

# YOUR PATIENT HAS GLAUCOMA... NOW WHAT?



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NO FINANCIAL DISCLOSURES.

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# OBLIGATORY STATISTICS


- WORLDWIDE
  - 76 MILLION WITH GLAUCOMA (ACG /OAG)
  - ACG / OAG SECOND LEADING CAUSE OF BLINDNESS
  - PREVALENCE OF POAG
    - > 40 YO 3.05 % IN 2013
    - **UP FROM PRIOR 2%**
    - 52.7 MILLION IN 2020
    - EXPECT 79.8 MILLION IN 2040
- UNITED STATES
  - 3.36 MILLION WITH OAG 2020
    - EXPECTED TO BE 7 MILLION IN 30 YEARS
  - **50% WITH ONH DAMAGE ARE *UNAWARE***



You could have **GLAUCOMA** and not know it.

Make a resolution to find out. Schedule a dilated eye exam.

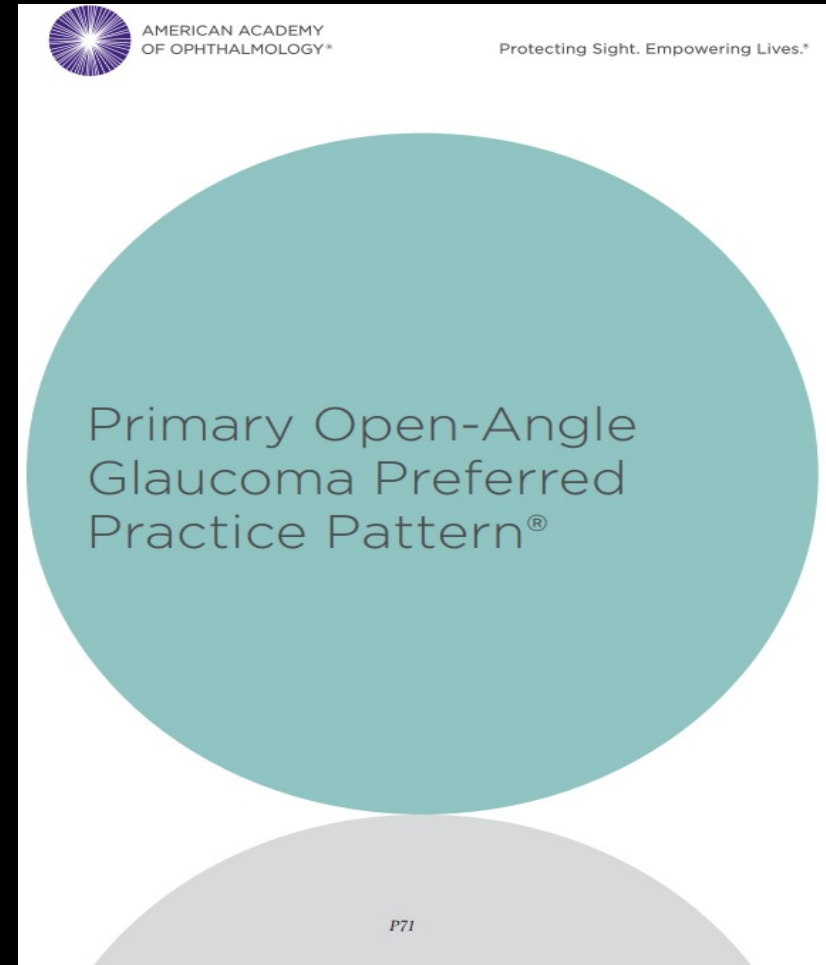
**50% KNOW** **50% DON'T KNOW**

 **NEHEP**  
A program of the National Institutes of Health

[www.nei.nih.gov/glaucoma](http://www.nei.nih.gov/glaucoma)

# PRIMARY OPEN ANGLE GLAUCOMA

- DEFINED
  - A chronic, progressive optic neuropathy in adults in which there is a characteristic **acquired atrophy of the optic nerve** and **loss of retinal ganglion cells and their axons**.
  - This condition is associated with an open anterior chamber angle by gonioscopy.
- WHAT'S NOT MENTIONED?
  - INTRAOCULAR PRESSURE (IOP)
  - VISUAL FIELD LOSS



AMERICAN ACADEMY OF  
OPHTHALMOLOGY  
*Preferred Practice Pattern 2020*

# CASE

## DFE



54 / AA / M  
IOP: 19/28, PACHYM: 511/508, NO FAM HX, NO PIG / NO PEX

# REVIEW:

## SUSPECTING GLAUCOMA

### Risk Factors for OAG Suspect Codes

- African American or Hispanic race
- Family history of glaucoma in 1st degree relative
- Thin central corneal thickness
- High IOP
- Pseudoexfoliation or pigment dispersion syndrome

