Gonioscopy

In Clinical Practice

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Gonioscopy

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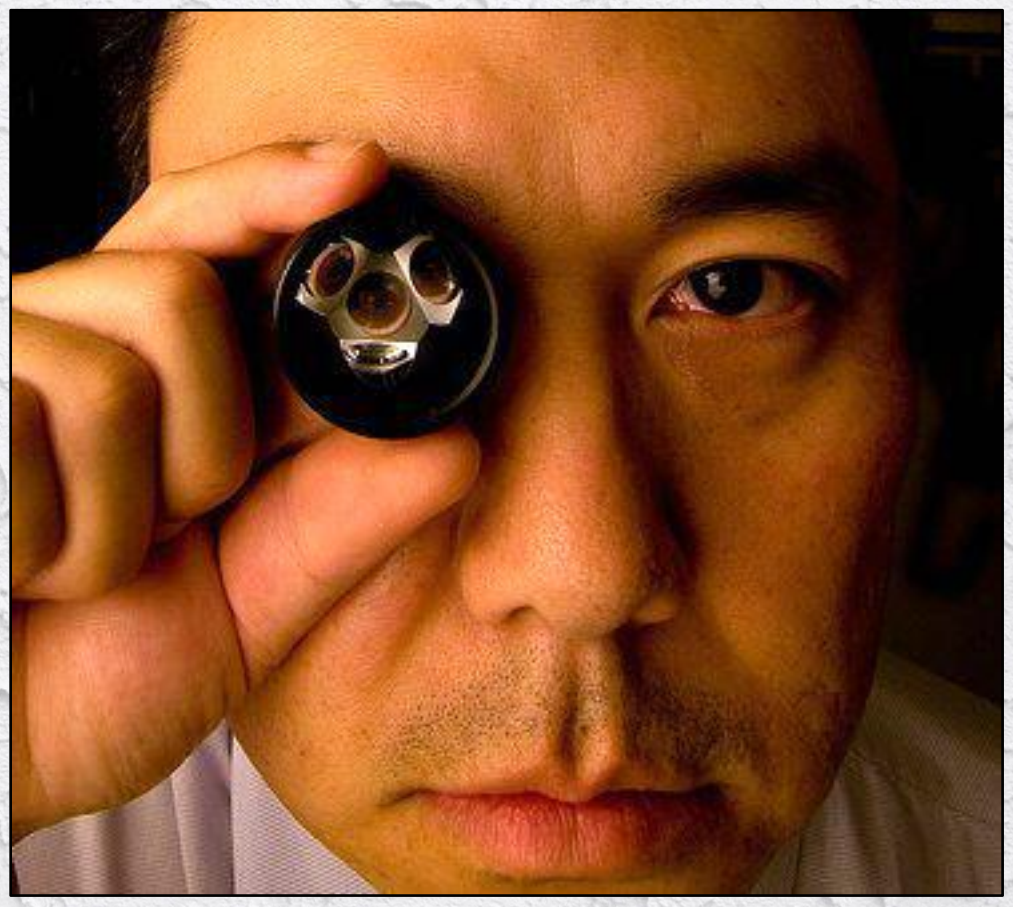
- Disclosures
  - None



The Basics

Indications for Gonioscopy

Reasons for performing gonio….
My experience:

80% -- VanHerick Grade 2 or Less

15% -- OAG Suspect

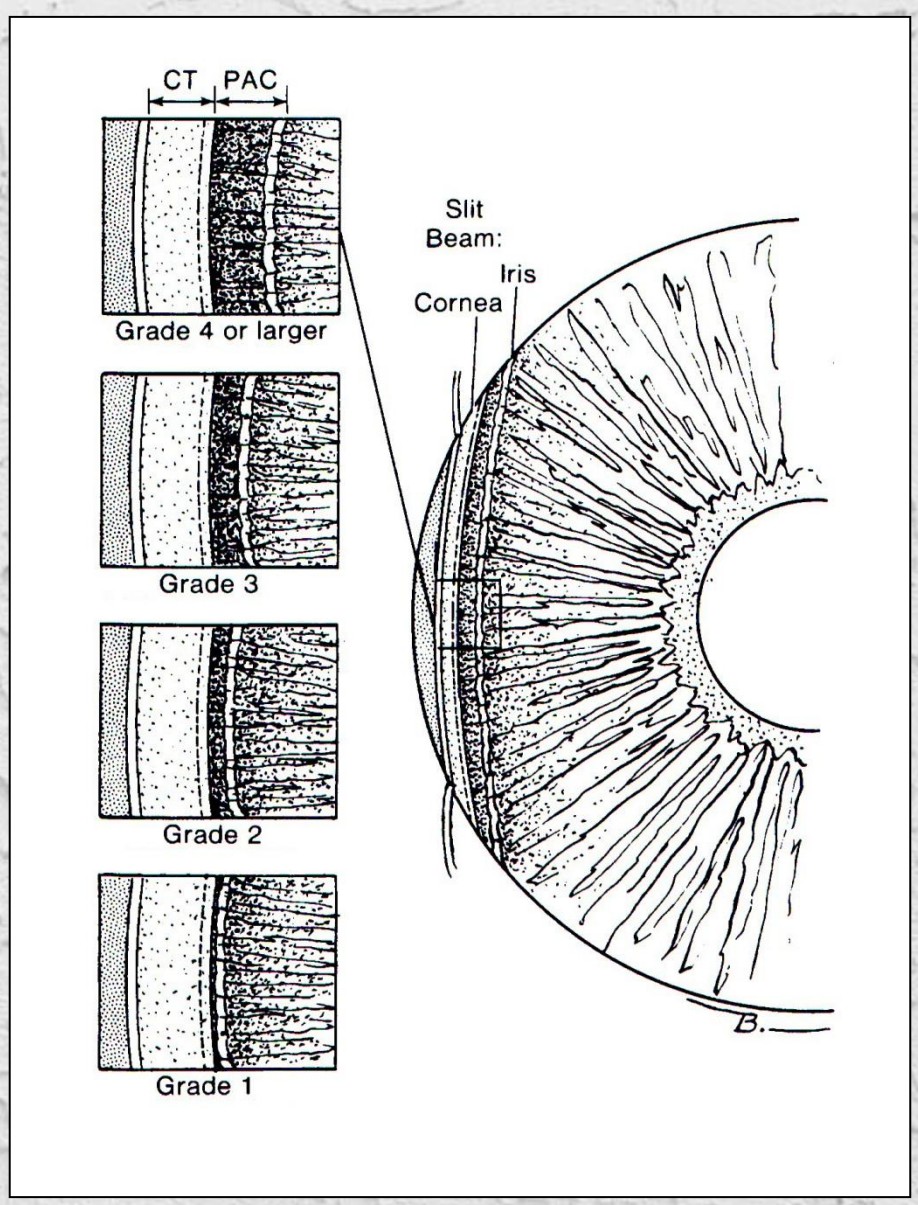
5% -- ACG Suspect

<1% -- “It ain’t rare if it’s in your chair”

VanHerick Angle Estimation

Grade	ACD : CT	Interpretation
1	<1 : 4	Closure likely
2	=1 : 4	Closure possible
3	>1 : 4 <1 : 1	Closure unlikely
4	≥1 : 1	Wide open

Gonio is indicated if the peripheral anterior chamber is one-fourth the corneal thickness or less



Foster, et al BJO, 2000		GOLD STANDARD (Gonioscopy)	
		(+)	(-)
Van Herick	(+)	128	519
	(-)	1	984
		Sensitivity TP / (TP + FN)	Specificity TN / (FP + TN)

