Intraoperative Gonioscopy: A Key to Angle Surgery
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Course Outline
- Historical perspective and importance of office based gonioscopy (Dr. Alward)
- 10 Essentials Steps of Perioperative Gonioscopy (Dr. Shareef)
- Tips/Pearls of Gonioscopy in MIGS procedures (Drs. Ahmed/Vold)
- Non-gonioscopic Methods of Angle Viewing (Dr. Crandall)
- Panel Discussion/Q&A (Time allows)

10 Essential Steps of Perioperative Gonioscopy
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No financial conflicts of interest
Angle Surgery limited to goniotomy

1936 – Goniotomy

2006 – FDA Approves Trabectome

70 years

What’s the Big Deal?

MIGS PROCEDURES
- Canaloplasty
- Trabectome
- iStent/iStent inject
- Hydrus
- Xen/iStent Focus
- CyPass/iStent Supra
- Goniotomy/GATT
- KDB/ABiC/Visco 360
- In Development ...

RATE LIMITING STEP

ANGLE VISUALIZATION WITH INTRAOPERATIVE GONIOSCOPY

Why Learn Gonioscopy?

<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>PERFORMED</th>
<th>FDA APPROVAL/TRIALS</th>
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<tbody>
<tr>
<td>Trabectome (NeoMedix)</td>
<td>&gt;5,435*</td>
<td>June 2006</td>
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<tr>
<td>iStent (Glaukos)</td>
<td>&gt;100,000</td>
<td>June 2012</td>
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<tr>
<td>CyPass (Transcend/Alcon)</td>
<td>&gt;1000</td>
<td>COMPASS trial</td>
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<tr>
<td>Hydrus (Ivantis)</td>
<td>2000</td>
<td>Investigational in U.S.</td>
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GONIOSCOPIC ASSISTED ANGLE SURGERIES (2015)

Rate-limiting step to angle surgery: angle visualization with surgical gonioscopy

Phaco vs. MIGS

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<th>CATARACT</th>
<th>MIGS</th>
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<tr>
<td>ELBOWS</td>
<td>Increased work distance between oculars &amp; surgical field with elbow extension.</td>
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<tr>
<td>HANDS</td>
<td>Bimanual Intraocular Simultaneous extra/intra ocular</td>
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<tr>
<td>CORNEA</td>
<td>Minimal impact with incisions Maximal stimulation with goniolens docking</td>
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<tr>
<td>RED REFLEX</td>
<td>Present Absent</td>
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<tr>
<td>IRIS PLANE VIEWING</td>
<td>Posterior – Full view Anterior; viewing confined to AC depth, 0.7 mm TM space in angle</td>
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Essential Perioperative Steps For Successful Angle Surgery

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Step 1: Office Based Gonioscopy

PRE-OP

Intra-op gonioscopy is NOT a substitute for slit lamp based gonioscopy.
Step 1: Office Based Gonioscopy

- **Why?** For surgical planning
- [www.gonioscopy.org](http://www.gonioscopy.org) (Dr. Alward)

1. Gonioscopy documented < 50% charts reviewed at patients undergoing ocular medical therapy
2. Medicare Claims Data: 50% open angle glaucoma patients undergoing surgery had a claim for pre-op gonioscopy

Reflects [under utilization](https://www.gonioscopy.org) of office based gonioscopy

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**PRE-OP**

- **Step 2: Angle Anatomy**

  - Scleral Spur: surgical landmark separates TM anteriorly from CB posteriorly
  - TM: Canal based surgery
  - CB: Suprachoroid based surgery

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**PRE-OP**

- **Step 3: Anesthesia**

  - Topical – involuntary movements (Saccade)
  - Peri-Retrobulbar – Anesthesia

Novice surgeons: **Block**

Build surgical confidence

Avoid intraocular complications
Step 4: Corneal Incision

1. Fixation Ring:
   - Familiarity in holding handle of surgical goniolens. Use it in all cataract cases
   - Globe control
   - Nasal rotation provides access to peripheral cornea

INTRA-OP

Step 4: Corneal Incision

Eccentricity

With assistance of a fixation ring, rotate globe nasally and create incision just inside the limbus.

Avoid nicking limbal conjunctival vessels – Blood will get between goniolens and cornea obscuring view of angle

INTRA-OP

Step 4: Corneal Incision

Eccentricity

Femtosecond Laser – Keratome incision offset from limbus. Potential for interference of surgical instruments with the overlying goniolens. Consider making incision manually and limiting the laser to capsulorhexis and fragmentation.

