Ten Steps to Better Glaucoma Care

Rick Trevino, OD, FAAO

Rosenberg School of Optometry

San Antonio, TX

Carolyn Majcher, OD, FAAO

Oklahoma College of Optometry

Tahlequah, OK

Ten Steps to Better Glaucoma Care

Contact Us

rctrevin@uiwtx.edu

majcher@nsuok.edu

Lecture Handout

richardtrevino.net

Disclosure Statement

Nothing to disclose

Ten Steps to Better Glaucoma Care

Welcome to the Iowa Glaucoma Curriculum

About the Iowa Glaucoma Curriculum

This is a teaching site for residents and others interested in learning about glaucoma.

It breaks glaucoma into fifty bite-sized lectures that average 14 minutes in length (range 4 to 37 minutes). In total the curriculum is just under 12 hours long.

It is highly visual with >900 images and >90 movie clips.

Taking care of glaucoma can be very hard, but I am hoping that I have made learning about this family of diseases somewhat easier.

READ MORE

iowaglaucoma.org

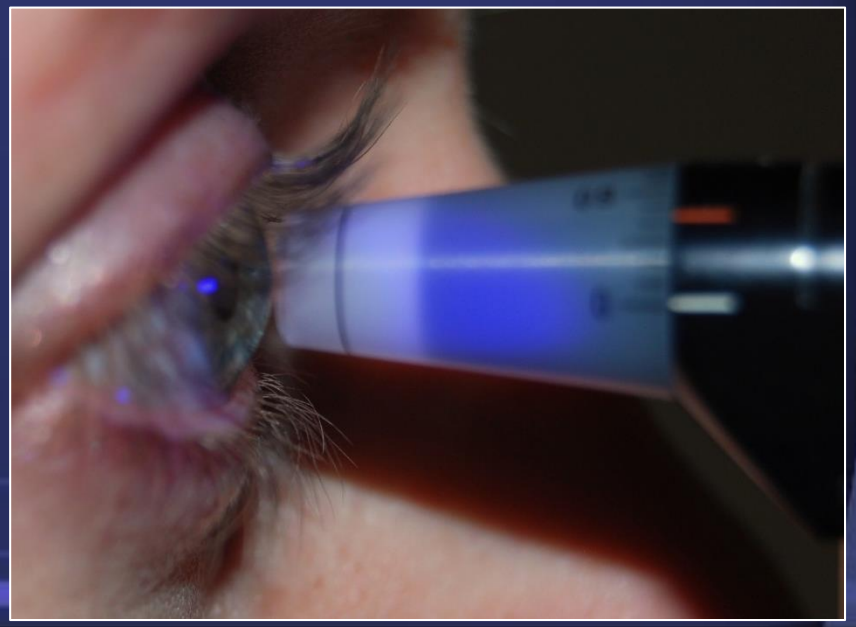
Ten Steps to Better Glaucoma Care

Ten Steps to Better Glaucoma Care

1. Master the Art of Tonometry

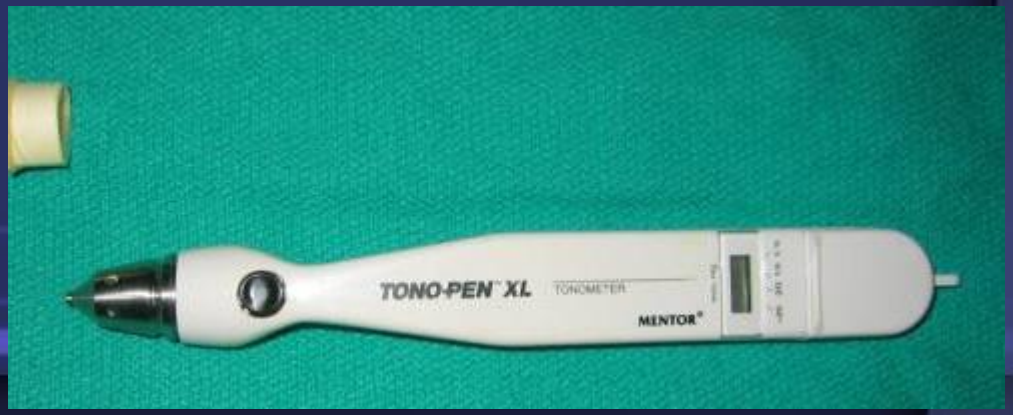
Master The Art of Tonometry

- When GAT Isn't Good Enough
  - Irregular Astigmatism
  - S/P LASIK
  - Blepharospasm
  - Morbid Obesity
  - Bedside exam
  - Young children



Master The Art of Tonometry

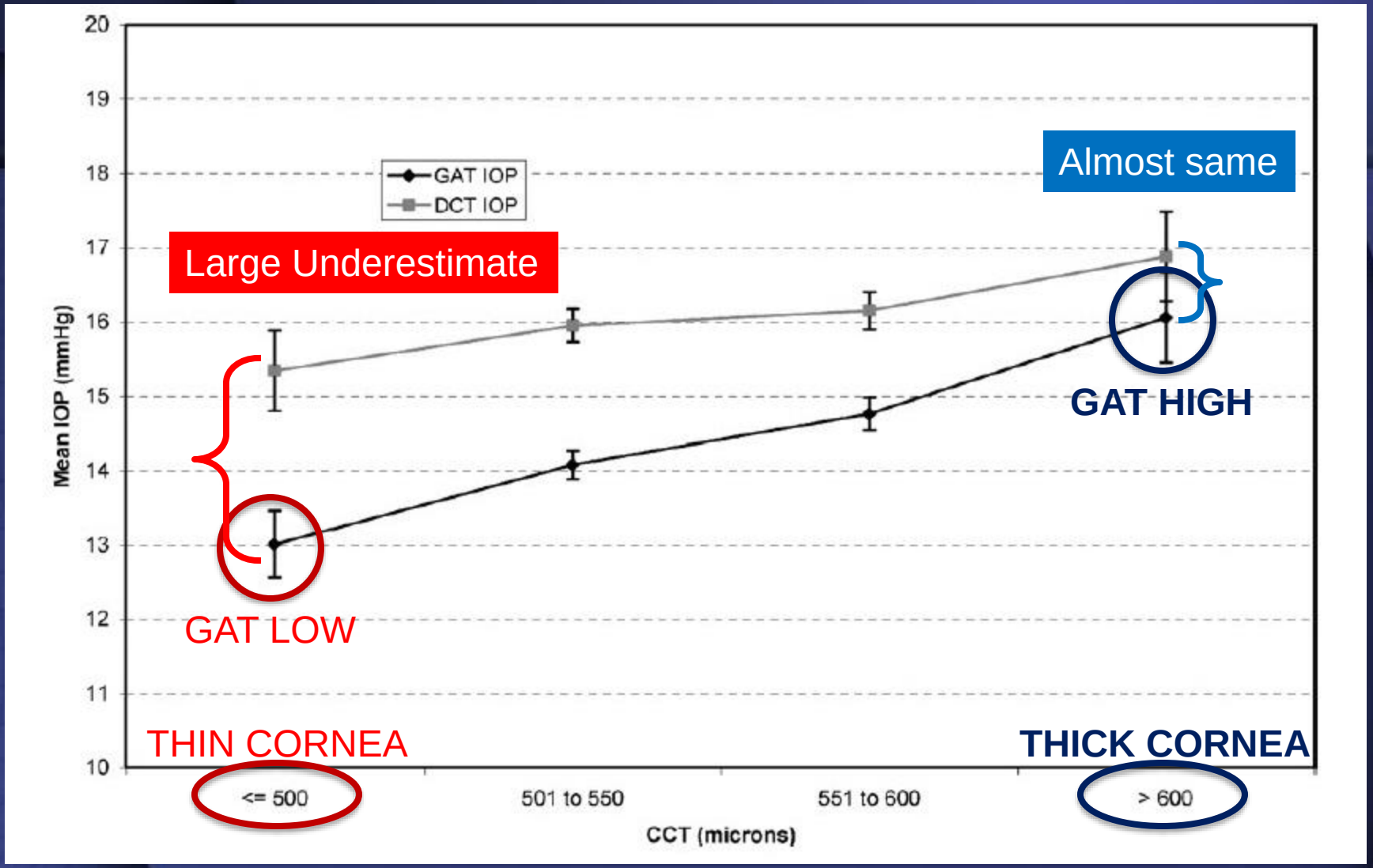
- Hand-held Tonometers
  - Perkins, Tono-Pen, iCare, others
  - Special populations
    - Obese, arthritic, anxious, pediatric, S/P LASIK



Master The Art of Tonometry

- Dynamic Contour Tonometry
  - Concave tip with piezo-electric pressure sensor
  - Less influenced by corneal biomechanics than GAT
  - Closer estimate of true IOP than GAT

Source: Arch Ophthalmol. 2004;122:1287-1293



Francis (2007): The mean IOP for GAT and DCT across CCT groups. The IOP measured **with** both GAT and DCT significantly increases with increasing CCT. However, the magnitude of the effect is greater with GAT than DCT. Although mean and median GAT IOP was lower than the DCT IOP across all CCT groups, the difference between the means decreases with increasing CCT.

Master The Art of Tonometry

Table 1 Mean DCT readings and mean GAT measurements according to CCT stratification

	CCT ⩽ 500 μm	501 ⩽ *CCT* ⩽ 540 μm	541 ⩽ *CCT* ⩽ 560 μm	561 ⩽ *CCT* ⩽ 600 μm	*CCT* > 600 μm
DCT (mmHg)	16.7 ± 3.5	17.5 ± 3.0	17.47 ± 3.0	18.07 ± 3.0	17.32 ± 3.0
GAT (mmHg)	11.2 ± 2.7	13.18 ± 3.2	14.10 ± 2.9	16.30 ± 3.3	19.49 ± 2.3
ΔDCT/GAT	5.47	4.30	3.37	1.77	−2.17
P	*P* < 0.001	*P* < 0.001	*P* < 0.001	*P* < 0.001	*P* < 0.001

CCT = central corneal thickness; DCT = dynamic contour tonometry; GAT = Goldmann aplanation tonometry.

THIN CORNEAS

GAT underestimates DCT by 4-5 mmHg

THICK CORNEAS

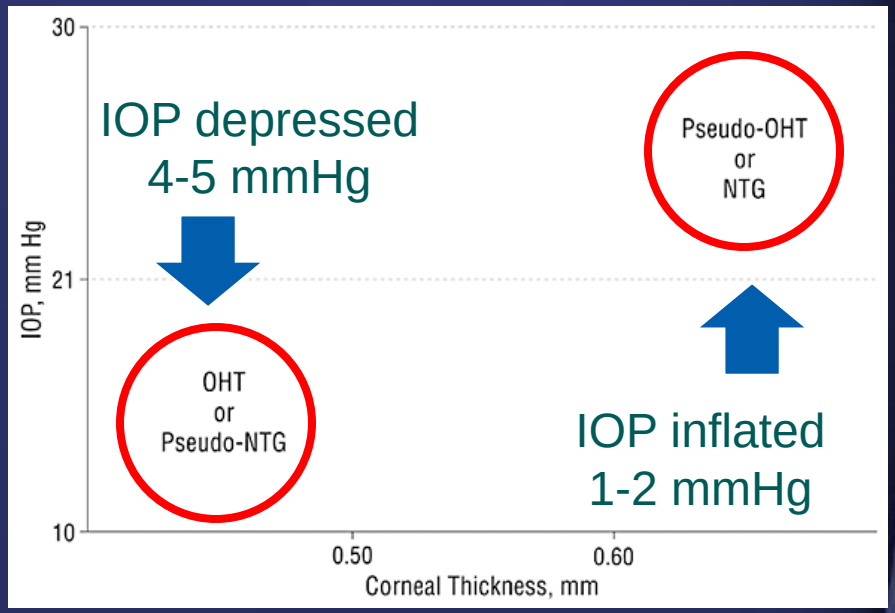
GAT within 1-2 mmHg of DCT

The problem is not that GAT reads high on patients with thick corneas but that it reads very low on patients with thin corneas

Source: Eye. 2009;23:1364-1369

Master The Art of Tonometry

- Pachymetry
  - OHTS: CCT <555µm is a risk factor for POAG
  - Detect depressed Goldmann readings in patients with thin corneas (<525µm)



Source: Arch Ophthalmol. 1998;116:544-545

Master The Art of Tonometry

- Dealing with LASIK
  - Dynamic contour
    - Most accurate
  - Change from baseline
    - Difference between pre-op and post-op IOP
  - Peripheral cornea
    - Tono-pen or iCare tonometry outside flap

Ten Steps to Better Glaucoma Care

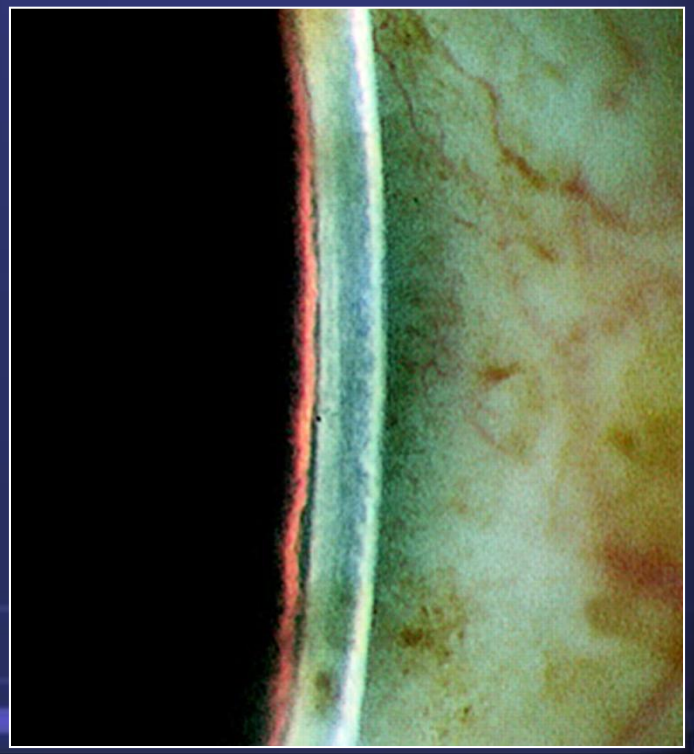
1. Master the Art of Tonometry
2. Gonioscopy is Fundamental

Gonioscopy is Fundamental

- Van Herick is a mixed blessing
  - **GOOD NEWS**

    99.9% of eyes that appear open are not occludable
  - **BAD NEWS**

    About 80% of eyes that appear occludable are not with gonioscopy (the Gold Standard)

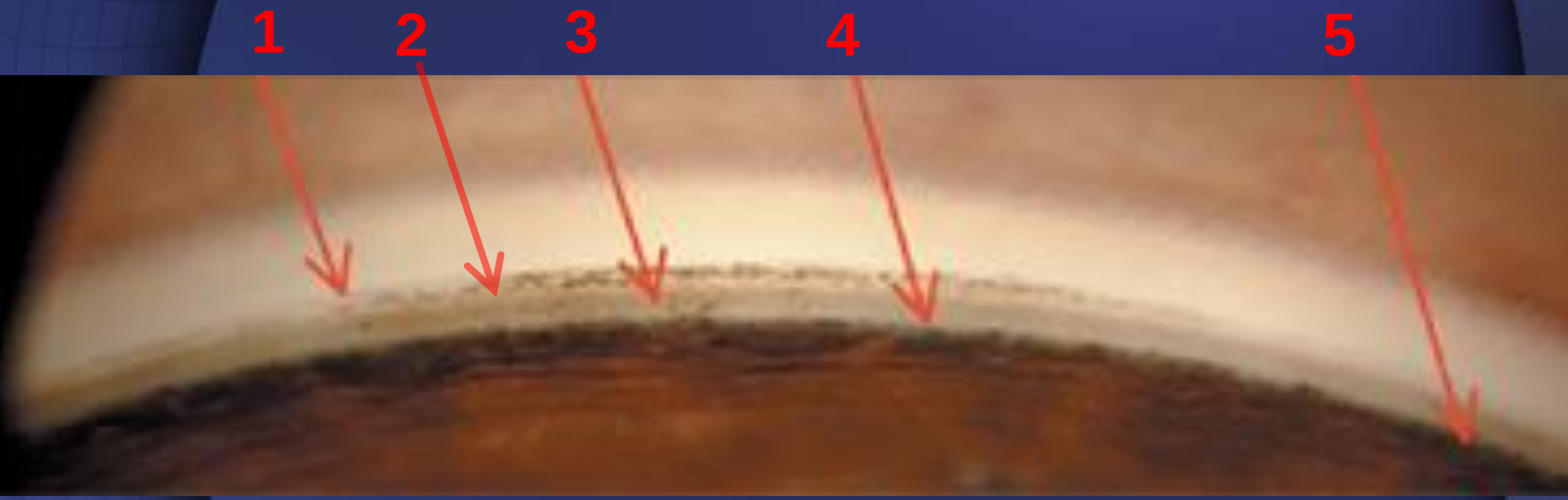


Gonioscopy is Fundamental

- Identify cause of elevated or asymmetric IOP
  - Angle closure, PAS, NVA, hyphema
- Identify cause of loss of IOP control

Gonioscopy is Fundamental

Angle Anatomy Review

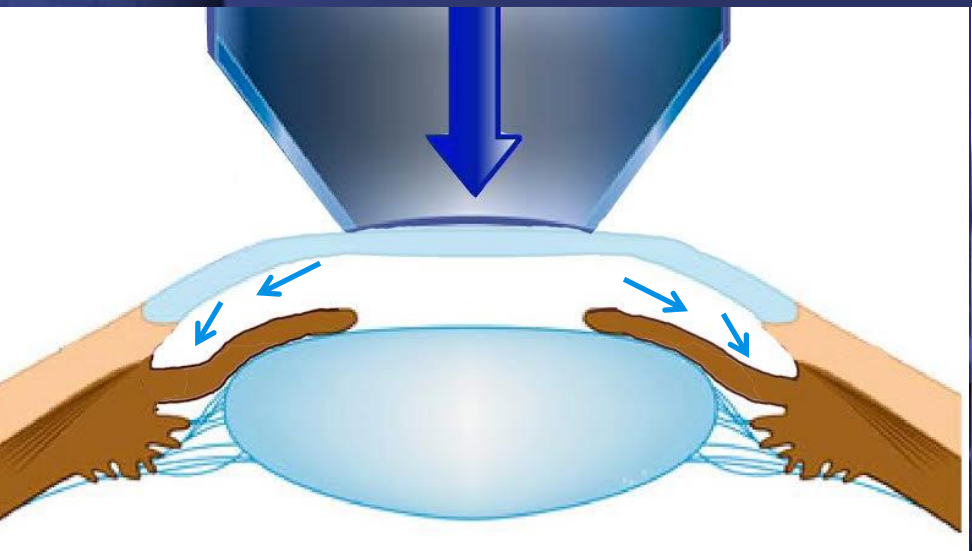


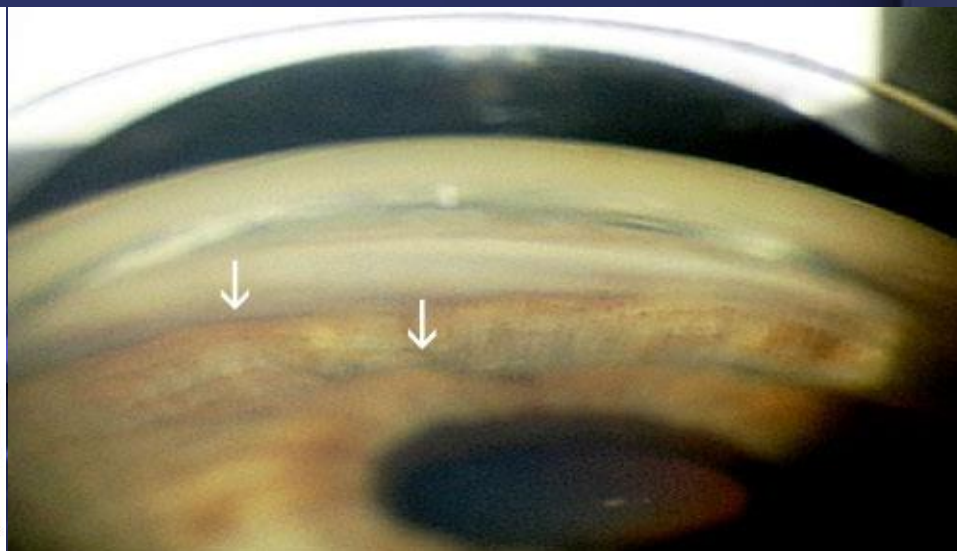
Gonioscopy is Fundamental

Compression/Dynamic Gonioscopy

- Apply direct pressure to the cornea to force aqueous into the angle to deepen it and push the iris posteriorly
  - Pressure should be directed perpendicularly to the cornea plane

Post-indentation





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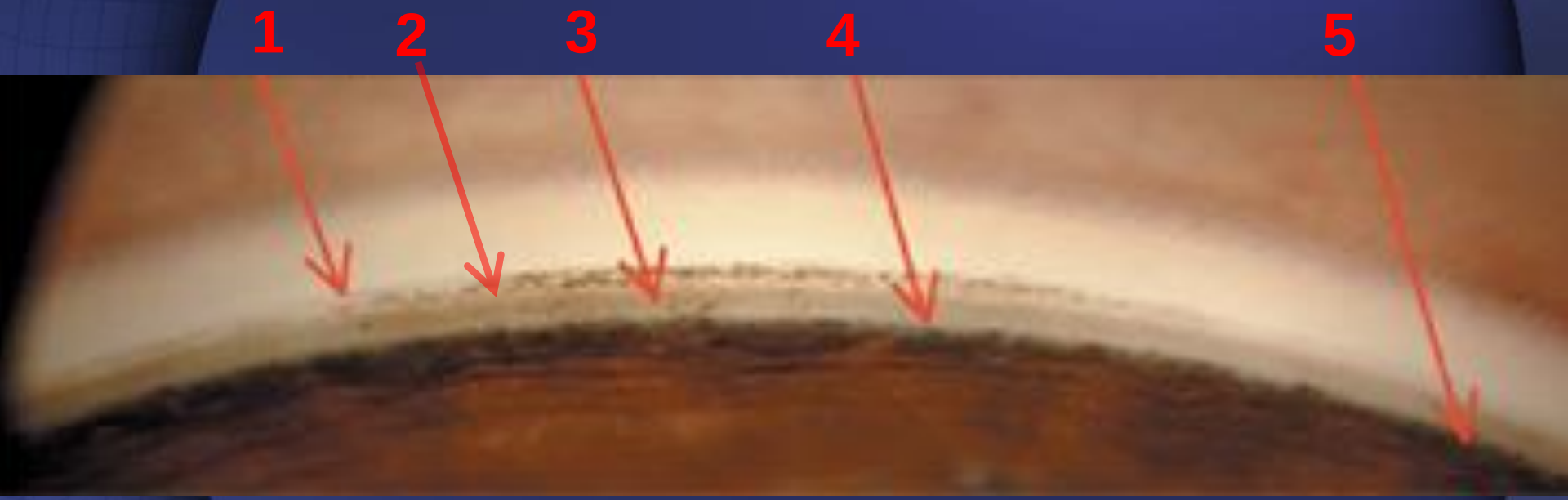