Sensitivity: 128/129 = 99% ← High sensitivity = few FN errors

Specificity: 984/1503 = 65% ← Low specificity = many FP errors

Case

61yo WM presents for routine exam

BCVA: 20/20 OD, 20/40 OS

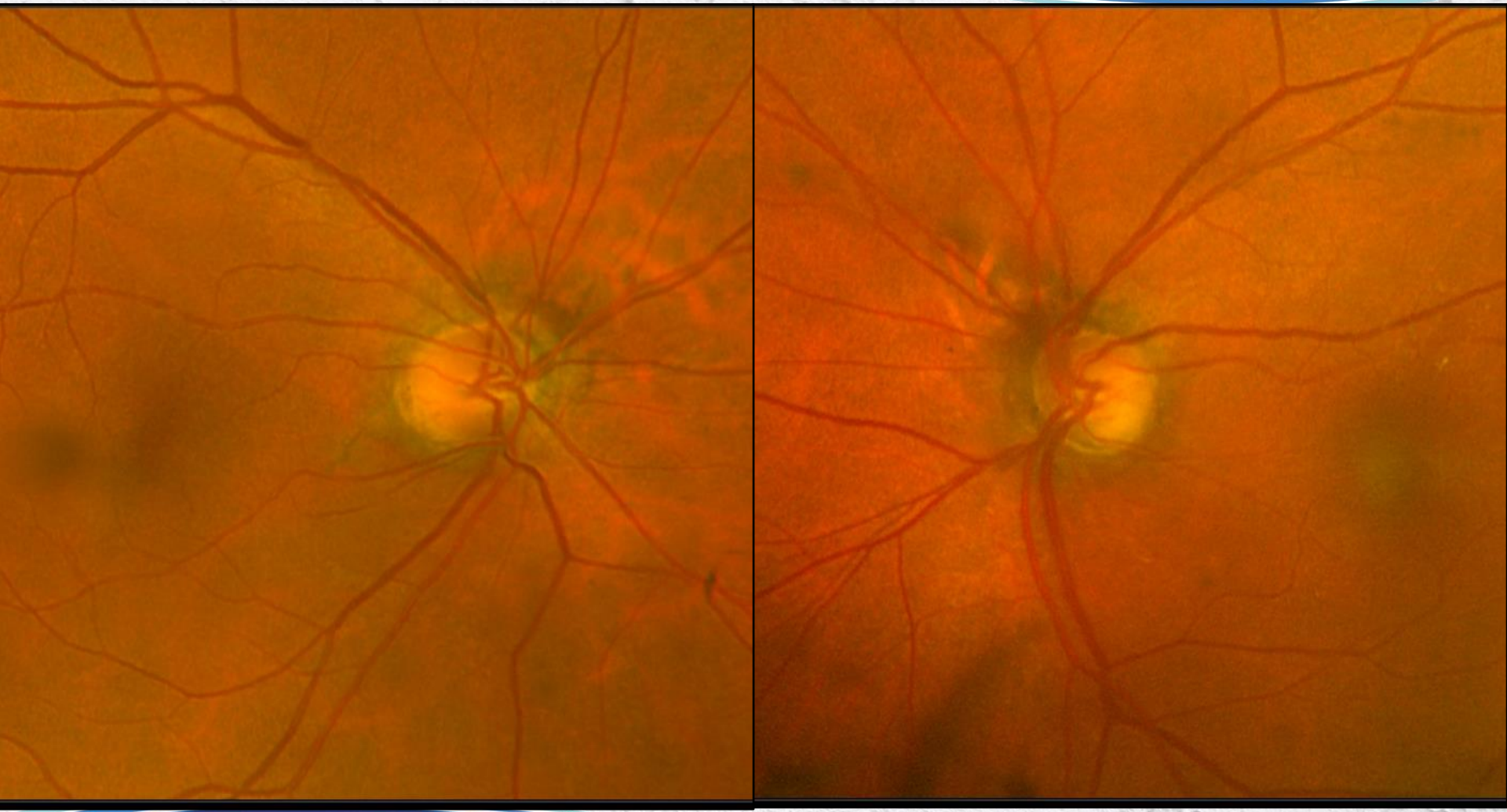
Ta 28/32 @ 9:44AM

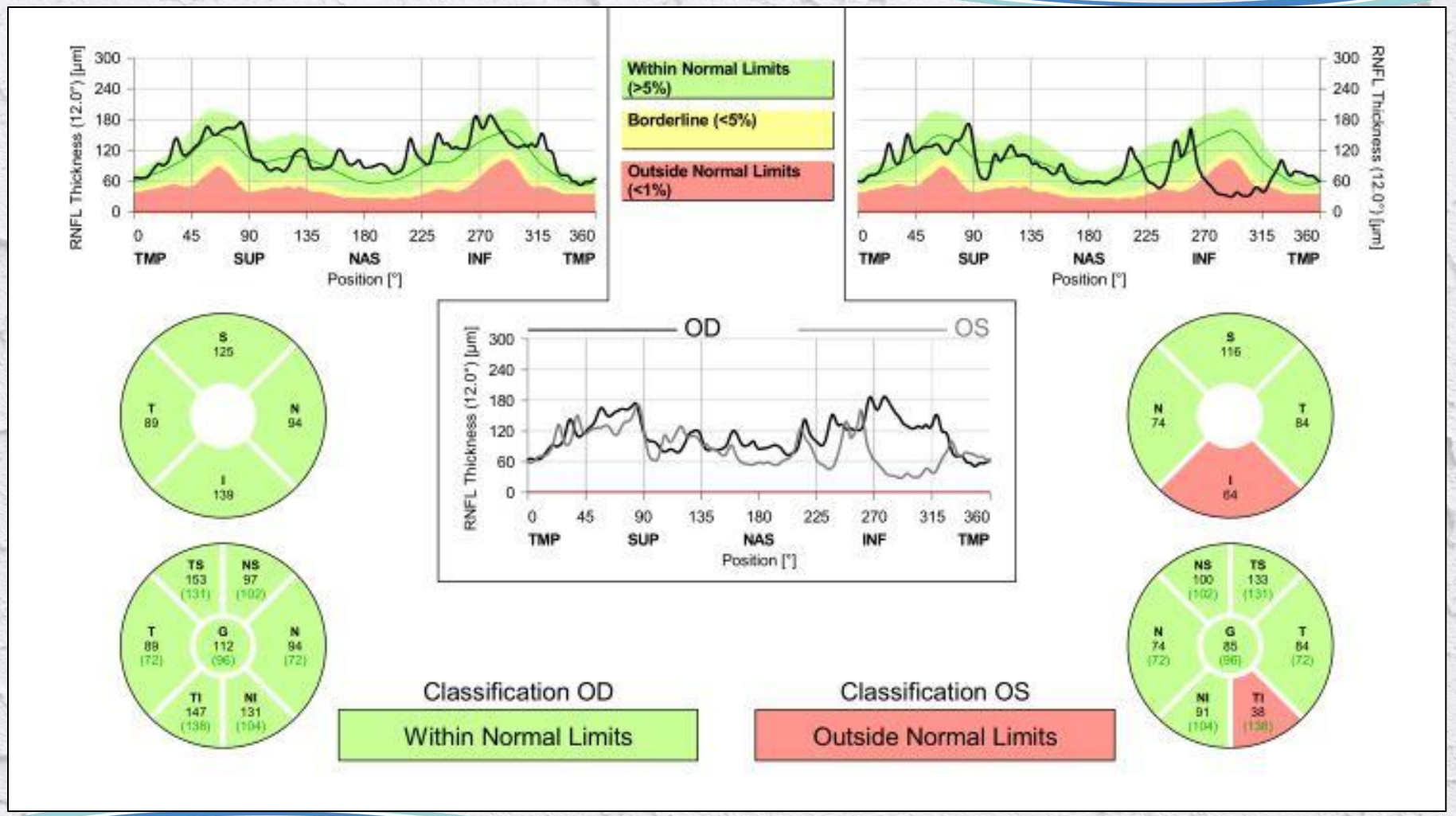
PERRL, No APD

FROM, nontrabismic

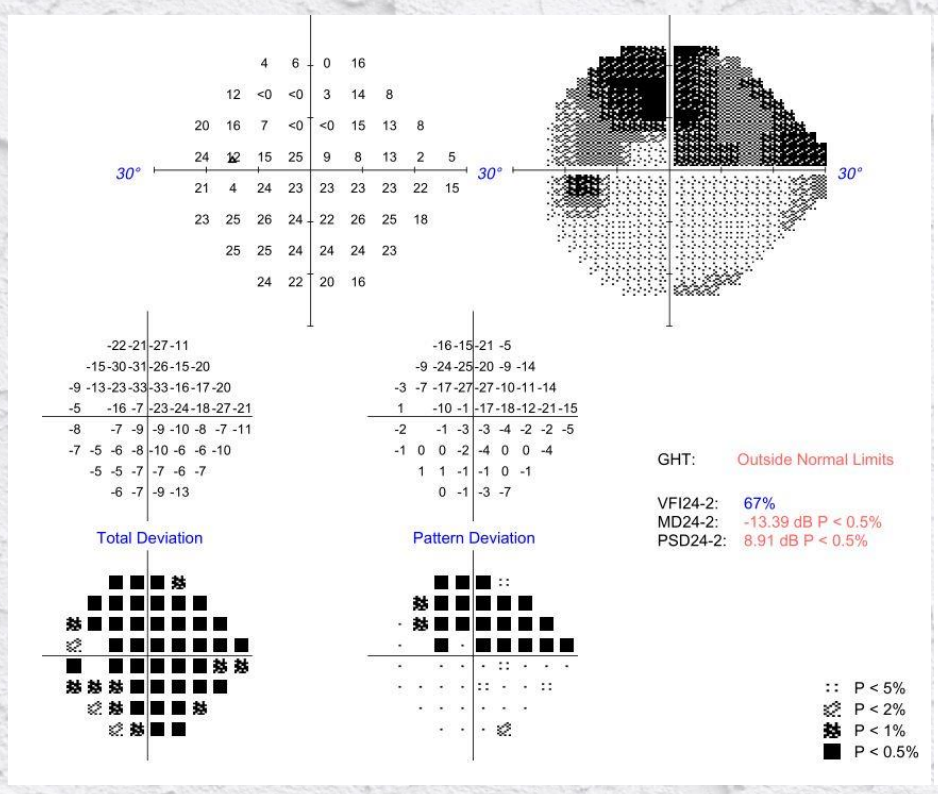
SLE: Mild nuclear sclerosis OU. VH: 2+ OU