≥ 3 risk factors = high risk

≤ 2 risk factors = low risk

### Glaucoma or Normal? Use the 5 Rules

- 1 Observe the scleral **Ring** to identify the limits of the optic disc and its size
- 2 Identify the size of the **Rim**
- 3 Examine the **Retinal** nerve fiber layer
- 4 Examine the **Region** of parapapillary atrophy
- 5 Look for **Retinal** and optic disc hemorrhages

FORGE™

### SUSPICIOUS OCT RNFL

- AVG / GLOBAL <5 OR <1
- SUP / INF QUADS <5 OR <1
- ST / IT SECTORS <5 OR <1
- ASYMMETRY > 9  $\mu$ m



# CASE

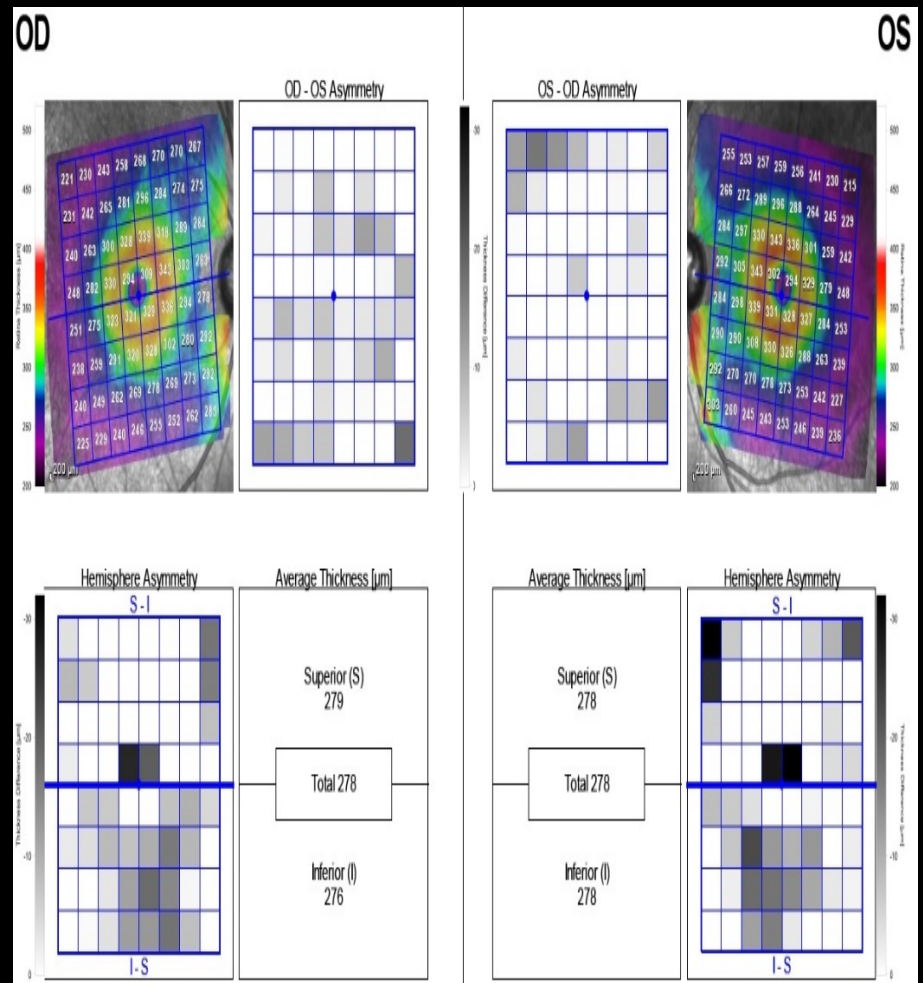
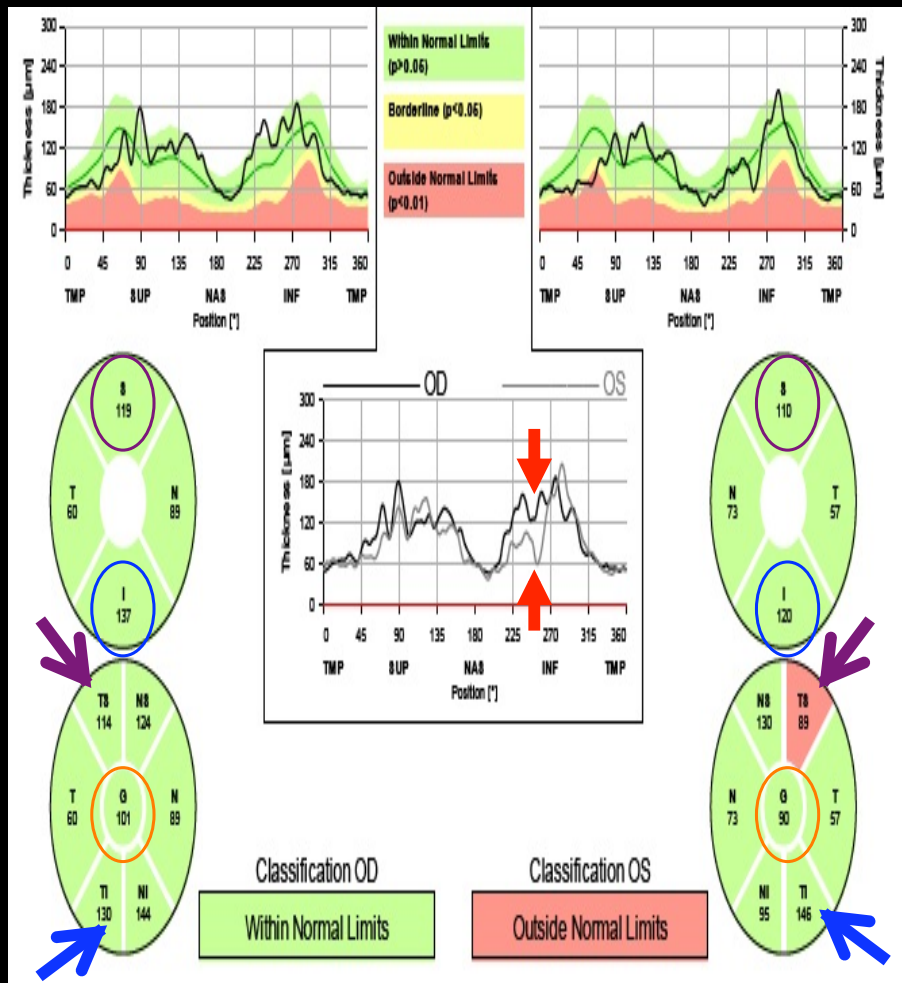
## DFE



