss
  - Mild zonular instability
  - Injector or free hand
  - Should not be used in anterior capsular tear, a discontinuous capsulorhexis, or a p-cap tear
Capsular Tension Rings

- Dial in towards area of instability
- Free hand
  - Instrument in second hand to pull/push ring in centrally

CTR: Injector

CTR: Free hand

CTR: Watch for capsule violation!
Sutured CTR should be considered for > 4-5 clock hours of zonular loss.
- Obviously dislocated lens
- Profound zonular instability
- Should not be used in anterior capsular tear, a discontinuous capsulorhexis, or a p-cap tear

**Double-armed Non-Dissolvable Suture**
- Ethicon® Double-Armed 3” 9-0 CTC-6L (curved) or STC-6L (straight)

**Cionni CTR**

**Marfan’s: Inferior Dislocation**
Double-islet Cionni CTR

Indications
- Greater generalized zonular instability
- Single-islet just not be enough

Ahmed Capsular Tension Segments

- Wonderful newer addition
- Easier learning curve than sutured CTR
- Ant. or post. capsular tear → no problem
- No-dialing technique → minimal capsular/zonular trauma
- Often used with standard CTR
**Ahmed CTS**

**Conclusion**

- Mild zonulopathy can be managed with a 3-piece IOL in the bag
- Difficulty: CTR < CTS < sew-in CTR
- Always manage vitreous prolapse around areas zonulolysis
- Some very loose lenses should be managed by Retina surgeons

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**Pearls to Prevent Peril in Complex Cataract Surgery**

W. Barry Lee, M.D., F.A.C.S.

**Small Pupil**

- Causes
  - Mature Cataract
  - Pseudophakia
  - Glaucoma
  - Uveitis (Posterior Synechiae)
- Medications
  - Mydriatics
  - Prostaglandins
  - Floppy Iris Syndrome (FIS)

**Financial Disclosures**

- Allergan
- Mentor
- Bausch & Lomb
- Meditec Imaging Systems
- BioTissue

**Surgical Options**

- Posterior Synechiolysis
  (Lens sweep or OVD cannula)
- Overfill with OVD
- Pupil Stretching
  (Leiter or Kuglen hooks)
- Iris Hooks
- Pupil Expansion Devices
  (Graether, Murchen, Oasys, Malayan ring)
  OVD = Ophthalmic Viscoelastic Cones

**When Phaco Is Not Routine**

- Small Pupil
- White Cataract
- Traumatic Cataract
- Anterior Capsule Tear
- Intraoperative Floppy Iris Syndrome (IFIS)
- Fuchs Dystrophy

**Pupil Expansion Devices**
What to Avoid

Capsular Tension Devices

- capsular tension devices
- capsular tension devices
- capsular tension devices
- capsular tension devices
- capsular tension devices

Selecting the Right CTD:

- select the capsular tension device
- select the capsular tension device
- select the capsular tension device
- select the capsular tension device
- select the capsular tension device

Pearls for CTRs

- less than 4 o'clock hour of zonulysis
- overfill the bag with OVD before placement
- use a 3-piece intracocular lens implant
- orient the haptics in the direction of zonulysis

Anterior Capsule Tear

- concerns & considerations
- extension to posterior capsule
- posterior capsule rupture / Vitreous loss
- lens implant stability
- placement of lens in bag or sulcus?
- lens implant (3-piece or 1-piece)?

Anterior Capsule Tear Pearls

- refill with cohesive OVD to attempt save
- can reverse direction of capsulorrhexis
- can opener capsulorrhexis can help if lost peripherally
- only gentle hydrodissection

Anterior Capsule Tear Pearls

- fill capsule bag with OVD prior to removing irrigation (prevents chamber collapse)
- lens in bag versus sulcus
- do not place 1-piece lens in sulcus
- orient haptics 90 degrees away from tear
Intraoperative Floppy Iris Syndrome (IFIS)

- Problems
  - Iris prolapse
  - Poor dilation / miosis
  - Billowing of iris
  - Iris caught in ultrasound or I/A tip
  - Difficult view of peripheral cortex