CDR: 0.3 OD, 0.4 OS

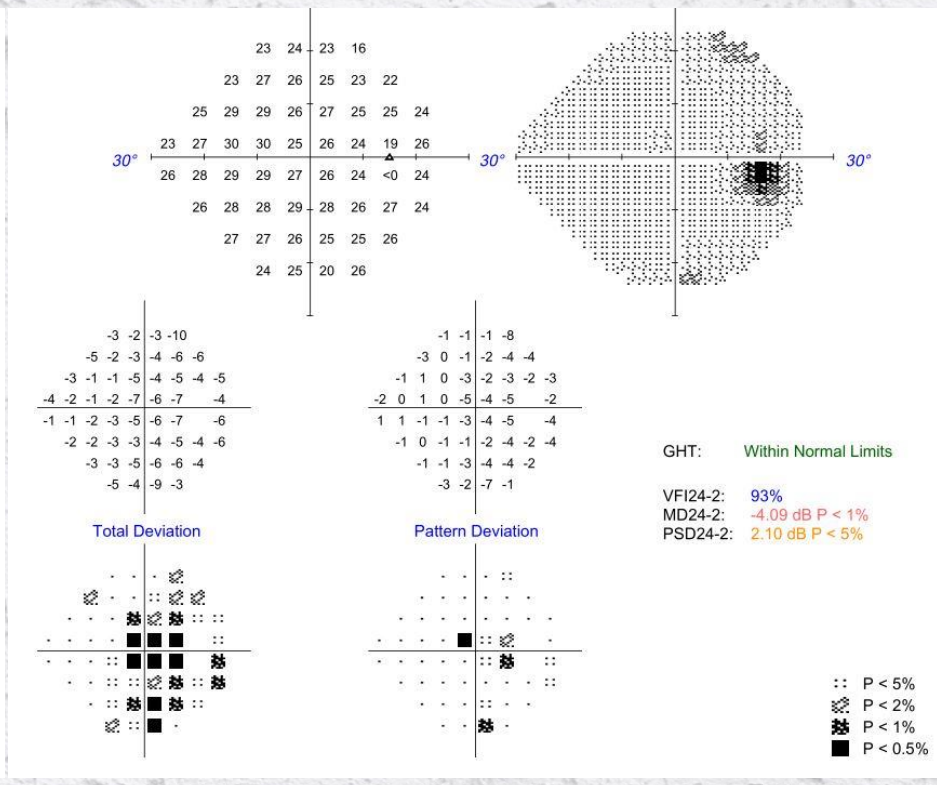



RNFL Thickness (12.0°) [µm]
300
240
180
120
60
0
0 45 90 135 180 225 270 315 360
TMP SUP NAS INF TMP
Position [°]
Within Normal Limits (>5%)
Borderline (<5%)
Outside Normal Limits (<1%)
OD
OS
S 125
T 89
N 94
I 139
TS 153 (131)
NS 97 (102)
T 89 (72)
G 112 (96)
N 94 (72)
TI 147 (138)
NI 131 (104)
S 116
N 74
T 84
I 64
NS 100 (102)
TS 133 (131)
N 74 (72)
G 85 (96)
T 84 (72)
NI 91 (104)
TI 38 (138)
Classification OD
Within Normal Limits
Classification OS
Outside Normal Limits

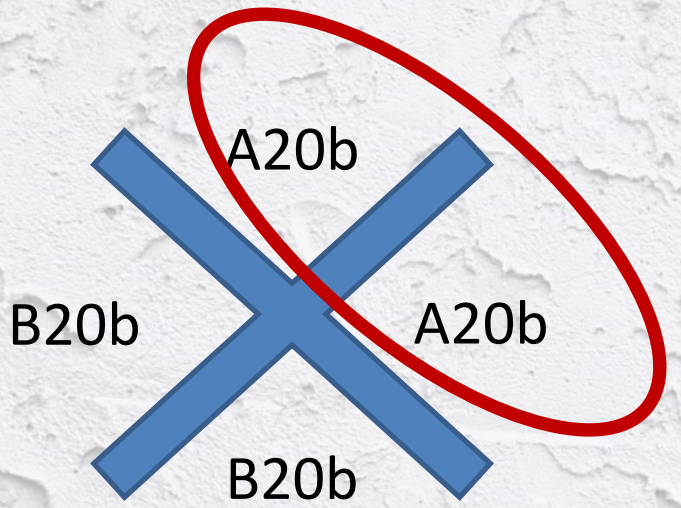
OS


30°
30°
30°
Total Deviation
Pattern Deviation
GHT: Outside Normal Limits
VFI24-2: 67%
MD24-2: -13.39 dB P < 0.5%
PSD24-2: 8.91 dB P < 0.5%
:: P < 5%
P < 2%
P < 1%
P < 0.5%

OD

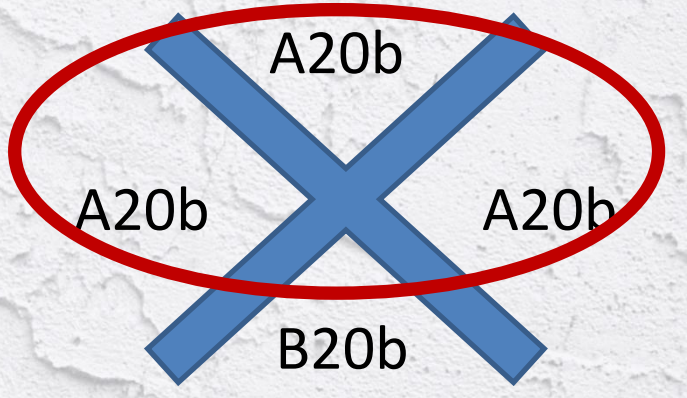

30°
30°
30°
Total Deviation
Pattern Deviation
GHT: Within Normal Limits
VFI24-2: 93%
MD24-2: -4.09 dB P < 1%
PSD24-2: 2.10 dB P < 5%
:: P < 5%
P < 2%
P < 1%
P < 0.5%

DX: CHRONIC ANGLE CLOSURE GLAUCOMA



OD

180° of closure



OS

270° of closure

TABLE 4. SPAETH GONIOSCOPIC GRADING SYSTEM*

1 Iris Insertion	2 Angular Approach	3 Peripheral Iris		Pigmentation of Trabecular Meshwork
A Anterior to Schwalbe's line	0° to 50°	**r** regular	**f** flat	**0** no pigment
B Between Schwalbe's line and scleral spur		**s** steep	**b** bowed anteriorly	**1+** minimal
C Scleral spur visible			**p** plateau iris	**2+** mild
D Deep with ciliary body visible		**q** queer	**c** concave	**3+** moderate
E Extremely deep with >1 mm of ciliary body visible				**4+** intense

** Evaluating iris insertion, angular approach, peripheral iris configuration, and degree of trabecular meshwork pigmentation.*

Case

Assessment & Plan

DX:

- Chronic angle-closure glaucoma OU
- Mild nuclear cataract OU

TX:

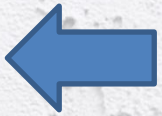
- Start PGA HS OU
- Refer for cataract extraction

Case

69yo WF presents for annual exam

BCVA: 20/25 OD, 20/20 OS

Ta 27/28 @ 12PM



10mmHg increase from 1yr ago!