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# CASE

## SPECTRALIS RNFL / GCC



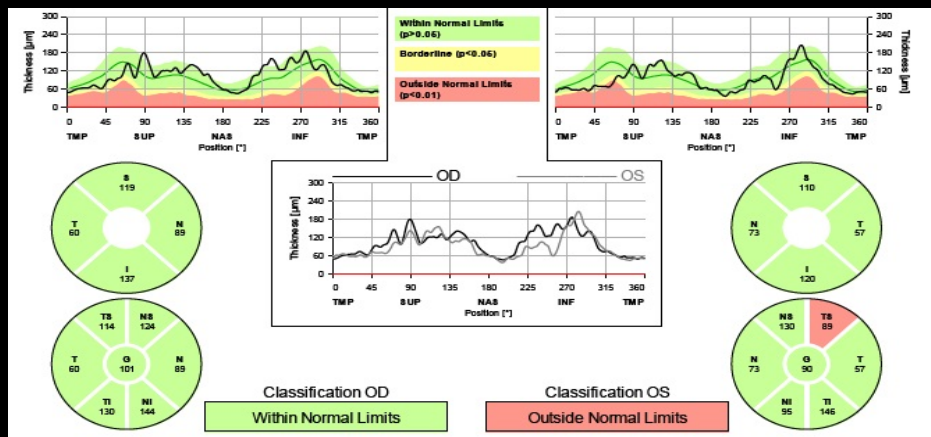
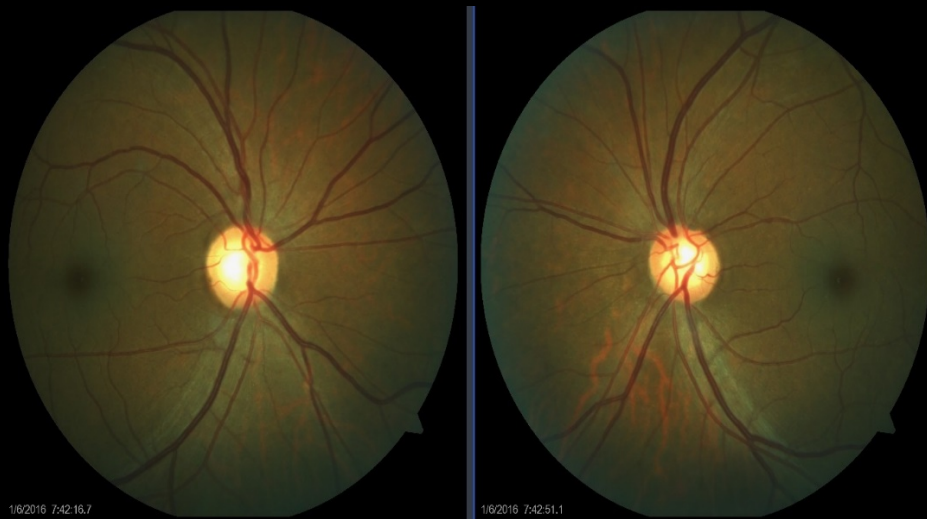
54 / AA / M