### IFIS
- **Medications**
  - Alpha-1 blockers
  - Beta blockers
  - Beta blockers (neurological)
  - Calcium channel blockers
  - Antihypertensives
  - Alpha-1 blockers
  - Beta blockers (neurological)
  - Aminophylline (herb)

### IFIS - Preoperative Tips
- **Not Helpful**
  - Discontinuation of alpha-blocker
- **Helpful**
  - Pre-operative topical atropine (1%) bid (3-4 days prior) variable effect
  - Epinephrine added to I/S bottle
  - Intraocular unpreserved epinephrine (1:4000 concentration)
  - Sluggish ciliary 9cc (I/S Plus), 3cc (4% preservative-free lidocaine), 4 cc (1:1000 preservative-free epinephrine)

### Cornea - Microscopic View

### High Power View of Endothelium

### FECD
- **Fuchs Dystrophy (FECD)**
  - Hereditary endothelial dystrophy
  - International Committee for Classification of Corneal Dystrophies (ICCD)
  - COL4A1 gene, SLC4A1 gene
  - Onset (4th - 5th decades)
  - Premature aging of endothelium
  - Guttae develop centrally and extend peripherally
  - Epithelial and stromal edema
  - Ultimate loss of endothelial cells

### Cataract Surgery in FECD
- **Major Concern**
  - Corneal Decompensation
- **Surgical Planning**
  - Cataract surgery alone
  - Endothelial keratoplasty (DSEK alone)
  - Triple procedure (Cataract surgery + DSEK)

### New Classification
- **APPENDIX 2: FECD GRADING SCALE**

### Preoperative Considerations
- Sit lamp exam
- Corneal guttae density
- Presence of corneal edema
- Presence of corneal scarring / stromal haze
- Specular Microscopy
- High power slit lamp view
- Endothelial cell count
- Corneal Pachymetry
- Measure of corneal thickness with ultrasound
Preoperative Considerations

- **Normal Cornea Thickness**
  - Average range: 525-570 microns (μm)

- **Corneal Pachometry**
  - > 600 μm → Triple procedure
  - Between 500-600 μm: Consider ≥ 1/3 thickness
  - ≤ 500 μm: Consider ≥ 1/2 thickness

Surgical Pearls

- Cataract Surgery alone
  - Student: Consider IOL size
  - Be diligent: OVD to coat endothelium
  - Use Ultrasonic Power

Pearls for Combined Surgery

- Use cohesive OVD
  - Improve anterior capsule visualization
  - Use laser capsulotomy

Keys to Success

- Appropriate patient selection & surgical decision making
- Minimize corneal incision size
- Use of protective ophthalmic viscosurgical devices (OVDs)
- Minimize fluid irrigation time
- Minimize lens capsule and posterior capsule removal time
- Postoperative medication regimen
  - Longer interval use

Refractive Outcomes of DSAEK

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Conclusions

- Every cataract surgery is different
- Be prepared for special situations that add complexity to cataract surgery
- Familiarize yourself with the different devices to improve cataract surgical skill and efficiency in challenging cases
- Difficult cases can be made routine when adjunct devices are mastered
Intraocular Lens Exchange and Reposition

Jeremy Z. Kieval, MD
Cornea, Cataract, and Refractive Surgery
Lexington Eye Associates
Lexington, MA

Indications for IOL exchange
- Refractive error
  - Anisometropia
  - Refractive surprises/post excimer laser vision correction
- Toric errors
- Visual symptoms
  - Positive dysphotopsia
  - Negative dysphotopsia
  - Inadequate visual function
- Malpositioned IOL
  - Zonulopathy– PXF, trauma, uveitis, RP, long AL
  - Iatrogenic causes
  - Therapeutic indication
- UGH syndrome
- IOL deposits
  - Calcifications
  - Glistenings

Prepare for surgery!
- Know the history
- Slit lamp exam:
  - Capsule/capsulotomy status
  - Zonular status
  - Endothelial cell status
  - Incision locations/astigmatism
  - IOL type
  - Position of the haptics
- Exchange vs. Reposition
- Pars plana vs. limbal approach
- Pt expectations, CME, capsular compromise, open capsules

Financial Disclosures
- Optimedica, consultant/speaker
- Alcon, consultant/speaker
- Allergan, consultant/speaker
- Abbott Medical Optics, consultant/speaker
- Lenstec, consultant
Surgical procedure

- Retro/peribulbar block
- Instrumentation
  - Viscoelastics
  - Viscodisection: 27g needle vs cannula vs. bimanual
  - Iris hooks
  - Capsular retractors
  - Lens manipulators
  - Microsurgical forceps and scissors
  - Vitrector
  - Triesence®
  - Suture

Out with the old...