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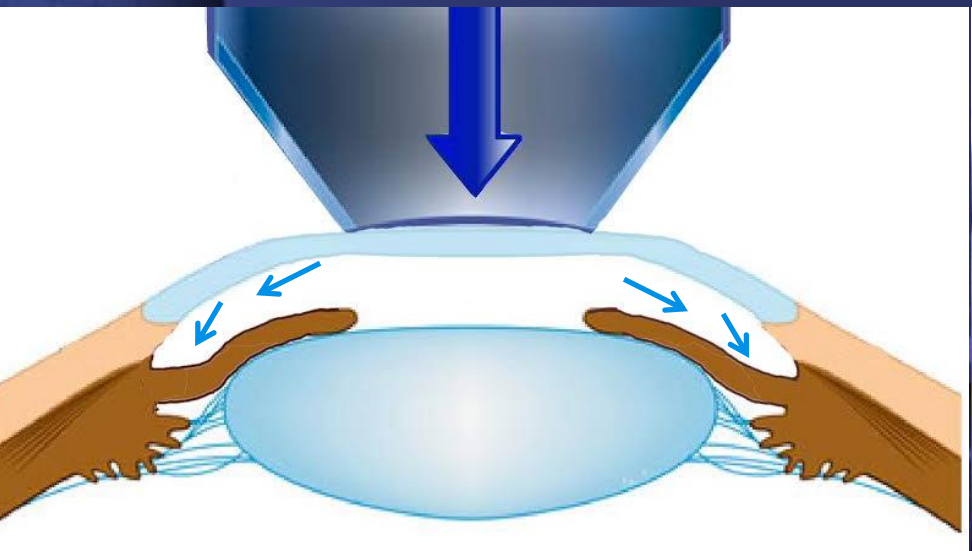
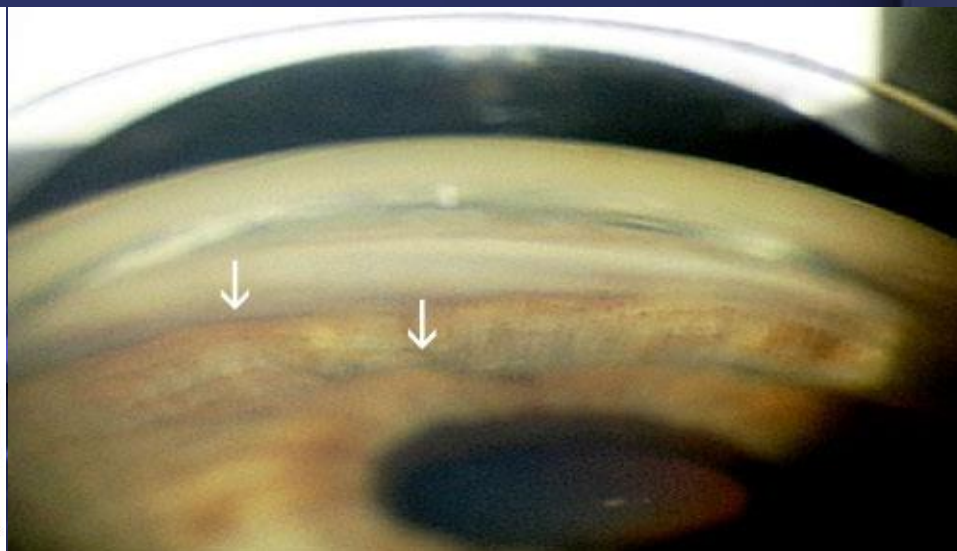


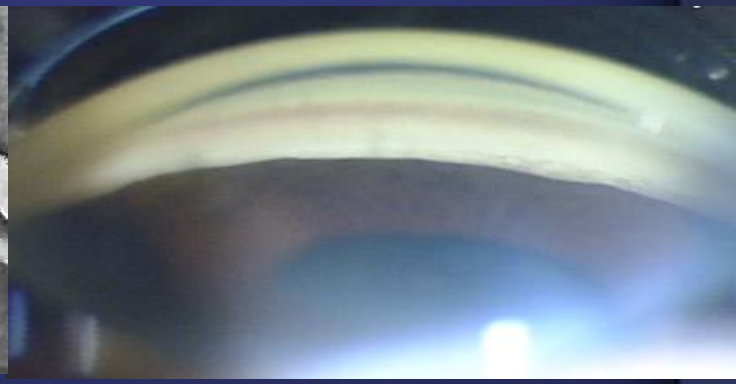


Gonioscopy is Fundamental

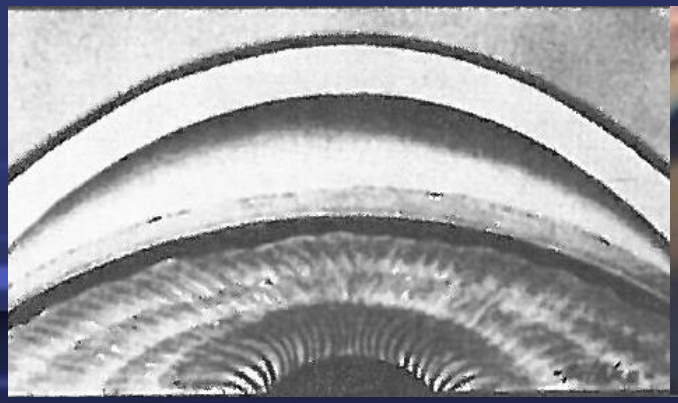
- Compression Gonioscopy: Apposition vs PAS

Apposition

Pre-indentation



Post-indentation



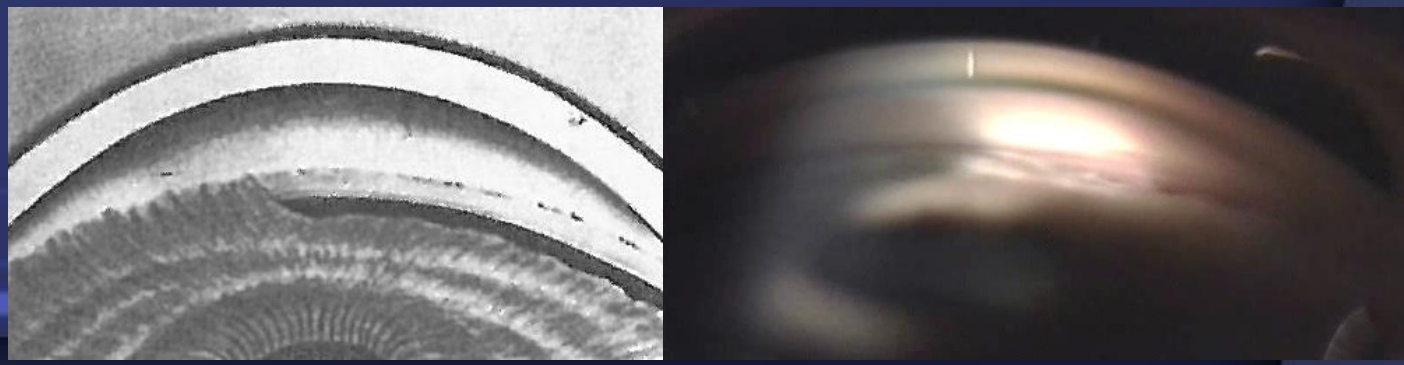
Gonioscopy is Fundamental

- Compression Gonioscopy: Apposition vs PAS

PAS (left side of view)

Pre-indentation

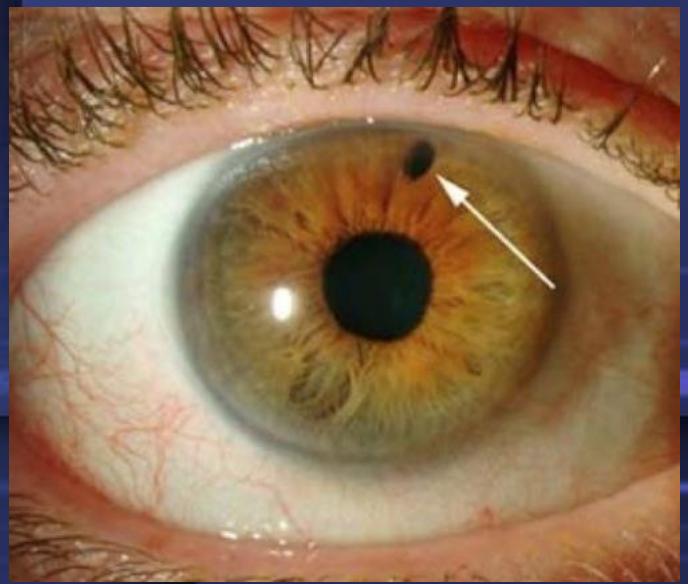
Post-indentation

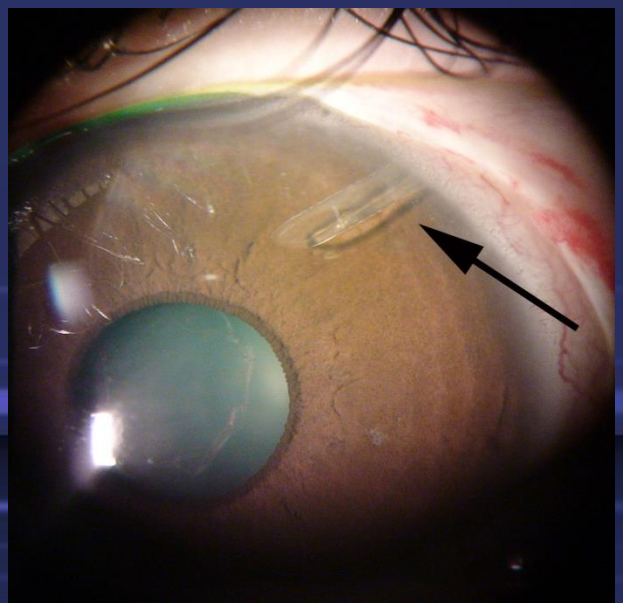


Gonioscopy is Fundamental

Treatment Implications

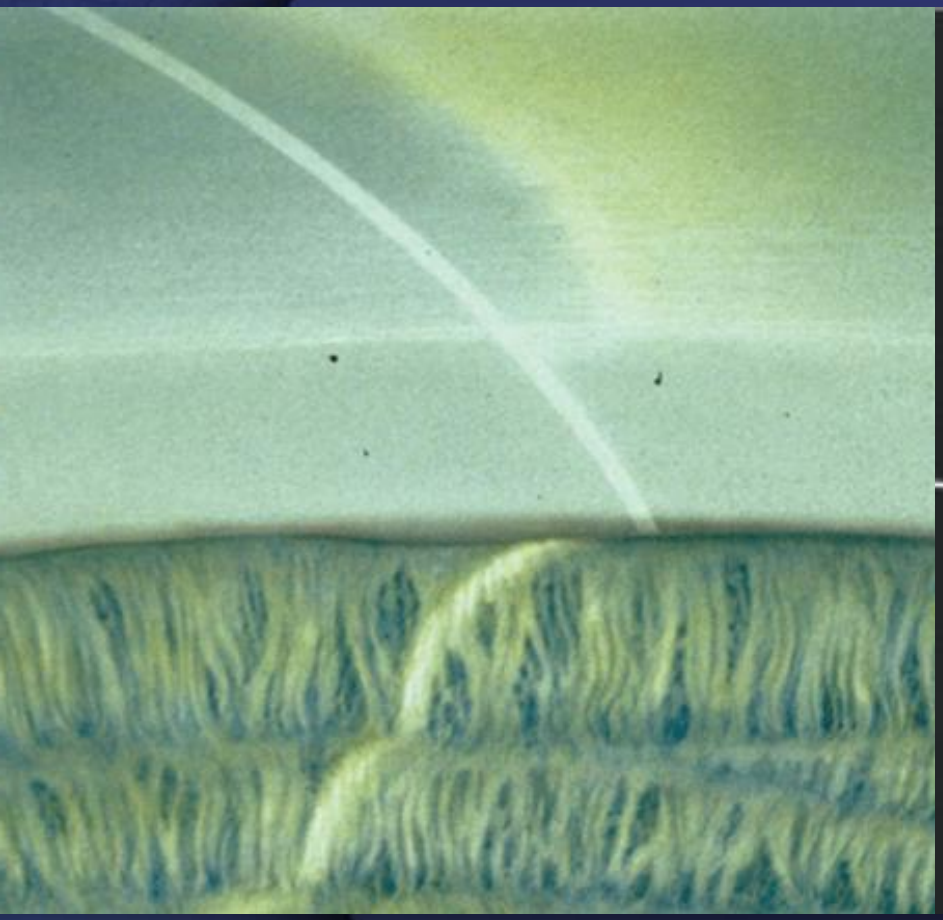
- Eyes that open with indentation will likely respond to LPI
- Eyes that do not open with indentation will likely require iridoplasty or filtration surgery/tube shunt

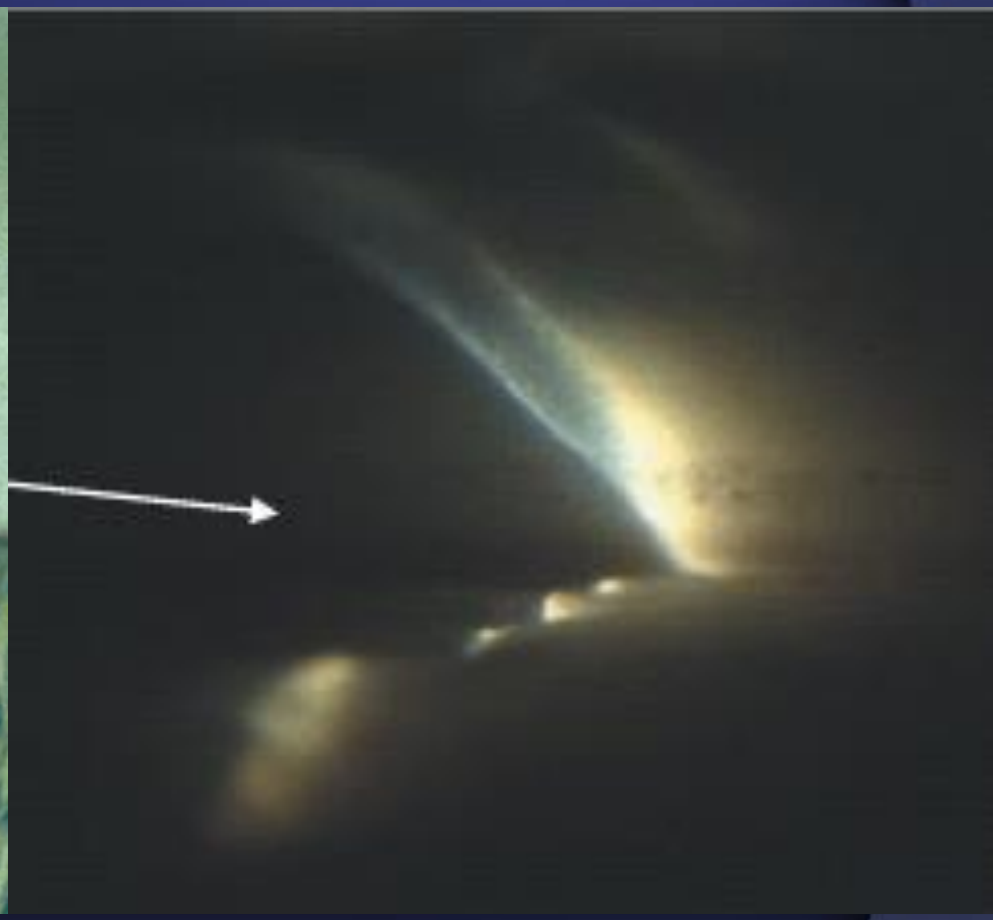




Gonioscopy is Fundamental

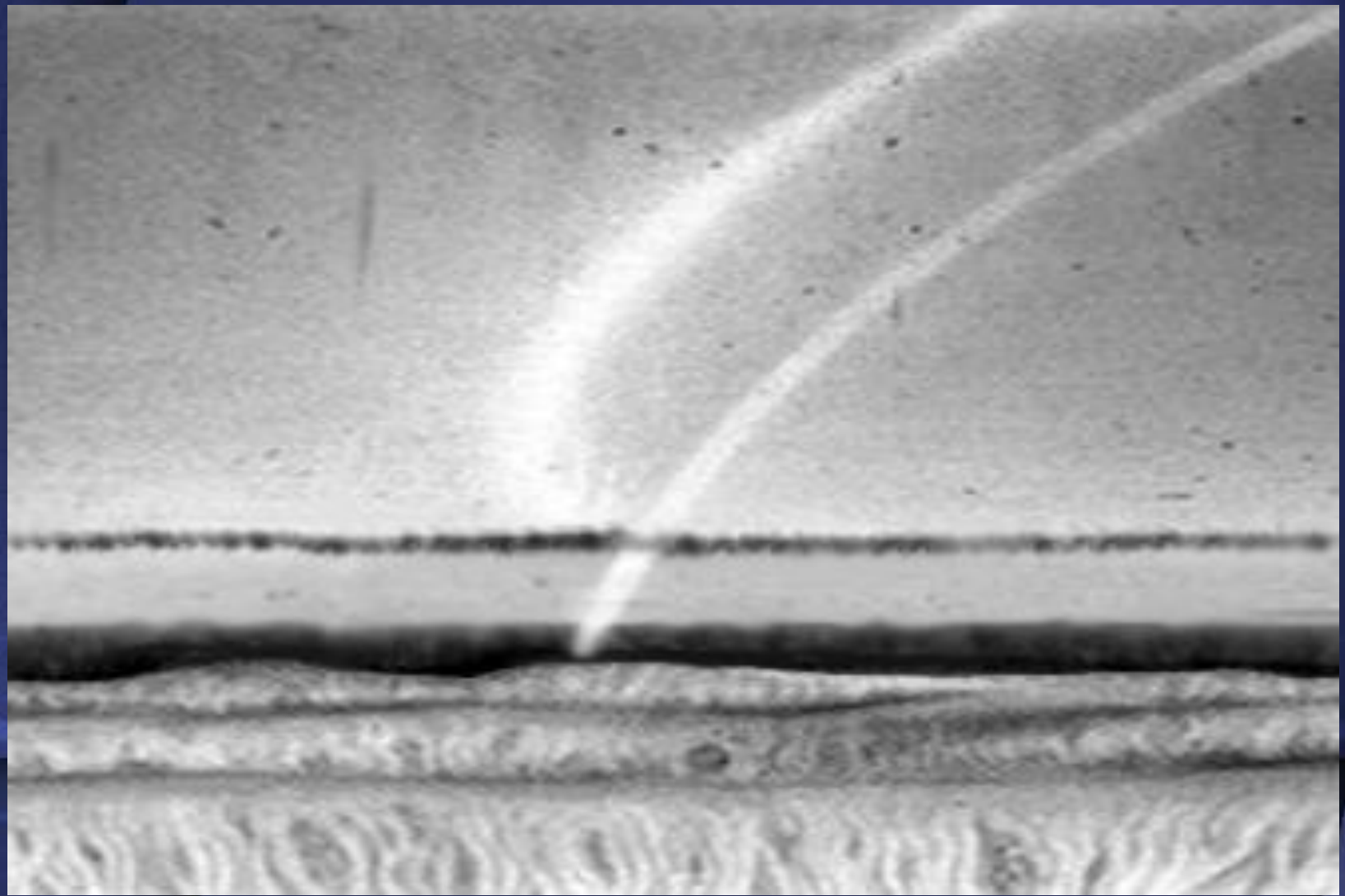
Corneal Wedge Technique





Gonioscopy is Fundamental

Most posterior structure??



Gonioscopy is Fundamental

- Does this patient need an iridotomy?
  - Judging risk of future angle closure using gonioscopy alone is prone to error
  - The importance of corroborating evidence
    - Suggestive symptoms
    - Gonio abnormalities
    - VF and ONH damage
    - Chronically elevated IOP

Ten Steps to Better Glaucoma Care

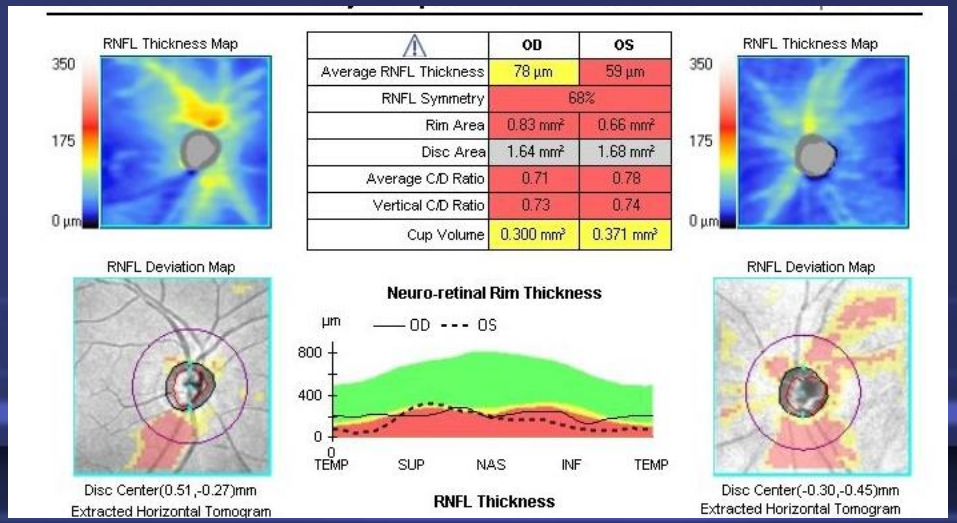
1. Master the Art of Tonometry
2. Gonioscopy is Fundamental
3. Examine the Rim, Not the Cup

Examine the rim, not the cup

- ISNT rule
  - Decreasing order of rim thickness
- Pallor
  - Rim pallor not associated with glaucoma
- Disc Size
  - Large cups are normal in large optic discs

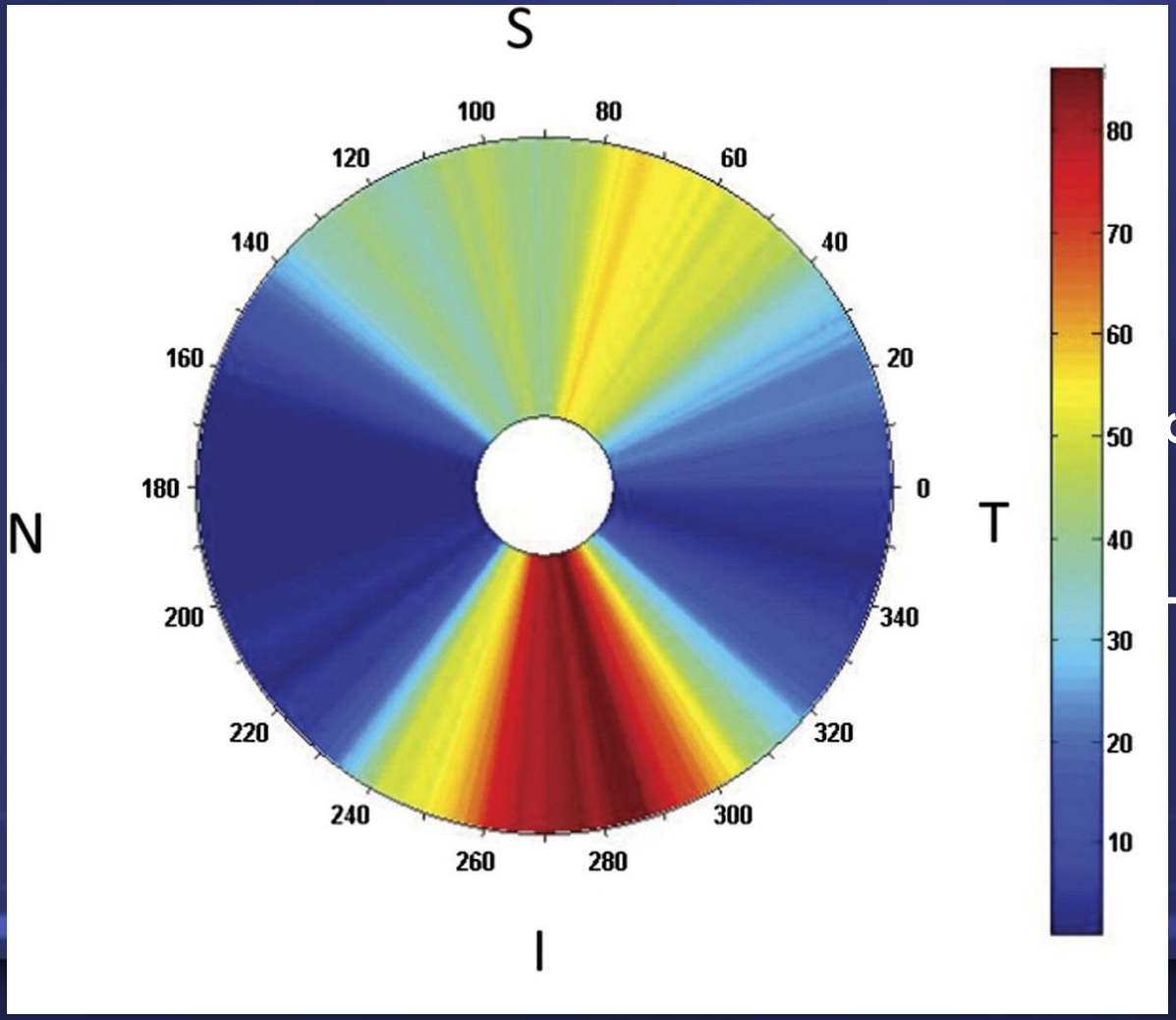
Examine the rim, not the cup

- OCT detection of glaucoma
  - Retinal nerve fiber layer thickness
  - Optic nerve head topography
  - Ganglion cell layer thickness



Examine the rim, not the cup

Frequency distribution profile of the location of RNFL defects in glaucoma patients displayed in a pie chart



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RNFL OCT

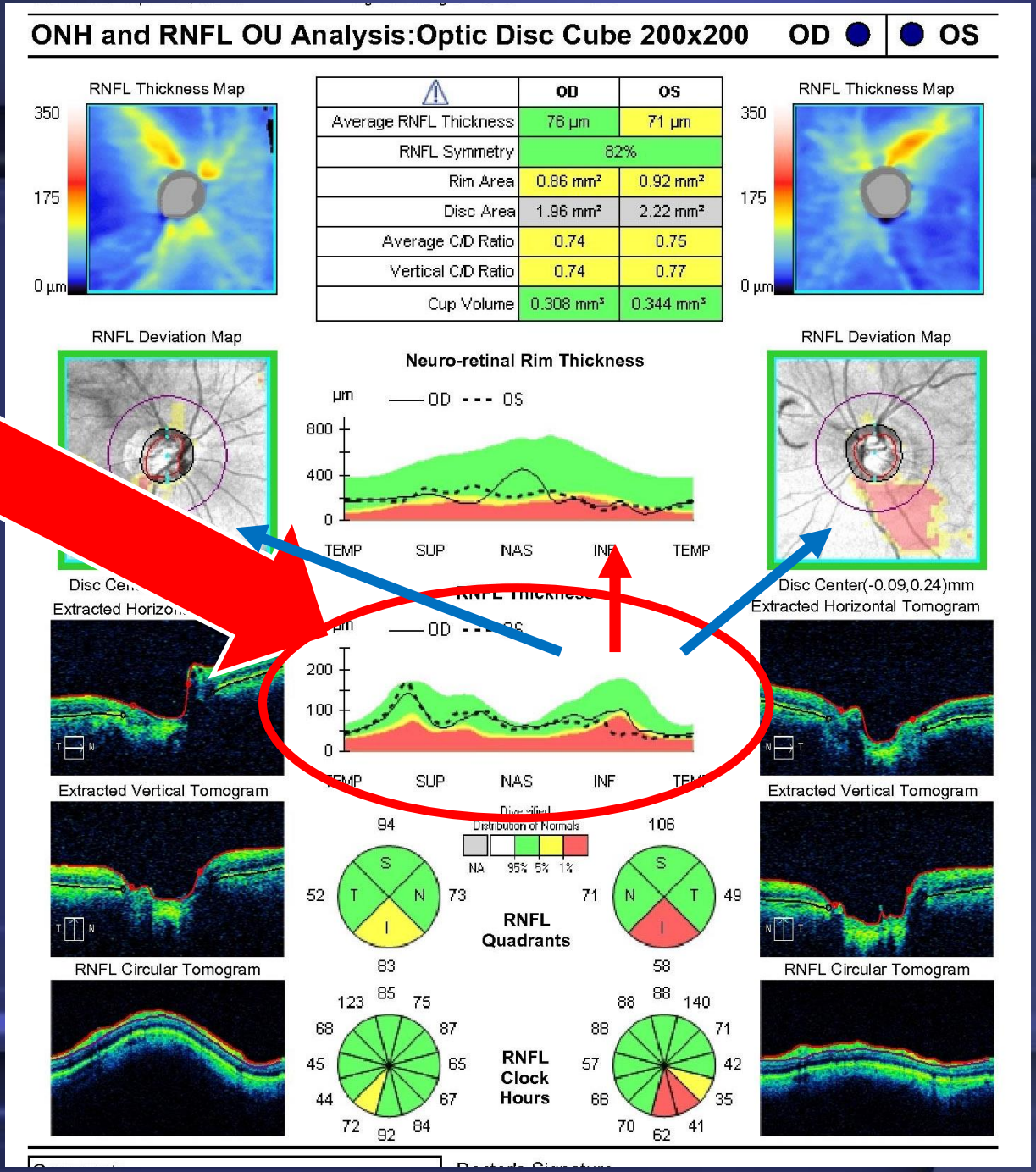
This is where most of the action is!