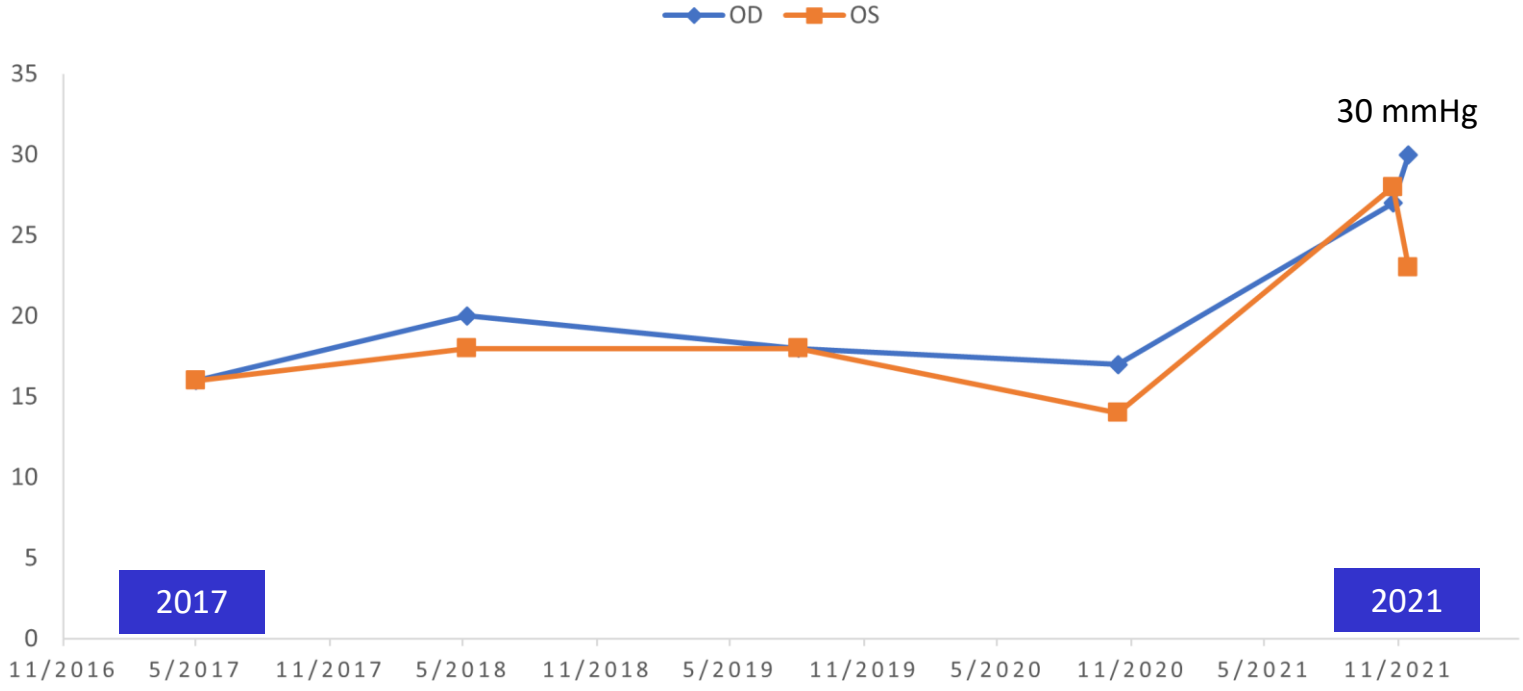
PERRL, No APD

FROM, nontrabismic

SLE: White and quiet OU. VH: 4+ OU

CDR: 0.6 OD, 0.5 OS; Mild ERM OD

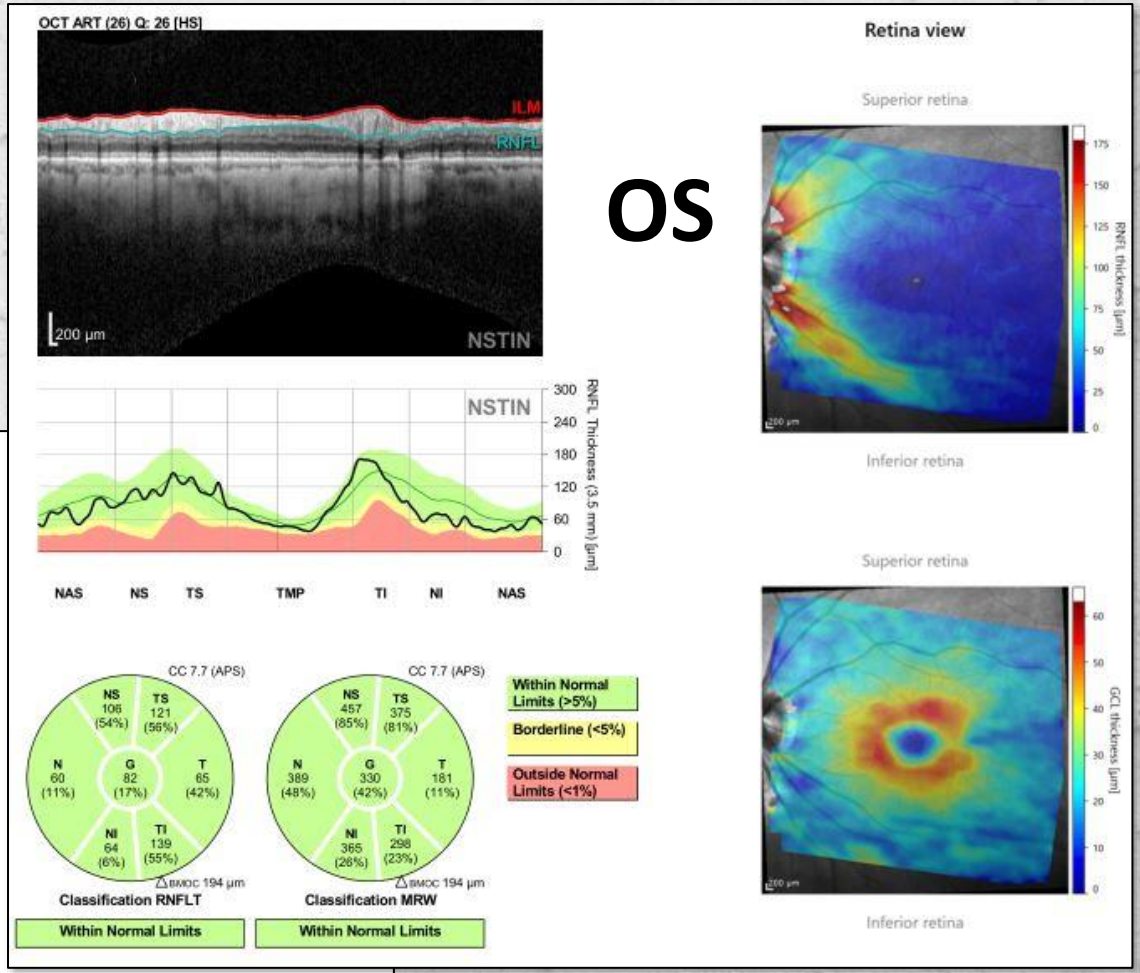
IOP PROFILE



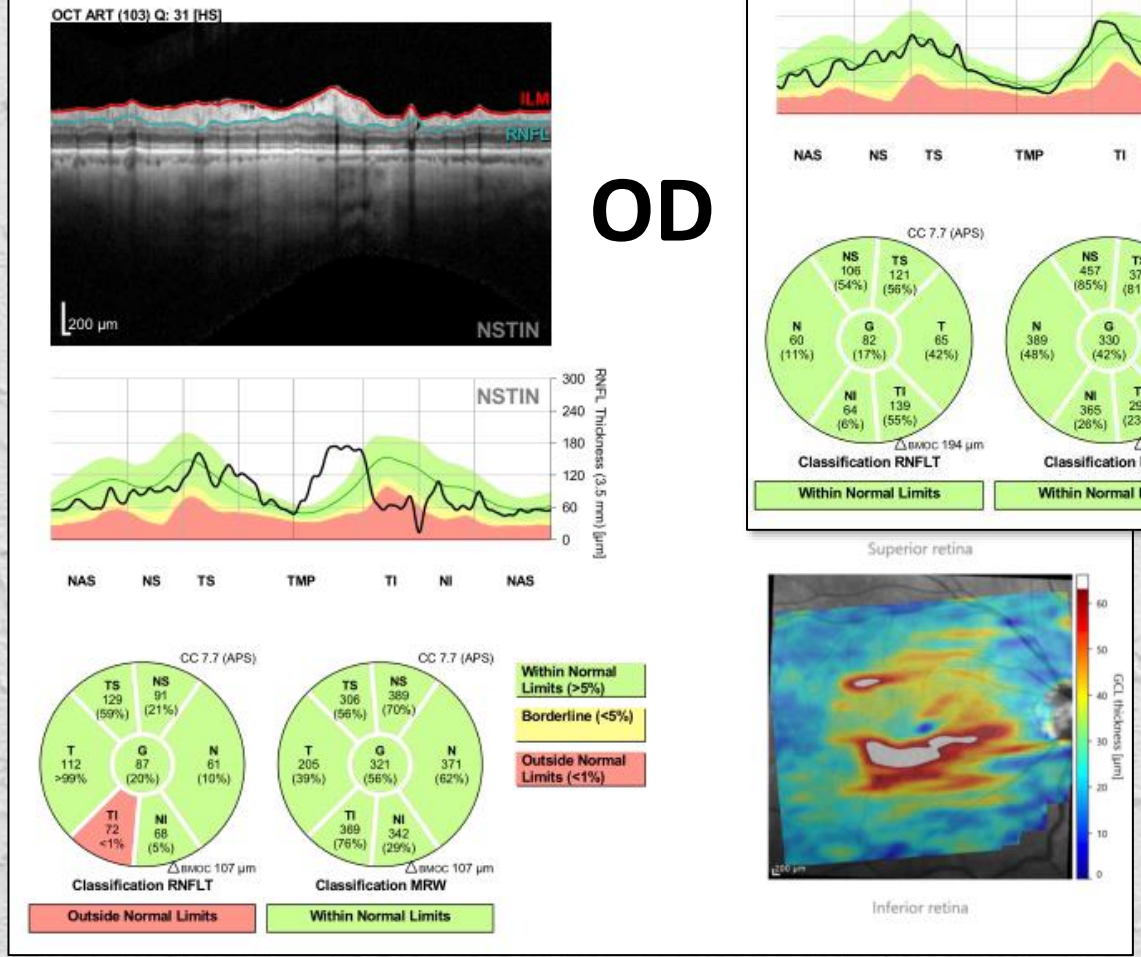
	5/24/2017	5/30/2018	8/26/2019	11/5/2020	11/16/2021	12/7/2021
OD	16	20	18	17	27	30
OS	16	18	18	14	28	23