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# YOUR PATIENT HAS GLAUCOMA

54 / AA / M

IOP: 19/28, PACHYM: 511/508, NO FAM HX, NO PIG / NO PEX



- ONH EVAL
  - OD / OS
    - SUP RIM THINNING
    - SUP RNFL DIFFUSE LOSS
- OCT EVAL
  - GLOBAL
    - OD WNL / OS WNL
    - ASYMMETRY 101 VS 90
  - QUADS
    - OD WNL / OS WNL
    - ASYMMETRY INF 137 VS 120
  - SECTORS
    - OD WNL
    - OS TS <1
    - ASYMMETRY TI 130 VS TI 146

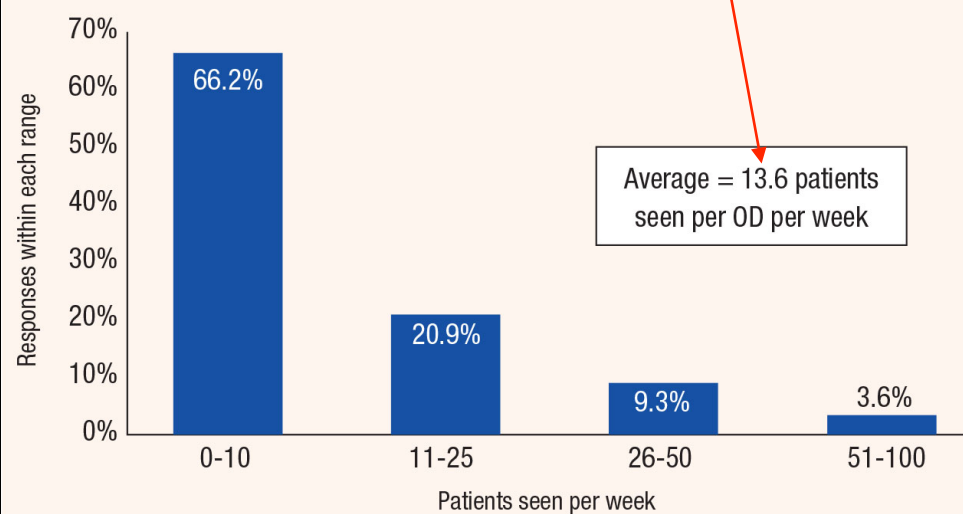


# QUESTION

YOUR PATIENT HAS GLAUCOMA.  
NOW WHAT?

## SUSPECTS OR GLAUCOMA

**Fig. 1. Weekly Glaucoma Patient Volume**



**364 ODS SURVEYED**

**(PROBABLY CLOSER TO 10 PER WEEK AS SOME ODS SKEWED THE DATA)**

# REVIEW<sup>®</sup>

OF OPTOMETRY

YOUR PATIENT HAS  
GLAUCOMA.  
WHAT DO YOU DO NOW?

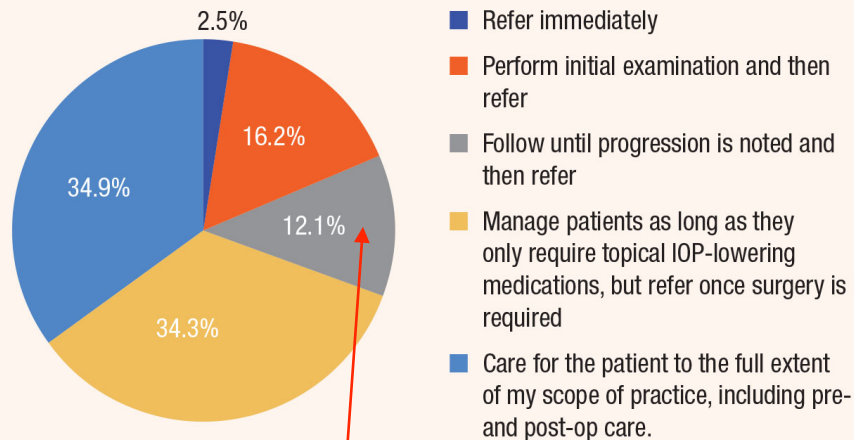
- A. REFER IMMEDIATELY
- B. PERFORM INITIAL EXAMINATION AND THEN REFER
- C. FOLLOW UNTIL PROGRESSION IS NOTED AND THEN REFER
- D. MANAGE PATIENTS AS LONG AS THEY ONLY REQUIRE TOPICAL IOP-LOWERING MEDICATIONS, BUT REFER ONCE SURGERY IS REQUIRED
- E. CARE FOR THE PATIENT TO THE FULL EXTENT OF MY SCOPE OF PRACTICE, INCLUDING PRE- AND POST-OP CARE



