

# Rethinking Gonioscopy

Fundamentals and Future Tech

Anthony DeWilde, O.D.

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## Financial Disclosure

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No financial disclosures

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## Goals

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Misconceptions about angle closure

Prognosis/Treatment

New Technology

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## Indications

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Elevated IOP

Asymmetric IOP

Vascular

CRVO, DM, OIS

Trauma

History of glaucoma treatment

Every Glaucoma patient!!

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## Indications

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Every Glaucoma patient!!

Role of IOP = assess risk

Role of gonioscopy = determine treatment

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## Contraindications

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Hyphema?

Open Globe

Compromised Cornea

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## **Underutilized**

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**Only 50% of Glaucoma patients have gonio recorded**

**74% of referred patients had no angle status**

**Am J Ophthalmol 2018;188:16–29**

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## **Underutilized**

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**Don't understand value**

**Difficult to handle equipment**

**Difficult to interpret**

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## **Subacute**

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**Most primary angle closure is subacute**

**Spend months to years asymptomatic**

**May not catch during exam**

**Acute closure is uncommon**

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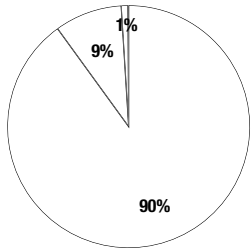
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**Risk of closure**



Wilensky. AJO 115:338-346. March 1993

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**Not all angle closure is acute**

**Not all acute glaucoma is angle closure**

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**Not all angle closure is acute**

**Most is subacute**

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Not all acute glaucoma is angle closure

Rubeosis

Uveitis

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### Difficult

Technically difficult to handle

Practice

Few good references

[gonioscopy.org](http://gonioscopy.org)

Google

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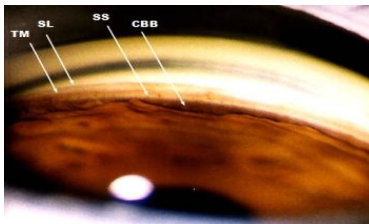
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### Difficult



<http://classconnection.s3.amazonaws.com/703/flashcards/1084703/jpg/gonioscopy-exam1326431985652.jpg>

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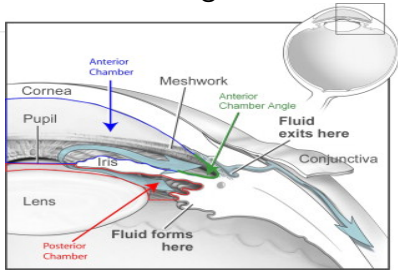
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## How Do Angles Close?



<http://biomechanical.asmedigitalcollection.asme.org/data/Journals/JBENDY/27152/036004jby1.jpeg>

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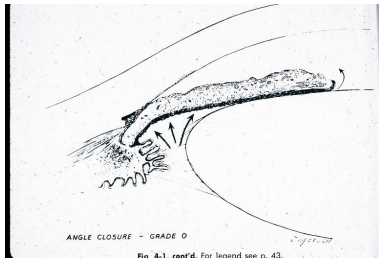
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## How Do Angles Close?



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## Risk Factors

Age

Race (Asian, Eskimo)

Shorter Axial Length

Shallow Anterior Chamber

Lens

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**Accuracy**

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**Classify type of glaucoma**

**Leads to better treatment**

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**Accuracy**

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**POAG**

**NTG**

**Angle Closure**

**Rubeotic**

**Uveitic**

**Pigmentary/Pseudoexfoliation**

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**Accuracy**

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**Many different methods**

**Van Herrick**

**Shaffer**

**Spaeth**

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## **Accuracy**

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**Many different methods**

**Van Herrick**

**Shaffer**

**Spaeth**

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## **Why Change?**

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**Gonioscopy should grade occludability**

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## **Why Change?**

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**Spaeth tells us**

**Occludability**

**Relationship of Iris to TM**

**Easier to monitor for change**

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## Spaeth Method

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## Spaeth Method

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Normal Angle - Video

Video from [gonioscopy.org](http://gonioscopy.org) - Used with written permission

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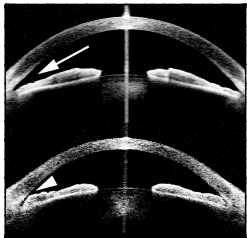
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## Spaeth Method

