Gonioscopy

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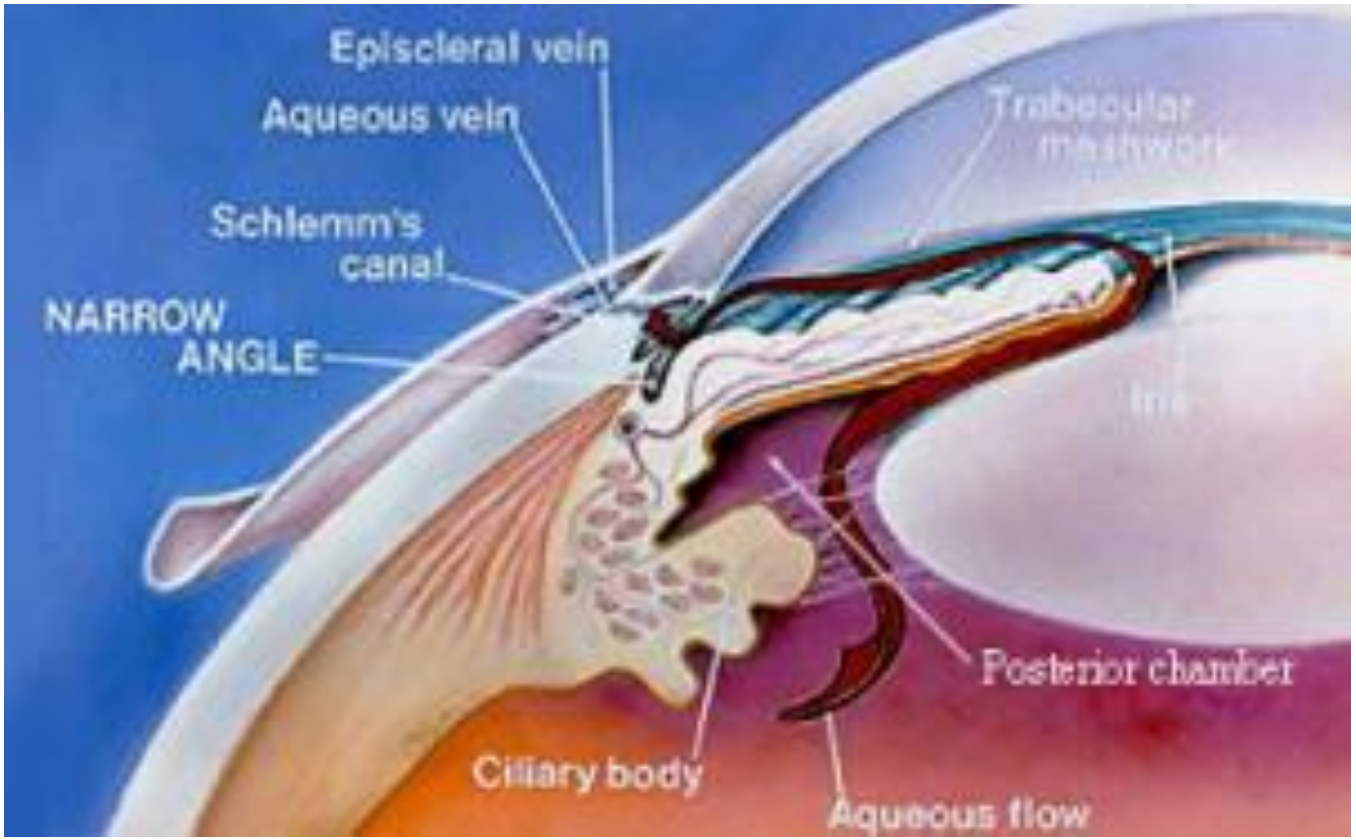
Disclaimer

- 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:

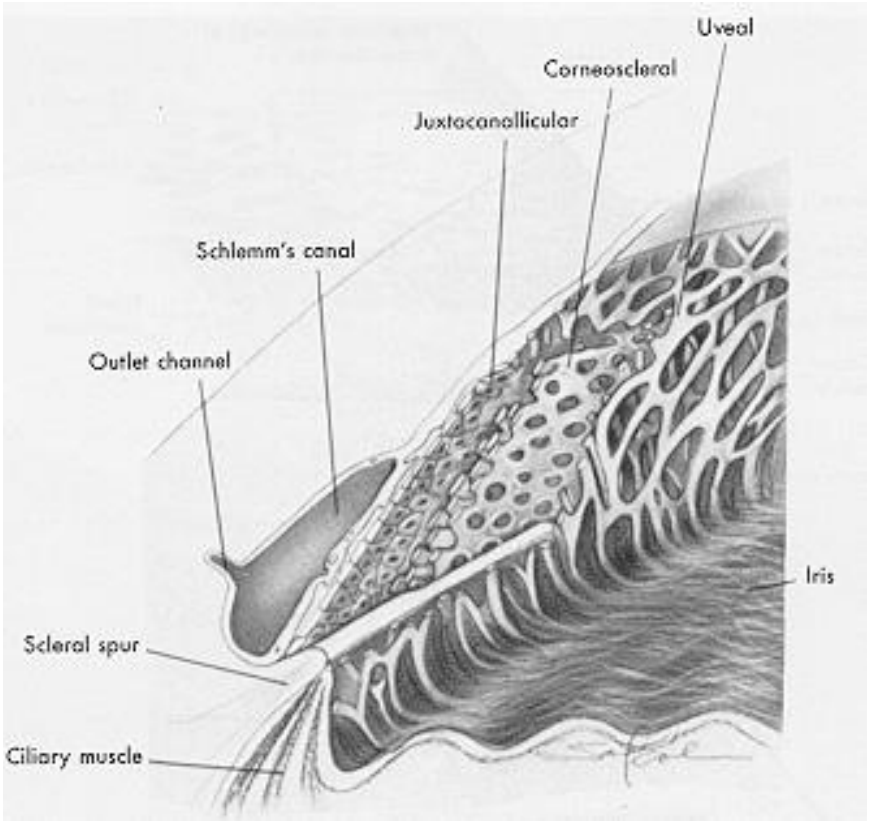
- List indications for performing gonioscopy
- Recognize good gonioscopy technique
- Interpret & document observed angles
- Recognize normal & abnormal angle architecture & implications


Episcleral vein
Aqueous vein
Schlemm's canal
NARROW ANGLE
Trabecular meshwork
Iris
Posterior chamber
Ciliary body
Aqueous flow

Anatomy:

Where is the canal of Schlemm?

