Goodness, Gracious, Great Gonioscopy

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Disclosure

- Michelle Steenbakkers, OD, FAAO is an independent optometrist and faculty member at the School of Optometry & Vision Science, University of Waterloo.

- I do not have any relevant financial relationships that could be perceived as having a bearing this presentation.
Objectives

- To understand the clinical indications for gonioscopy
- To differentiate between the various lenses clinically available for gonioscopy
- To appreciate the pathology observed with gonioscopic techniques
Gonioscopy – WHY?

Can you list 10 indications for gonio?
**Contraindications**

**When is gonioscopy contraindicated?**

- Penetrating injury
- Orbital fracture
- Hyphema (blood in the anterior chamber)
- Severe corneal compromise
Gonioscopy

- Describe what you see in the following photos ...
Gonioscopy

- **3-Mirror Goldmann** ... a classic
  - Vaults the corneal surface
  - Use anesthetic and coupling gel (Celluvisc)
  - Avoid bubbles in the gel .... bubbles in view!
  - “Steady View”
Gonioscopy

3-Mirror Goldmann:

- Central lens → macula ... like you’ve never seen (diabetes, CSME, CME, hole, pseudohole ...)
- Trapezoid → Posterior pole to equator
- Rectangular → Equator to beginning of ora serrata
- Thumbnail → Ora serrata (dilated), anterior chamber and iris (undilated)

Note: Viewing the angle 180 degrees away from the mirror (view is inverted or reversed)
Gonioscopy

4-Mirror Goniolens (Posner, Sussman)

- Rests on corneal surface
- Anesthetic, coupling solution (NP-ATs)
- “Steady Hand”
- No rotation! – quick and easy
- Indentation gonioscopy to break synechiae/angle closure
- Over-estimate angle depth due to indentation
4-Mirror Sussman

- **QUESTION:** To flange or not to flange?

- **ANSWER:** To indent or not to indent ...
Gonioscopy

- 2-5% of general population have anatomically narrow angles\textsuperscript{1}
- Occludable angles are 1.6%\textsuperscript{1}
- Angle closure glaucoma is 0.09%\textsuperscript{2}

Angle Closure

Plateau Iris

- Rare
- Younger patients
- Slit lamp: normal or deep central anterior chamber depth, shallow peripheral angle and flat iris contour
- Angle closure may be precipitated with dilation
- Angle closes off due to folding of iris root against the wall of the endothelium which blocks the trabecular meshwork
Angle Closure

- **Pupillary block**
  - Apposition of iris to the crystalline lens when the iris is mid-dilated
  - Pressure increase in posterior chamber forces iris root against the anterior wall of the angle
  - Aqueous cannot move from post. chamber to the ant. chamber

- **When?**
  - Occurs when the iris is recovering from dilation (may happen hours after the gtts are instilled)
Pupillary Block
Gonioscopy

- Normal Anterior Chamber Angle
Clinical Anatomy of the Angle

Schwalbe’s Line
- End of Descemet membrane, end of clear cornea (limbus)
- Visible as grey/white line

Trabecular Meshwork
- Visible as gray/brown coloured band
  - Non-pigmented section (nearest Schwalbe)
  - Pigmented section (nearest Scleral Spur)
- Canal of Schlemm may contain blood
Clinical Anatomy of the Angle

Scleral Spur
- Attachment of ciliary muscle to sclera
- Visible as white line

Ciliary Body
- Located at root of iris
- Visible dark brown band
Normal Angle

- Schlemm’s Canal
- Scleral Spur
- Ciliary Body
- Iris
- Schwalbe’s Line
- Trabecular Meshwork
Identifying Angle Structures

Focal Line Technique

- Also known as the “Corneal wedge”
- Uses optic section of cornea
- Optic section ends at Schwalbe’s line
Focal Line method

- cornea
- angle
- Schwalbe’s line

Ed Sung, MD & Lee Alward, MD
U of Iowa 2004
Gonioscopy Structures

- "Look to see closure in people!"
  - Dr. Andria Tinkham

- Look (SL)
- To (TM)
- See (SS)
- Closure (CB)
- In (iris)
- People (pupil)
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- Interpretation of angles:
  - If less than 1/2 of the TM is visible, the patient is at \textit{risk} for angle closure
  - If ciliary body band is seen, the angle is wide open
  - If no structures are visible, the angle is closed
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- Record results for each quadrant (X)
- Primary view, secondary view (tilt lens)
- Describe:
  - most posterior structure visible per quadrant
    - (CBB, SS, TM, SL or none)
  - presence of pigment? (grade 0-4)
  - iris insertion (concave, convex or flat approach)
  - iris processes? anomalies?
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- Angle depth:
  
  i. Inferior angle is widest
  
  ii. Superior angle is the narrowest
Video
GOODNESS, GRACIOUS GREAT GONIOSCOPY CASES
Gonioscopy

- Angle Recession 2° Trauma
  - Axial compression with equatorial expansion
  - Separation of the longitudinal & circular fibers
  - Early or delayed loss of outflow facility and elevation of IOP

recession <180° … rare development of glaucoma
180° … 4-9% incidence of glaucoma
240° … high risk of glaucoma

http://emedicine.medscape.com/article/1204999-overview#a0199
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- Pigment Dispersion Syndrome
- Accumulation of pigment over the TM
- Pigment granules from the posterior iris surface (transillumination defects)
- Secondary Glaucoma develops in 20-50% (PDS $\rightarrow$ PDG)
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- Peripheral Anterior Synechiae (PAS)
- \(2^\circ\) Argon Laser Trabeculoplasty (ALT)
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- Iridocorneal Endothelial Syndrome (ICE)
  - Cogan-Reese Syndrome

- Iris stroma is stretched with holes

- Visible iris nodules

- Angle is not visible because of the extensive anterior synechiae
ICE Syndrome

- Abnormal corneal endothelium
- Iris abnormalities
- Angle-closure with a membrane formation

1. **Cogan-Reese Syndrome** – pigmented nodules on the iris

2. **Chandler’s Syndrome** – corneal edema

3. **Essential Iris Atrophy** – corectopia, “melting holes” and “stretch holes”
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- Iris Melanoma
- Iridocyclectomy performed
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- Cyclodialysis
- Ciliary muscle separated from scleral spur
- Often history of trauma
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- Rubeosis Iridis
- New vessels cover the chamber angle (ciliary body band, scleral spur, trabecular meshwork) thus preventing outflow
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- Pseudoexfoliation Syndrome/Glaucoma
  - Secondary Open Angle Glaucoma

- Pigment granules also accumulate in the chamber angle

www.xalatan.com

www.mrcophth.com
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Sampaolesi's Line:

- Pigment on the angle wall in a scalloped pigmented wave
- Located above Schwalbe’s
  - Usually in the inferior angle
- Associated with pigment dispersion or exfoliation syndrome
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- Gonioscopic view of a steel foreign body in the inferior chamber
- The entry wound in the limbus is visible
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- Perforating injury to the cornea
- Aqueous leaked through the wound and the iris was involved
- Anterior synechiae remained with re-deepening of the anterior chamber
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- Axenfeld-Reiger syndrome
- Gonioscopy shows the prominent Schwalbe's line with iris tissue inserting into it
Additional gonioscopy instruction and videos:

www.gonioscopy.org
Thank You