Is the superior (less common) or inferior (more common) hump depressed?

Is there RE/LE symmetry?

Is there evidence of rim loss corresponding to the RNFL loss?

Does the deviation map show evidence of a NFL defect?



Examine the rim, not the cup

Optic Nerve Head Topography

	OD	OS
Average RNFL Thickness	73 µm	61 µm
RNFL Symmetry	55%	
Rim Area	1.12 mm²	0.72 mm²
Disc Area	1.58 mm²	1.72 mm²
Average C/D Ratio	0.53	0.75
Vertical C/D Ratio	0.49	0.77
Cup Volume	0.036 mm³	0.220 mm³

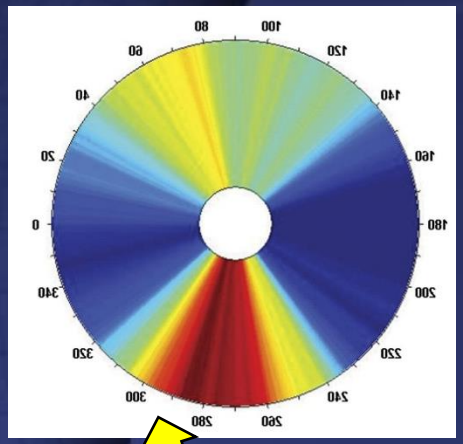
Always gray b/c it's not compared to normals!

<1.75mm² = sm
>2.75mm² = lg

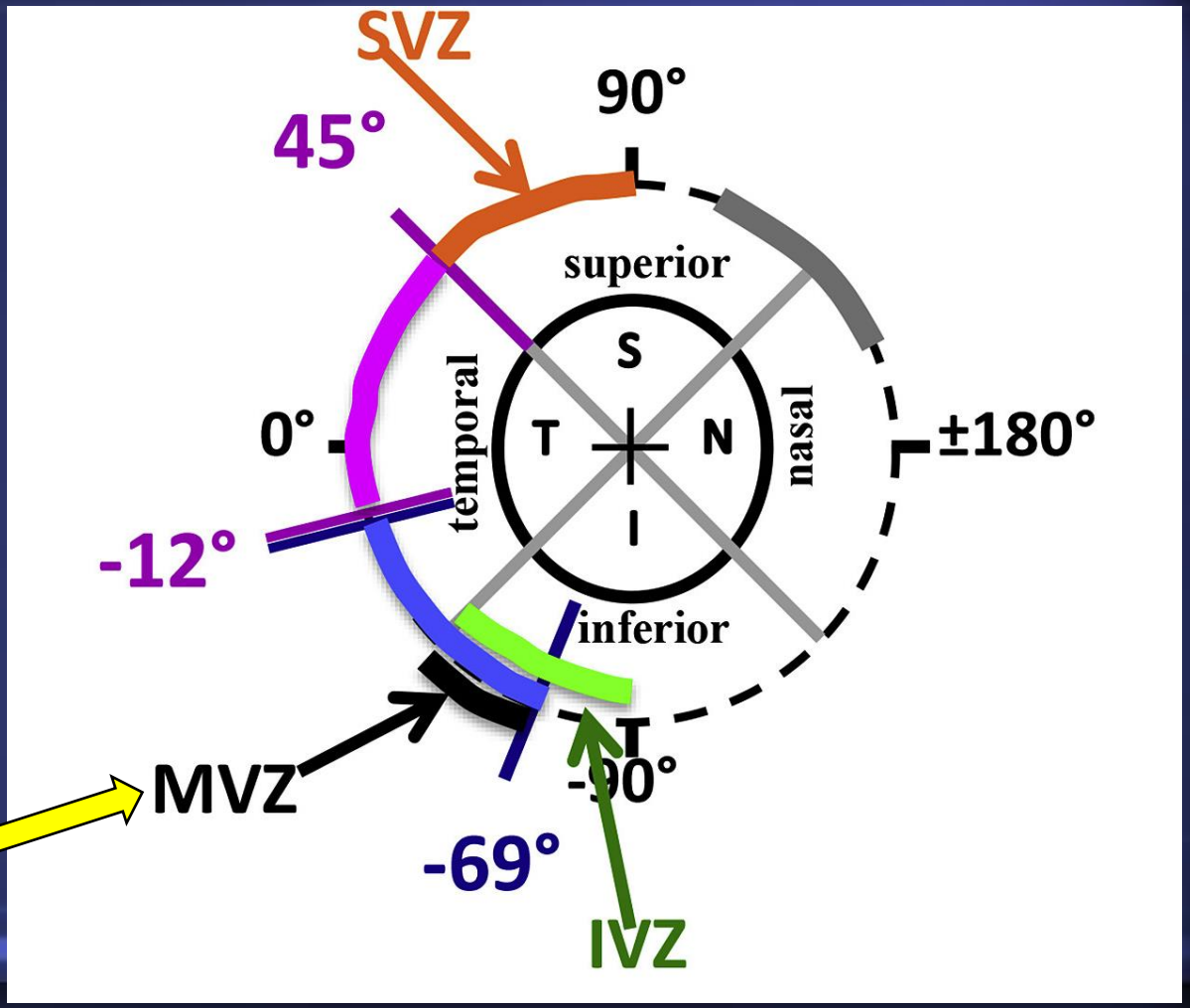
ONH morphology

NOTE: Asymmetric size may account for asymmetry in CDR and RNFL

Examine the rim, not the cup



Macula Vulnerability Zone



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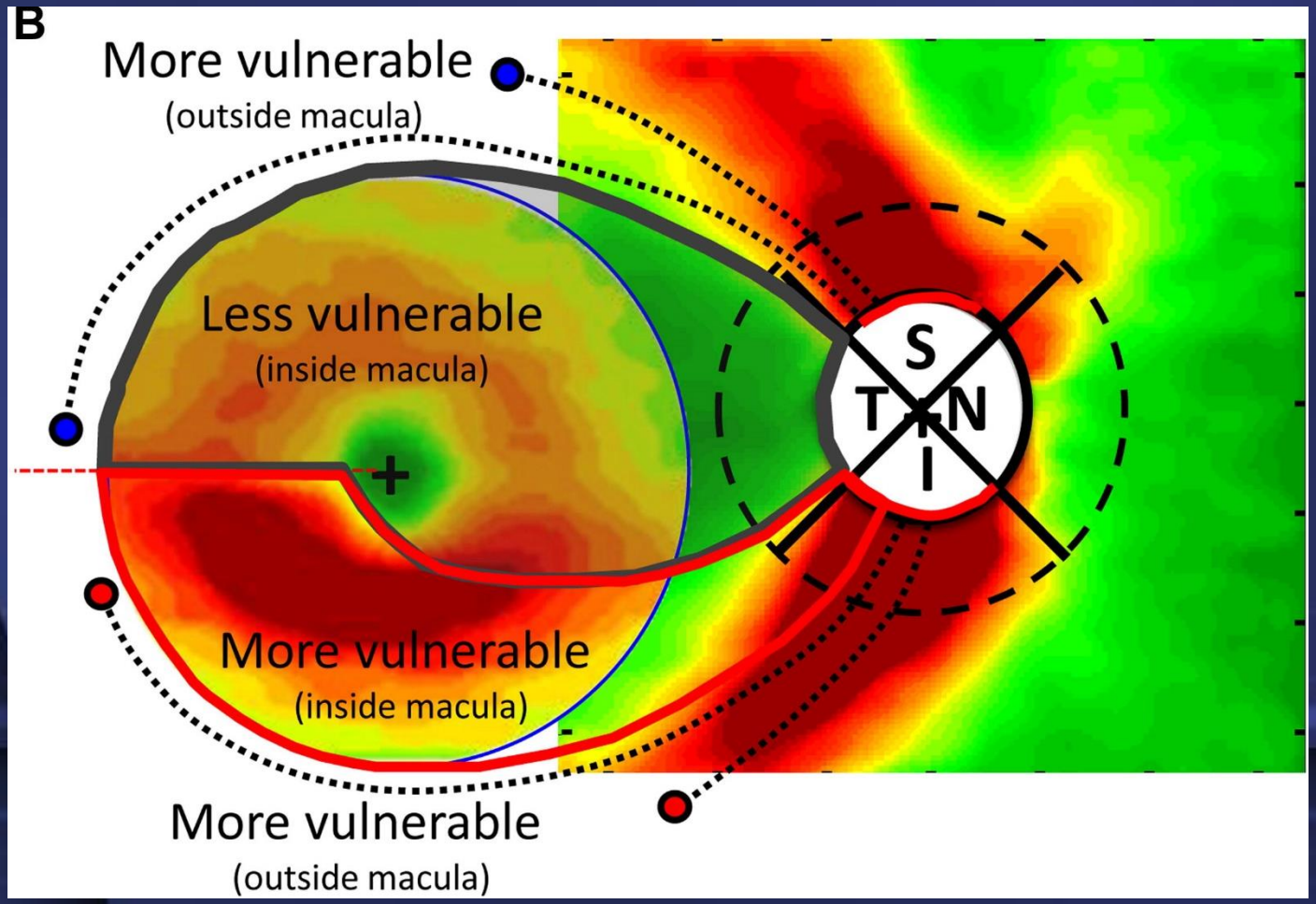
Examine the rim, not the cup

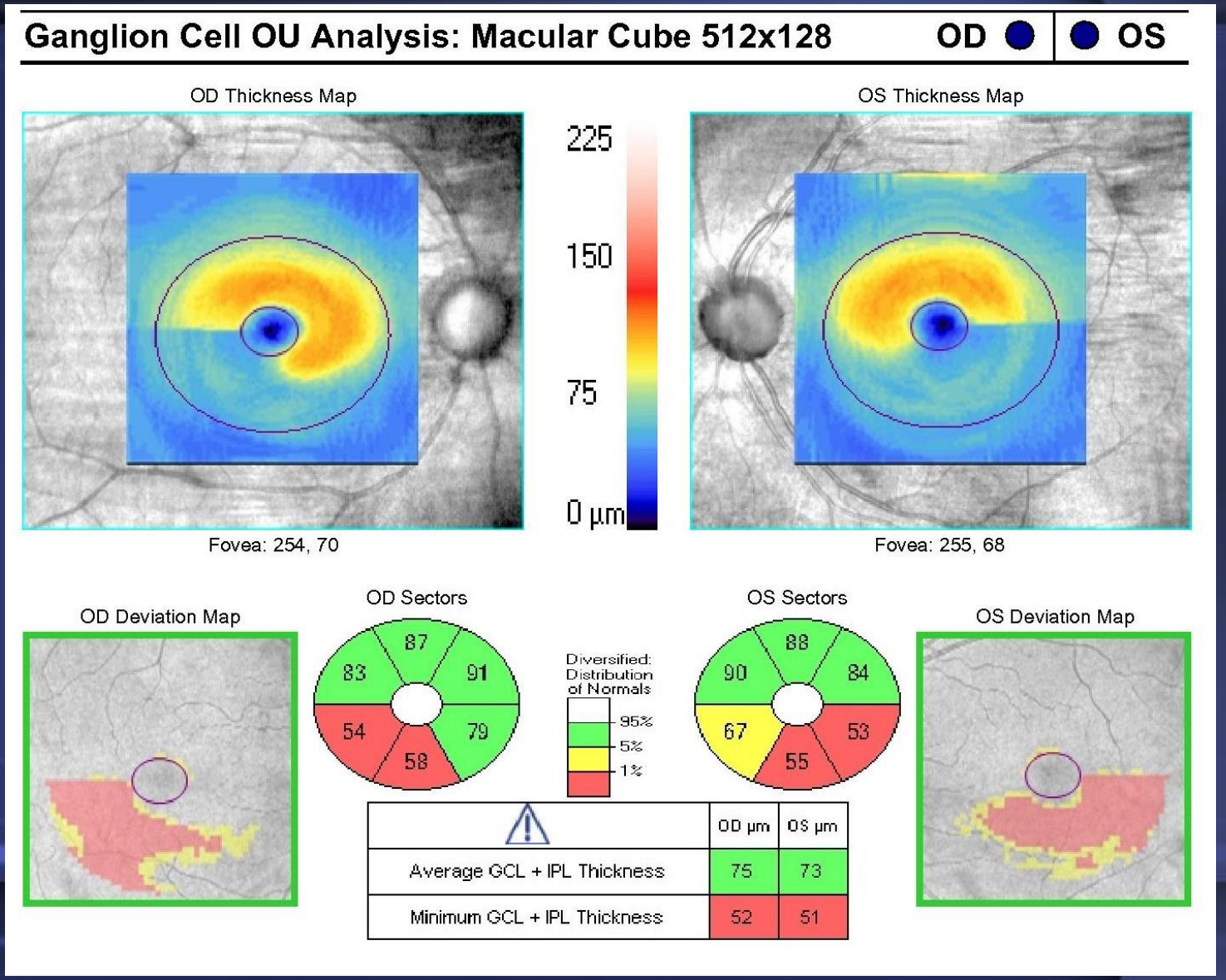
- Ganglion Cell Thickness



Zeiss GCC Report

Look for horizontal respect at the temporal raphe

A 5µm difference across the temporal raphe is suspicious for glaucoma

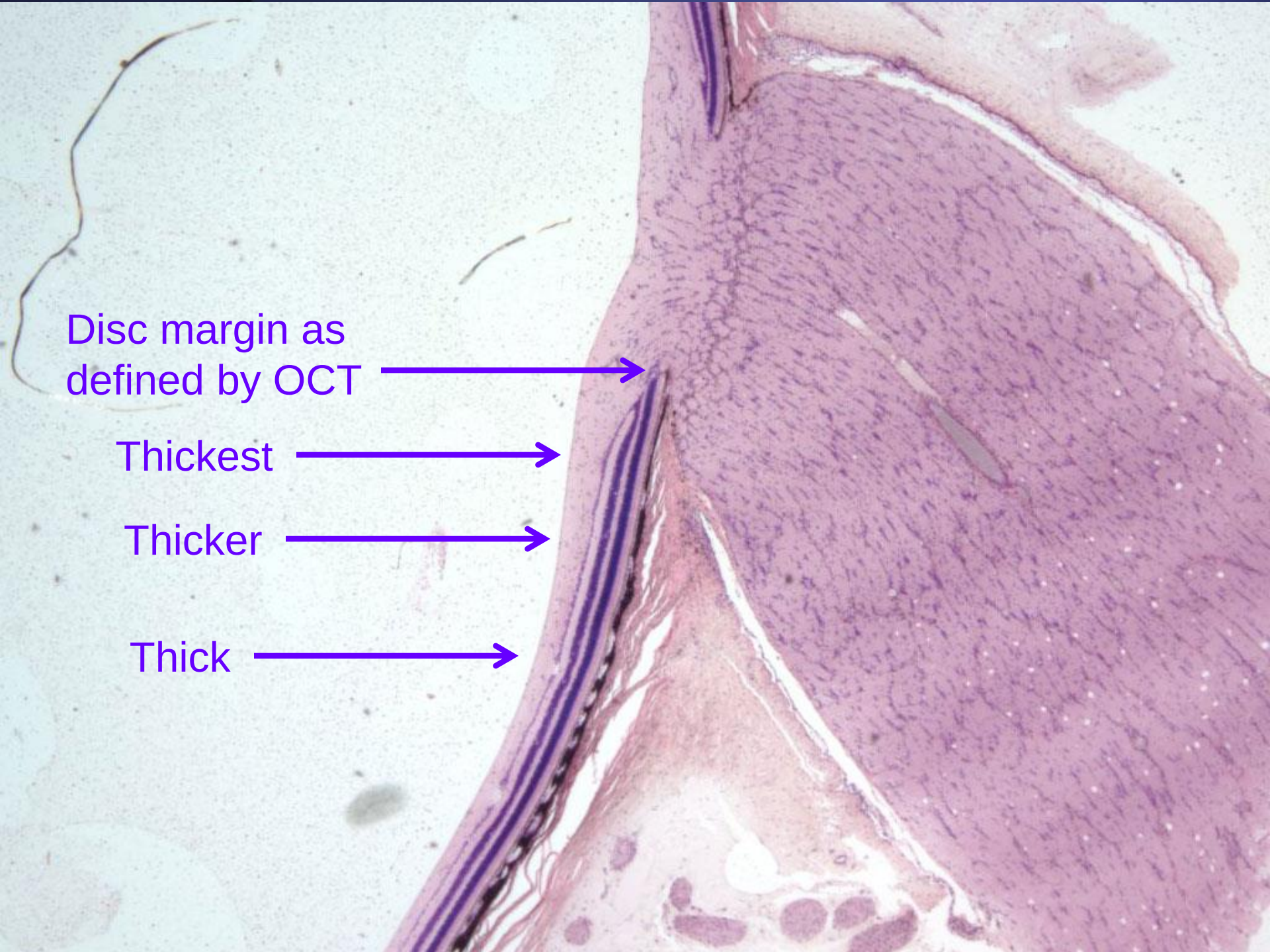


Examine the rim, not the cup

- Factors affecting OCT detection of glaucoma
  - Disc size
  - Axial length
  - Artifacts and technical errors
  - Age & race
  - Others

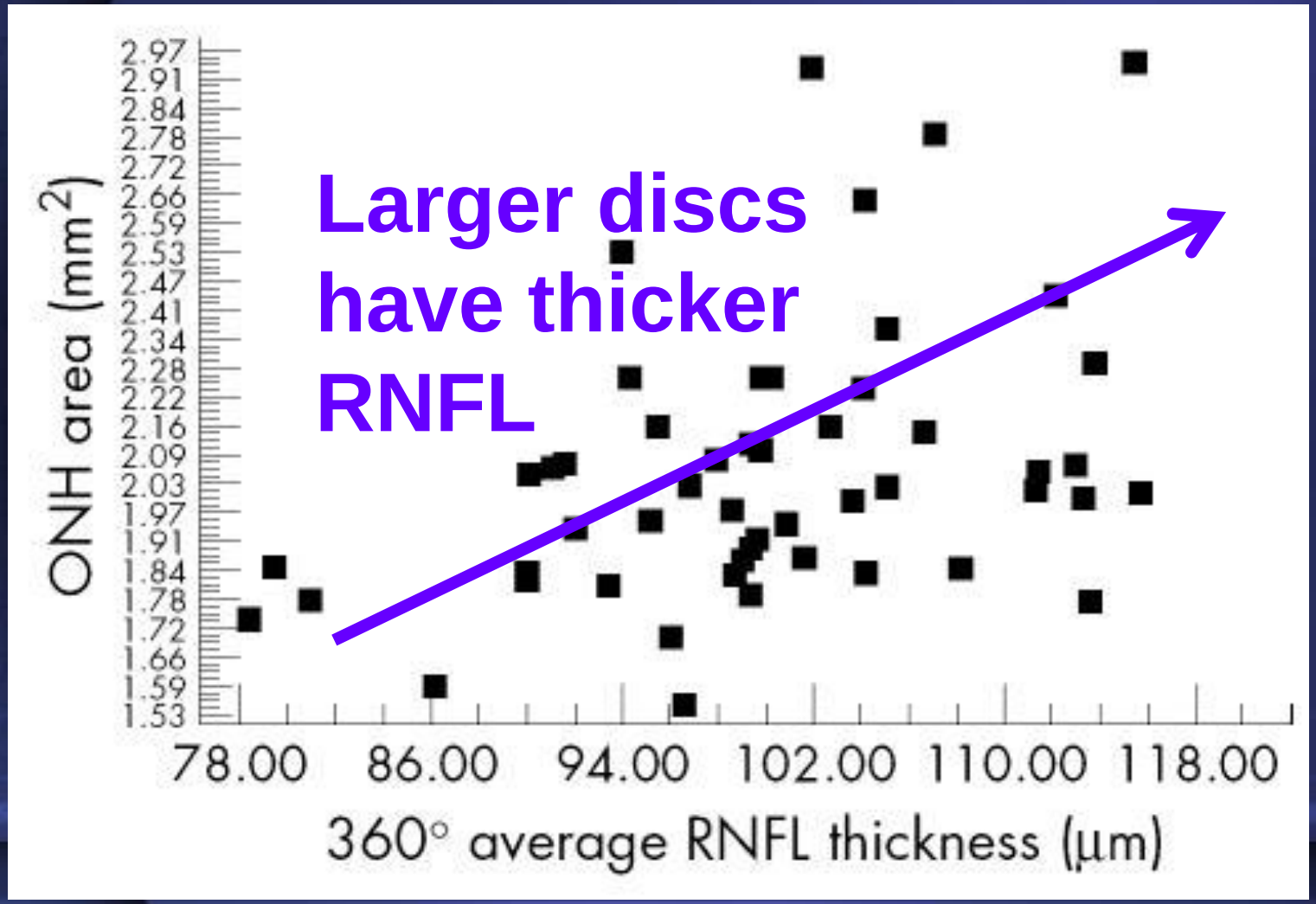
Examine the rim, not the cup

- Optic Disc Size
  - **Larger discs have thicker RNFL measurements** (Savini, BJO. 2005;89:489)
    - An artifact of fixed measurement circle
  - **Larger discs have <u>lower sensitivity</u> for early glaucoma detection**
    - Large: >2.75mm^2 ➔False negatives
    - Small: <1.75mm^2 ➔ False positives