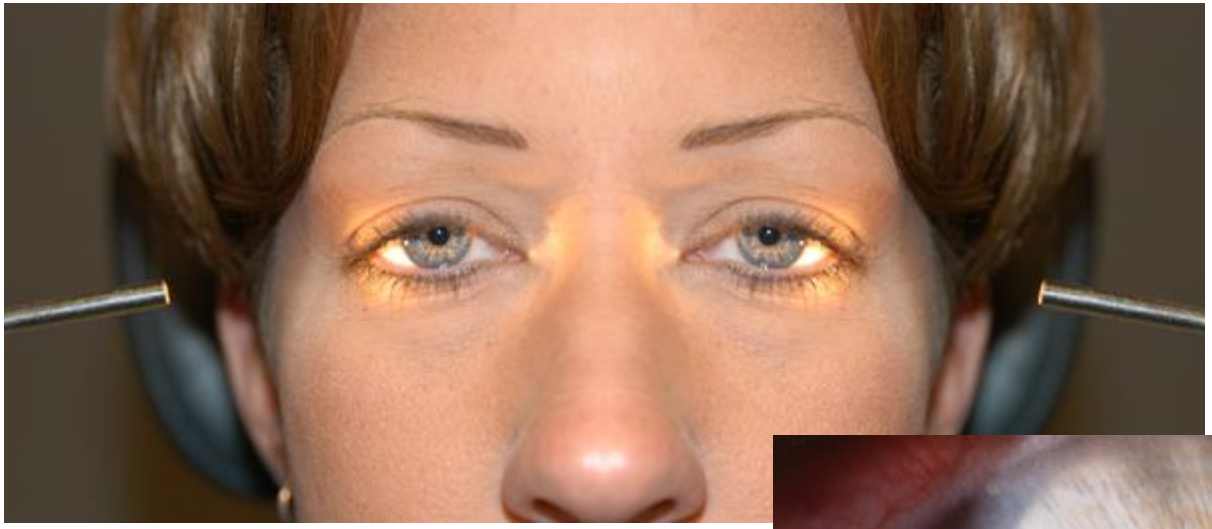
- Schwalbe's line (SL)
  - Sampaolesi line
- TM
  - anterior
  - posterior
- Scleral spur (SS)
- Ciliary body (CB)
  - wider in myopes
- Iris root
- Widest inferior

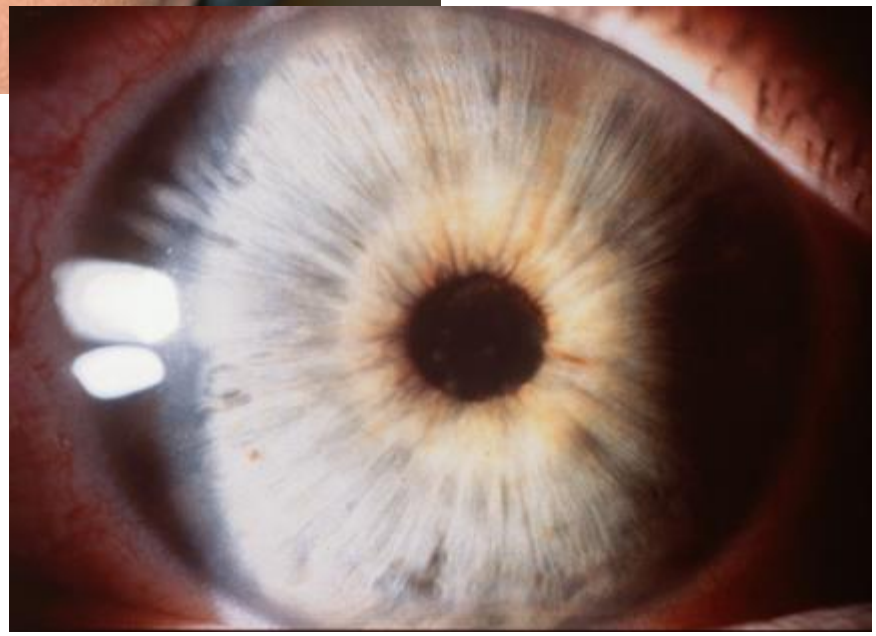


When to perform gonioscopy (92020)

- 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





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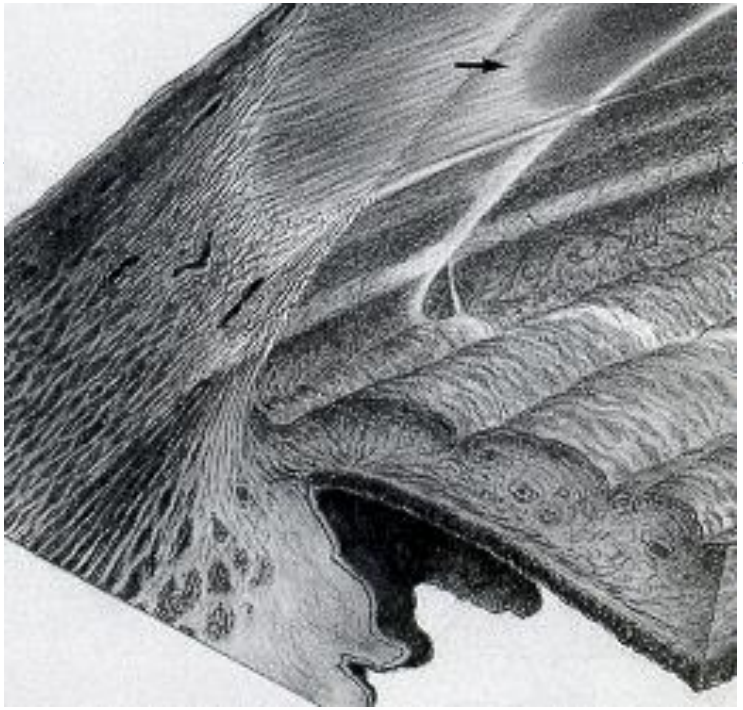
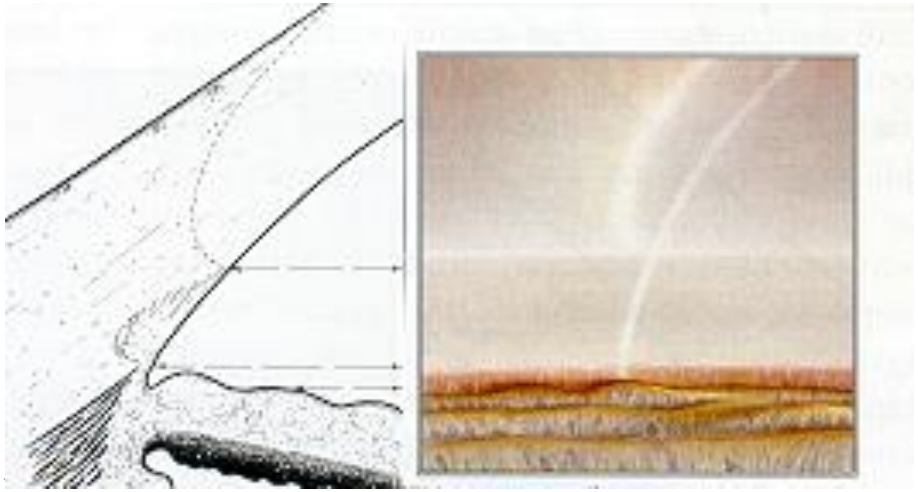
Gonioscopy



Subsequent figures courtesy:

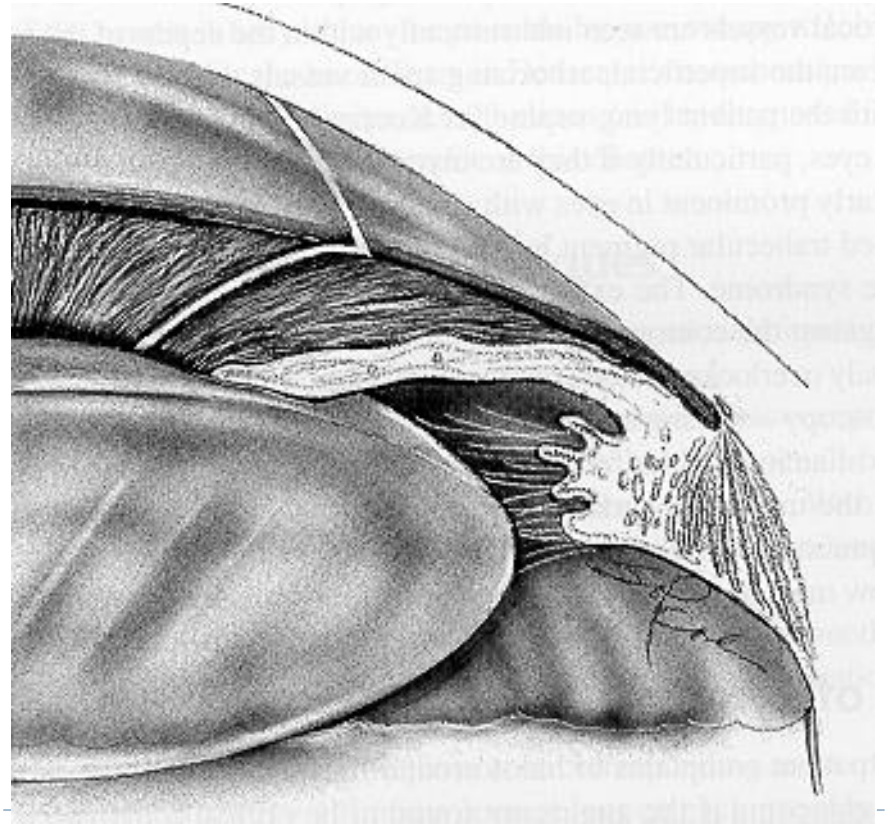
W Alward
Color Atlas of Gonioscopy
1994



Is your view all the way in?

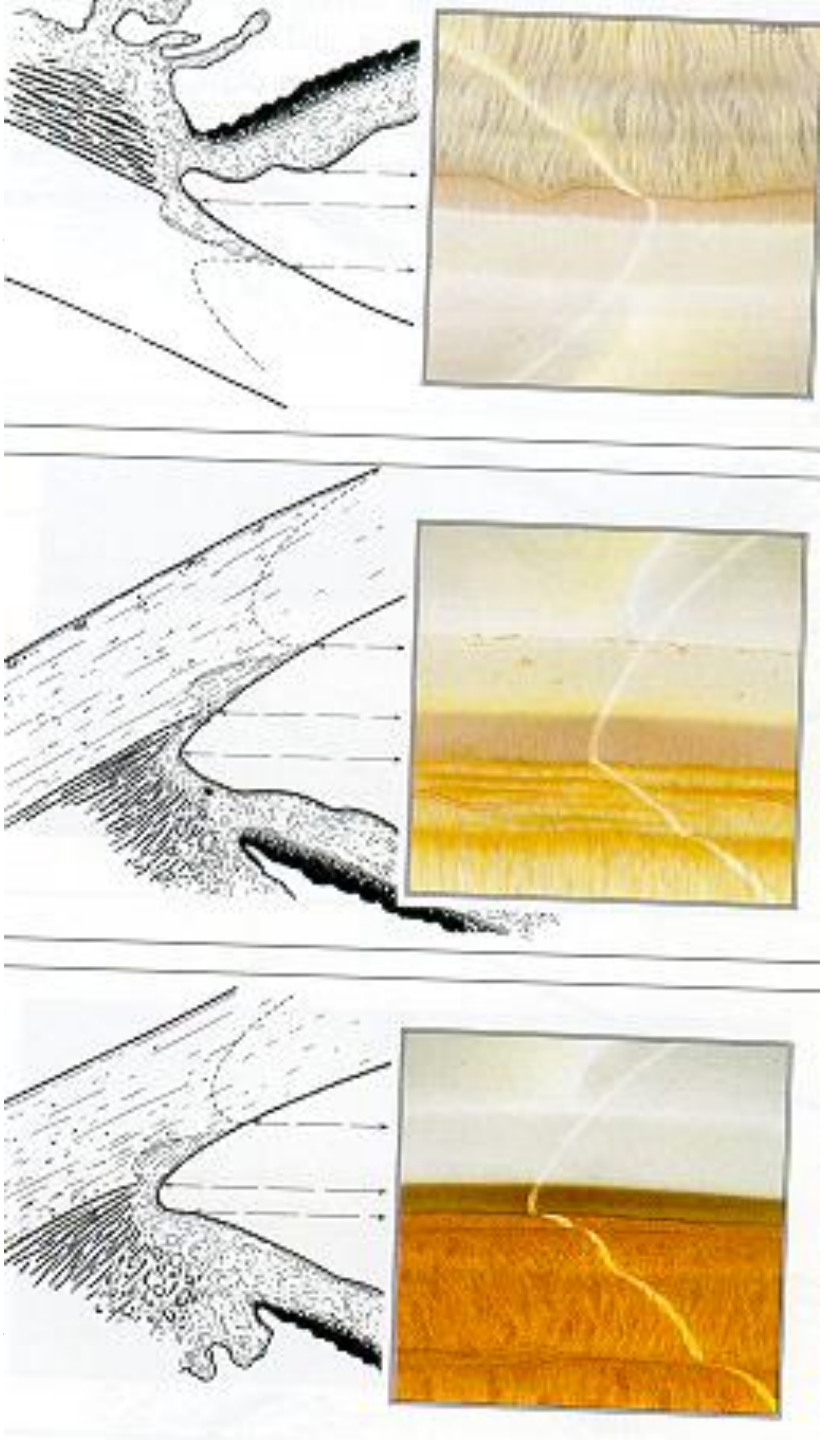
The iris beam meets the anterior wall beam where the iris root inserts OR where there is apposition