## WHAT ARE OUR COLLEAGUES DOING?

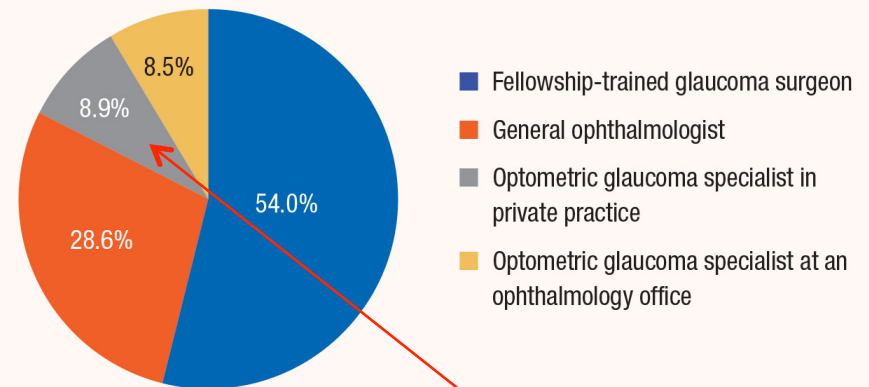
69.2% (OR 81.3%) OF THIS GROUP OF OPTOMETRISTS ARE TREATING GLAUCOMA.  
WHAT ABOUT THE OTHERS?

**Fig. 2. How Do You Handle Glaucoma Patients/Suspects in Your Office?**



WHAT DOES "FOLLOW" MEAN?

**Fig. 3. If You Don't Manage Glaucoma, Where Do You Refer Cases?**



THIS COULD/SHOULD BE HIGHER.

364 ODs SURVEYED

<https://www.reviewofoptometry.com/article/moving-optometry-forward-in-glaucoma>

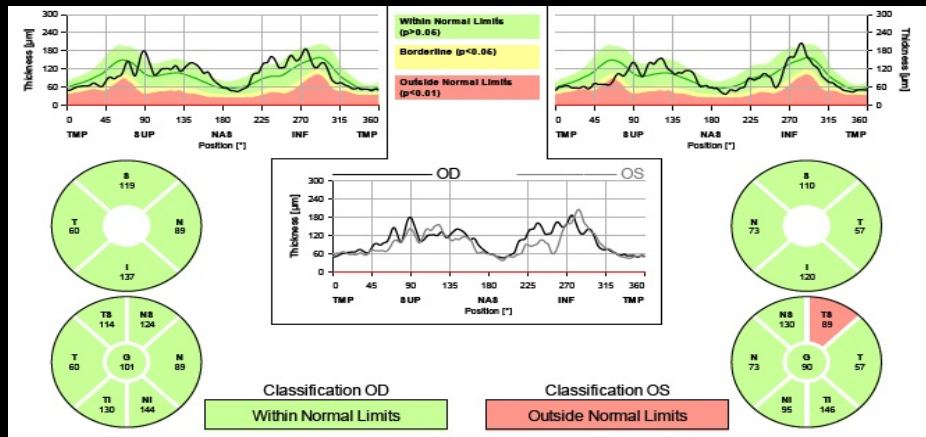
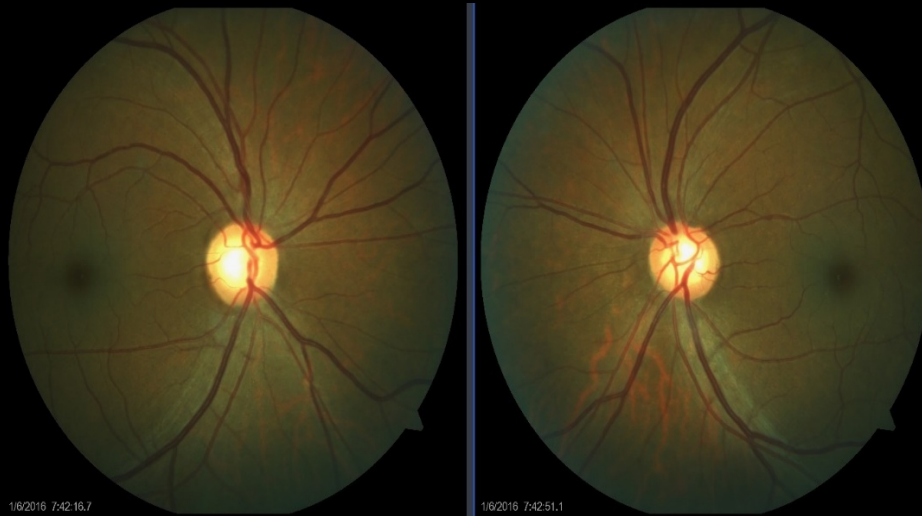
4/15/20