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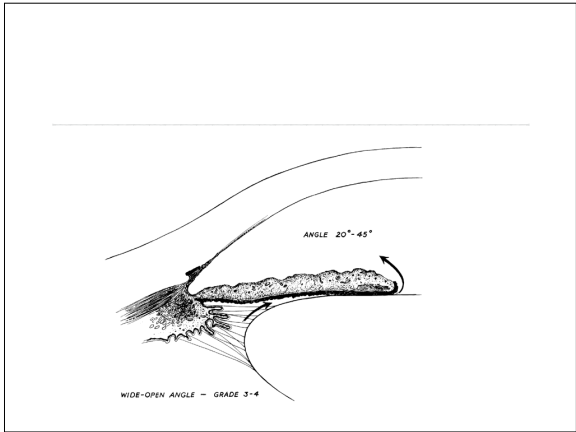
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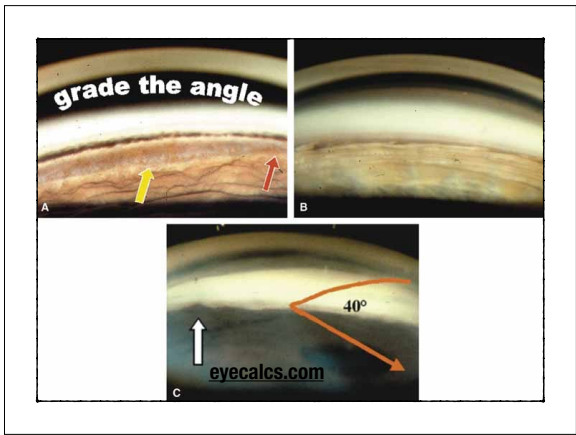
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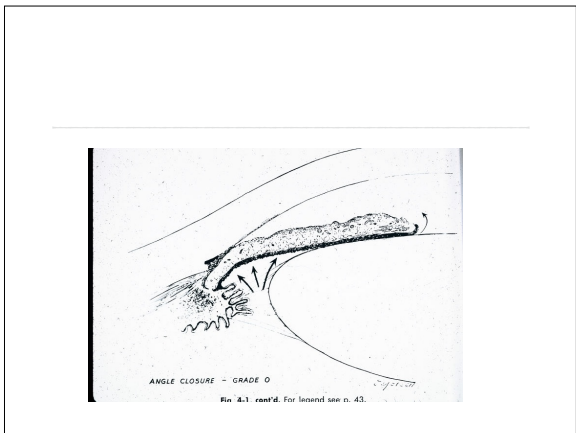
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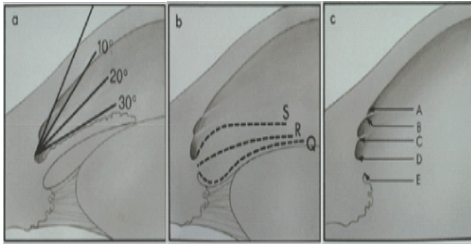
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### Angle of Insertion



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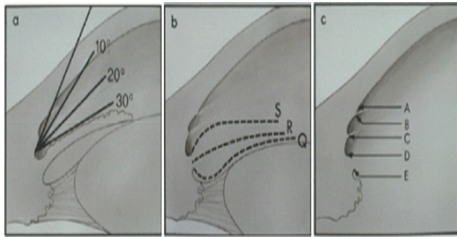
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### Step or Regular



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### Step or Regular

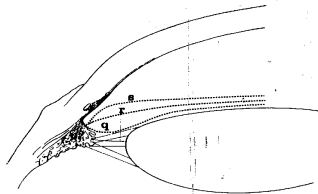


FIG. 8.  
The three fundamental configurations of the peripheral iris, and their effect on the width of the recess, are indicated.

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## 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

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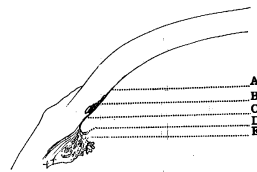


FIG. 15.  
A schematic drawing of the five possible locations of iris 'insertion'. Only C, D, and E are normal.

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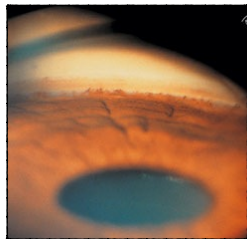
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## Compression

If angle is narrow, may need compression

How far back does it go?

Check for PAS

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## Compression

Compression Gonioscopy - Video

Video from [gonioscopy.org](http://gonioscopy.org) - Used with written permission

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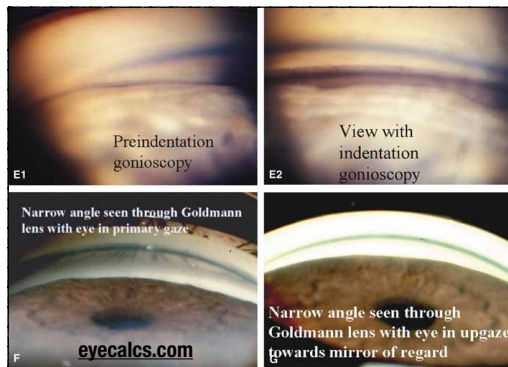
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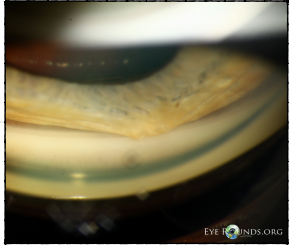
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## Occludable

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**Who is occludable?**

**30 and 40 are not**

**10 and 20 are**

**Not all occludable angles will occlude**

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## Who needs treatment?

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**No controlled clinical trials**

**Not everyone needs treatment**

**Only 10% of occludable angles**

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## Who needs treatment?