A gap separating these 2 beams indicates there is open space beyond your view



Corneal wedge/ Focal line

Gonioscopic Variations

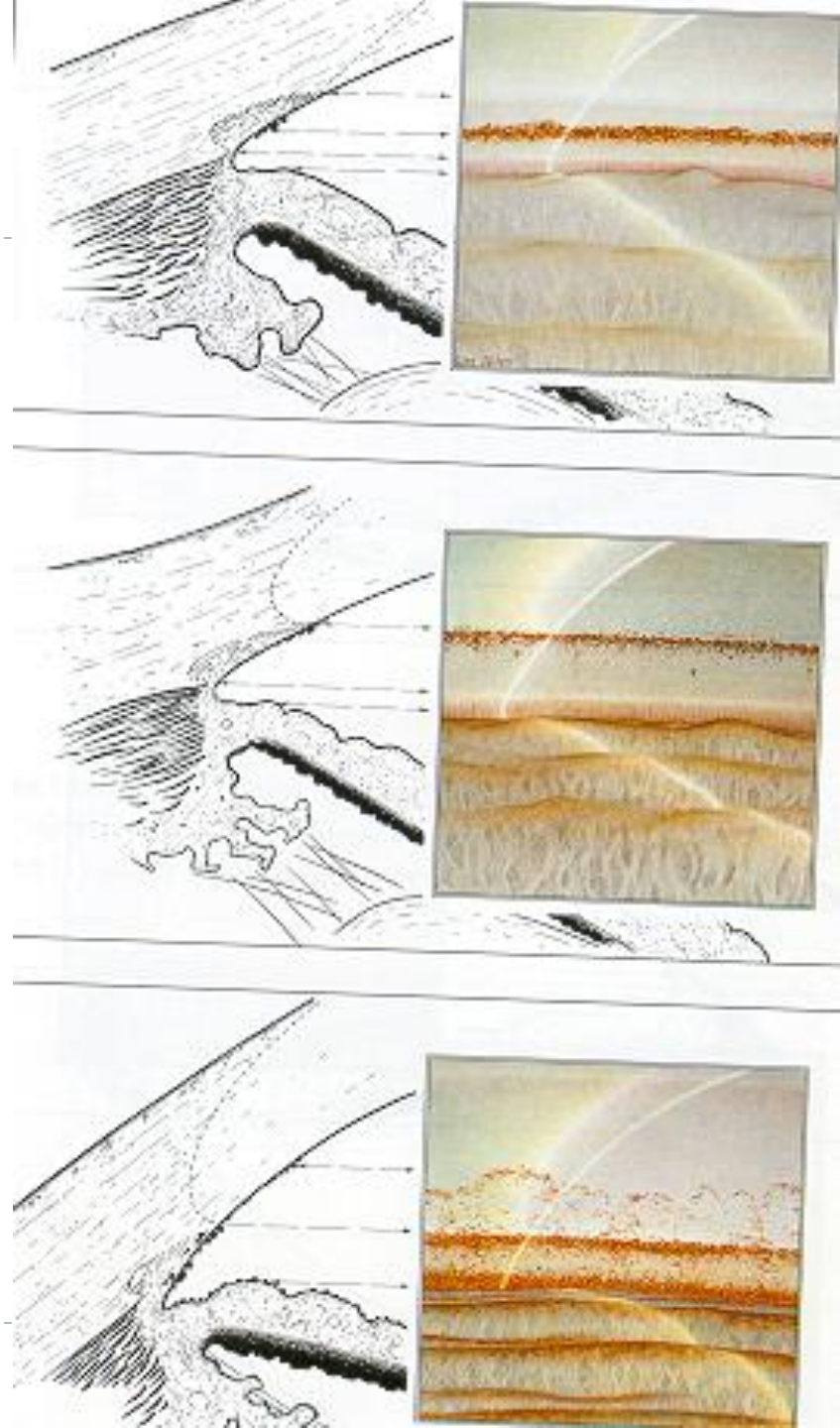


Gonioscopic Variations

Narrow CB, wide SS, pigmented post TM

Clear posteriorTM with pigmented anteriorTM

Convex, no CB/SS, ‘banded’ TM, Sampaolesi line



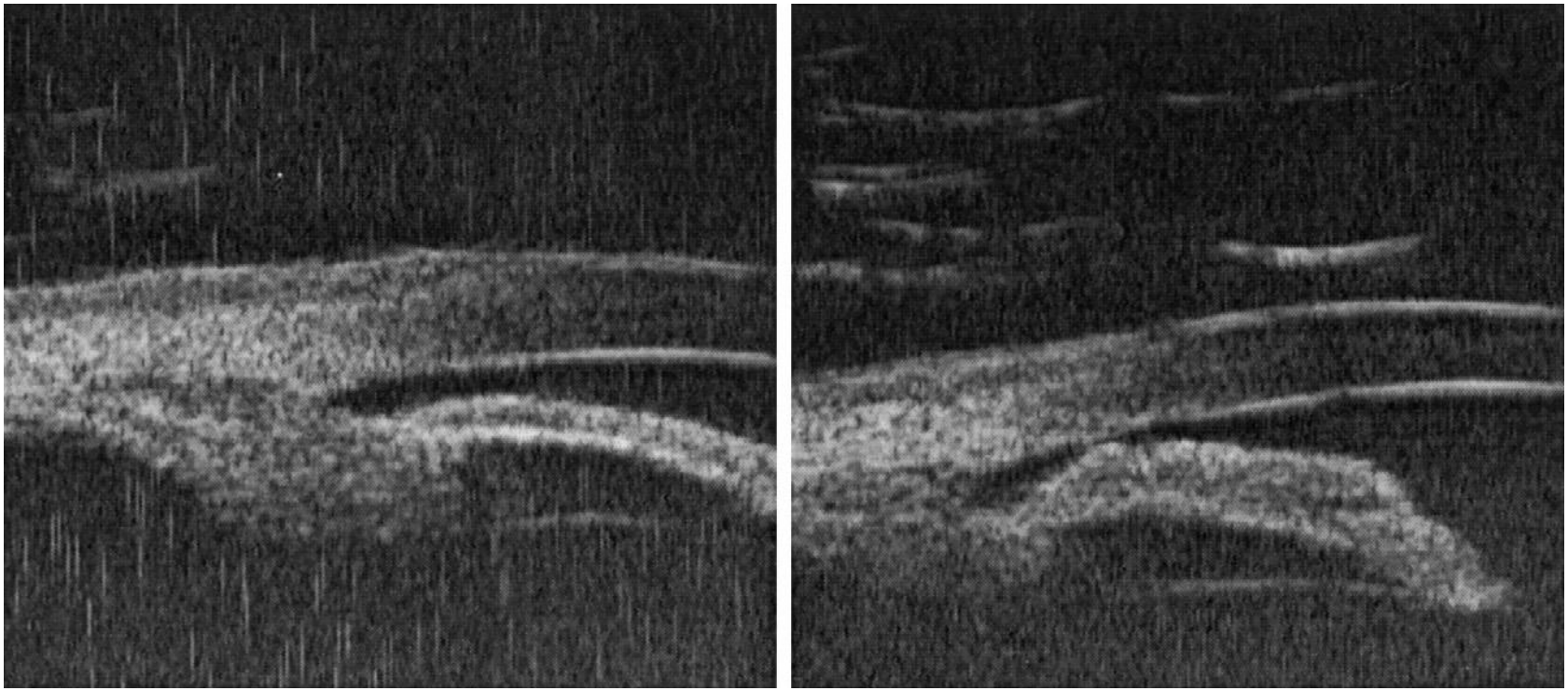
Gonioscopy Technique – Dark Room Conditions

- 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)