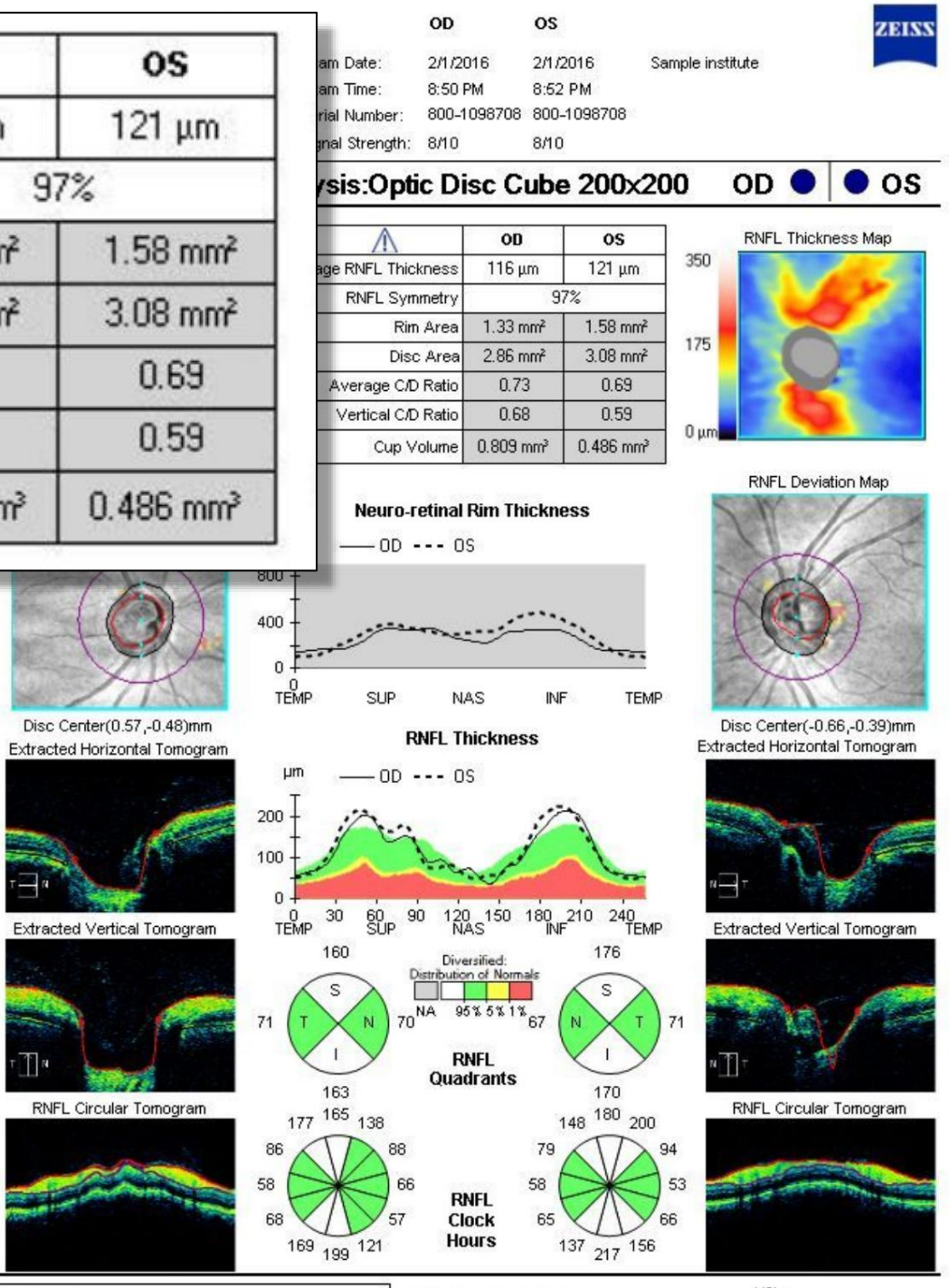

Disc margin as defined by OCT
Thickest
Thicker
Thick

Relationship between ONH size and measured RNFL thickness

Savini, BJO. 2005;89:489



	OD	OS
Average RNFL Thickness	116 µm	121 µm
RNFL Symmetry	97%	
Rim Area	1.33 mm²	1.58 mm²
Disc Area	2.86 mm²	3.08 mm²
Average C/D Ratio	0.73	0.69
Vertical C/D Ratio	0.68	0.59
Cup Volume	0.809 mm³	0.486 mm³



Example of a patient with a large ONH

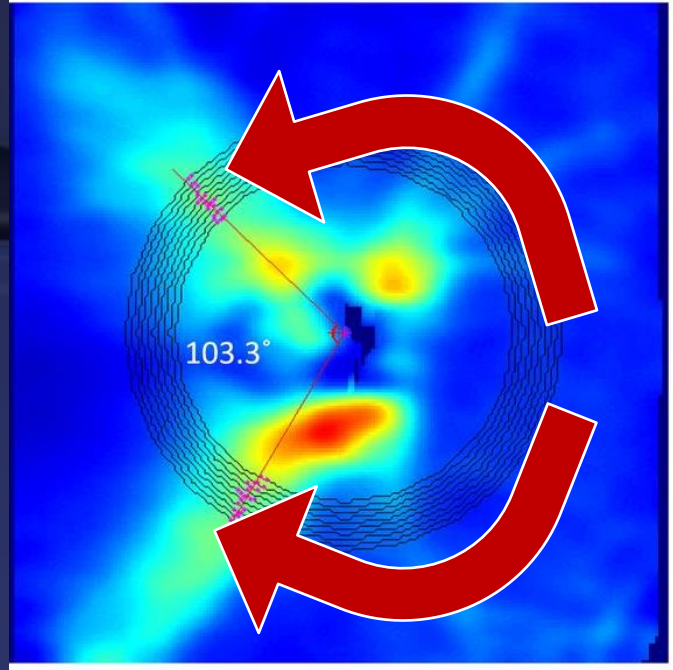
His cups are large due to his large ONH, but he has plenty of rim tissue (>1.0 mm²)

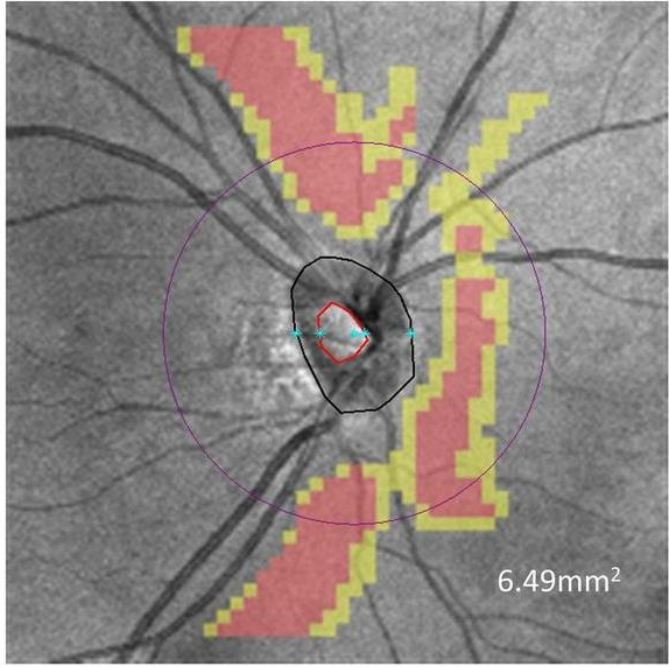
Examine the rim, not the cup

- Axial Length
  - **Every 1mm ↑axial length = ↓ 2.2µm avg RNFL** (Budenz, Ophthalmology. 2007;114:1046)
  - Higher risk of OCT **false positive errors** (Kim, Ophthalmology. 2011;118:1774)
  - High myopes also have **lateral shifts** in their RNFL thickness profile (Leung, IOVS. 2012;53:7194)

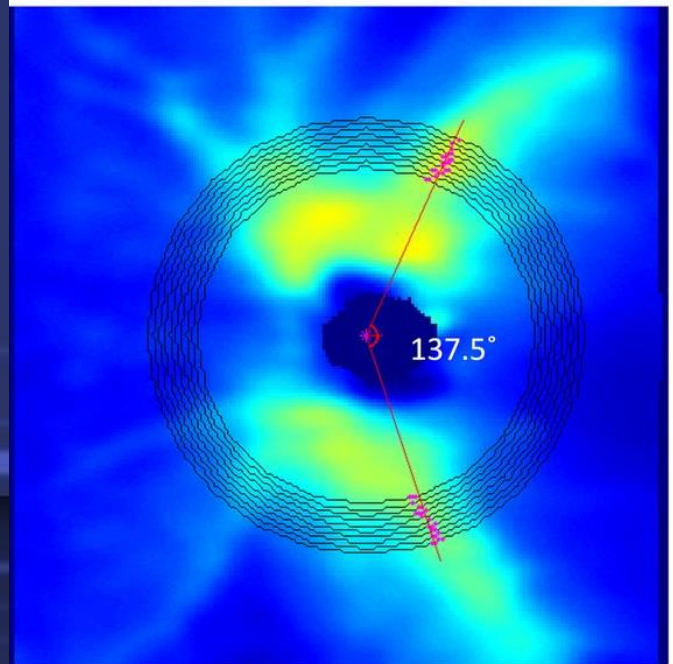
Displacement of RNFL bundles in myopia

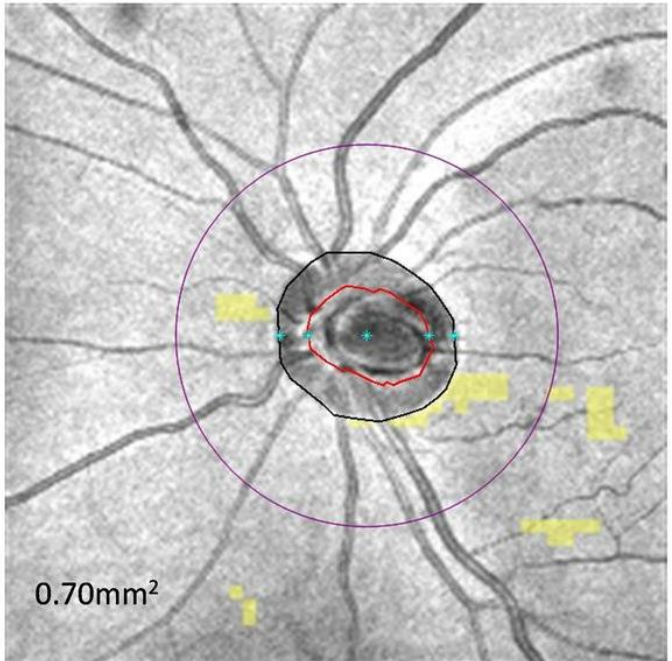
Axial length: 27.26
RE: -6.75 D





Axial length: 26.61
RE: -2.00 D





Leung, IOVS. 2012;53:7194

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3. Examine the Rim, Not the Cup
4. Is this *Really* Glaucoma?

Is this *really* glaucoma?

Non-glaucomatous Cupping

- Compression
- Inflammation (sarcoid, lupus)
- Infection (syph)
- Ischemia (NAION, AAION)
- Demyelinating disease (MS)
- Hereditary disease – Leber's, AD optic atrophy
- Toxic/Nutritional – B12 deficiency, methanol
- Trauma
- Late papilledema

Is this *really* glaucoma?

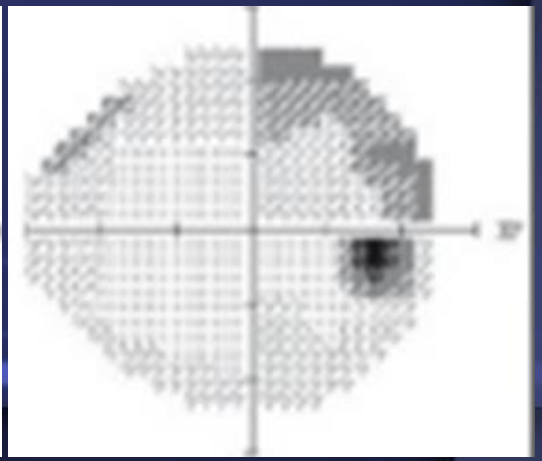
Findings that suggest non-glaucomatous neuropathy

- Young age
- Significant asymmetry
- Significant VA loss

Is this *really* glaucoma?

Findings that suggest non-glaucomatous neuropathy

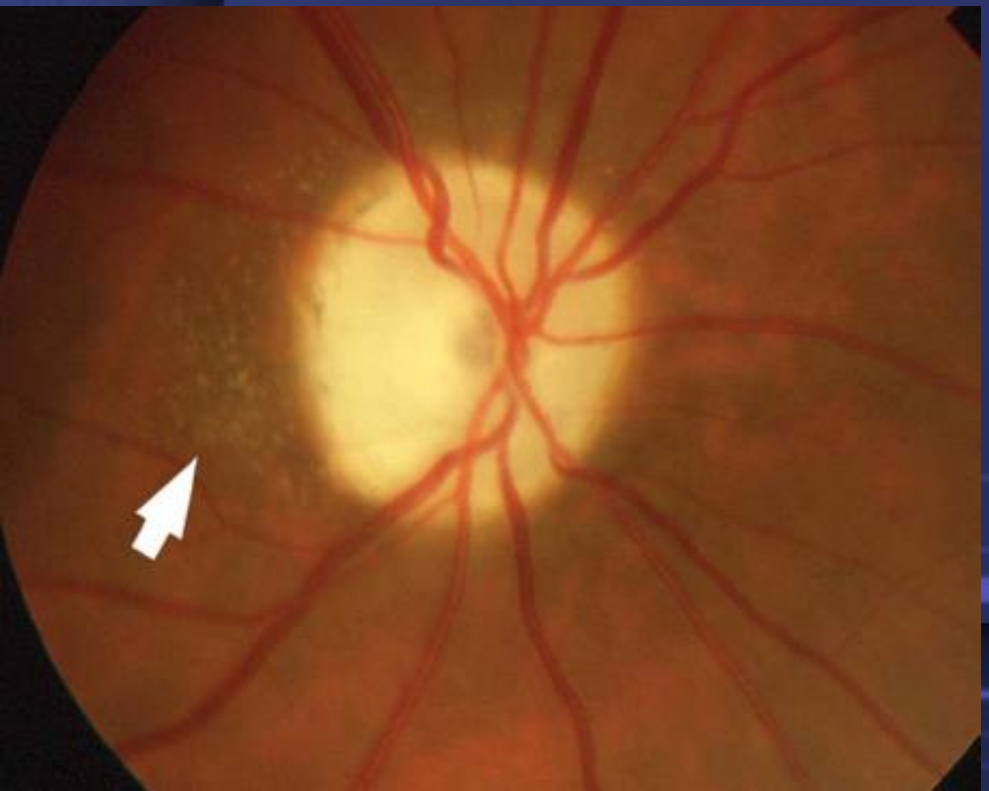
- Disc pallor
- Visual field defect T>N, respects the vert, mainly central



Is this *really* glaucoma?

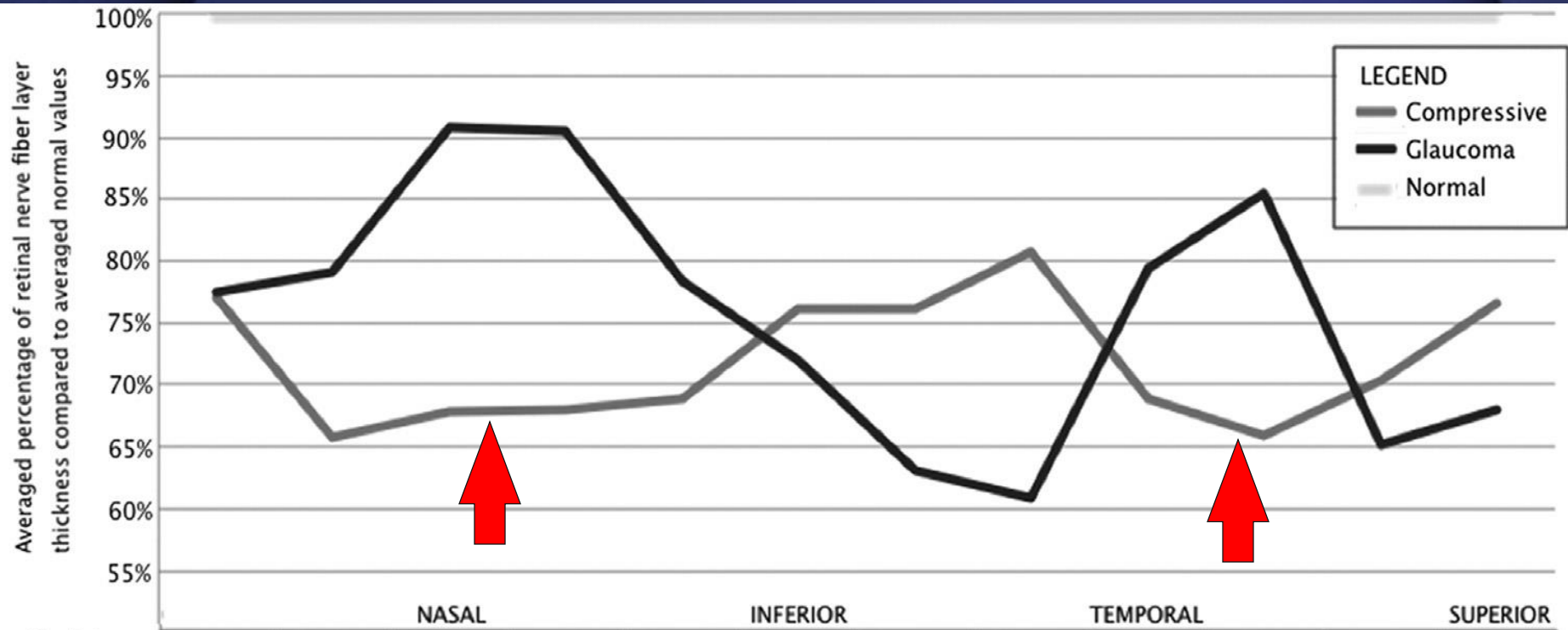
Findings that suggest non-glaucomatous neuropathy

- Peripapillary exudates
- Significant arteriolar attenuation/sheathing



Is this *really* glaucoma?

Differentiation of compressive from glaucomatous optic neuropathy with SD-OCT

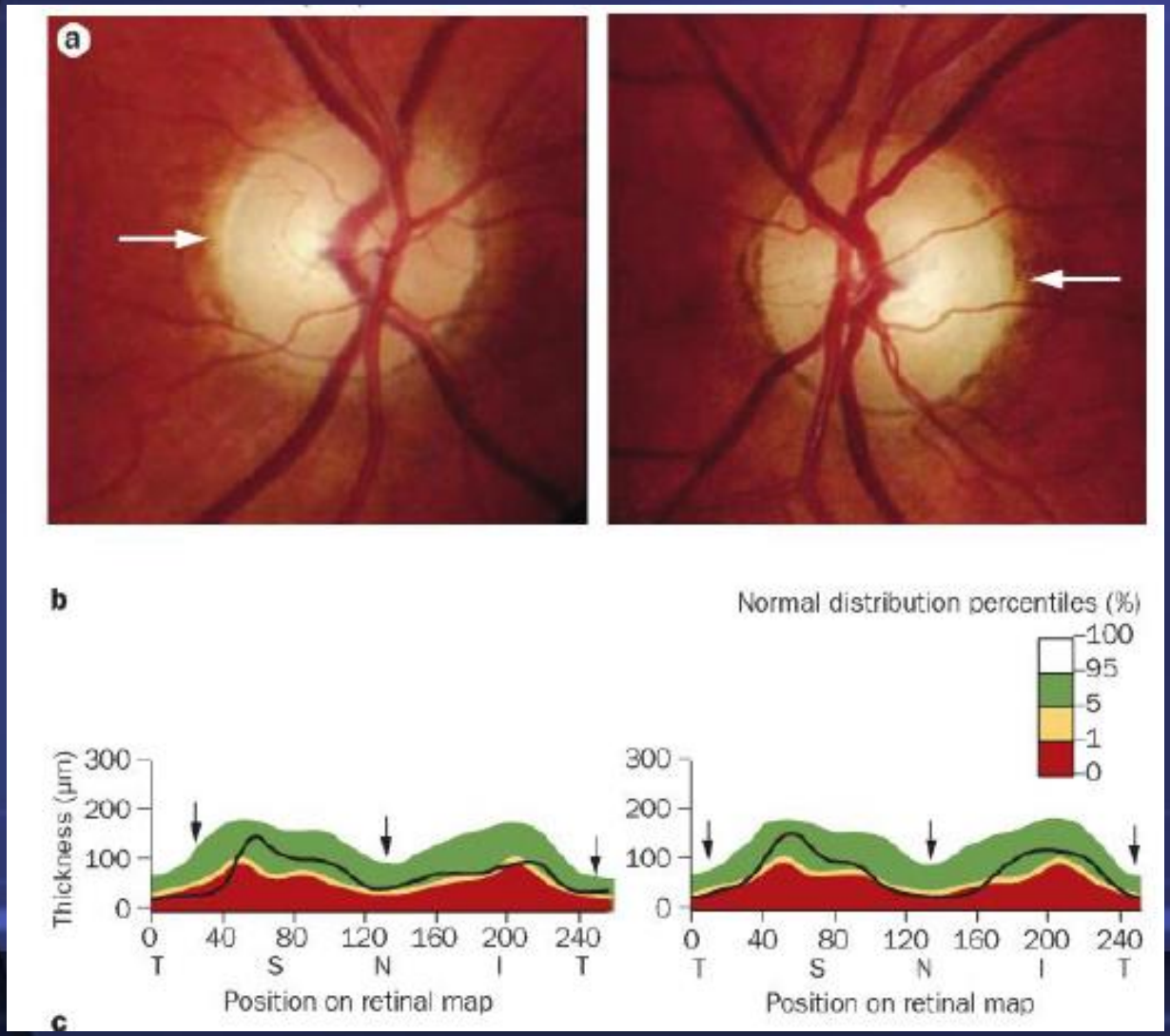


Clock hour	1	2	3	4	5	6	7	8	9	10	11	12
Compressive	77.1%	65.7%	67.9%	68.0%	68.9%	76.2%	76.1%	80.8%	68.8%	65.9%	70.4%	76.6%
Glaucoma	77.5%	79.1%	90.9%	90.5%	78.3%	72.0%	63.1%	60.8%	79.4%	85.4%	65.2%	68.0%
Normal	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Danesh-Meyer HV, et al. Differentiation of compressive from glaucomatous optic neuropathy with SD-OCT. Ophthalmology. 2014 Aug;121(8):1516-23.

Is this *really* glaucoma?

