Disclaimer

- This lecture has been independently developed by the lecturer.
- Dr. Cale has no financial relationship or conflict of interest with any referenced authors, studies, or business related to topics discussed in this lecture.
Learning Objectives

- At the end of the lecture the attendee will be able to:
  - List indications for performing gonioscopy
  - Recognize good gonioscopy technique
  - Interpret & document observed angles
  - Recognize normal & abnormal angle architecture & implications
Anatomy:
Where is the canal of Schlemm?

- Schwalbe’s line (SL)
  - Sampaolesi line
- TM
  - anterior
  - posterior
- Scleral spur (SS)
- Ciliary body (CB)
  - wider in myopes
- Iris root
- Widest inferior
When to perform gonioscopy (92020)

- Narrow angle (365.02) or suspected obstruction of TM per Van Herick estimate
- Shallow A/C (penlight shadow test)
- Evidence of prior angle closure
- POAG or secondary glaucoma or suspect
- History of ocular contusion (NOT acute injury)
  - R/O angle recession, iridodialysis, cyclodialysis
- Risk of NVA (e.g. ischemic CRVO, BRVO)
Penlight shadow test

uthsc.edu
Gonioscopy

Subsequent figures courtesy:
W Alward
*Color Atlas of Gonioscopy*
1994
Is your view all the way in?

The iris beam meets the anterior wall beam where the iris root inserts OR where there is apposition.

A gap separating these 2 beams indicates there is open space beyond your view.
Corneal wedge/ Focal line
Gonioscopic Variations
Gonioscopic Variations

Narrow CB, wide SS, pigmented post TM

Clear posterior TM with pigmented anterior TM

Convex, no CB/SS, ‘banded’ TM, Sampaolesi line
Gonioscopy Technique – Dark Room Conditions

- Minimize the impact of room light or slit lamp beam on constricting the pupil
  - It is estimated (Barkana, et al) that 38% of closed angles may be misdiagnosed by the light opening an appositionally closed angle
    - This is supported by evidence viewed with ultrasound biomicroscopy examination under dark and light conditions on closed angles
Angle Variation with Light (UBM)

Friedman, He Survey of Ophthalmology Vol53,No3 2008; reprinted from Radhakrishnan et al Arch of Ophth
Missing the diagnosis of angle closure

- Not performing gonioscopy
- Not performing gonioscopy under “dark“ conditions
- Increasing IOP/opening the angle using gonio lens
- Misinterpretation of a Sampaolesi line as pigmented

Paul Palmberg, *Gonioscopy in the Laser Age* 2003
How we view the angle
Positioning the lens for best view

Look “over the hill” without pressing by tilting lens toward the angle being viewed
Indentation or compression

- Applying pressure to the globe by pushing in on the lens (usually more toward one side or edge of lens) can open up the angle and is used to help differentiate appositional closure from synechial closure.

- This is better accomplished with a 4-mirror (or small faced lens)
Indenting with 4-mirror

Narrow angle, convex iris

Indenting with gonio lens opens view to CB
Ultrasound Biomicroscopy
AS-OCT

Friedman. He Survey of Ophthalmology Vol53, No3 2008; reprinted from Radhakrishnan et al Arch of Ophth
Gonioscopy Lenses

- Direct (Koepppe)
- Indirect
  - 3-mirror
  - 4-mirror
  - pediatric
Lens Choice Advantages

- **Goldmann 3-mirror**
  - Stability

- **4-mirror**
  - Quick
    - May not require interface solution
  - Compression
  - Adding flange improves stability
The Procedure

- Anesthetic
- Interface Solutions
  - Goniosol (hydroxypropyl methylcellulose)
  - Refresh Celluvisc (carboxymethylcellulose)
  - RGP conditioning solution
Classification

- Shaffer (widely used)
- Spaeth
- Scheie (rarely used)
- Van Herick (non-gonio estimate)
van Herick

- van Herick: compare a/c depth (endothelium to iris depth) at limbus to corneal thickness in slit lamp optic section

- 4 : a/c = cornea
- 3 : a/c = 1/4 to 1/2 cornea (and ½ to full)
- 2 : a/c = 1/4 cornea
- 1 : a/c = < 1/4 cornea
- slit
Angle Grades (Shaffer)

- Grade 0 = closed
- Slit = (<10deg) partial closure
- Grade 1 = (10deg) closure probable
- Grade 2 = (20deg) closure possible
- Grade 3-4 = (30-40deg) wide open

Correspondance similar to van Herick
Identify most posterior structure seen in each of 4 quadrants
  - SL, anterior TM, posterior TM, SS, CB

Iris approach into angle
Iris processes or PAS
Pigmentation in TM
Spaeth grading (e.g. D40r)

- **site of iris insertion**
  - A: @ SL
  - B: post to SL (@ TM)
  - C: @ SS
  - D: @ CB
  - E: posterior CB

- **angle width**: 10, 20, 30, 40°

- **configuration**: s (steep), r (regular or flat), q (queer or concave)
Spaeth Grading

6-2 equiv A-E
Scheie

Reversed grading system