Lights ON

Lights OFF



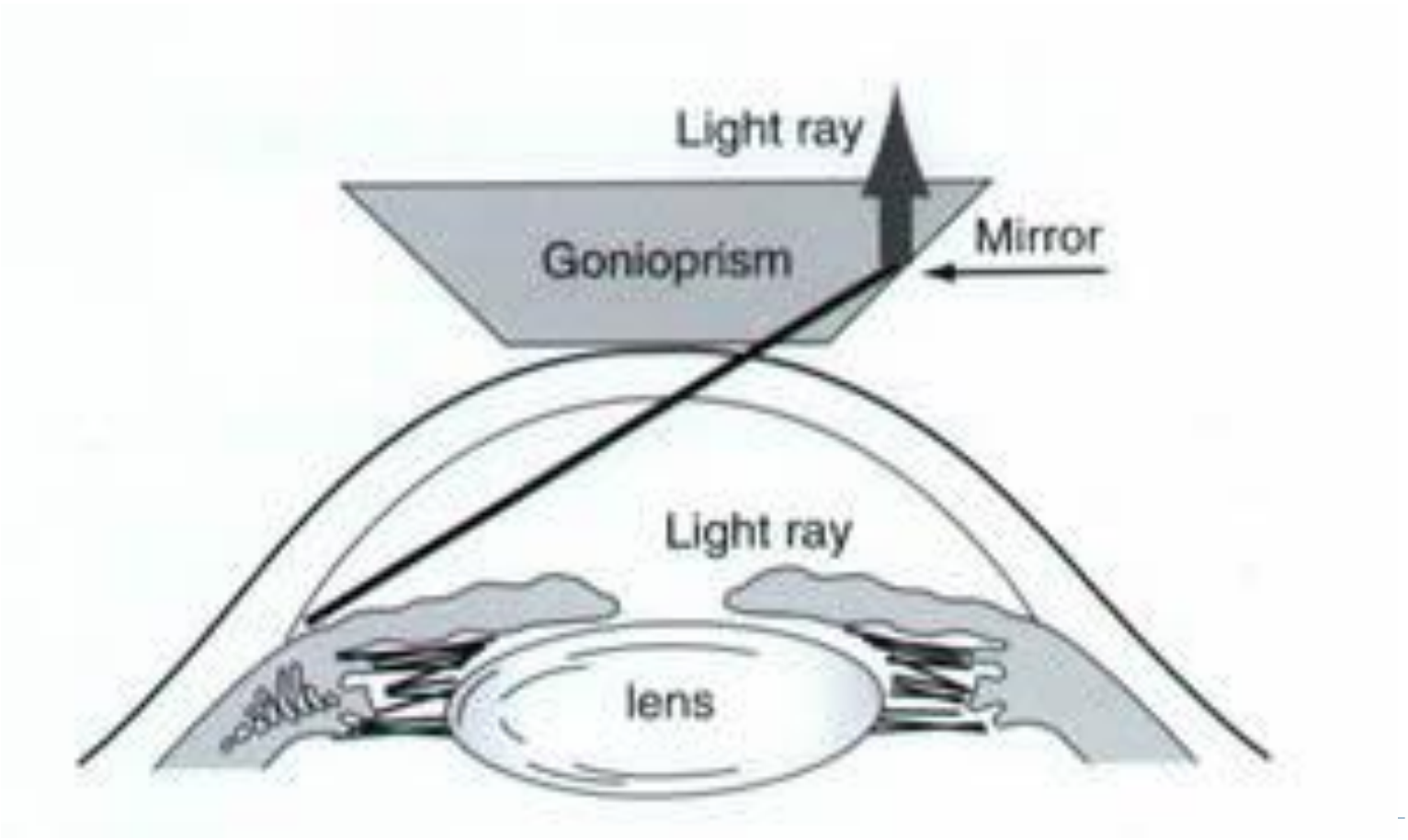
Friedman, He *Survey of Ophthalmology* Vol53,No3 2008; reprinted from Radhakrishnan et al *Arch of Ophth*

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 pigmentedTM

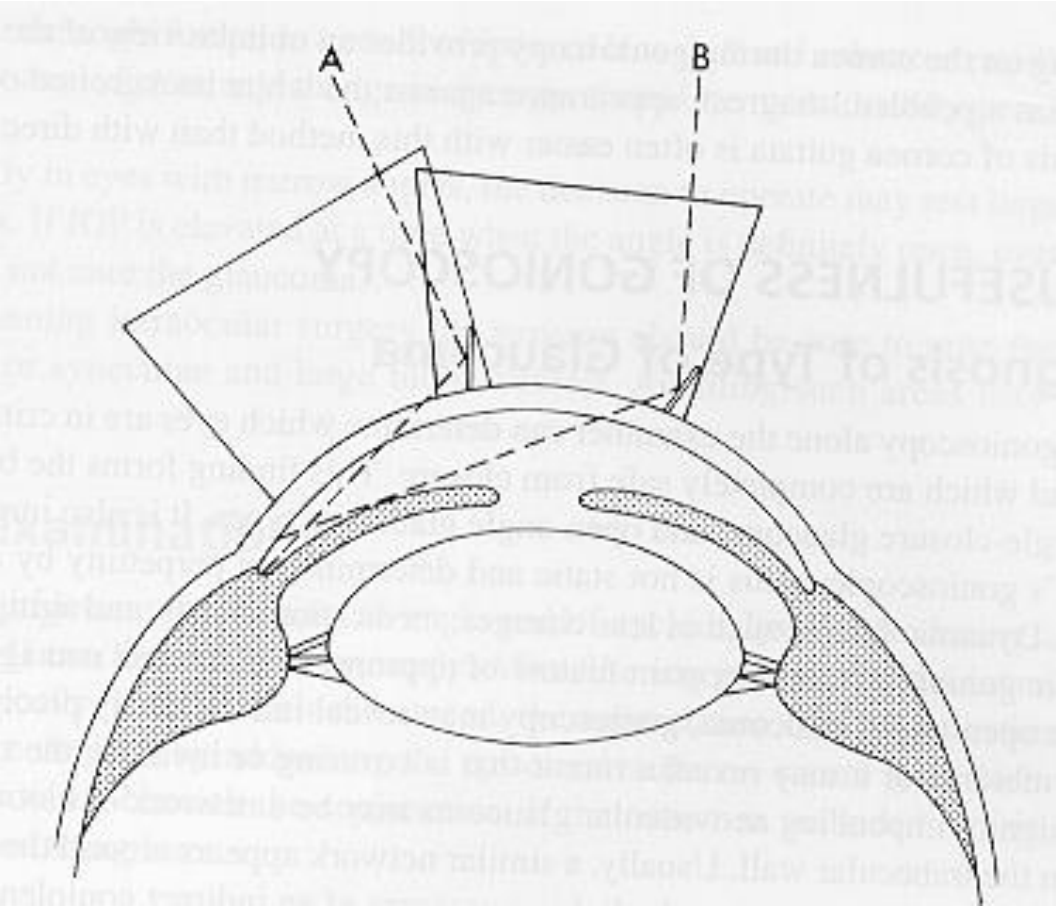
Paul Palmberg, *Gonioscopy in the Laser Age* 2003

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



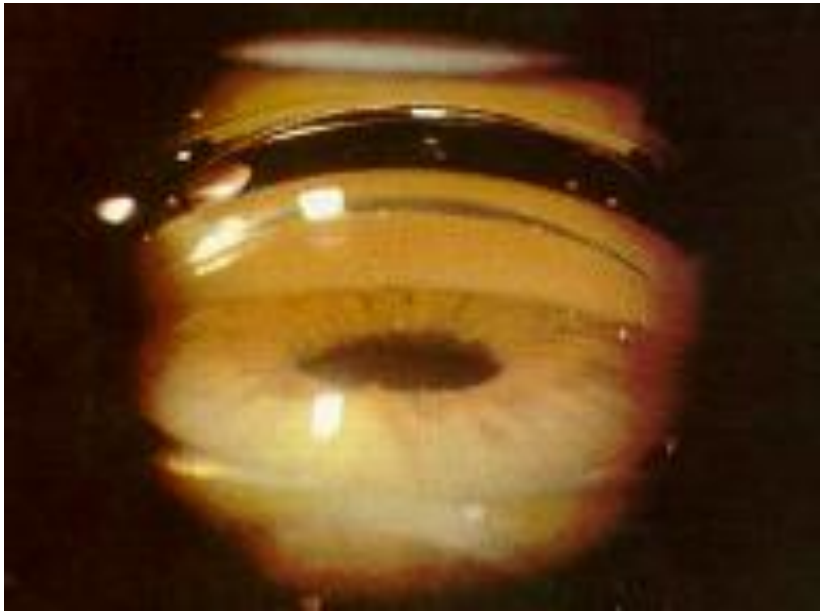
Indentation or compression

- 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.