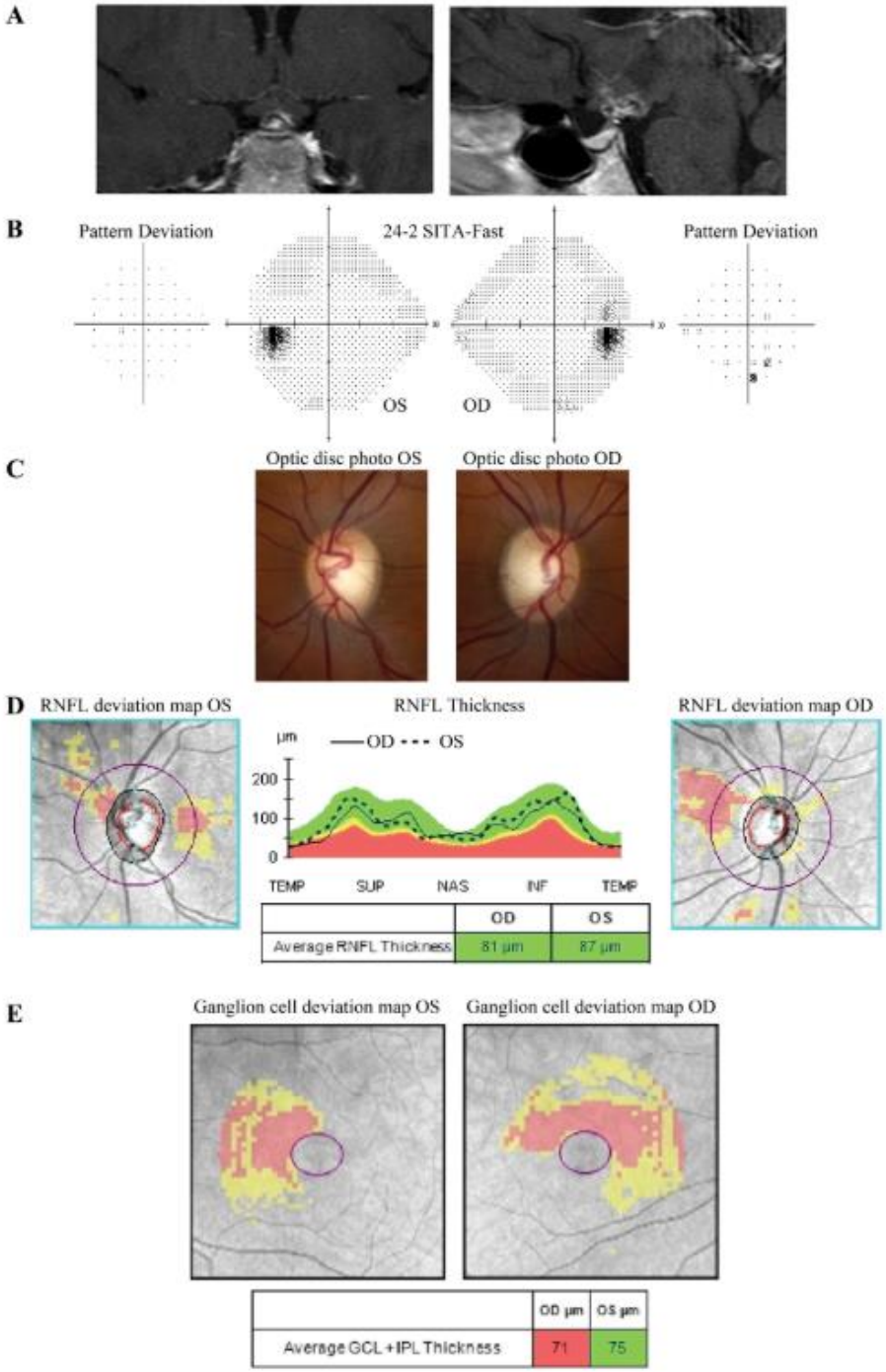
- Pituitary Adenoma

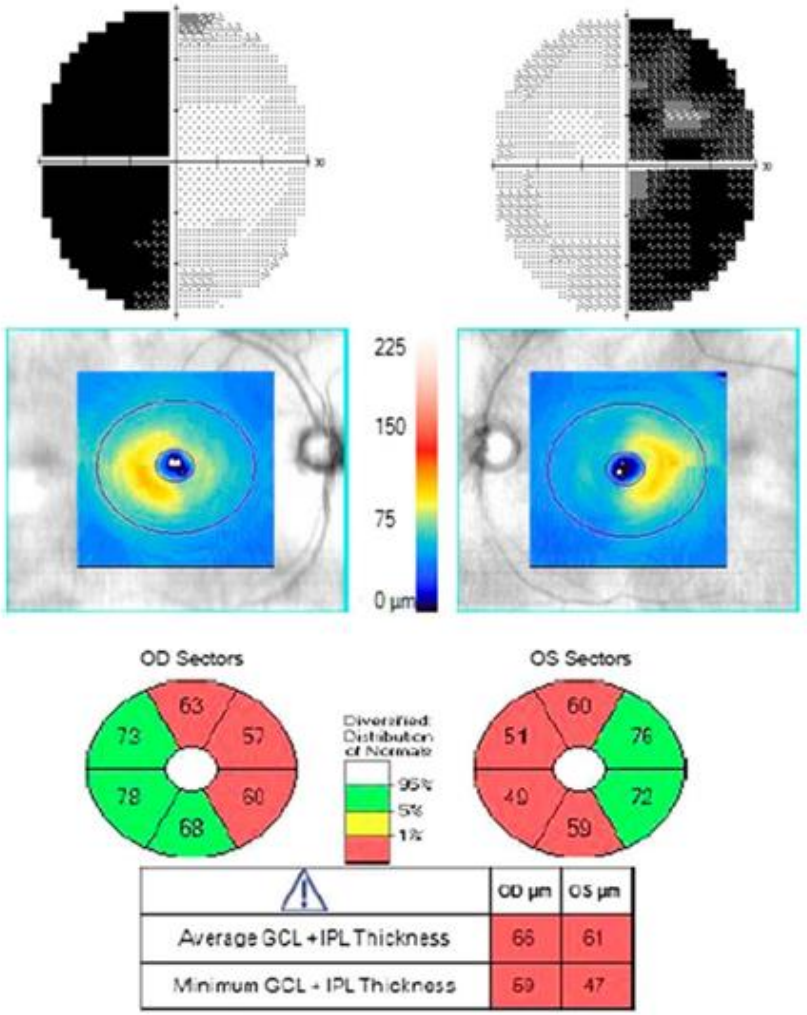


O'Neill EC, et al. The optic nerve head in acquired optic neuropathies. Nat Rev Neurol. 2010 Apr;6(4):221-36.

Non-Glaucomatous Cupping

- Cupping
  - Non-glaucomatous optic atrophy can exhibit glaucomatous cupping (compressive, ischemic) (Trobe, Arch Ophthalmol. 1980;98:1046)
- Pallor
  - Important, but may be subtle, variable, and deceptive
  - Many normal discs appear pale (16%) (Trobe, Arch Ophthalmol. 1980;98:1040)
- OCT
  - Pattern of RNFL loss varies depending on cause





GCC thinning is <u>more</u> sensitive than perimetry in detection of chiasmal compression.

Blanch RJ, et al. Pituitary 2018;21:515–23.

When Should I Order an MRI?

Findings that increase the risk of an intracranial mass lesion in NTG suspects

- **Age <50yrs**
  - NTG is rare in young people
- **VA worse than 20/40**
  - Beware unexplained reduction in BVA
- **Vertically aligned VF defects**
  - Glaucoma does not respect the vertical
- **Optic disc pallor**

Greenfield, Ophthalmology. 1998;105:1866

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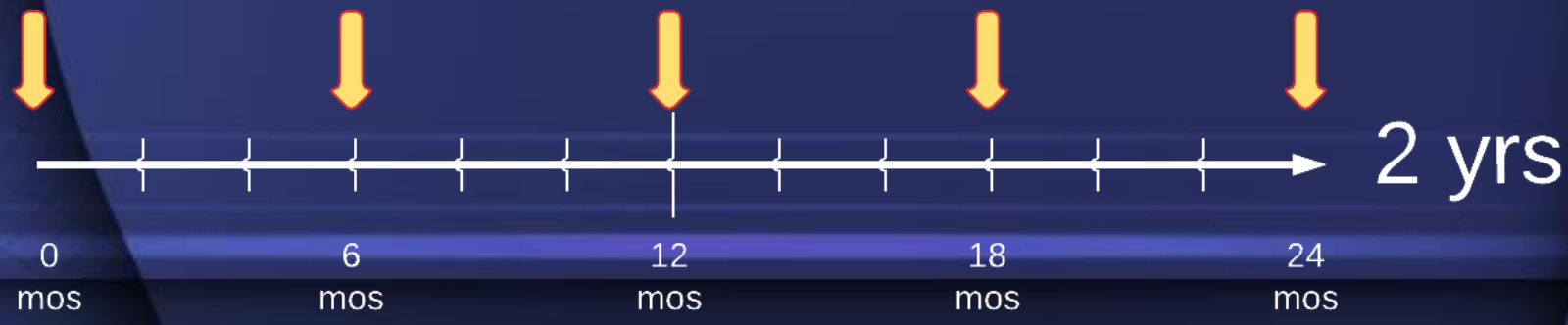
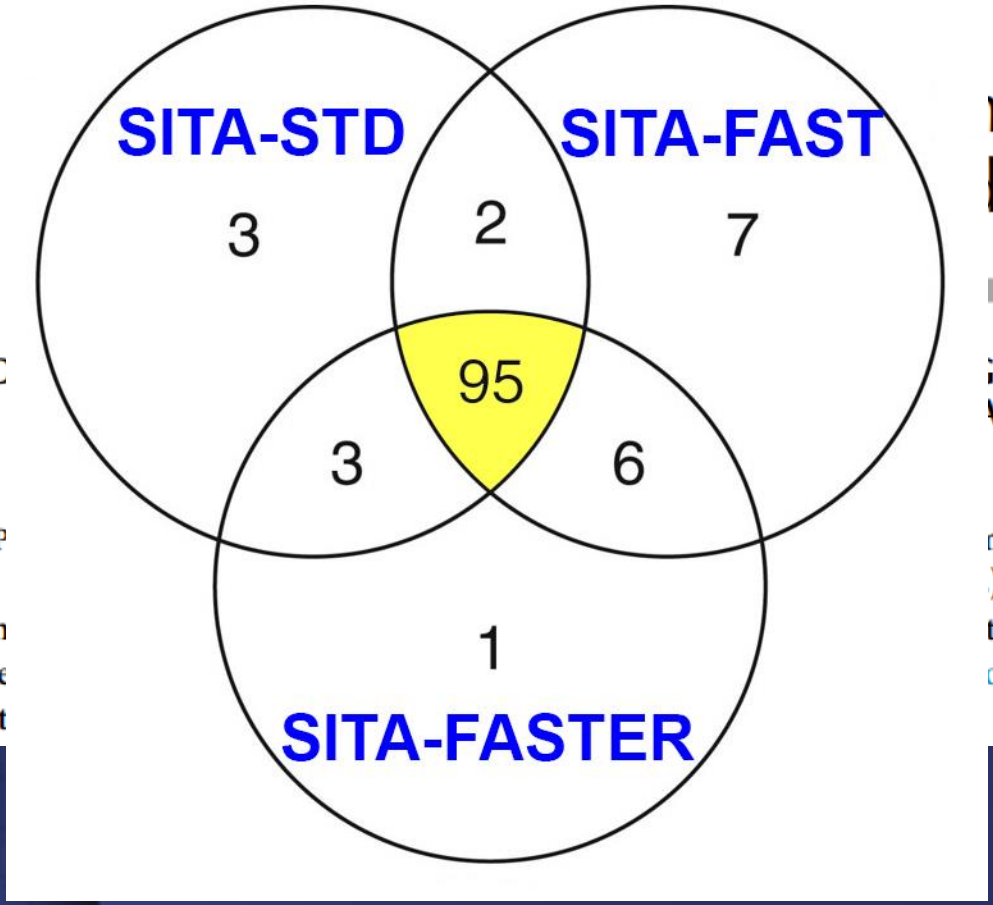
5. Establishing the Baseline

Establishing the baseline

- How many VFs are needed to reliably establish a baseline?
  - OHTS: Chance of reverting back to normal
    - After 2 consecutive abnormal VF: 66%
    - After 3 consecutive abnormal VF: 12%
  - Need to detect rapid progressors early



Source: Arch Ophthalmol. 2005;123:1201-1206



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ommons.org/licenses/by-nc-nd/4.0/).)

"SITA Faster saved considerable test time. SITA Faster and SITA Fast gave almost identical results."

Am J Ophthalmol. 2019;198:154

Re-establishing baseline IOP

- PHACO / IOL
  - Long-term IOP lowering
  - Max effect at 3 mos
  - Average 2.5 mmHg decrease
  - Glaucoma pts may require fewer meds
  - IOP elevation following capsulotomy

Source: J Cataract Refract Surg. 2005;31:479-83.

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6. Setting a Target Pressure

Setting a target pressure

- Goals in treating glaucoma:

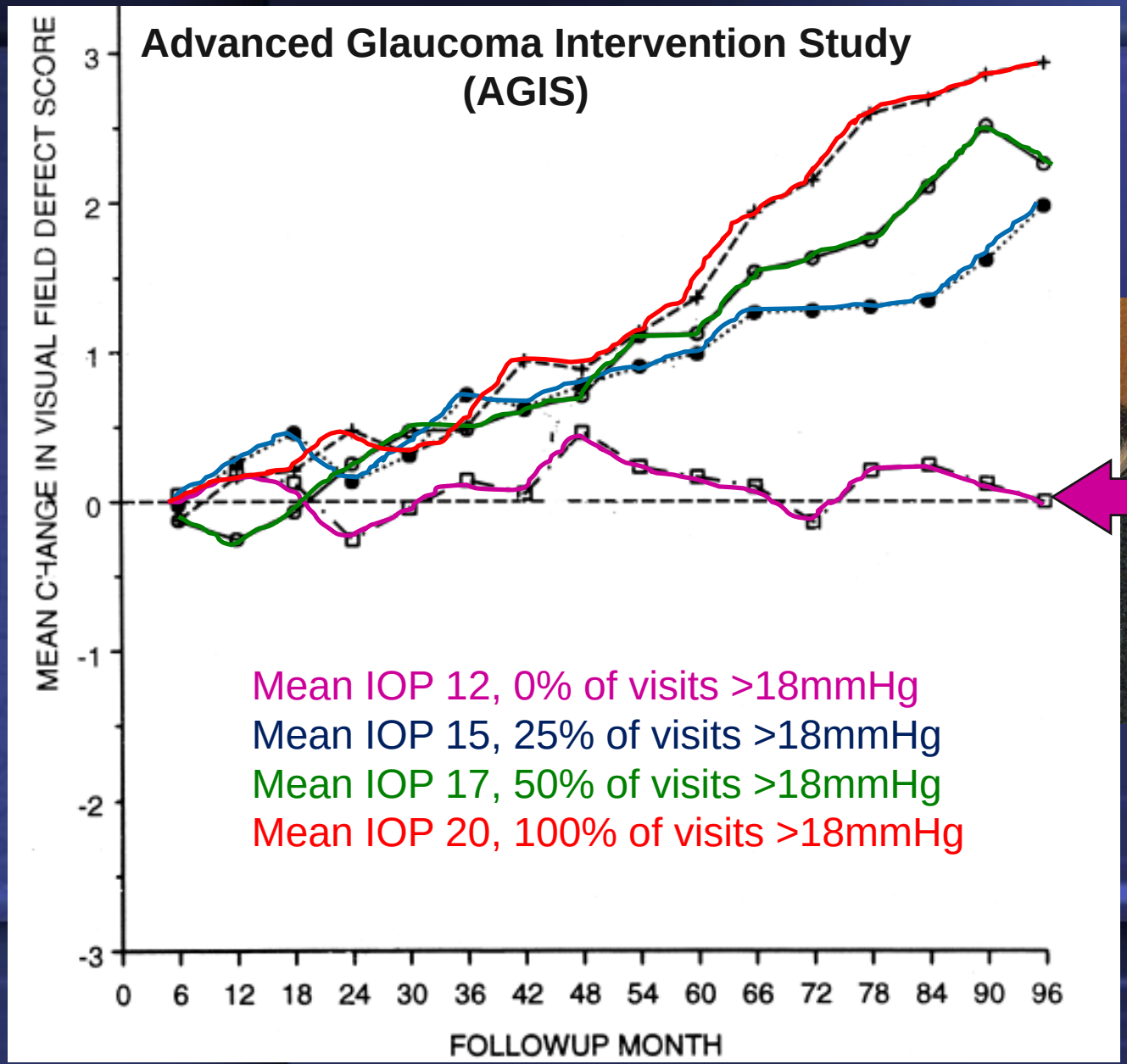
  Preservation of vision

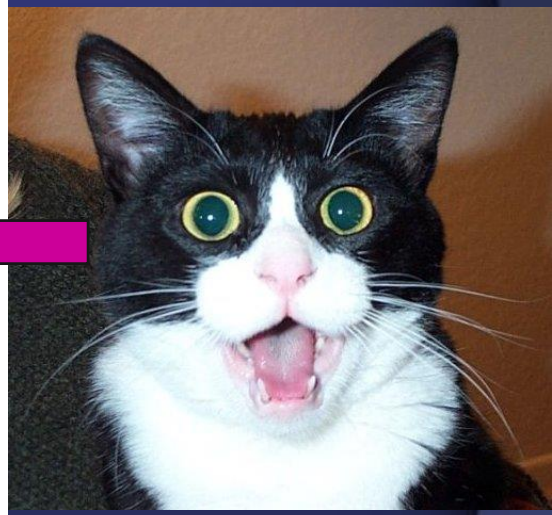
  and

  Quality of life

- Factors to consider
  - Disease severity
  - Baseline IOP
  - Risk factors
  - Life expectancy
  - Status of fellow eye

Setting a target pressure





NO PROGRESSION?!?

Setting a target pressure

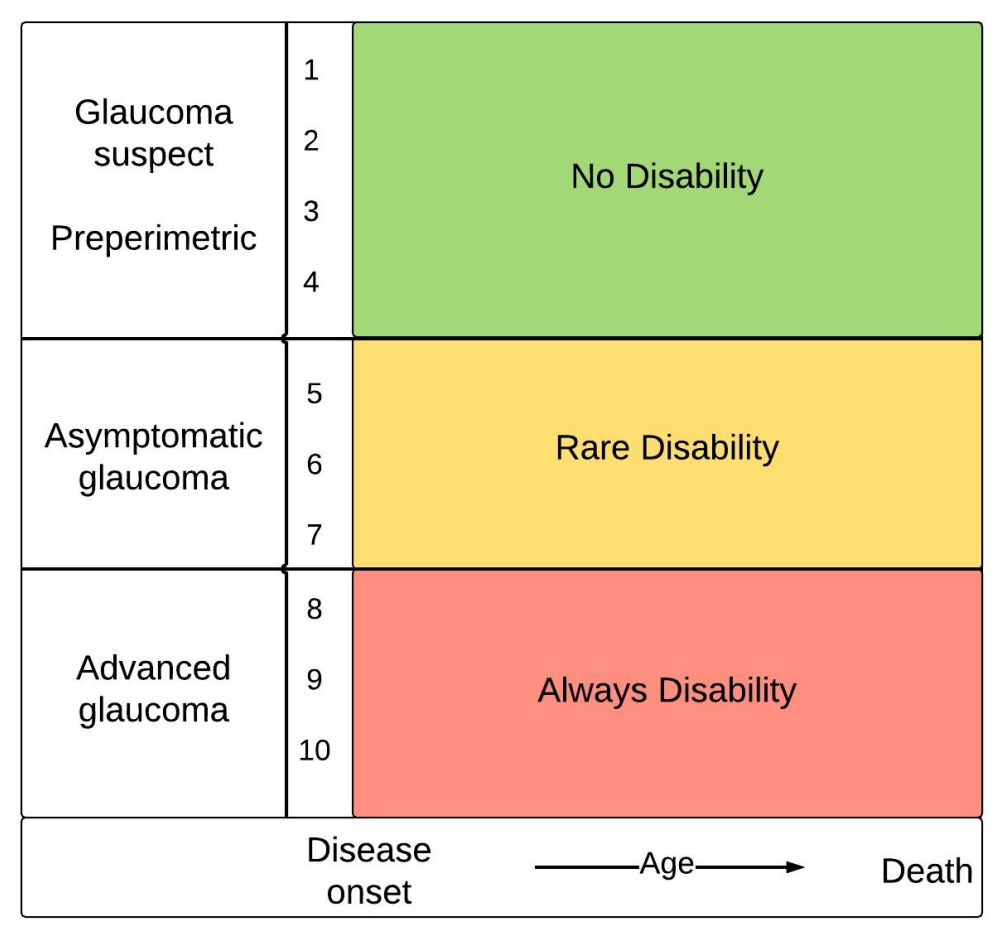
Pre-perimetric glaucoma	Low twenties
Mild glaucoma	High teens
Moderate	Mid teens
Advanced	Low teens
Fixation threatened	High single digits

Chandler and Grant's Glaucoma, 4th ed. 1997

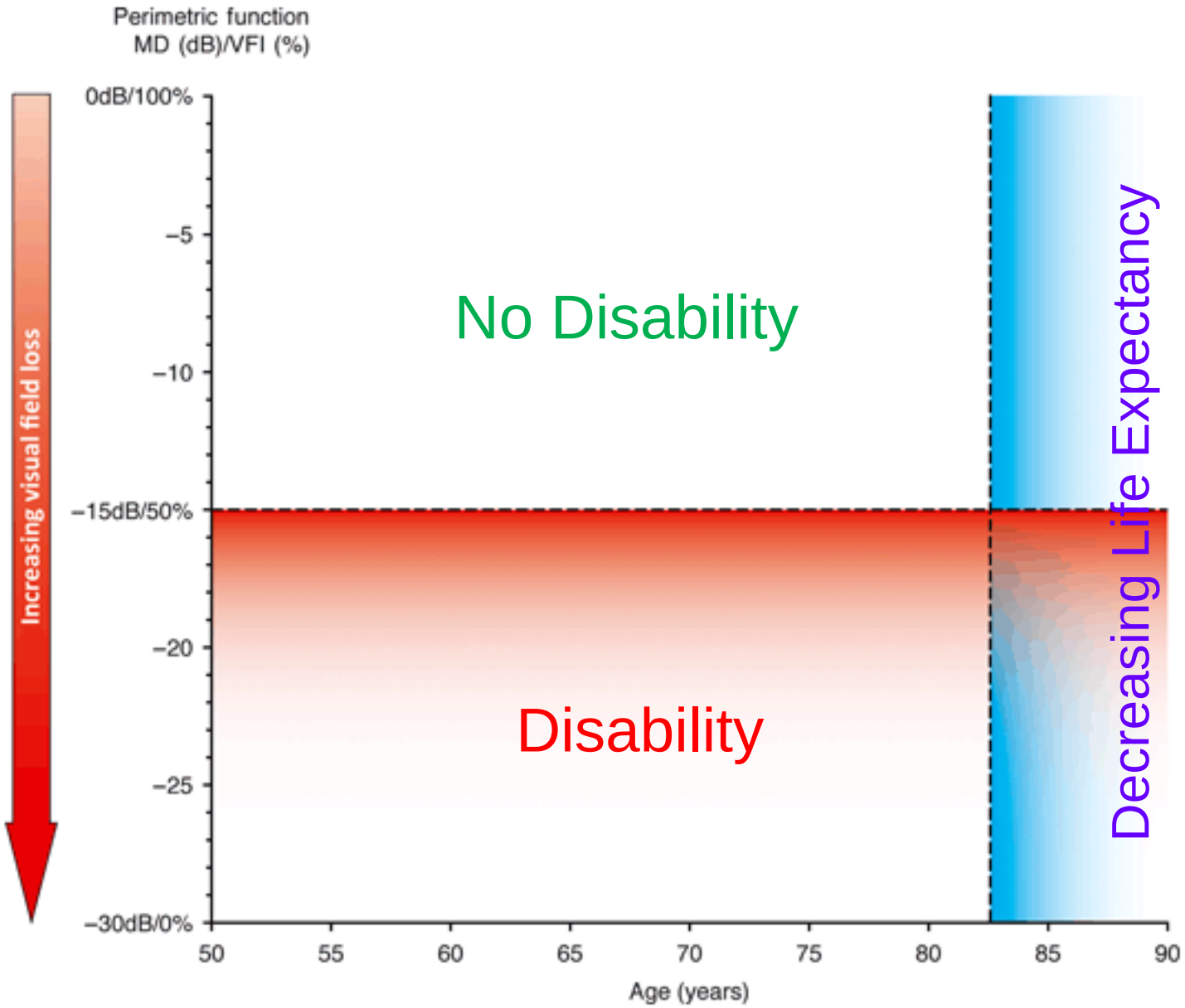
Setting a target pressure

The Glaucoma Graph:

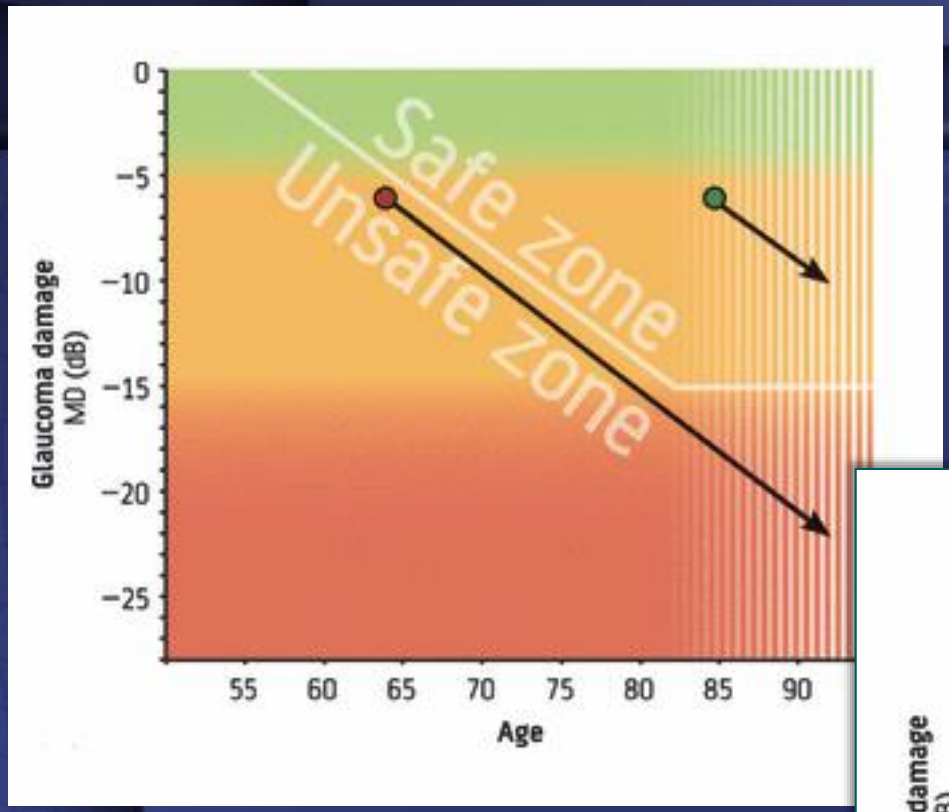
Balancing Life and IOP



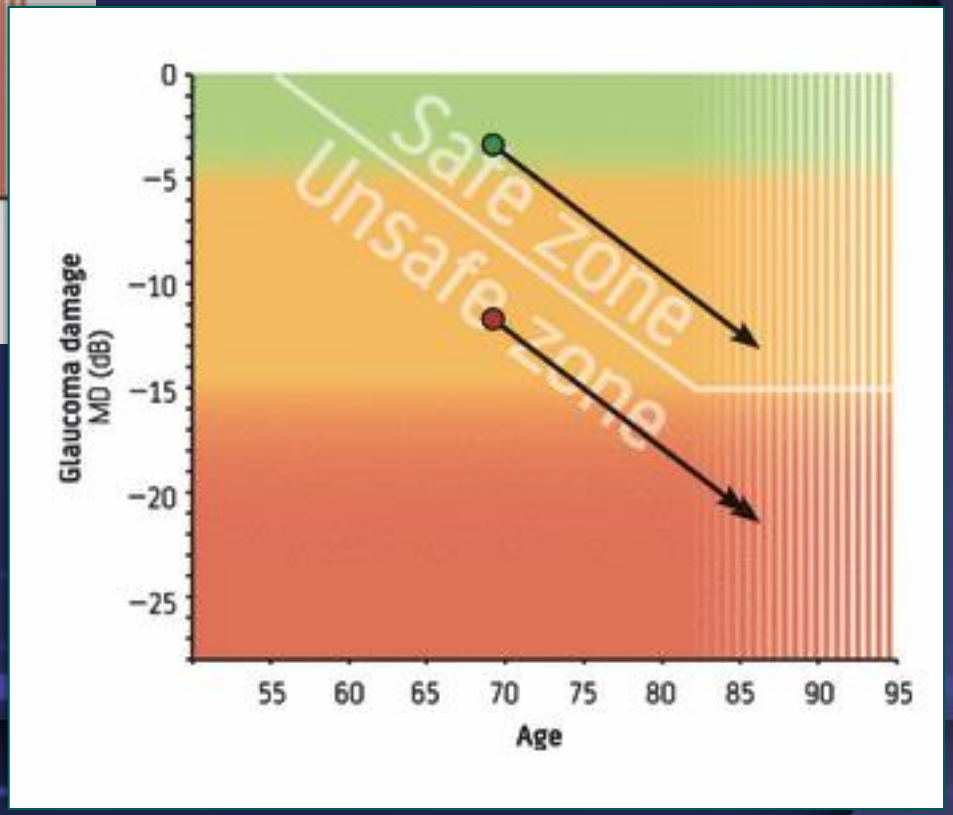
Source: J Curr Glaucoma Pract 2010;4:83-92



Source: Acta Ophthalmol. 2013:91:92-99



Initial target pressure can be based upon where they sit on the Glaucoma Graph, then refined once rate of progression is known



In general, treat younger patients and more advanced glaucoma more aggressively

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7. Maximize Patient Compliance

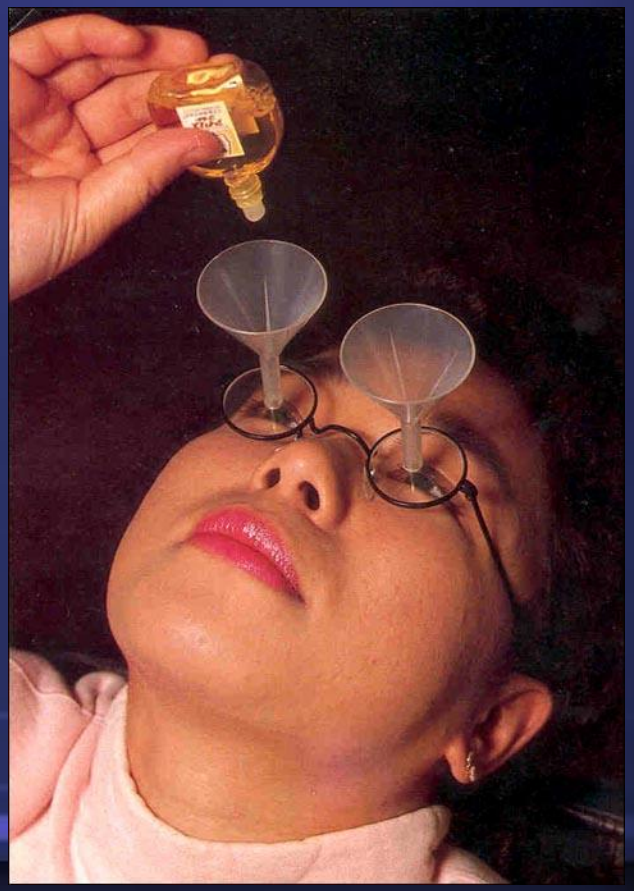
Maximize patient compliance

- The problem…
  - Patients are less compliant than they claim
  - Persistence with glaucoma treatment varies from 20% to 64% at 1 year
  - 20% of glaucoma pts do not return for care

Source: Arch Ophthalmol 2005;123:1134-1135

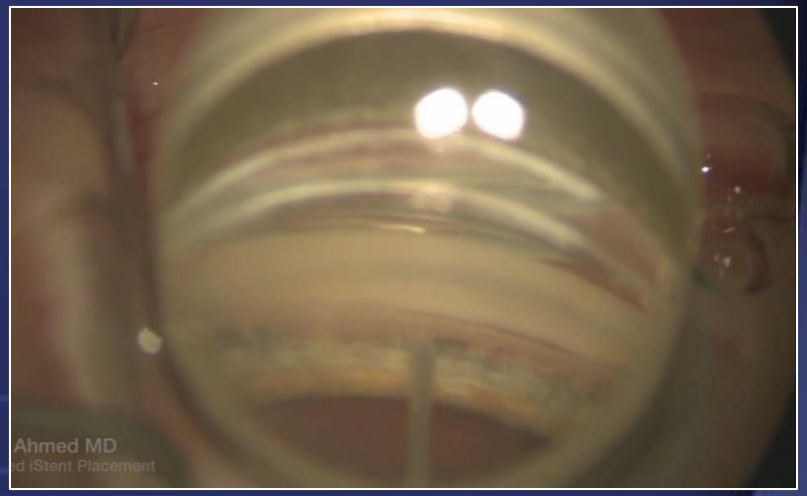
Maximize patient compliance

- Steps to improve compliance
  - Effective communication
  - Educate patients about their disease
  - Inquire about compliance at every visit (*"How frequently do you forget?"*)
  - Family support
  - Simplify dosing
  - Give instructions in writing
  - Cell phone alarms
  - Address side effects

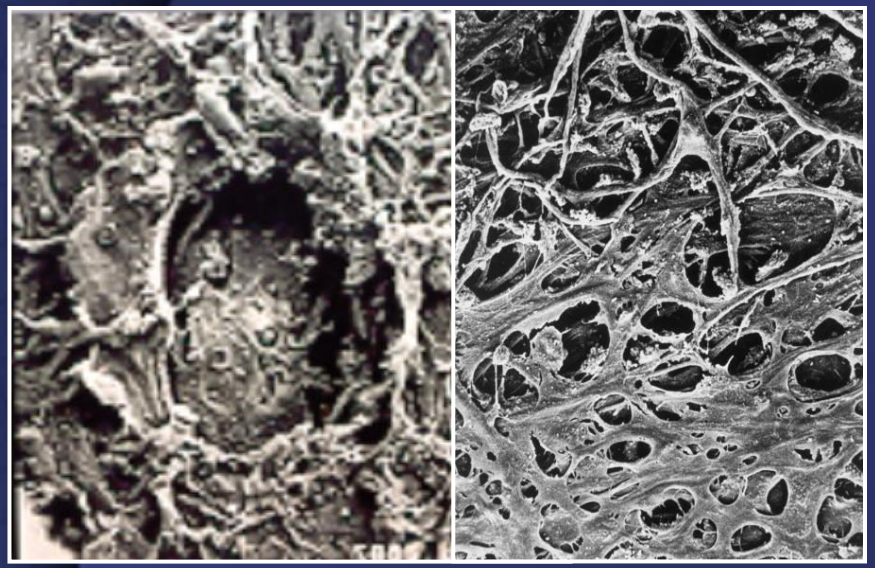


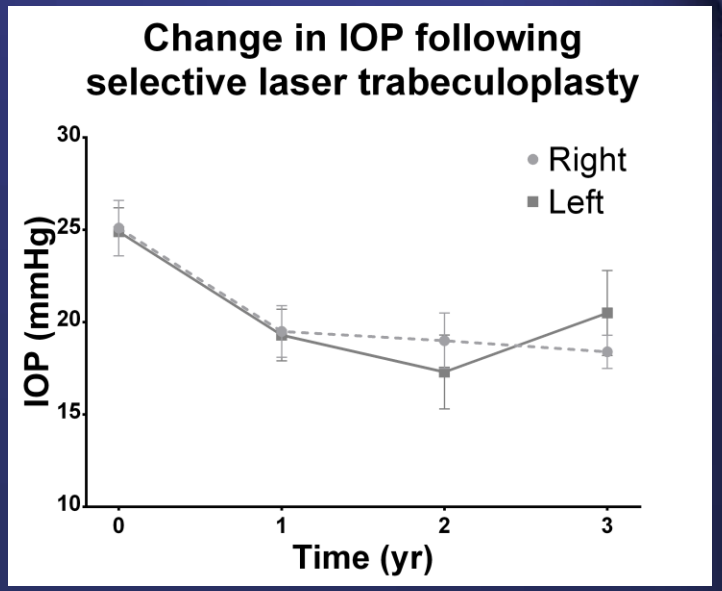
Maximize patient compliance

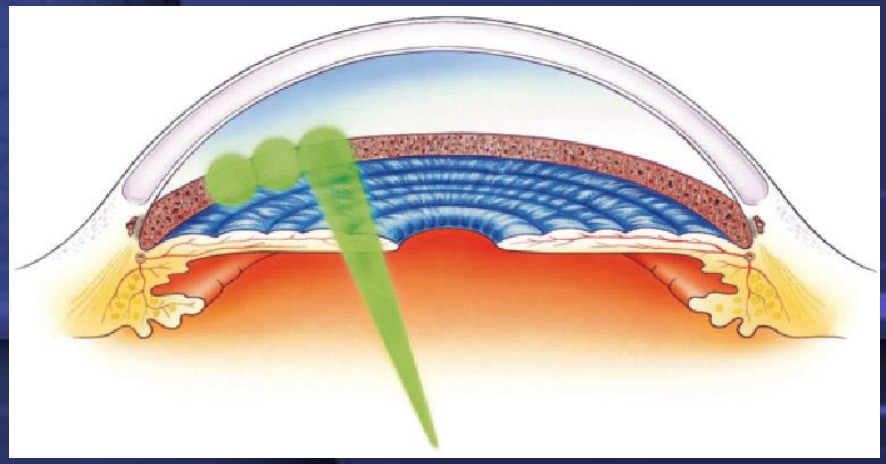
- Alternatives to topical therapy for mild to moderate glaucoma
  - Selective laser trabeculoplasty
  - Minimally Invasive Glaucoma Surgery (MIGS)
- IOP-lowering effect similar to one topical agent without compliance issues



Selective Laser Trabeculoplasty







ORIGINAL STUDY

Transscleral Selective Laser Trabeculoplasty Without a Gonioscopy Lens

Noa Geffen, MD,†‡ Shay Ofir, MD,*† Avner Belkin, MD,*† Fani Segev, MD,*† Yaniv Barkana, MD,†§ Audrey Kaplan Messas, MD,†§ Ehud I. Assia, MD,*†‡ and Michael Belkin, MD†‖*

Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LiGHT): a multicentre randomised controlled trial

*Gus Gazzard, Evgenia Konstantakopoulou, David Garway-Heath, Anurag Garg, Victoria Vickerstaff, Rachael Hunter, Gareth Ambler, Catey Bunce, Richard Wormald, Neil Nathwani, Keith Barton, Gary Rubin, Marta Buszewicz, on behalf of the LiGHT Trial Study Group**

	MEDS FIRST	LASER FIRST	
Visits @ Target IOP	91.3%	93.0%	P = 0.04
Progression (all)	36 (5.8%)	23 (3.8%)	P = 0.05
Cataract Extraction	25 (4%)	13 (2.1%)	P = 0.05
Trabeculectomy	11 (1.8%)	0	P = 0.001
Treatment Escalations	348	299	

"Laser-first gave drop-free disease control at stringent target IOPs, lower trabeculectomy rates, less glaucoma progression, and lower cost"

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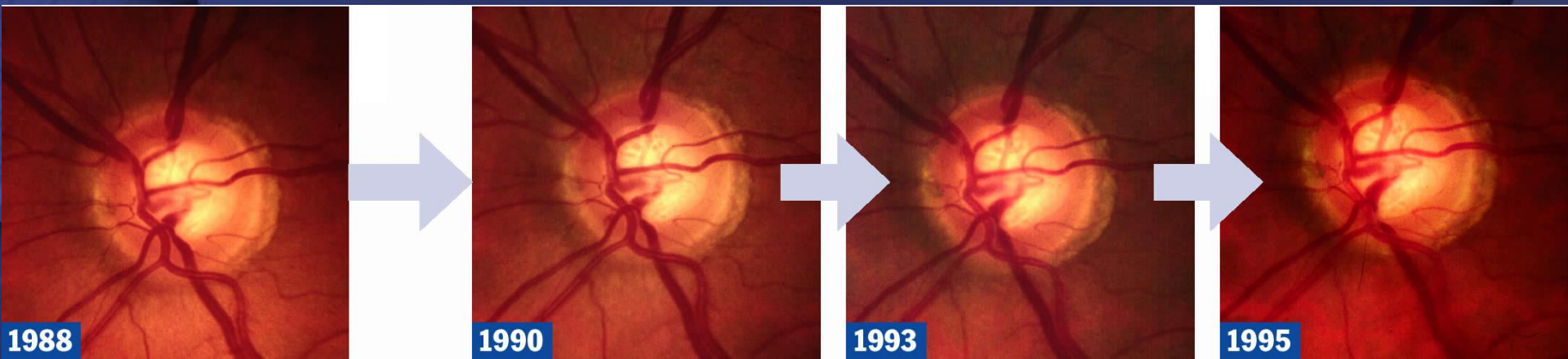
7. Maximize Patient Compliance
8. Confirming Progression

Confirming Progression

- Reliably detecting progression is more challenging than detecting presence of disease
- The best tool for detecting progression is adequate baseline data
  - OCT and/or disc photos
  - Multiple visual fields (Recommend five)
  - Untreated baseline IOP

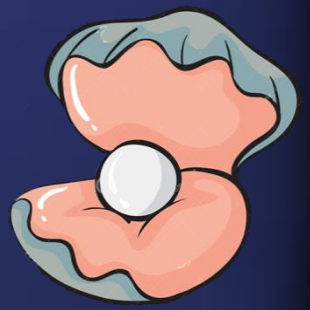
Confirming Progression

- Optic Disc Changes
  - Sequential disc photos: Subjective, significant inter-observer variability
  - **Sequential OCT**: Must be on same instrument! Highly reproducible. Can detect progression prior to VF loss



Confirming Progression

- Visual Field Changes
  - Extreme variability of VF requires caution in assessing possible progression
  - **Never change therapy on the basis of a single bad visual field**
  - Use of a statistical software package rather than “eyeballing” approach is highly recommended



Confirming Progression

- VF Changes
  - 78% - deepening of existing scotoma
  - 52% - enlargement of an existing scotoma
  - 49% - new scotomas

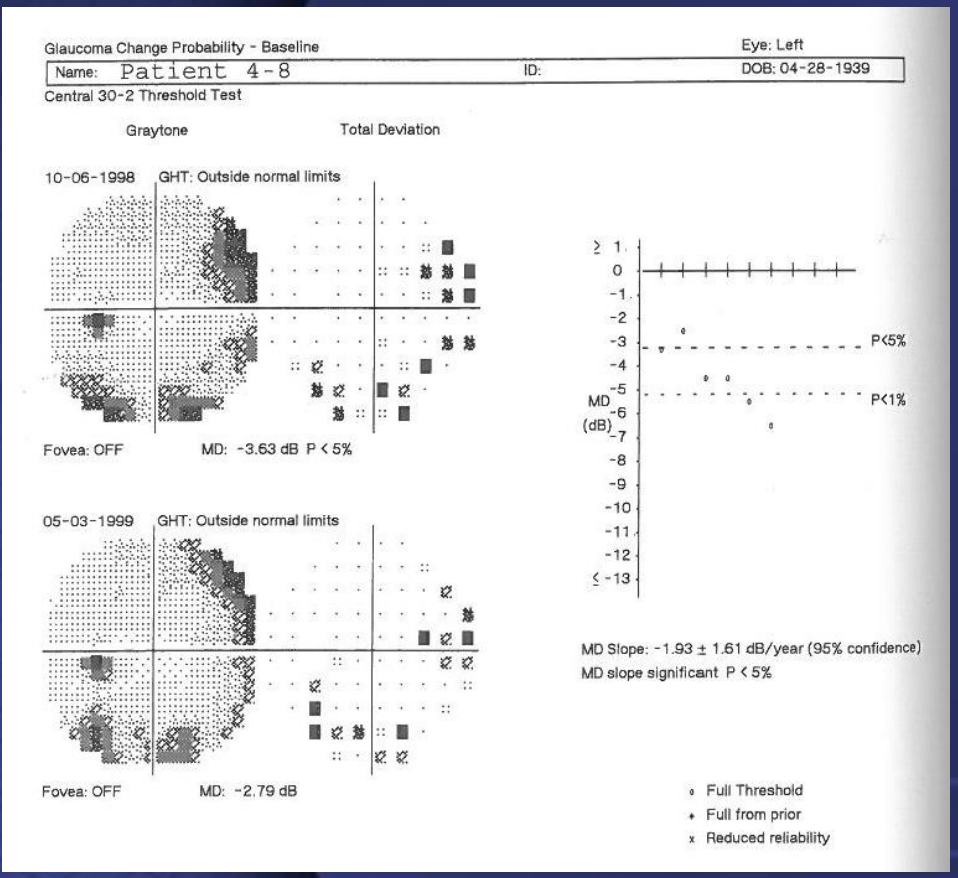
TABLE 4-4. Guidelines for Recognizing Progression

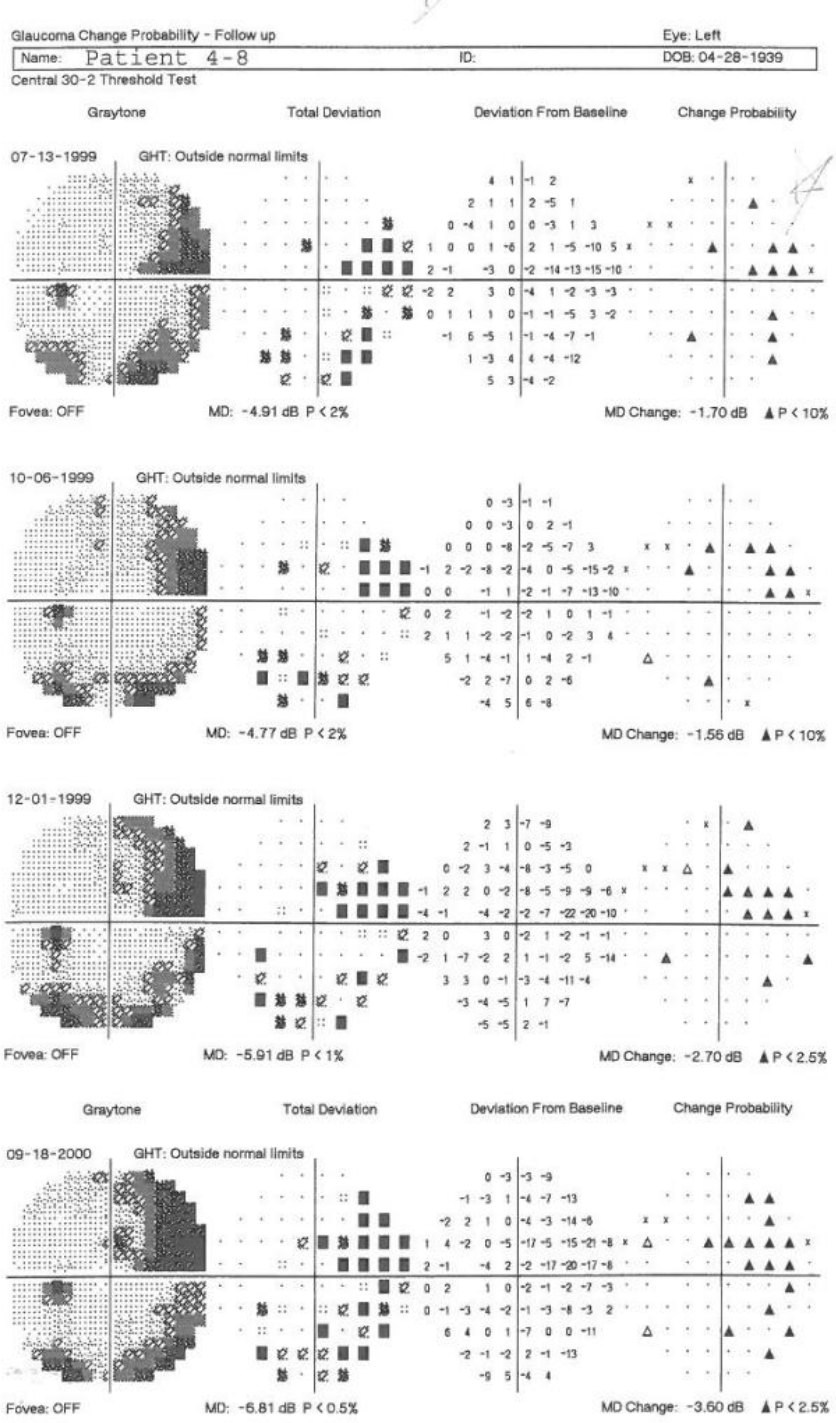
New defect in previously normal region: cluster of 3 points worsening by 5 dB each, 1 of which has worsened by 10 dB
Previously abnormal region has deepened if: 3 or more points have deteriorated by 10 dB each
Previously abnormal region has widened if: 2 or more new contiguous points are involved

Note: *This scheme requires reliable fields.In general, progression should be confirmed on a subsequent field or fields. See text.*

Adapted with permission from Anderson DR: Automated Static Perimetry. St Louis: *Masby–Year Book*;1992:208–211.