Hood report reveals effect of epiretinal membrane OD

OS

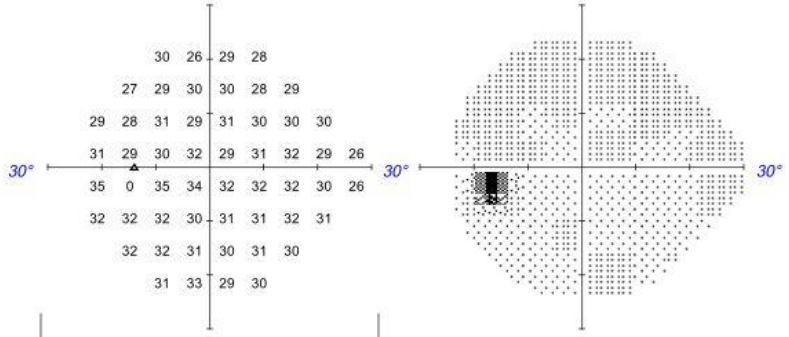


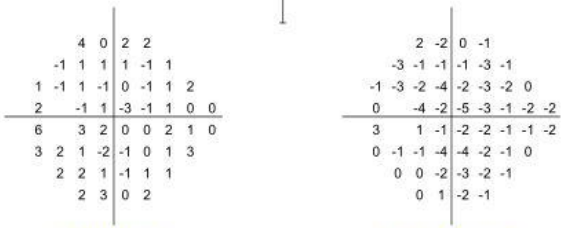
OD



OS Single Field Analysis — Central 24-2 Threshold Test

Fixation Monitor:	Gaze/Blind Spot	Stimulus:	III, White	Date:	Dec 07, 2021
Fixation Target:	Central	Background:	31.5 asb	Time:	10:43 AM
Fixation Losses:	7/15 XX	Strategy:	SITA Standard	Age:	69
False POS Errors:	3%	Pupil Diameter:	4.6 mm *		
False NEG Errors:	0%	Visual Acuity:			
Test Duration:	05:16	Rx:	+1.50 DS		
Fovea:	34 dB				





GHT: Borderline

VFI24-2: 99%
MD24-2: 0.78 dB
PSD24-2: 1.65 dB

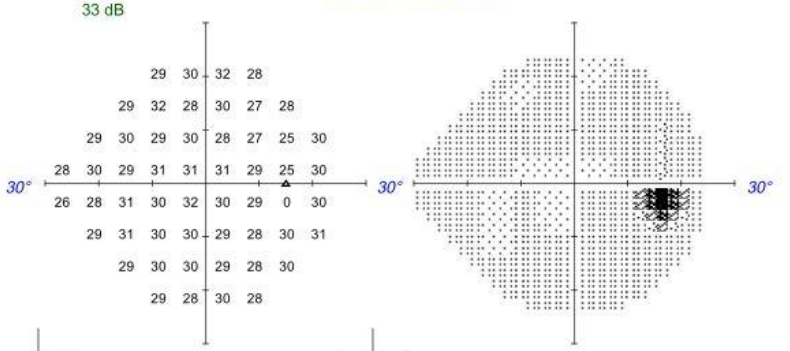
*** Low Test Reliability ***

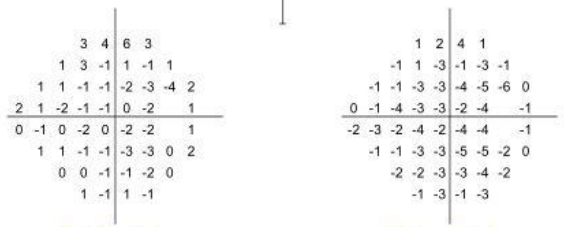
OS

:: P < 5%
P < 2%
P < 1%
P < 0.5%

OD Single Field Analysis — Central 24-2 Threshold Test

xation Monitor:	Gaze/Blind Spot	Stimulus:	III, White	Date:	Dec 07, 2021
xation Target:	Central	Background:	31.5 asb	Time:	10:31 AM
xation Losses:	1/14	Strategy:	SITA Standard	Age:	69
lse POS Errors:	2%	Pupil Diameter:	5.3 mm *		
lse NEG Errors:	0%	Visual Acuity:			
st Duration:	04:53	Rx:	+2.75 DS -1.25 DC X 70		
ovea:	33 dB				



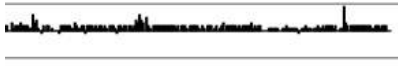


GHT: Borderline

VFI24-2: 98%
MD24-2: -0.44 dB
PSD24-2: 1.74 dB

OD

:: P < 5%
P < 2%
P < 1%
P < 0.5%

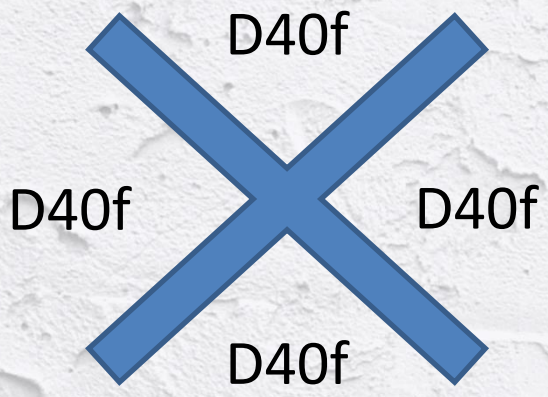


Case

Differential diagnosis of clinically significant increase in IOP

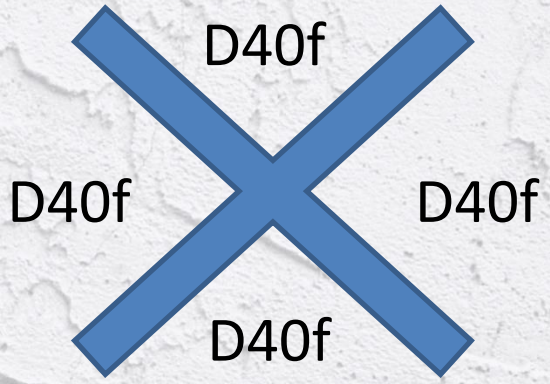
- **Angle closure**
- Start on steroid medication
- Previously undetected large diurnal variation
- Discontinuation of systemic beta-blocker
- Influence of other drugs or medications (eg caffeine)

Gonioscopy



OD

Wide open



OS

Wide open

Case

Assessment & Plan

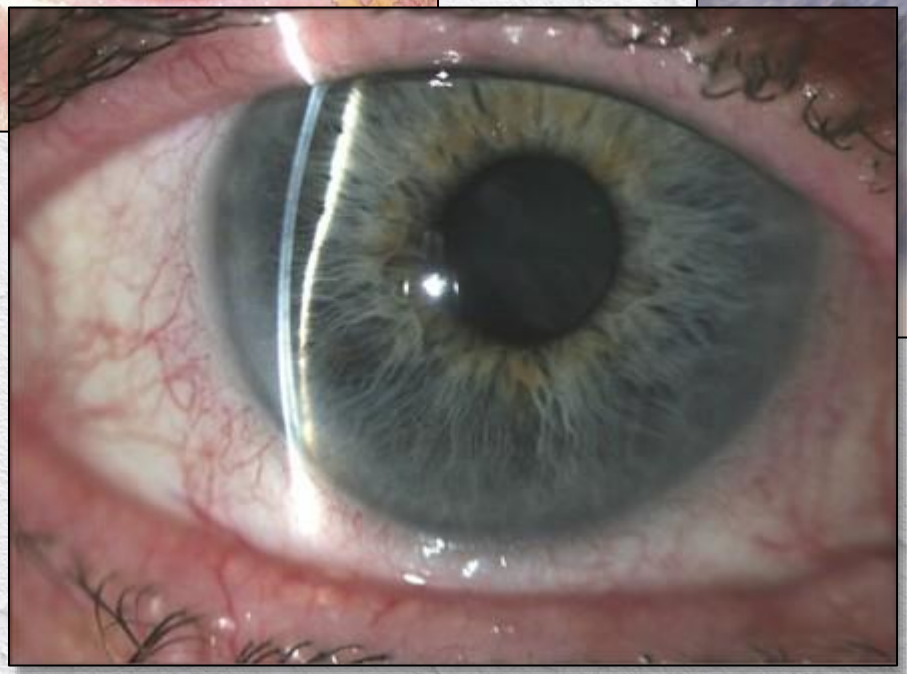
DX:

- Ocular hypertension
- Epiretinal membrane OD

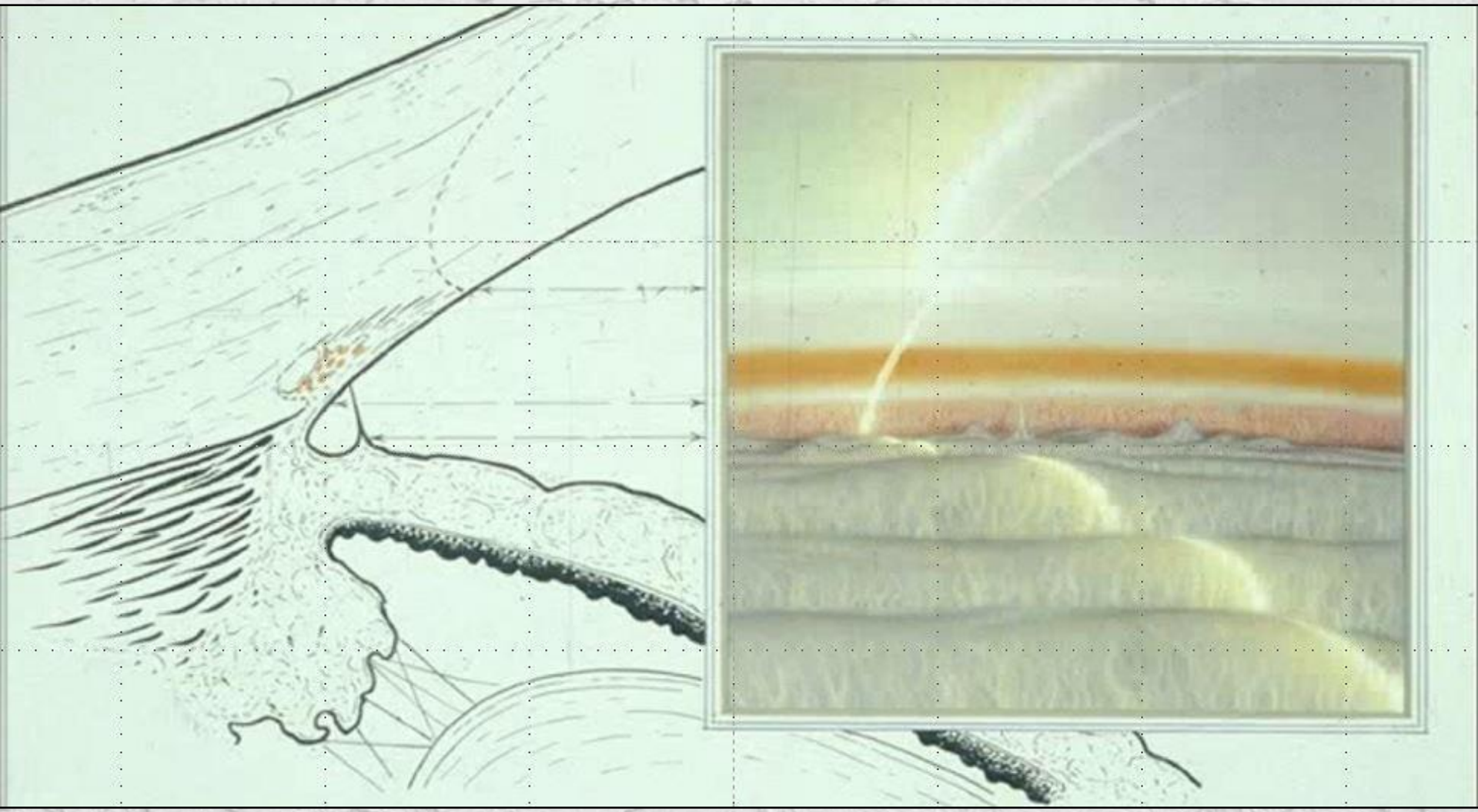
TX:

- Start PGA HS OU

It Ain't Rare If It's In Your Chair



Angle Anatomy



Angle Anatomy

Source: Gonioscopy.org

Angle Anatomy

1. **Deepest Structure**
   - Iris Insertion
2. **Angle geometry**
   - Estimate geometric angle of iris insertion
3. **Iris contour**
   - Convex, Concave, or Flat

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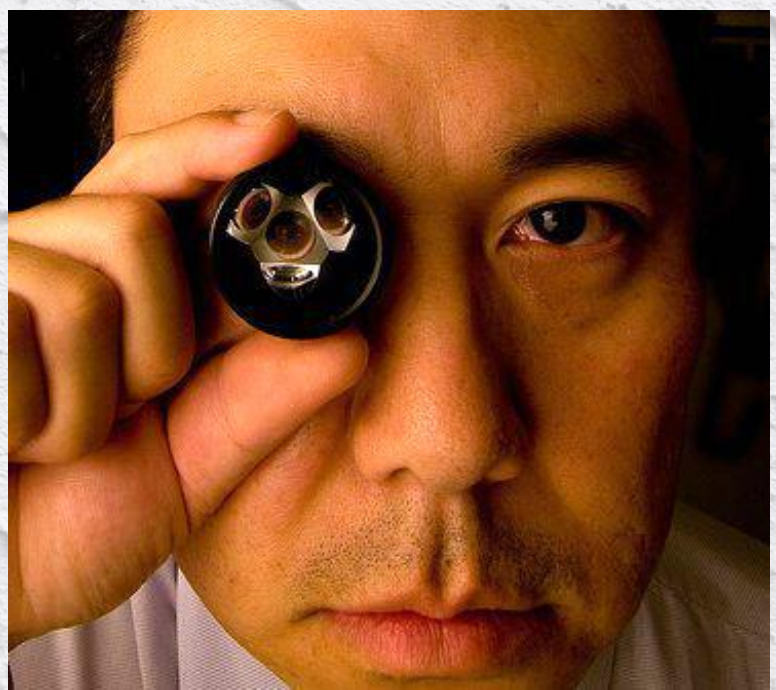
** Evaluating iris insertion, angular approach, peripheral iris configuration, and degree of trabecular meshwork pigmentation.*

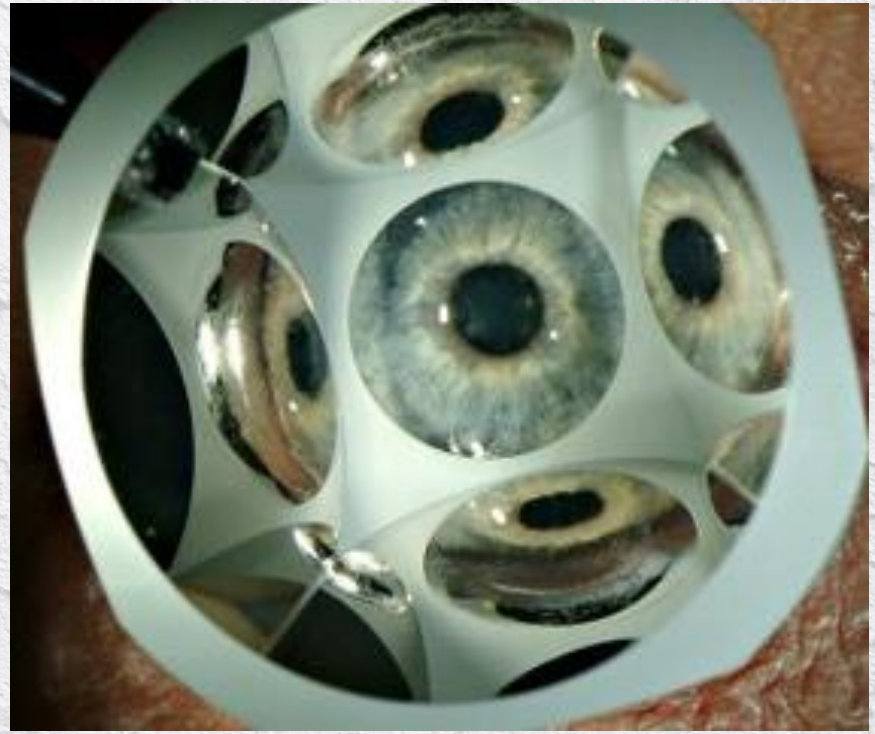
Gonioscopy Lens Designs

- Goldmann
  - Superior optics: **Best view of angle anatomy**
  - Less technically challenging: **Best for beginners**
  - Disadvantages
    - Gonio goo (inconvenient, degrades corneal clarity)
    - Need to rotate lens
    - Inability to perform indentation technique