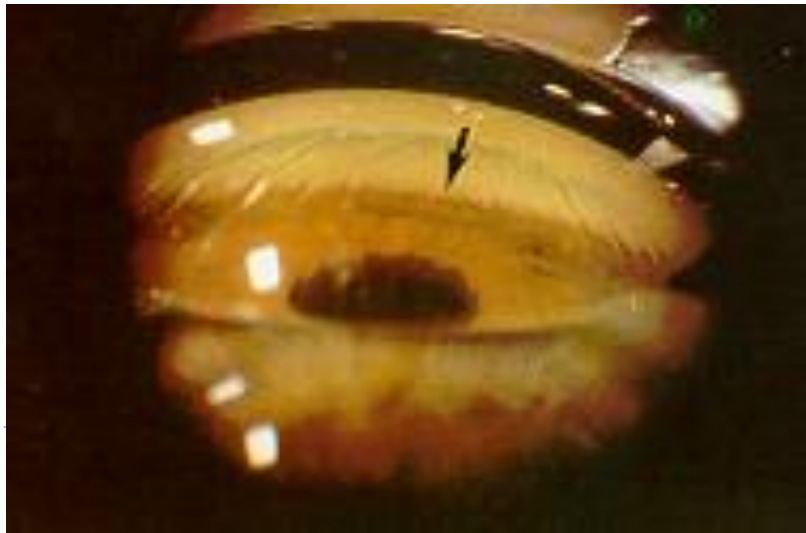
- This is better accomplished with a 4-mirror (or small faced lens)