# YOUR PATIENT HAS GLAUCOMA...NOW WHAT?

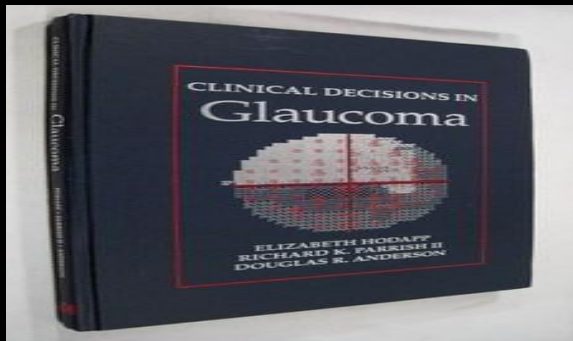
54 / AA / M

IOP: 19/28, PACHYM: 511/508, NO FAM HX, NO PIG / NO PEX



- ONH EVAL
  - OD / OS
    - SUP RIM THINNING
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- OCT EVAL
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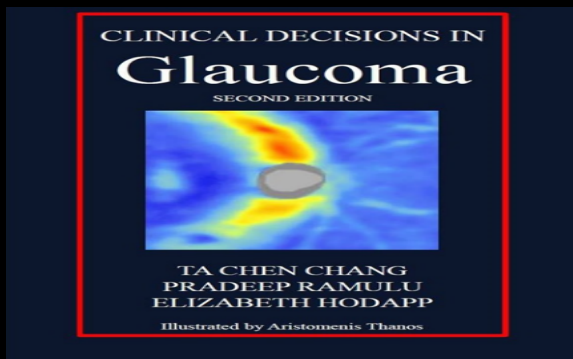
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Drs. Hodapp, Parrish and Anderson  
Clinical Decision in Glaucoma 1993

and again in

Drs. Chang, Ramulu and Hodapp  
Clinical Decisions in Glaucoma 2<sup>nd</sup> Edition, 2016



There are five basic steps to follow in managing a patient with glaucoma:

1. Establish a good baseline.
2. Set a reasonable target for intraocular pressure (IOP).
3. Lower the pressure.
4. Follow up with the patient to see if the target pressure is maintained and if the glaucomatous damage progresses.
5. Modify the target pressure and treatment as indicated by the patient's course.

# 1. ESTABLISH A BASELINE

# THE GLAUCOMA WORK-UP

- HISTORY
- VA
- PUPILS
- CONFRONTATION VISUAL FIELDS
- SLIT-LAMP
- IOP
- CENTRAL CORNEAL THICKNESS
- GONIOSCOPY
- DILATED FUNDUS EXAMINATION
- EVALUATION OF
  - ONH
  - RNFL
- DOCUMENT ONH / RNFL / MACULA
  - STEREOPHOTOGRAPHY
  - OR
  - COMPUTER BASED ANALYSIS
- VISUAL FIELD
  - BY AUTOMATED PERIMETRY



# INTRAOCULAR PRESSURE

- > 21 mmHg IS IRRELEVANT
  - IT IS JUST A NUMBER
- GET 3 IOP READINGS
  - PREFERABLY ON DIFFERENT DAYS AT DIFFERENT TIMES OF DAY
  - AVERAGE GLAUCOMA PATIENT IS TREATED FOR 20+ YEARS
    - “DO WE REALLY WANT TO BASE TREATMENT ON THAT ONE READING?”
      - Quigley HA. 21st century glaucoma care. Eye (Lond). 2019 Feb;33(2):254-260.
- RECORD TIME TESTED
  - TYPICALLY IOP IS HIGHER IN THE MORNING UPON WAKING

# CENTRAL CORNEAL THICKNESS

## WHO IS AT RISK?

- FROM OHTS RESULTS (1636 PTS)
  - CCT RELATED INFO
    - INFLUENCES GOLDMANN TONOMETRY
    - A RISK FACTOR FOR DEVELOPING POAG
      - THICKNESS < 555  $\mu\text{m}$  3X RISK COMPARED TO > 588
  - IOP RELATED INFO
    - NOT ALL NEED TREATMENT
    - TREAT THOSE AT GREAT RISK
- RECOMMENDATIONS
  - SAY NO TO NOMOGRAMS
  - DO NOT ADJUST IOP UP/DOWN
  - THINK
    - IS IT THIN / NORMAL / THICK?
      - THIN = AT RISK