Gonioscopy Lens Designs

- Zeiss
  - **Best for daily use**: Fast and convenient
  - **Indentation technique**: Identify AC mechanism
  - Disadvantages
    - Technically challenging
    - Unstable, low quality image
    - Requires good patient cooperation



Key Points

- **Perform gonioscopy often**
  - All patients with VH grade 2 or less
  - All glaucoma suspects
- **Learn and use the Speath grading system**
  - Evaluate the 3 key features of every angle
- **Use both the Goldmann and Zeiss lenses as indicated**
  - Zeiss → Angle closure
  - G3M → Angle structures

Gonioscopy
Clinical Tips

Gonio Tips

1. **Dark room gonioscopy**
   - Perform gonio in a dark room and keep the SL beam out of the patient's pupil
2. **Inferior quadrant first**
   - Deepest and most pigmented quadrant
3. **Look "Over the Hill"**
   - Learn how to use lens tilting to get the best views

Dark Room Gonioscopy

Source: Gonioscopy.org

Gonio Tips

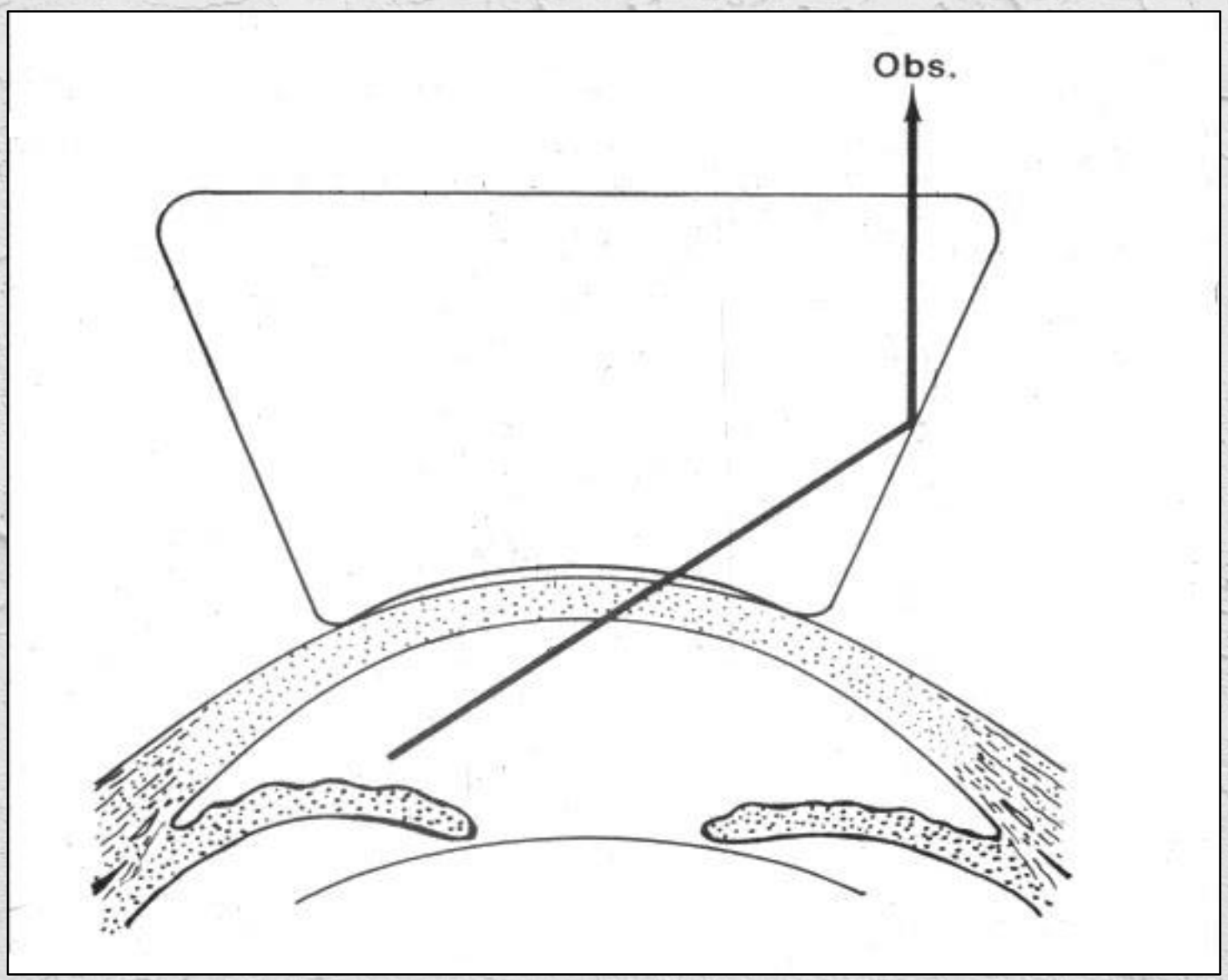
Examine the inferior quadrant first

- Inferior quadrant is usually deepest
  - Superior quadrant is usually the narrowest
- Inferior quadrant is usually the most pigmented
  - Superior quadrant usually has the least pigment