Indenting with 4-mirror

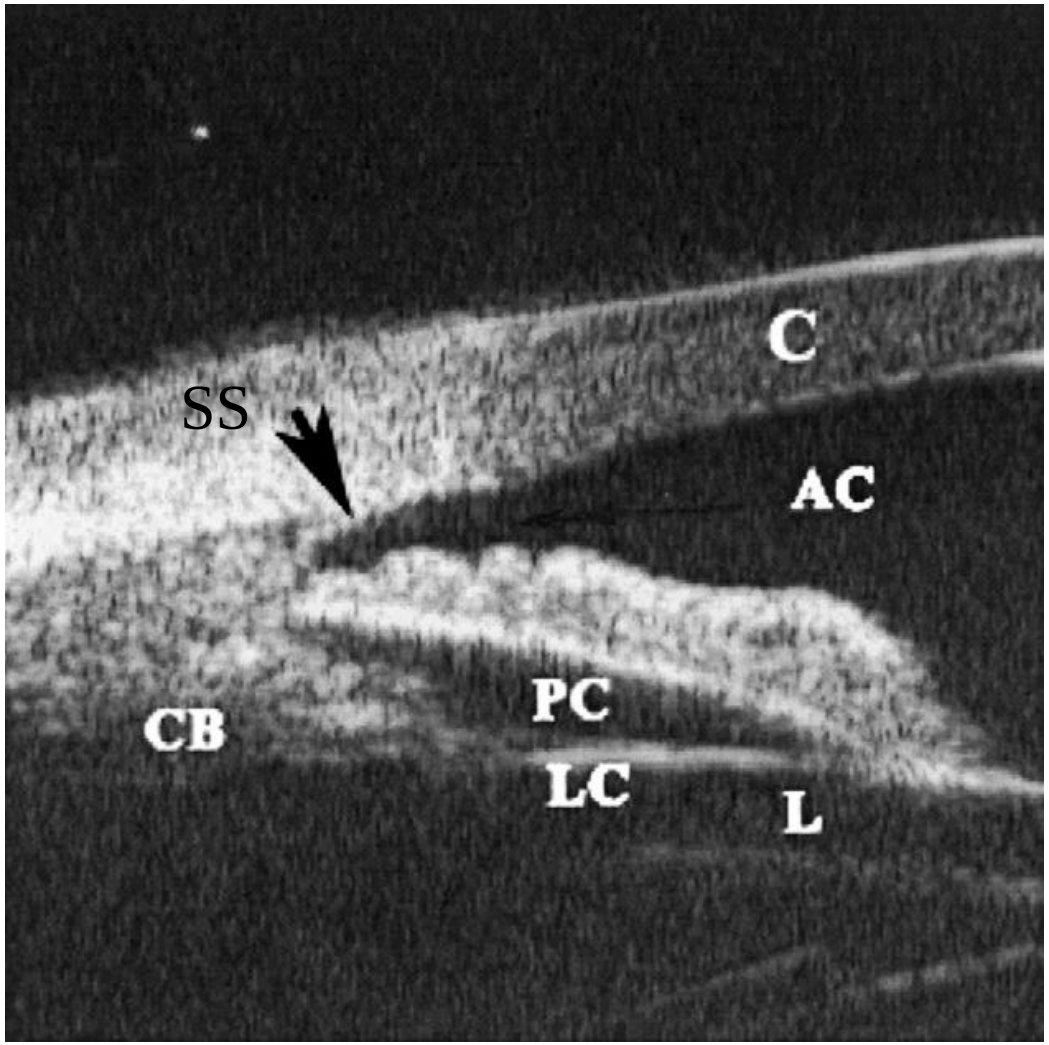
Narrow angle, convex iris



Indenting with gonio lens opens view to CB



Ultrasound Biomicroscopy



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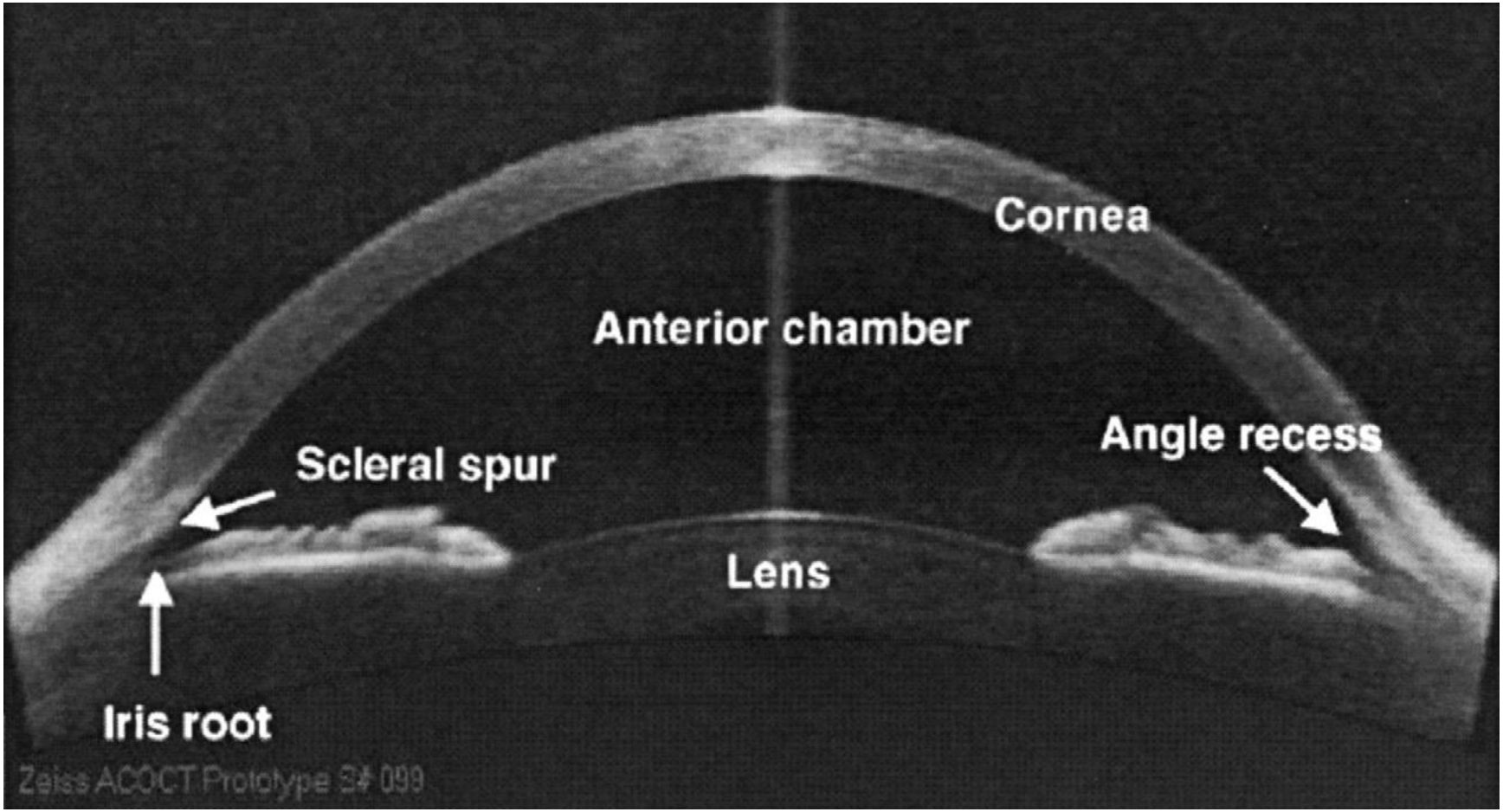

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Gonioscopy Lenses

- Direct (Koeppe)
- 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

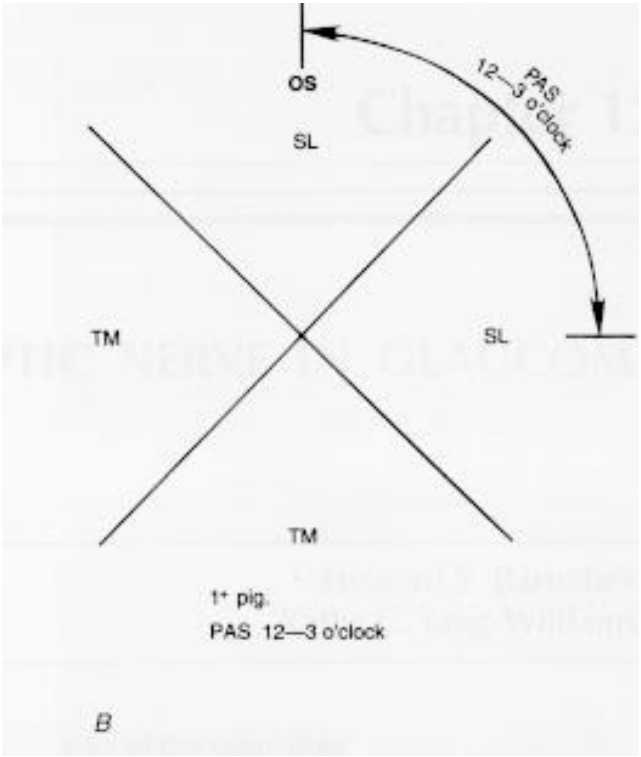
Angle Grades (Shaffer)

- 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

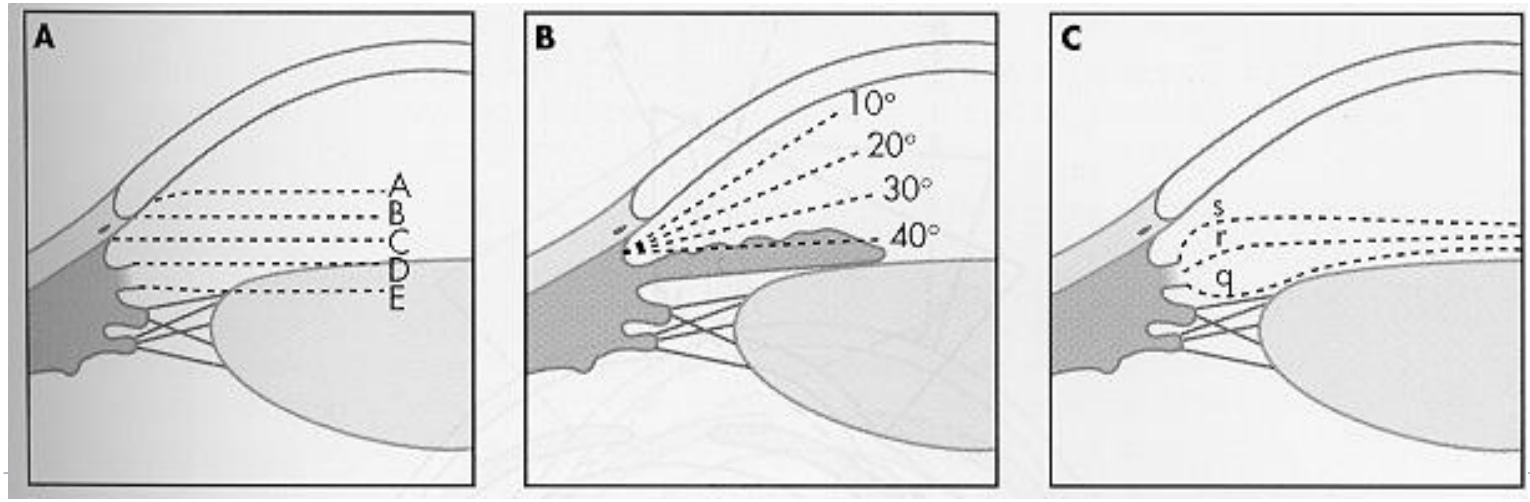
Modified (Shaffer) Diagram Documentation