I  
O  
P

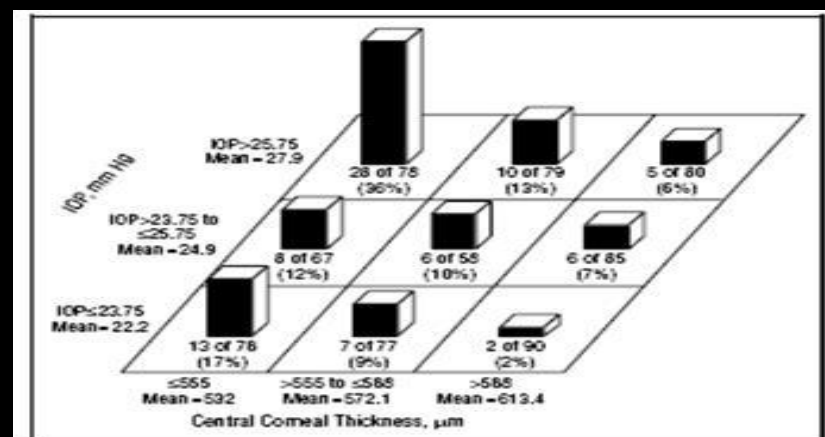


Figure 1. The percentage of participants in the observation group who developed primary open-angle glaucoma (median follow-up, 72 months)

CCT

V  
C  
D

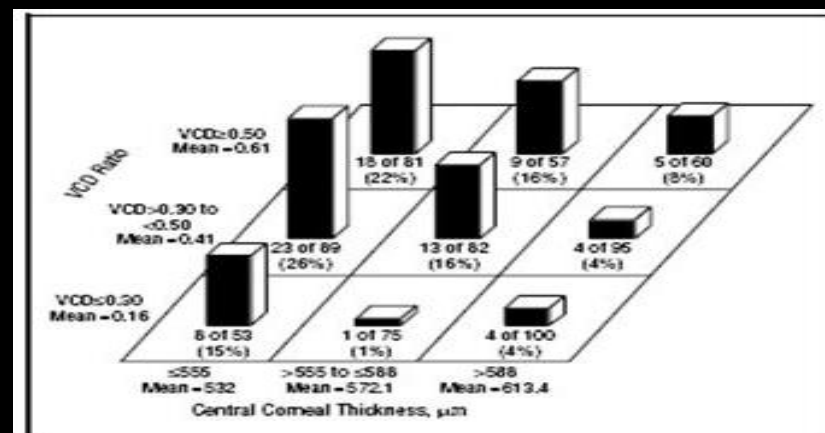
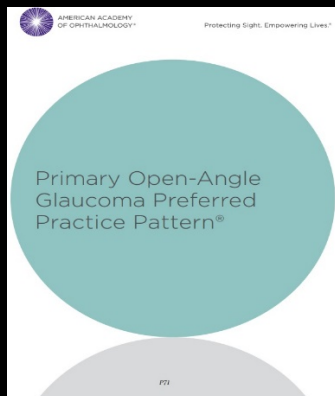


Figure 2. The percentage of participants in the observation group who developed primary open-angle glaucoma (median follow-up, 72 months)

Gordon, MO, et al. Arch Ophthalmol.  
2002;120:714-720

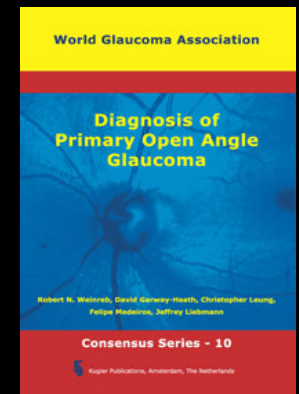
# OPTIC NERVE EVALUATION

- PER THE AAO
  - DOCUMENT THE OPTIC NERVE
    - STEREOPHOTOGRAPHS PREFERRED
    - COMPUTER ANALYSIS OF ONH AND RNFL IS AN ALTERNATIVE
  - 3 TYPES OF COMPUTER BASED IMAGING
    - SIMILAR IN ABILITY TO DISTINGUISH GLAUCOMA FROM CONTROLS
    - **USEFUL WHEN ANALYZED IN CONJUNCTION WITH OTHER RELEVANT CLINICAL PARAMETERS**
  - EACH METHOD IS COMPLEMENTARY
- PER THE WGA
  - ANCILLARY TESTING
    - AT BASELINE
      - OCT (OR ALTERNATIVE) AND
      - DISC PHOTOGRAPHS
    - MONITOR FOR CHANGE



