Rethinking Gonioscopy
Fundamentals and Future Tech

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Financial Disclosure

No financial disclosures

Goals

Misconceptions about angle closure
Prognosis/Treatment
New Technology
Indications

Elevated IOP
Asymmetric IOP
Vascular
CRVO, DM, OIS
Trauma
History of glaucoma treatment
Every Glaucoma patient!!

Indications

Every Glaucoma patient!!
Role of IOP = assess risk
Role of gonioscopy = determine treatment

Contraindications

Hyphema?
Open Globe
Compromised Cornea
Underutilized

Only 50% of Glaucoma patients have gonio recorded
74% of referred patients had no angle status

Am J Ophthalmol 2018;188:16–29

Underutilized

Don't understand value
Difficult to handle equipment
Difficult to interpret

Subacute

Most primary angle closure is subacute
Spend months to years asymptomatic
May not catch during exam

Acute closure is uncommon
Not all angle closure is acute

Most is subacute
Not all acute glaucoma is angle closure
- Rubeosis
- Uveitis

**Difficult**

Technically difficult to handle
- Practice
- Few good references
  - gonioscopy.org
  - Google

[Image link]
How Do Angles Close?

Risk Factors

Age
Race (Asian, Eskimo)
Shorter Axial Length
Shallow Anterior Chamber
Lens
Accuracy

Classify type of glaucoma
Leads to better treatment

Accuracy

POAG
NTG
Angle Closure
Rubeotic
Uveitic
Pigmentary/Pseudoexfoliation

Accuracy

Many different methods
Van Herrick
Shaffer
Spaeth
Accuracy

Many different methods
Van Herrick
Shaffer
Spaeth

Why Change?

Gonioscopy should grade occludability

Why Change?

Spaeth tells us
Occludability
Relationship of iris to TM
Easier to monitor for change
Spaeth Method

Normal Angle - Video

Video from gonioscopy.org - Used with written permission
Angle of Insertion

Steep or Regular

Steep or Regular
TM – Iris Relationship

Go to most narrow angle
A = Anterior to TM
B = Behind TM
C = Scleral Spur
D = Deep (Ciliary Body)
E = Very Deep

A schematic drawing of the iris anatomy shows the locations of A, B, C, D, and E.
Compression

If angle is narrow, may need compression

How far back does it go?

Check for PAS
Occludable

Who is occludable?
30 and 40 are not
10 and 20 are

Not all occludable angles will occlude

Who needs treatment?

No controlled clinical trials

Not everyone needs treatment

Only 10% of occludable angles
Who needs treatment?

- Increased IOP
- ONH and/or VF progression
- PAS - current or aborted
- Symptoms
- Other eye

Provocative Tests

- Dark Room
- Water
- Dilation
- Prone

Provocative Tests

- All tests suffer from
  - Poor specificity
  - Tedious
Provocative Tests

Dark Room
Gonio (after 1.5 hours)
66% sensitivity
80% specificity

J Glaucoma 2012 Mar;21(3):155-9

Provocative Tests

Dark Room
OCT (after 3 minutes)
90% sensitivity
57% specificity

J Glaucoma 2012 Mar;21(3):155-9

Provocative Tests

Friedman - AJO 1972
Sensitivity
Dark room 48%
Prone 71%
Pharmacologic 58%
Provocative Tests

Laser Peripheral Iridotomy
Argon Laser Iridoplasty
Cataract Surgery

Treatment

Laser Peripheral Iridotomy
Argon Laser Iridoplasty
Cataract Surgery

Acute Treatment

Diamox not fast enough
Isosorbide and Osmoglyn not available
Paracentesis
Cannot do this if angle is narrow
Acute Treatment

Meds!
Consider lopidine

Cornea is edematous
- Underestimate by as much as 20%

If cornea is clearing, IOP is improving
Quigley

Two factors influence risk of closure

Iris proximity to TM

Iris volume

Quigley

Possible mechanisms:

Iris volume increase on dilation

Choroidal expansion
**Advanced Tech**

Ultrasound Biomicroscopy (UBM)
Scheimpflug photography
Anterior Segment OCT (ASOCT)


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**Benefits**

- Good visualization of angle
- Documentation
- Patient education

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**UBM**

Similar to B-Scan
Uses higher frequency
Images anterior segment
**UBM**

**Pros**
- Quantitative/Qualitative view of ACA
- Correlates well with gonioscopy
- Plateau Iris
- Confirm efficacy of LPI

**Cons**
- Best imaging requires coupling with eye bath
- Inconvenient
- May be difficult to interpret

**Scheimpflug**

- Anterior Segment images from slit lamp
- Noncontact optical system
- Common system is Pentacam
Scheimpflug

Pros
- Inexpensive
- Good correlation with gonioscopy

Cons
- Not as good as OCT or UBM
- No view of angle structures
Objective measures
- Iris curvature
- Lens vault
- Iris volume
- Anterior chamber depth
- Anterior chamber width
OCT

**Pros**
- Can do in dark room
- Good sensitivity
- Many doctors familiar with OCT

**OCT**

**Pros**
- Good visualization - even with corneal pathology
- Good on uncooperative patients

**OCT**

**Con**
- May overestimate risk
- Questionable specificity
- Cannot visualize behind iris
**OCT**

- Con
  - Uses scleral spur as landmark, not TM
- Cost

**ASOCT**

*Am J Ophthalmol 2018;188:16–29*

**Imaging**

- All technology is a complement to gonio
- Cannot visualize angle as well as gonio
- Cannot compress
Imaging

Need prospective trials
LPI vs Monitoring
None can predict which angles close

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