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Increased IOP

ONH and/or VF progression

PAS - current or aborted

Symptoms

Other eye

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## Provocative Tests

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Dark Room

Water

Dilation

Prone

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## Provocative Tests

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All test suffer from

Poor specificity

Tedious

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## Provocative Tests

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### Dark Room

Gonio (after 1.5 hours)

66% sensitivity

80% specificity

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## Provocative Tests

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### Dark Room

OCT (after 3 minutes)

90% sensitivity

57% specificity

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

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## Provocative Tests

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### Friedman - AJO 1972

#### Sensitivity

Dark room 48%

Prone 71%

Pharmacologic 58%

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## Provocative Tests

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Eye (Lond), 2007 Jun;21(6):872-4. Epub 2007 Feb 16.

**Angle-closure triggered by orgasm: a new provocative test?**

Ritch R, Dorairaj SK, Liebmman JM.

PMID: 17304255 [PubMed - indexed for MEDLINE]

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## Treatment

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Laser Peripheral Iridotomy

Argon Laser Iridoplasty

Cataract Surgery

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## Acute Treatment

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Diamox not fast enough

Isosorbide and Osmoglyn not available

Paracentesis

Cannot do this if angle is narrow

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## Acute Treatment

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**Meds!**

**Consider loperidine**

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## Acute Treatment

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**Cornea is edematous**

**- Underestimate by as much as 20%**

**If cornea is clearing, IOP is improving**

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## Acute Treatment

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## Quigley

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Two factors influence risk of closure

Iris proximity to TM

Iris volume

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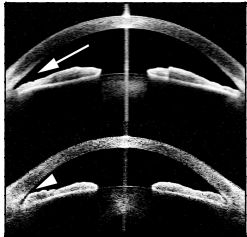
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## Quigley

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Possible mechanisms:

Iris volume increase on dilation

Choroidal expansion

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## **Advanced Tech**

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**Ultrasound Biomicroscopy (UBM)**

**Scheimpflug photography**

**Anterior Segment OCT (ASOCT)**

Ophthalmology 2013;120:1985-1997

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## **Advanced Tech**

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**Benefits**

**Good visualization of angle**

**Documentation**

**Patient education**

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## **UBM**

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**Similar to B-Scan**

**Uses higher frequency**

**Images anterior segment**

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## **UBM**

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### **Pros**

**Quantitative/Qualitative view of ACA**

**Correlates well with gonioscopy**

**Plateau Iris**

**Confirm efficacy of LPI**

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## **UBM**

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### **Cons**

**Best imaging requires coupling with eye bath**

**Inconvenient**

**May be difficult to interpret**

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## **Scheimpflug**

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**Anterior Segment images from slit lamp**

**Noncontact optical system**

**Common system is Pentacam**

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## Scheimpflug

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## Scheimpflug

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### Pros

Inexpensive

Good correlation with gonioscopy

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## Scheimpflug

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### Cons

Not as good as OCT or UBM

No view of angle structures

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# ASOCT



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# OCT

## Objective measures

Iris curvature

Lens vault

Iris volume

Anterior chamber depth

Anterior chamber width

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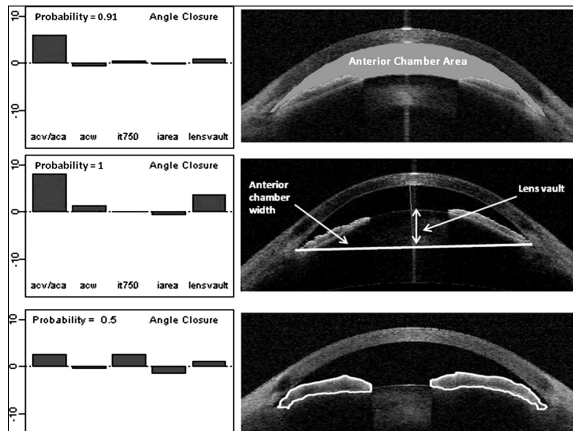
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## OCT

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### Pros

Can do in dark room

Good sensitivity

Many doctors familiar with OCT

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## OCT

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### Pros

Good visualization - even with corneal pathology

Good on uncooperative patients

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## OCT

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### Con

May overestimate risk

Questionable specificity

Cannot visualize behind iris

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## OCT

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**Con**

Uses scleral spur as landmark, not TM

**Cost**

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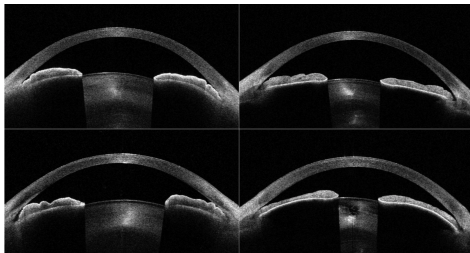
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## ASOCT



Am J Ophthalmol 2018;188:16-29

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## Imaging

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All technology is a complement to gonio

Cannot visualize angle as well as gonio

Cannot compress

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## **Imaging**

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**Need prospective trials**

**LPI vs Monitoring**

**None can predict which angles close**

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**anthony.dewilde@va.gov**

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