- 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



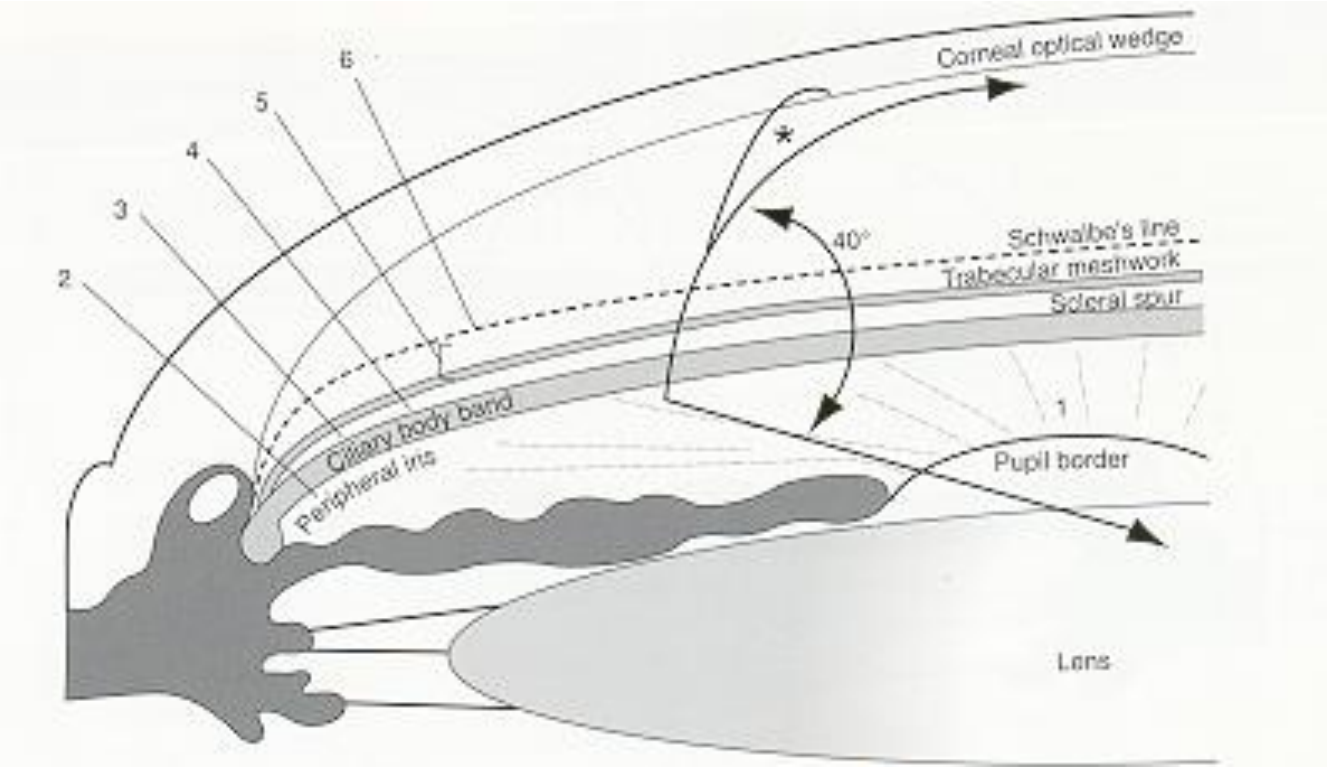
Spaeth grading (e.g. D40r)

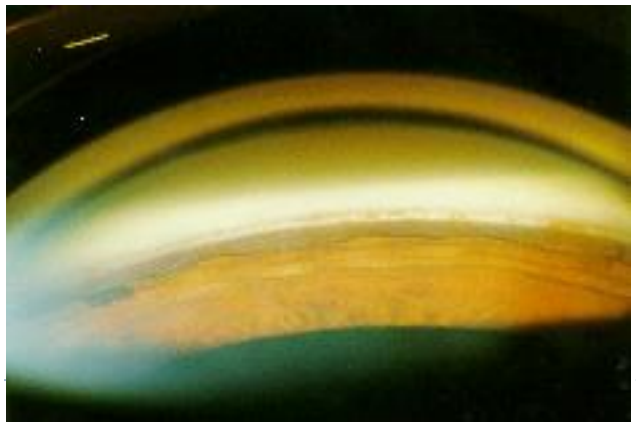
- site of iris insertion
  - A: @ SL
  - B: post to SL (@ TM)
  - C: @ SS
  - D: @ CB
  - E: posterior CB
- angle width: 10, 20, 30 40°
- configuration: s (steep), r (regular or flat), q (queer or concave)



Spaeth Grading

6-2 equiv A-E





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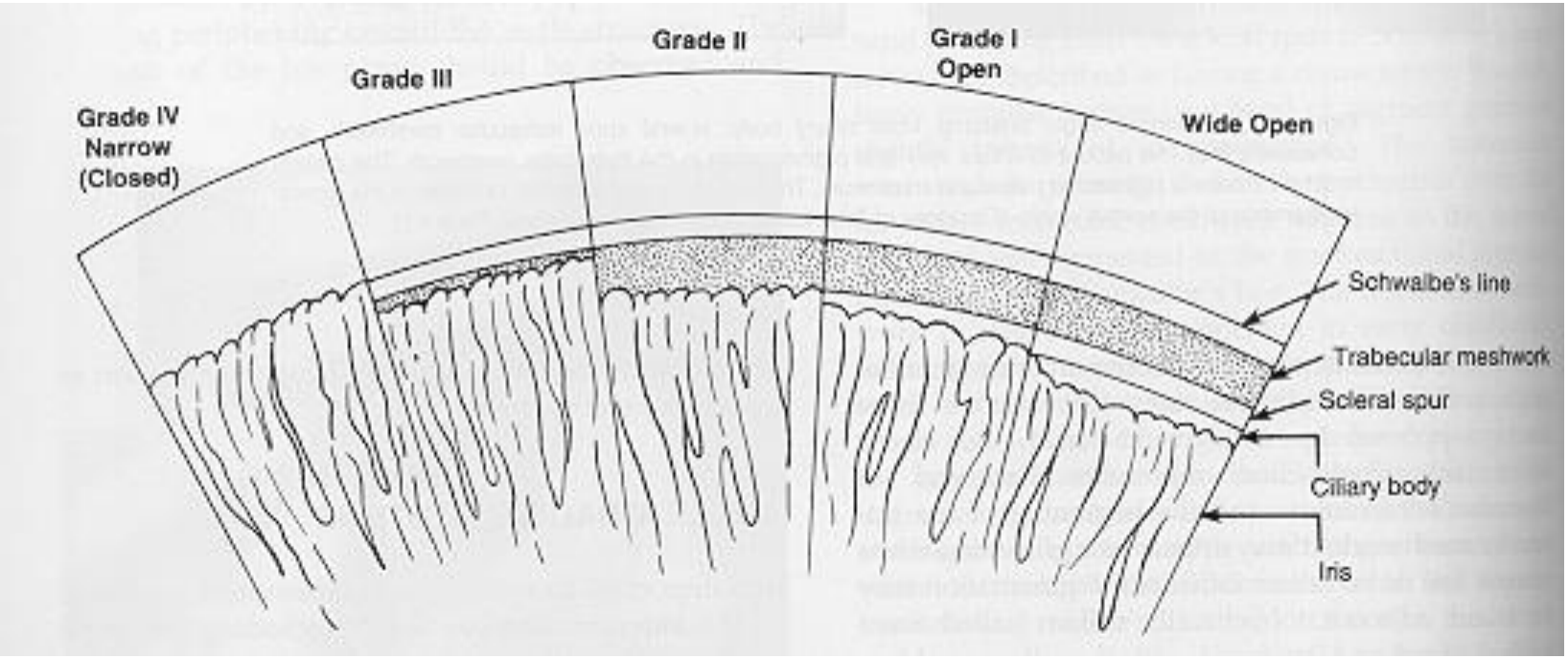

Reversed grading system