Glaucoma Progression Analysis (GPA)



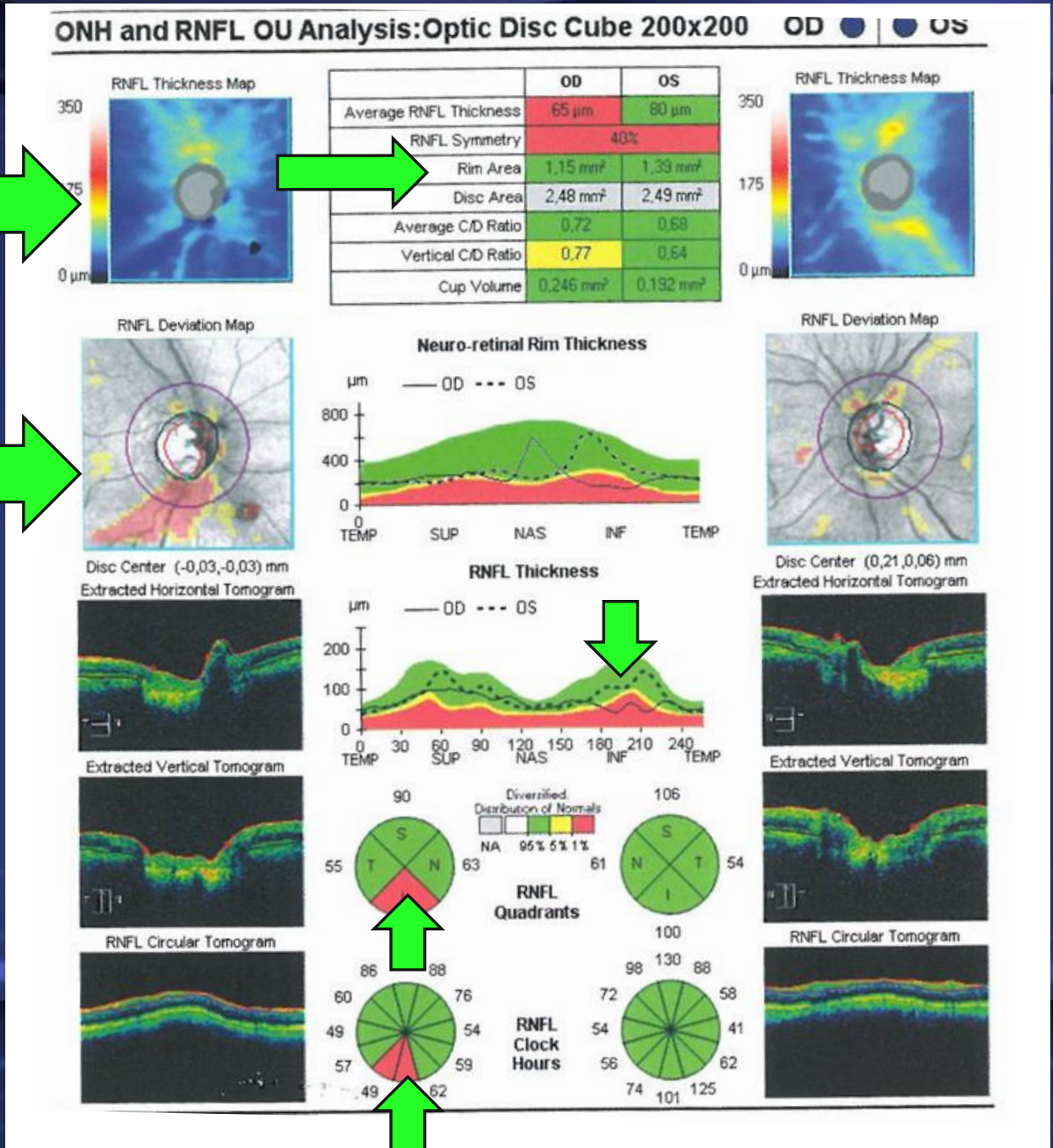


△ P < 5% Better
▲ P < 5% Worse
x Not in database

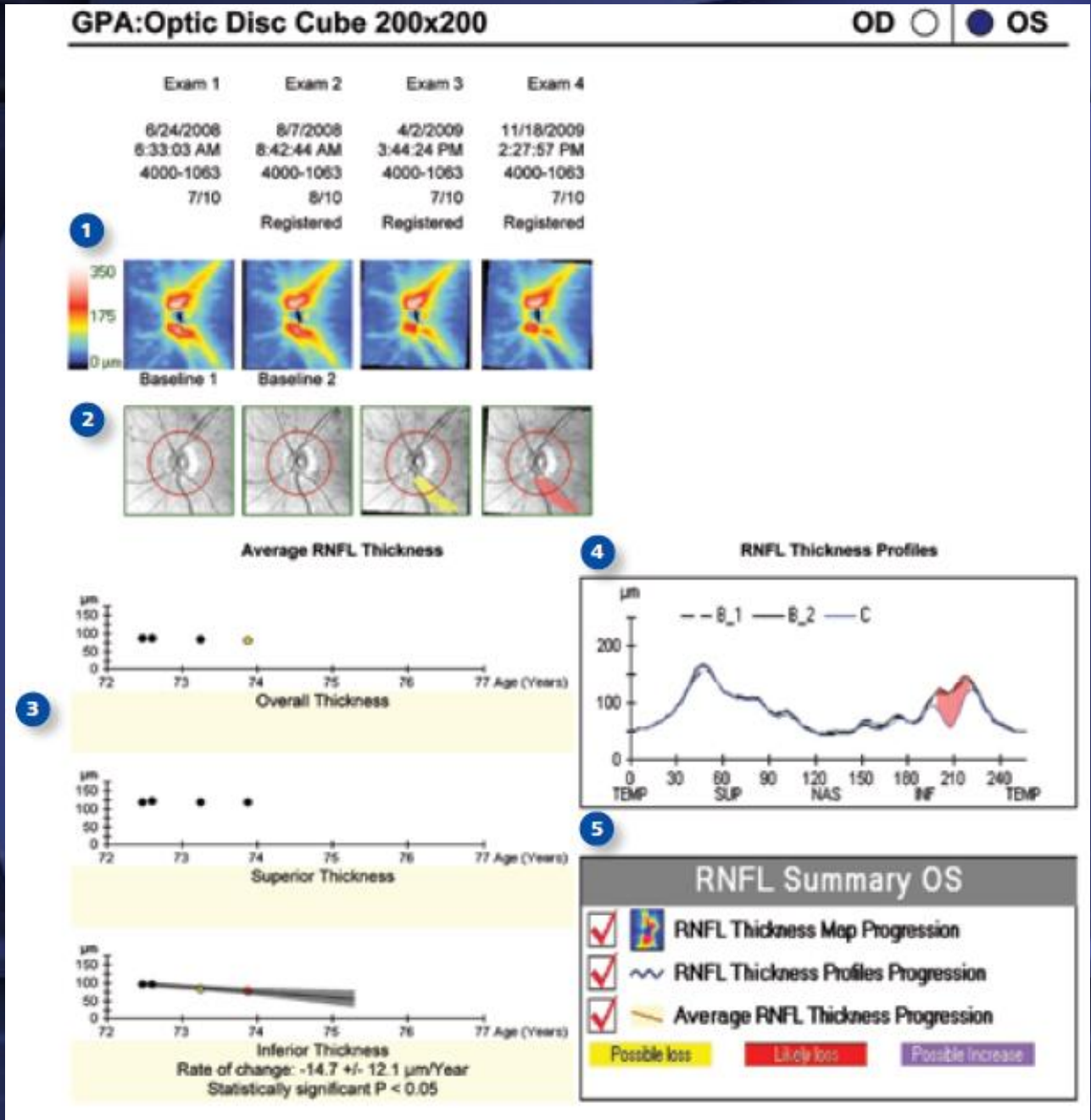
Confirming Progression

- **SD-OCT**
  - Provides reproducible measurements of the RNFL
  - Objective measure of structural progression
  - Detect progression in eyes with pre-perimetric glaucoma

Confirming Progression



Confirming Progression



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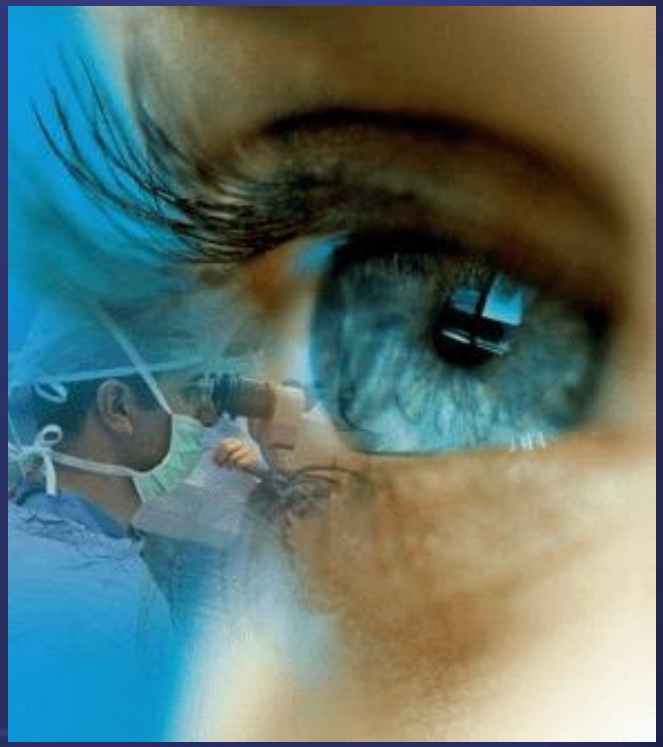
9. “What can I do to help control my glaucoma?”

Self-Care of Glaucoma

- What can I do to help control my glaucoma?
  - Full medical compliance
  - Engage in regular exercise
  - Control comorbid disease
    - CVD, sleep apnea
    - Quit smoking
  - Diet and supplements
    - Antioxidants, statins, ginko, caffeine, omega-3
  - Self-tonometry (iCare)
  - Self-perimetry (Damato)
  - Medical marijuana



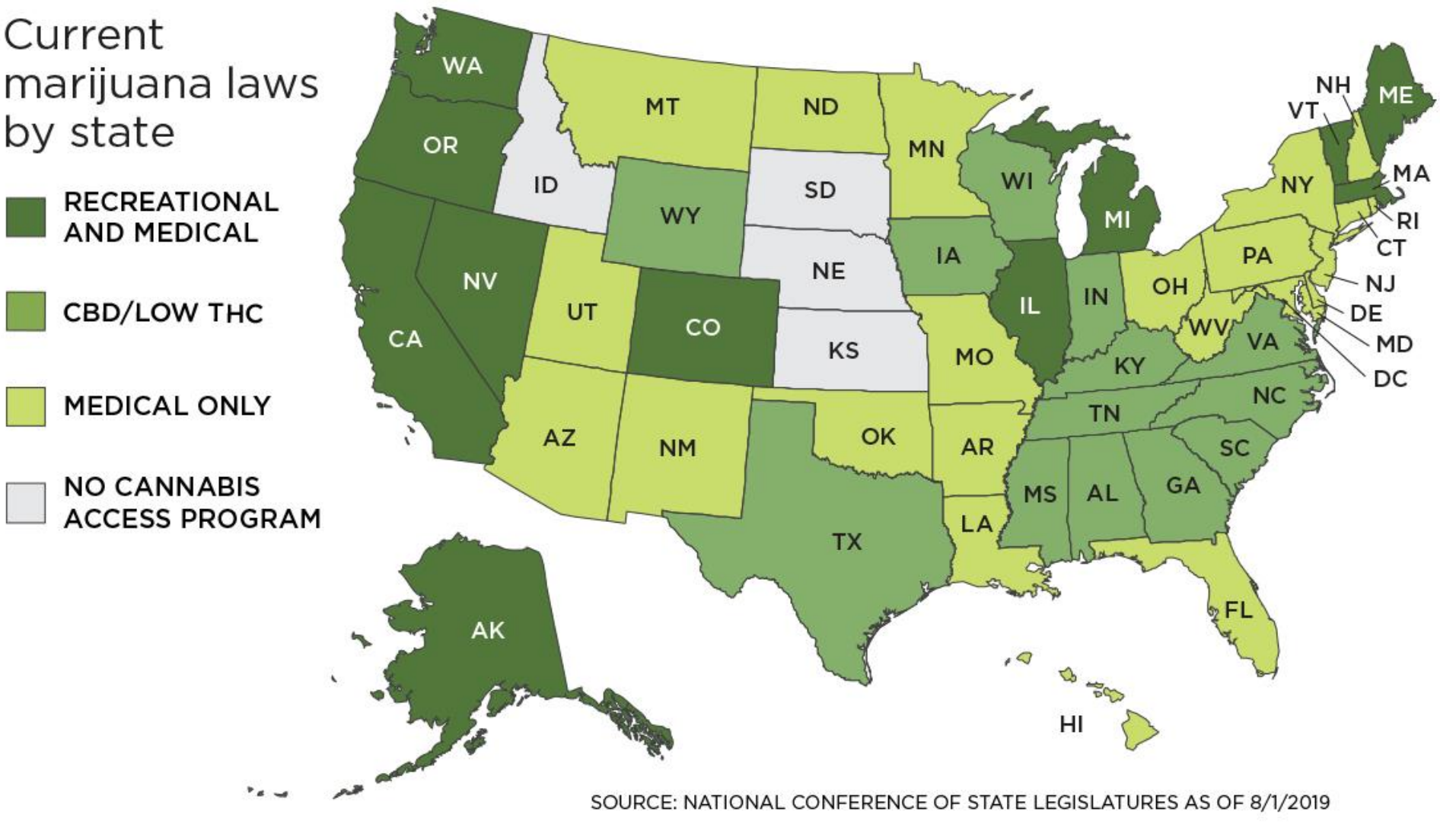
Source: Arch Ophthalmol 1991;109:1096-1098

GLAUCOMA

Elvy Musikka, one of six people receiving medical cannabis (for glaucoma) from the federal government and representative for those deprived. Elvy is holding a month's supply of marijuana provided to her by the federal government.

" I have dedicated my life to the eradication of what I believe is our greatest enemy—ignorance!"

AMERICANS FOR MEDICAL RELIEF



	Recreational	Medical	CBD	No Access
# States	11	22	13	4


CANADA
OCTOBER 17 · 2018

EDITORIAL

American Glaucoma Society Position Statement: Marijuana and the Treatment of Glaucoma

Henry Jampel, MD, MHS

Glaucoma is a disease of the optic nerve that can result in vision loss and blindness. Although many factors, some only partially understood, contribute to the optic nerve damage in glaucoma patients, it has been definitively established that the level of intraocular pressure (IOP) is related to the presence of damage,[1] and that treatments that lower IOP reduce the risk of developing initial damage,[2] and slow the progression of preexisting damage.[3] Therefore, the mainstay of treatment for glaucoma patients is lowering the IOP.

… there is no scientific basis for use of these agents in the treatment of glaucoma.

Source: J Glaucoma 2010;19:75-76

EDITORIAL

Canadian Op
Society policy
medical use o
glaucoma

Can J Ophthalmol 2010;45:324–
doi:10.3129/i10-069

EDITORIAL

Medical use of cannabis for glaucoma

The clinical utility of cannabis (sometimes referred to as marijuana or marihuana) for the treatment of glaucoma is limited by the inability to separate the potential clinical action from the undesirable neuropsychological and behavioural effects. The Canadian Ophthalmological Society does not support the medical use of cannabis for the treatment of glaucoma due to the short duration of action, the incidence of undesirable psychotropic and other systemic side effects, and the

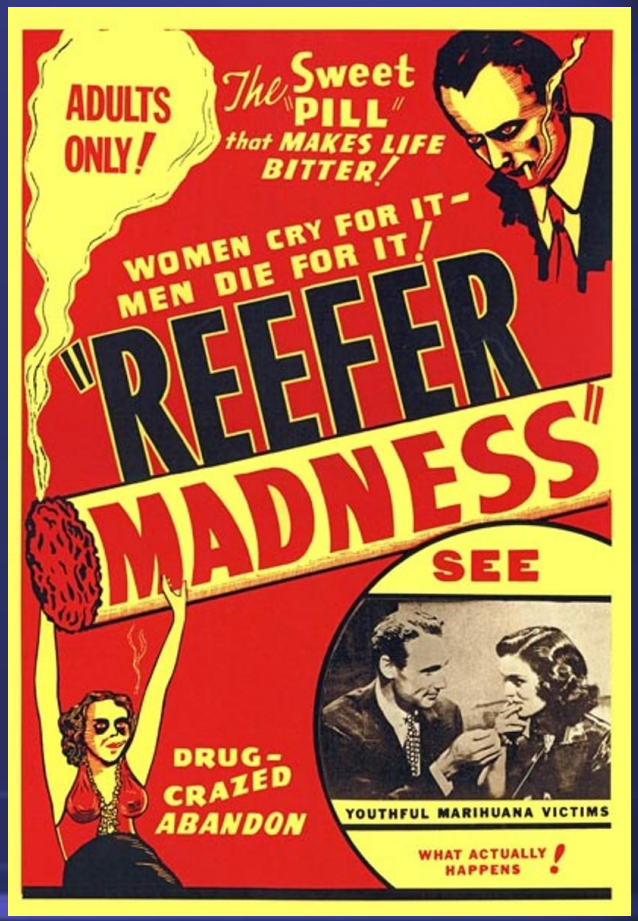
Can J Ophthalmol 2019;54:7-9

"The Canadian Ophthalmological Society does not support the medical use of marijuana for the treatment of glaucoma…"

Self-Care of Glaucoma

Cannabis & Glaucoma

- Average 25% reduction of IOP lasting 3-4 hrs
- IOP effect seen in 60-65% of population
- Role in neuroprotection?
- Unsuccessful to date in separation of IOP from psychotropic effects



Source: Arch Ophthalmol 1998;116:1433-1437

Self-Care of Glaucoma

Cannabis & Glaucoma

- Side effects with systemic administration (psychotropic, low BP, hormonal)
- Smoking associated with emphysema-like lung changes
- Topical not yet effective (low water solubility)

Source: Arch Ophthalmol 1998;116:1433-1437

Self Care of Glaucoma

Glaucoma

Δ^9-Tetrahydrocannabinol and Cannabidiol Differentially Regulate Intraocular Pressure

Sally Miller, Laura Daily, Emma Leishman, Heather Bradshaw, and Alex Straiker

The Gill Center for Biomolecular Science and the Department of Psychological and Brain Sciences, Indiana University, Bloomington, Indiana, United States

"We conclude that THC lowers IOP by activating two receptors—CB 1 and GPR18—but in a sex-dependent manner. CBD, contrary to expectation, has two opposing effects on IOP and can interfere with the effects of THC."

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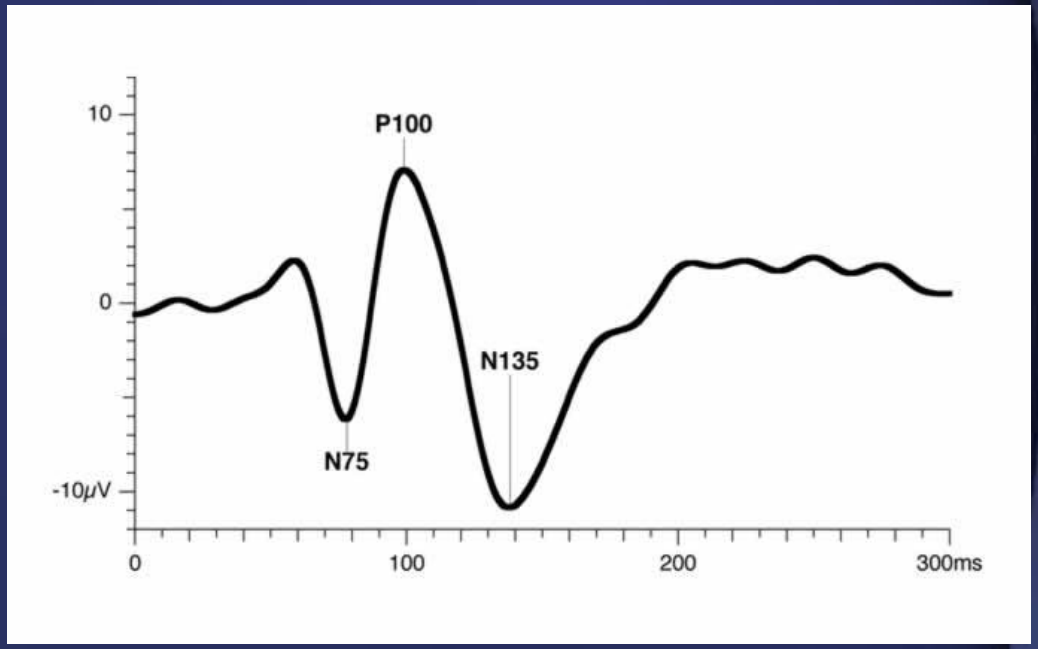
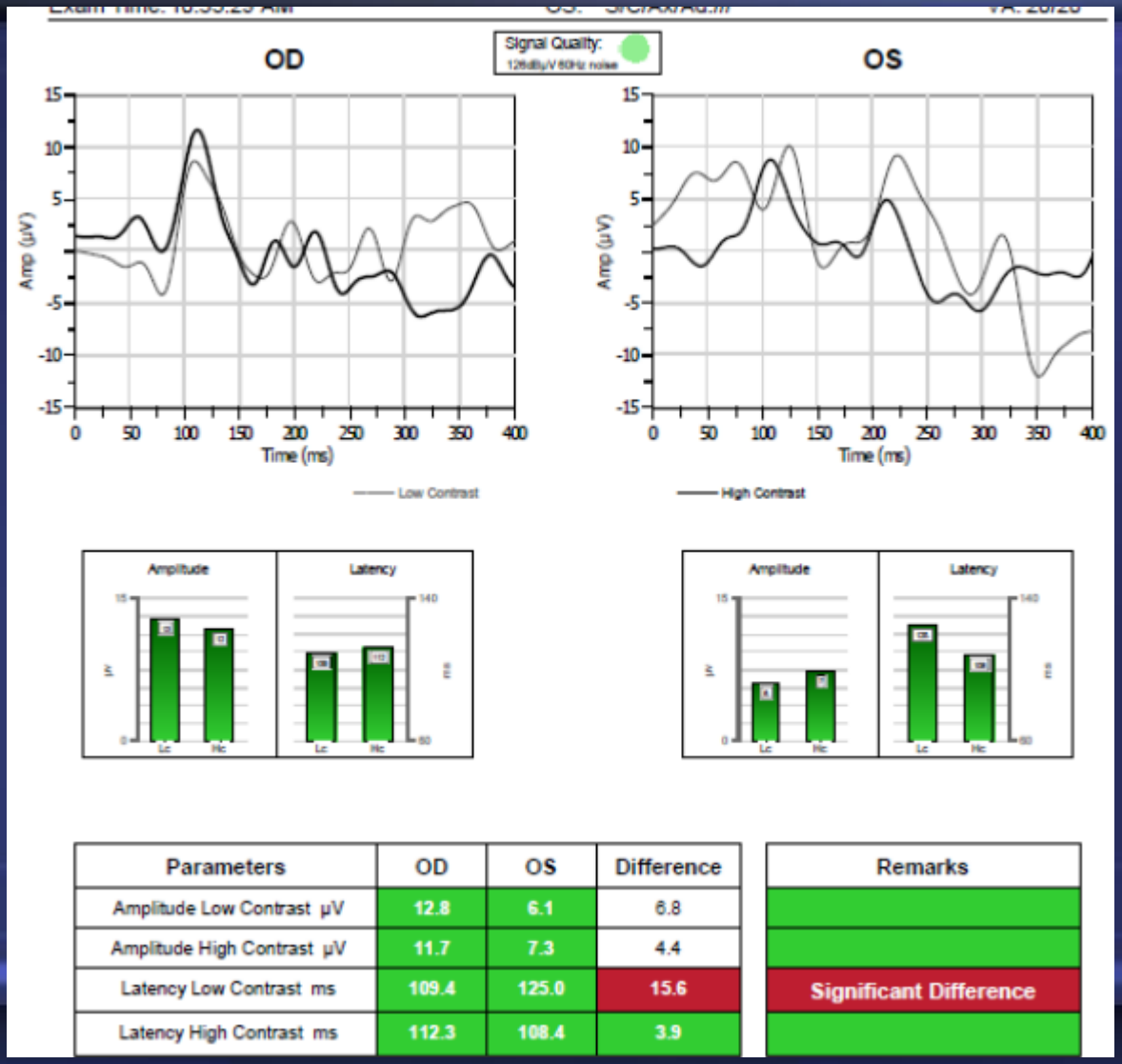
7. Maximize Patient Compliance
8. Confirming Progression
9. “What can I do to help control my glaucoma?”
10. The Future of Glaucoma Care

The Future of Glaucoma Care

Diopsys NOVA-LX VEP



The Future of Glaucoma Care



Parameters	OD	OS	Difference	Remarks
Amplitude Low Contrast µV	12.8	6.1	6.8	
Amplitude High Contrast µV	11.7	7.3	4.4	
Latency Low Contrast ms	109.4	125.0	15.6	Significant Difference
Latency High Contrast ms	112.3	108.4	3.9	

DIOPSYS®

Advancing the Science of Vision Testing

Clinical Utility of Short Duration Transient Visual Evoked Potential (SD-tVEP) Pathologic Indicators in Chronic Glaucoma

- William E. Sponsel[1,2], Richard Trevino[2], Carolyn Majcher[2], Sylvia Groth[3], Joseph Allen[2]
- [1]Baptist Medical Center Glaucoma Service, San Antonio, TX
- [2]Rosenberg School of Optometry, UIW, San Antonio, TX
- [3]University of North Carolina Ophthalmology, Chapel Hill, NC

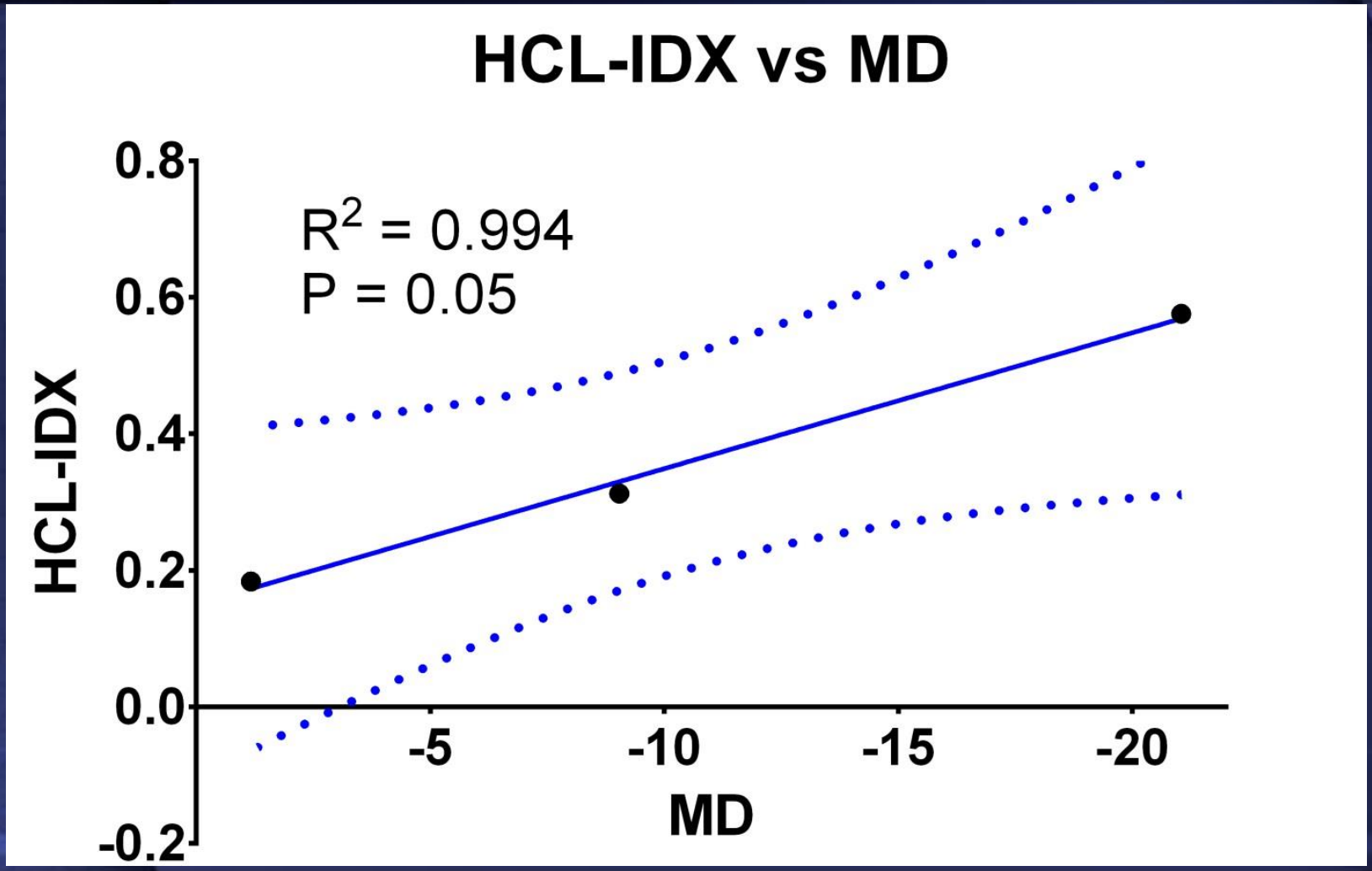
This study adds to a growing body of evidence that SD-tVEP offers a rapid and objective means to screen for and assess damage in glaucomatous eyes.