- Removing the IOL from the bag
  - Entirely
  - Amputate haptics
- Removing the IOL from the eye
  - Cut
  - Fold
  - Dial
  - Pull

In with the new...

- Where to put it:
  - In the bag
  - In the sulcus
  - Optic capture
  - ACIOL
- Inject new IOL before taking out old
- Iris fixation
  - McCannell suture
  - Seipser knot
  - Scleral fixation

Iris Repair

Brandon D. Ayres, MD
ASCRS 2014
Boston, MA
Financial Disclosure

- Alcon
- Allergan
- Bausch and Lomb
- Merck
- Bio-Tissue
- AMO
- Tear Science

Why Repair the Iris

- Not all iris defects need repair
- Small traumatic iris defects
- Peripheral iridotomy
- Iris capture after large incision cataract surgery

Symptomatic iris defects need repair
- To assist with another anterior segment procedure
- Cosmesis

Major Categories

- Iridodialysis (usually from trauma)
- Sphincter tears leading to irregular pupil
- Loss of tissue from trauma
- Atonic pupil
- Aniridia

Iridodialysis

- Commonly seen in ocular trauma
- Can be surgically induced
- Watch for zonular loss in area of dialysis, makes cataract surgery more challenging
- Timing is important
- Wait long enough for inflammation to clear
- Waiting too long may make the repair very difficult
Technique

- Create peritomy in area of iris defect
- Use 9 or 10-O prolene suture
- 25G needle can be used as a guide through peritomy
- Sutures passed through cataract wound or paracentesis
- Rotate knots to bury or leave long ends to prevent exposure
62 Year old man s/p blunt trauma to eye with severe glare

Technique
Iridodialysis
Repair

Brandon D. Ayres, MD
Cornea Service WEI

64 Year old woman s/p shovel injury to eye leaving her with corneal scar, aphakia, and with iridodialysis

Technique
Iridodialysis Repair
Open Sky

Brandon D. Ayres, MD
Cornea Service WEI
Iris Tears or Loss of Tissue

- Often due to floppy iris and phaco or IA tip grabbing the iris or trauma
- Often seen in the setting of trauma
- Defects can be asymptomatic or allow edge glare
- May be cosmetically unappealing in light colored eyes

Brandon D. Ayres, MD
Cornea Service WEI

Technique

- Use 9 or 10-O prolene suture on curved needle
- Sutures passed through cataract wound or paracentesis
- Can use a sliding knot or McCanell suture technique to close defect
- Sphincterotomy may be necessary to re-shape or move pupil

Brandon D. Ayres, MD
Cornea Service WEI
Technique

Sphincter Tear Repair

48 Year old man s/p traumatic cataract removal

Brandon D. Ayres, MD
Cornea Service WEI

Atonic Pupil

- Large dilated pupil can be difficult to close
- Large pupil can cause glare in phakic and pseudophakic patients
- Can be helpful to use prosthetic contact lens to see if symptoms resolve prior to surgical intervention

Brandon D. Ayres, MD
Cornea Service WEI

Etiology

- Idiopathic
- Orbital trauma
- Herpes Zoster Infection
- Diabetes
- Autonomic neuropathies (Riley Day)
- Guillain Barre syndrome
- Narrow angle glaucoma

Brandon D. Ayres, MD
Cornea Service WEI
• Pupillary cerclage surgery is tedious
• Easiest if patient is pseudophakic or becoming pseudophakic.
• Multiple techniques described (4 bite, 8 bite, etc)
• Don’t get suture stuck in fibril of cornea
• Good practice for the weak hand

Brandon D. Ayres, MD
Cornea Service WEI

Thank You
Brandon D. Ayres
bayres@willseye.org
www.willseyeonline.org