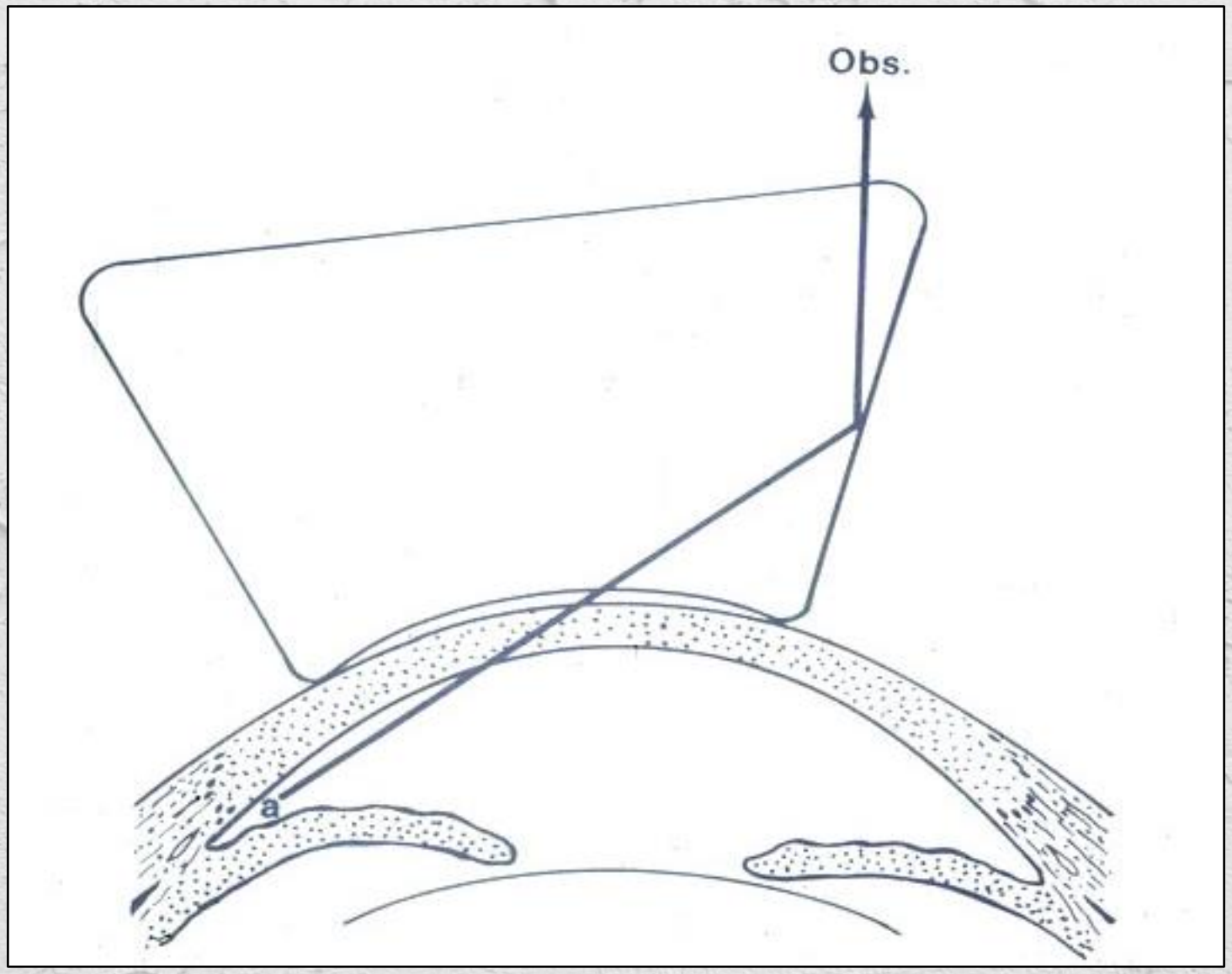
Start with the Inferior Quadrant

Source: Gonioscopy.org

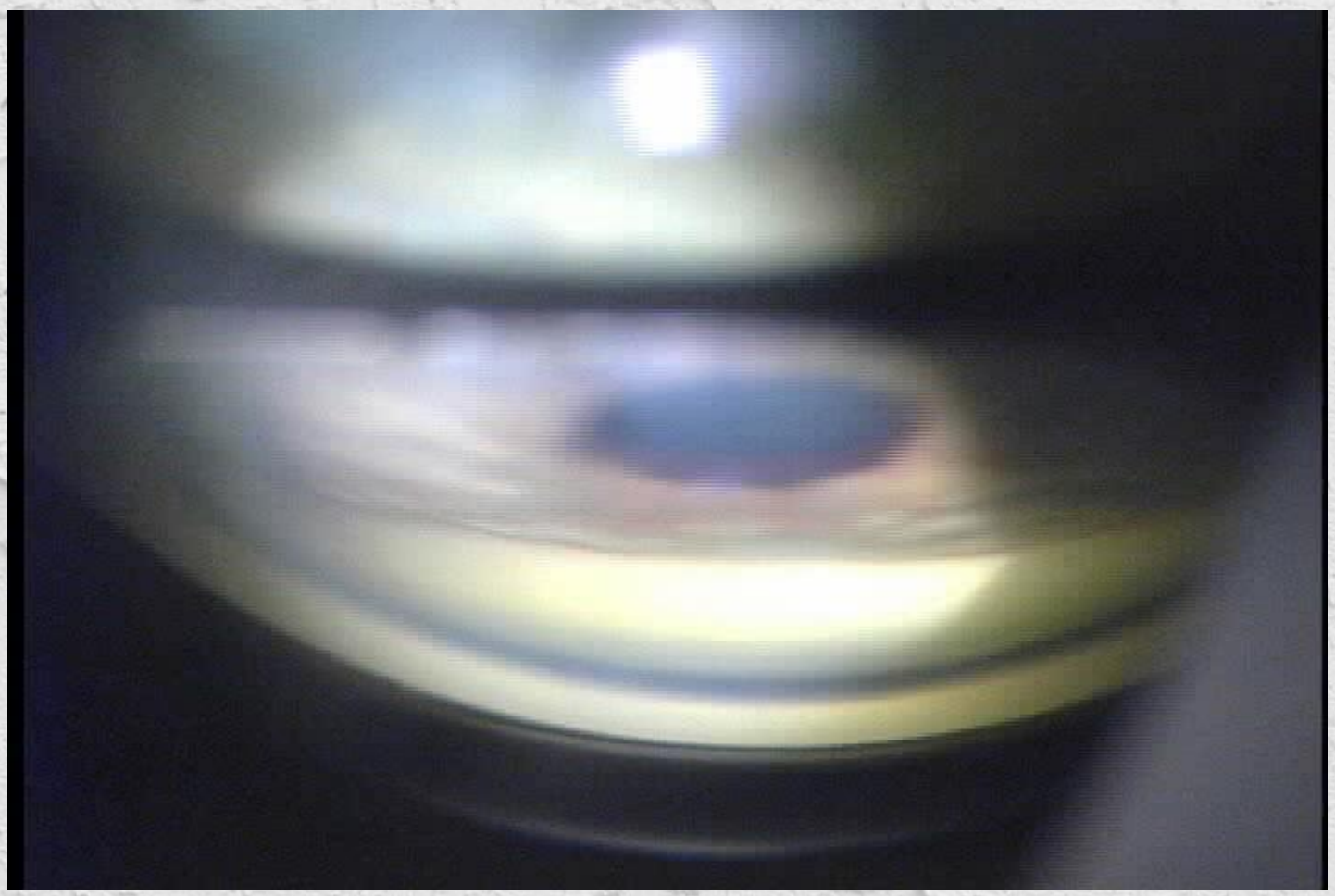
View of angle is blocked by convex iris



Look “over the hill” by tilting lens toward the angle



Look Over The Hill



Source: Gonioscopy.org

Key Points

- **Avoid constricting the pupil during gonio**
  - Keep room lights down
  - Keep slitlamp beam out of the patient's pupil
- **Examine the inferior quadrant first**
  - It is the deepest and most pigmented
- **Use lens tilting to look over a convex iris**
  - Avoid false impressions of angle closure

Indentation Gonioscopy

Indentation Gonioscopy

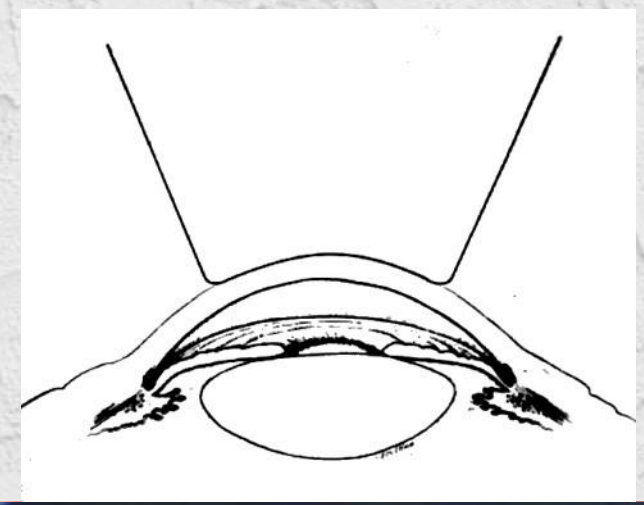
What is indentation gonioscopy?

- Pressure applied to the cornea with a Zeiss-style lens will push the iris backward

Why perform indentation gonioscopy?

- Identify angle closure mechanism: pupil block, phacomorphic or plateau iris
- Differentiate appositional from synechial angle closure

Indentation Gonioscopy

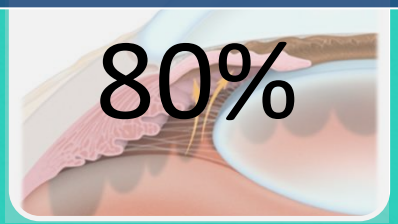


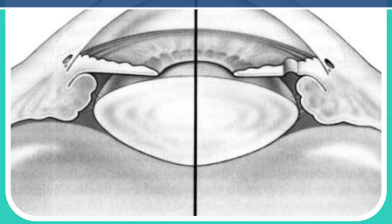
Indentation Gonioscopy

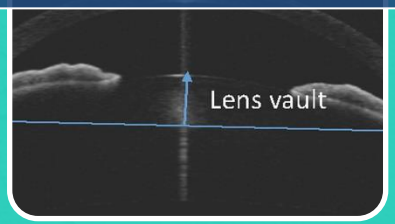
Source: Gonioscopy.org

Primary Angle Closure Mechanisms

NOT MUTUALLY EXCLUSIVE

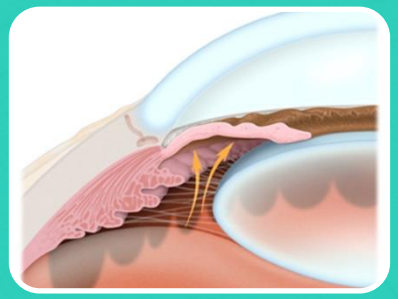


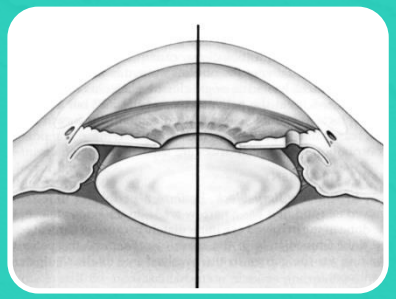


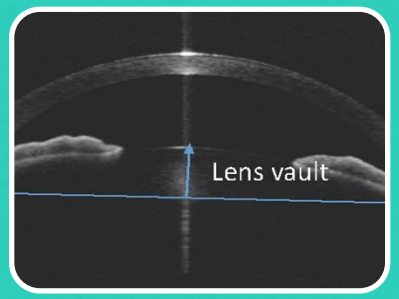


Pupil block	Plateau iris	Lens vault
Iridotomy Lens removal	Iridotomy Iridoplasty	Lens Removal

Indentation Gonioscopy Findings







Pupil block	Plateau iris	Lens vault
Large posterior displacement	Double hump	Minimal posterior displacement

Plateau Iris

Source: Gonioscopy.org

Key Points

- **Three mechanisms of primary angle closure**
  - Pupil block, plateau iris, phacomorphic
  - Not mutually exclusive
- **Utilize indentation to help guide treatment decisions**
  - Identify mechanism of angle closure & PAS

Thank you!

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