INTRA-OP
**Step 4: Corneal Incision**

**Eccentricity**

INTRA-OP

**Location**

Create incision along 3 – 9 o’clock plane
Gives equidistant access supero and inferonasal angle
Serves as an anchor and pivot point for surgical instruments during intra-op surgical manipulation

**Angle Surgery Timing: Pre or Post Phaco?**

INTRA-OP

**Pre-Phaco:**
- Pristine corneal clarity with unobstructed view of angle anatomy
- Maintenance of ocular integrity
- Small Keratome incision
Potential Post-Phaco Obstacles

- Cornea Diffuse Edema
- Prolonged Phaco Time
- Fuch’s Dystrophy
- Femtosecond Suction Ring
- Iris Posterior Synechiae
- Small pupil – need for Malyugin Ring
- Temporal Incision
- Arcus Senilis Edema around keratome incision
- Stromal hydration of wound
- Lens Anterior Chamber IOL
- Complex Cataracts: White Brunescent Pseudoxfoliation
- Vitreous Anterior/Pars Plana Vitrectomy

Step 5: Soft Shell Technique

- Arscinoff’s soft shell technique:
  - Viscodispersive OVD – coat and protect the corneal endothelium
  - Viscocohesive OVD – A 2nd deeper layer creates and maintains space to safely introduce instruments in a confined trabecular space 0.7 mm

INTRA-OP


Step 6: Head/Microscope Rotation

- Primary Phaco Position
  - Coaxial light perpendicular
  - Elbows straddling the flanks
- Angle Surgery Position
  - Elbow non-dominant hand extends forward due to increased distance 8 inches in this case
**Step 6:** Head/Microscope Rotation

*INTRA-OP*

**INTRA-OP**

Rotate Head **AWAY** Microscope **TOWARDS** surgeon 30 degrees. Note the **INCREASED** working distance between the oculars and surgical field.

**Endpoint:** Align coaxial light along iris plane – **NOT** corneal plane (oblique). Allows **direct** access of surgical instruments to target tissue in the **SAME** plane. Adjust *illumination* (no red reflex) & *magnification*

**Corneal Plane:** Oblique approach to angle structures

**Iris Plane:** Direct approach to angle structures in the same plane

**Fine Tuning:** Instruct patient to **look nasally** to bring angle into view
Step 7: Goniolens Selection

Modification of Swan Jacob (SJ) lens: Lens contiguous with handle. Vary in degree of corneal contact, field of view, magnification and handle length (See Hand-out: Table 2)


INTRA-OP

Step 7: Goniolens Selection

SJ lens modification with a plastic ridge to counter eye movement

INTRA-OP

Step 7: Goniolens Selection

Hill lens with Range (protruding metal rim) at base to counter eye movements for globe stabilization. Comes in right and left sided handles to be held by the non dominant hand
Step 7: Goniolens Selection

Vold Goniolens:
- Handle contiguous with a cleat (Fixation) ring and NOT lens itself
- Lens originates and is suspended by a separate pendulum handle
- Multiple pivot points allow for surgical adaptability

INTRA-OP

Step 8: Hand Positioning

INTRA-OP

Side of Palm:
- Weight bearing anchor
- Pivot point to help ‘gently’ dock the goniolens onto the corneal surface (Pencil analogy)
Step 9: Docking of Goniolens

INTRA-OP

Options: Topical anesthetic drops; viscoelastic; lidocaine gel
2% Lidocaine Gel: (1) Topical analgesic; (2) coupling medium
Decrease sensation of tissue manipulation during surgery

Step 9: Docking of Goniolens

Trabecular Meshwork Identification:
1. Pigmented TM Band
2. Trypan Blue
3. Blood Reflux into Schlemm’s Canal with relative hypotony in AC or by applying pressure of gonioprism in limbal area causing backflow

Step 10: Goniophotography

POST-OP

Documentation purposes
Fosters a trusting doctor-patient relationship (show and tell)
Self assessment of surgical technique
Pre-op Counseling of potential surgical candidates
Getting Started – Summary Points
- Office-based gonioscopy at slit lamp
- In Minor O.R., practice gonioscopy
- Cataract Surgery:
  1. During surgery:
     i. Hold fixation ring to stabilize globe
     ii. Rotate globe to create keratome incision
  1. After routine surgery:
     i. Rotate head and microscope
     ii. Place goniolens to view angle structures

Recommend References
- www.gonioscopy.org
- www.anglesurgery.org
- Basis for this course:

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