The Future of Glaucoma Care

VEP LATENCY DEFICITS (% with standard error)

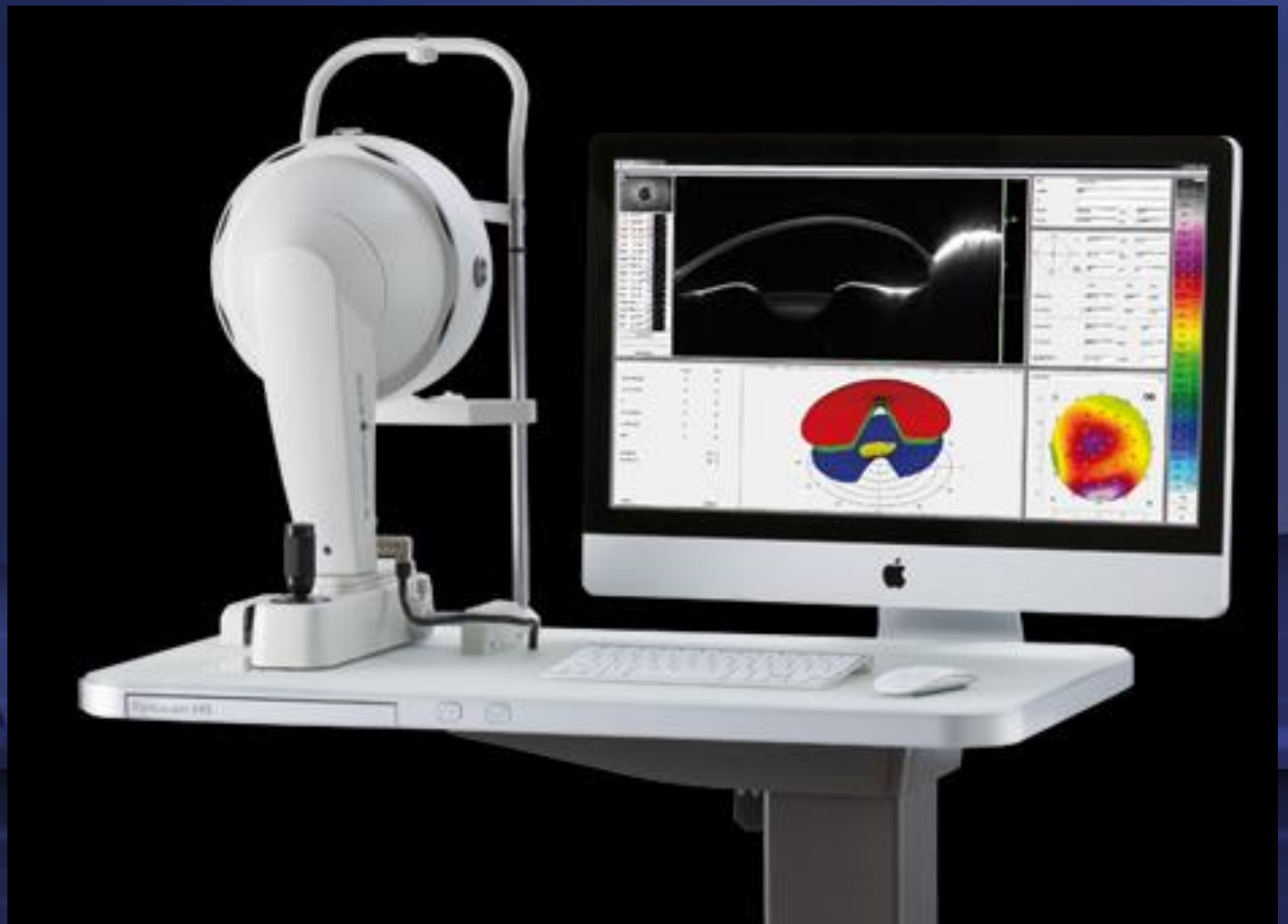
	MILD	MODERATE	SEVERE	R^2	p
Hc	18.4±5.6	31.3±12.0	57.6±8.8	0.994	0.05
Lc	12.2±4.7	18.8±10.1	33.3±8.3	0.991	0.06

The Future of Glaucoma Care



The Future of Glaucoma Care

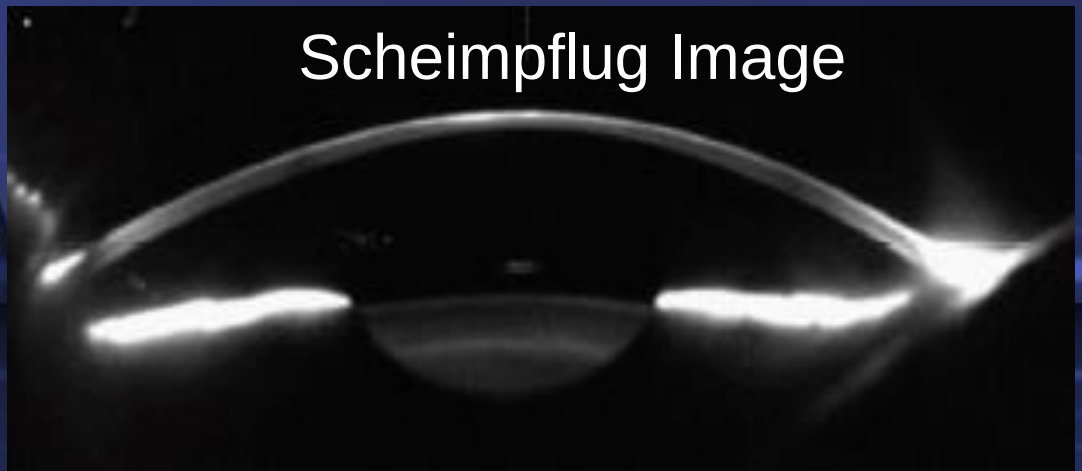
OCULUS

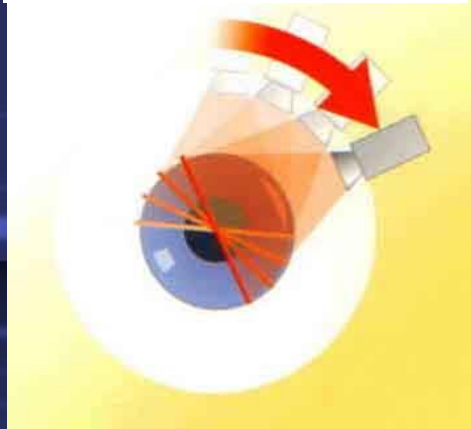


The Future of Glaucoma Care

How it works

- Combination of a slit illumination system and a camera that rotate around the eye to create a series of radial, cross sectional images (Scheimpflug images)

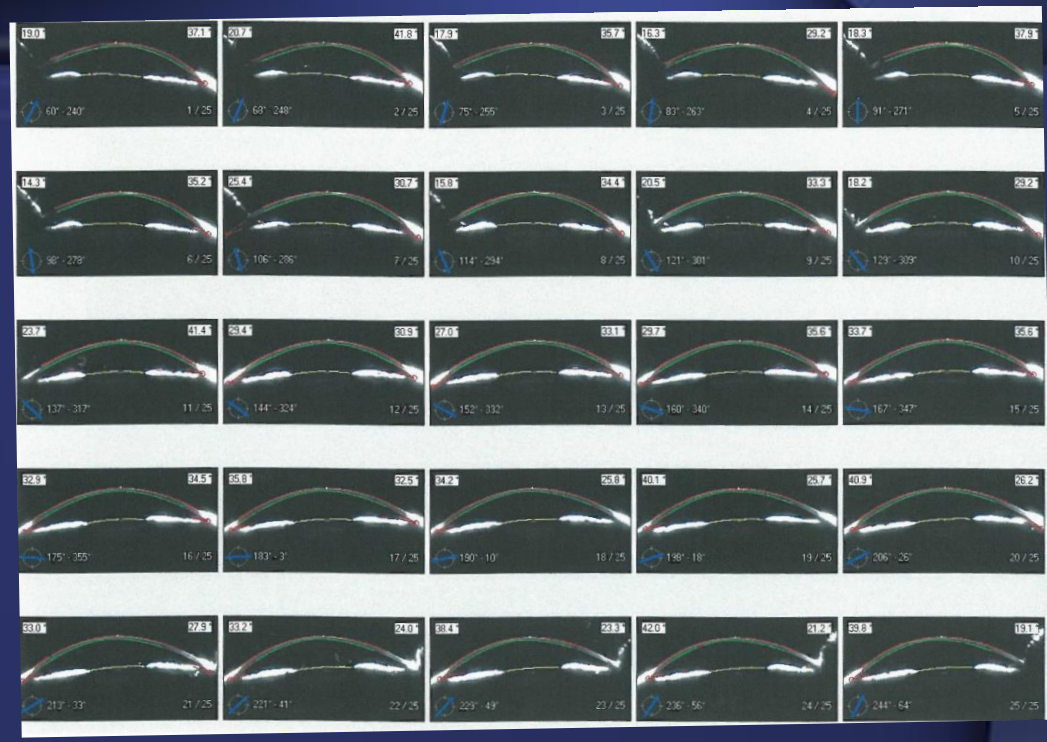


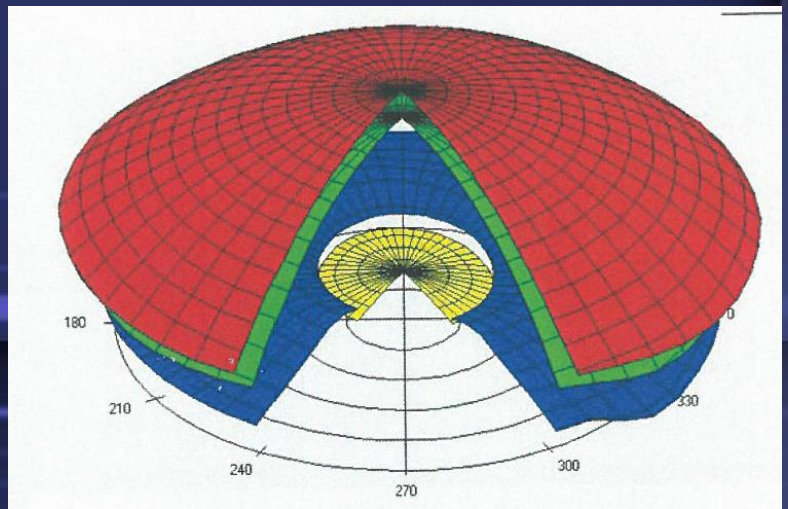


The Future of Glaucoma Care

How it works

- The Scheimpflug images (25-100) are combined to generate a 3D model of the eye from the cornea to the posterior surface of the lens

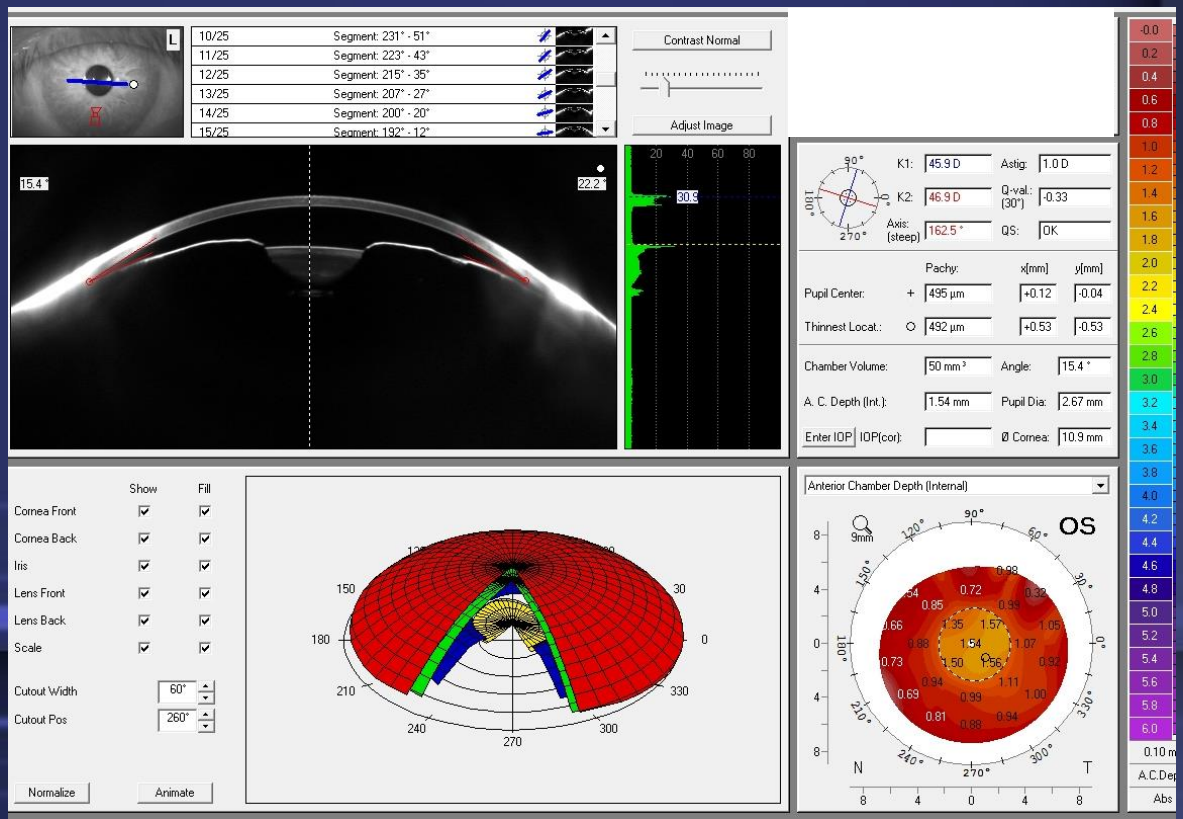




The Future of Glaucoma Care

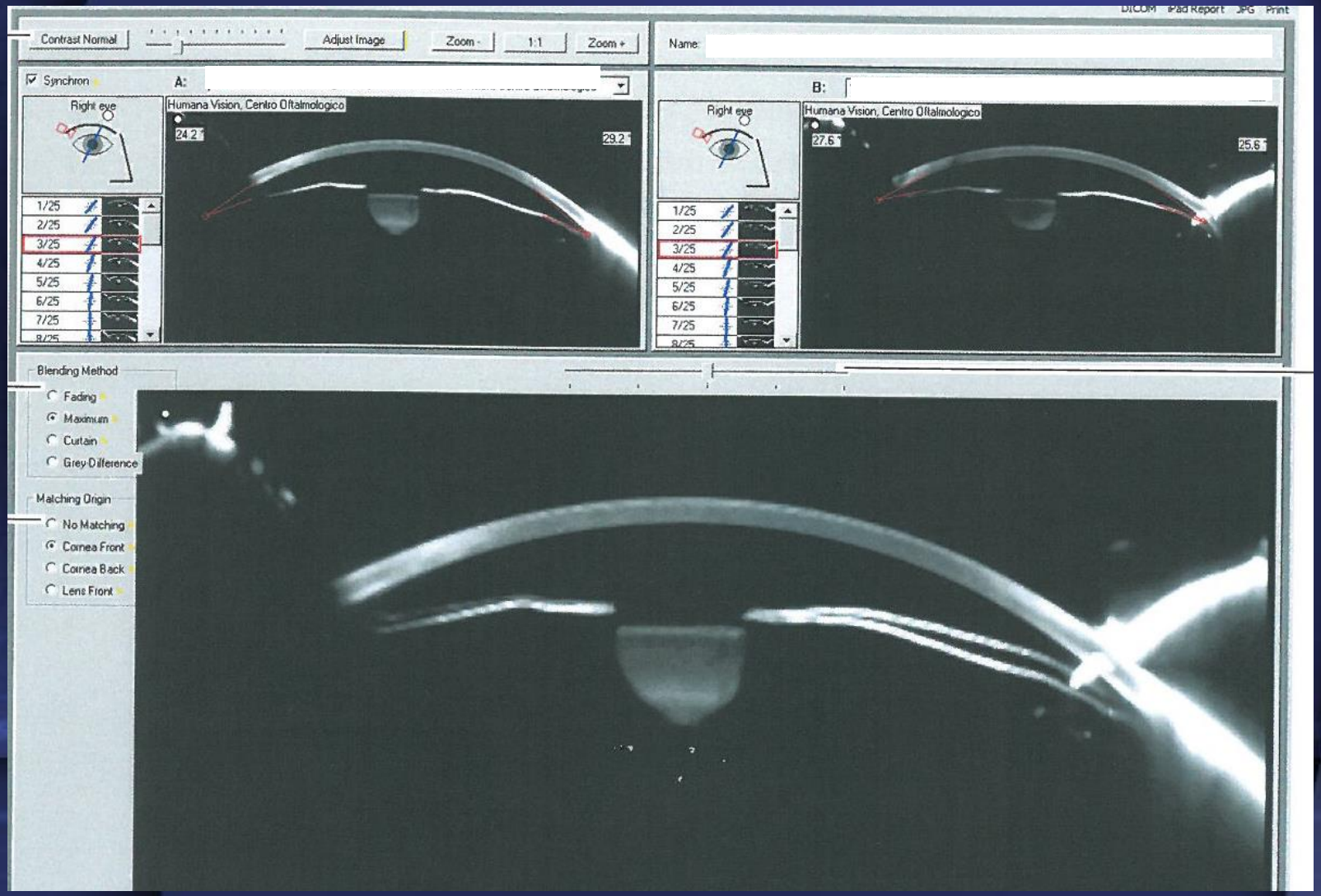
Biometric parameters associated with PACG:

- flatter cornea
- thicker lens
- shallow ACD
- narrow AC angles
- less ACV



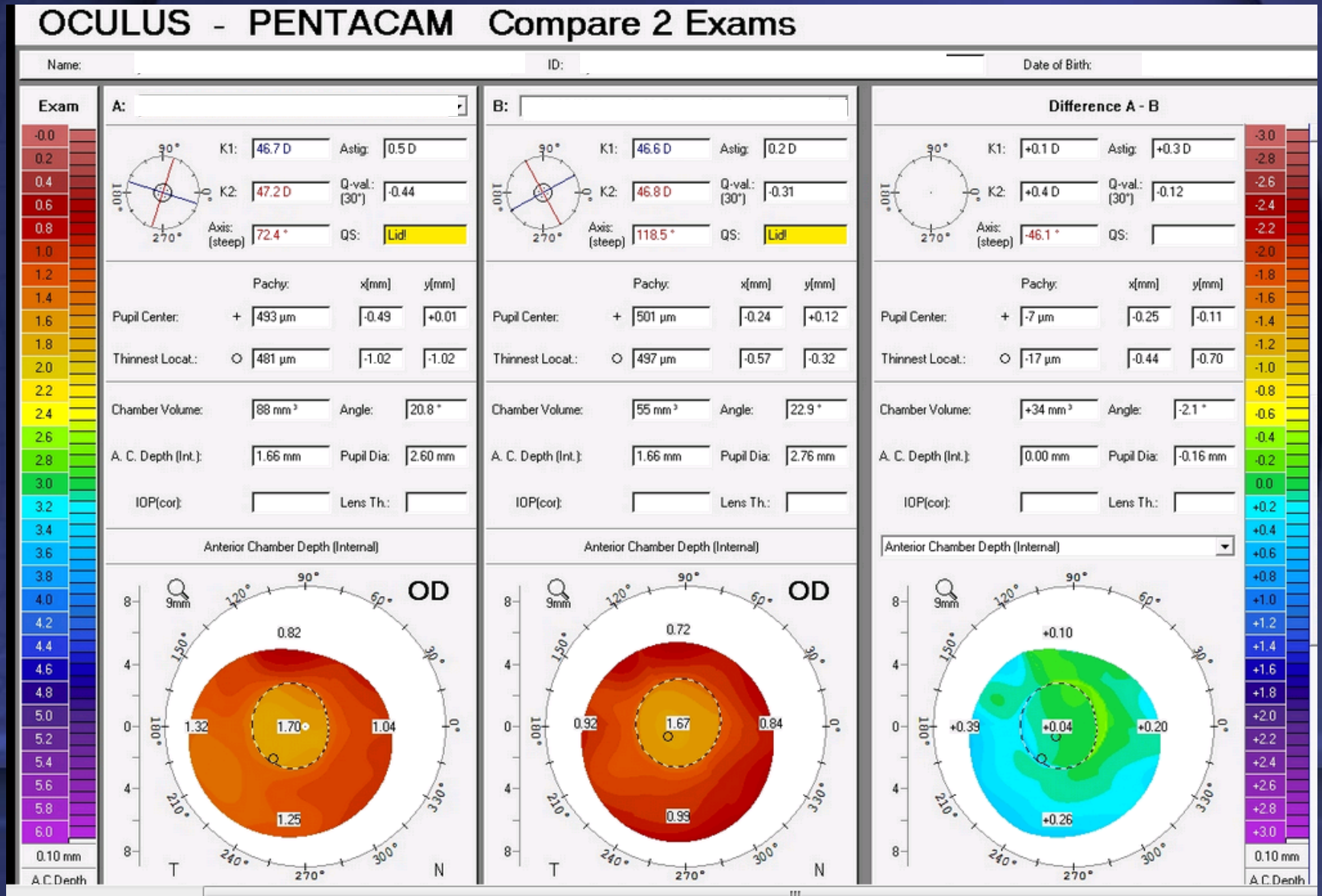
The Future of Glaucoma Care

Pre and post-op LPI



The Future of Glaucoma Care

Pre and post-op LPI



Ten Steps to Better Glaucoma Care

1. Master the Art of Tonometry
2. Gonioscopy is Fundamental
3. Examine the Rim, Not the Cup
4. Is it *Really* Glaucoma?
5. Establishing the Baseline
6. Setting a Target Pressure
7. Maximize Patient Compliance
8. Confirming Progression
9. “What can I do to help control my glaucoma?”
10. The Future of Glaucoma Care

Ten Steps to Better Glaucoma Care

Thank You!

Artist: Patrick Saine