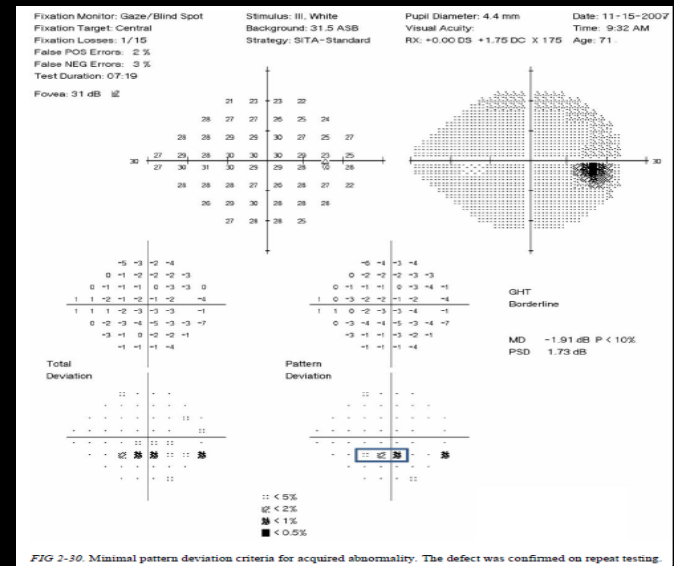
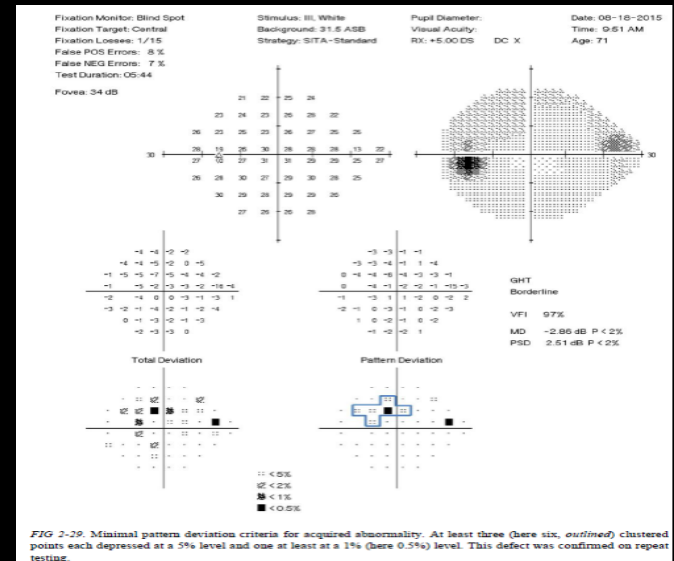
AAO PPP 2020

WGA 4/30/16



# VISUAL FIELDS

- YES, THEY STILL NEED TO BE DONE
  - SOME PATIENTS WILL HAVE
    - FUNCTIONAL LOSS BEFORE STRUCTURAL LOSS
  - DONE TO DETERMINE SEVERITY OF DAMAGE
    - MONITORED FOR PROGRESSION (SLOW OR RAPID)
- REMEMBER...
  - VF LOSS MUST MATCH THE OPTIC NERVE / OCT
  - SHOULD MEET MINIMUM CRITERIA FOR GLAUCOMA
- MINIMUM CRITERIA FOR GLAUCOMA
  - GHT ONLY
- OR
- PATTERN DEVIATION, A CLUSTER OF 3 OR MORE POINTS IN LOCATION TYPICAL FOR GLAUCOMA ALL <5%, ONE <1%, ALL RESPECT HORIZONTAL MERIDIAN
- OR
- PSD <5%
- AND...
  - ONH AND/OR THE RNFL / OCT RNFL ARE ABNORMAL
  - THE VISUAL FIELD LOSS MUST BE REPEATABLE

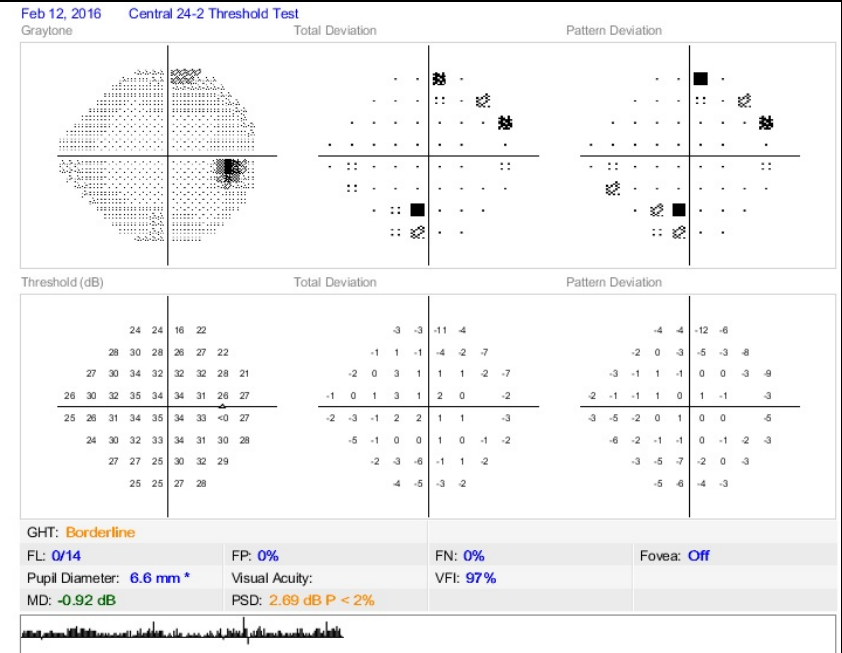
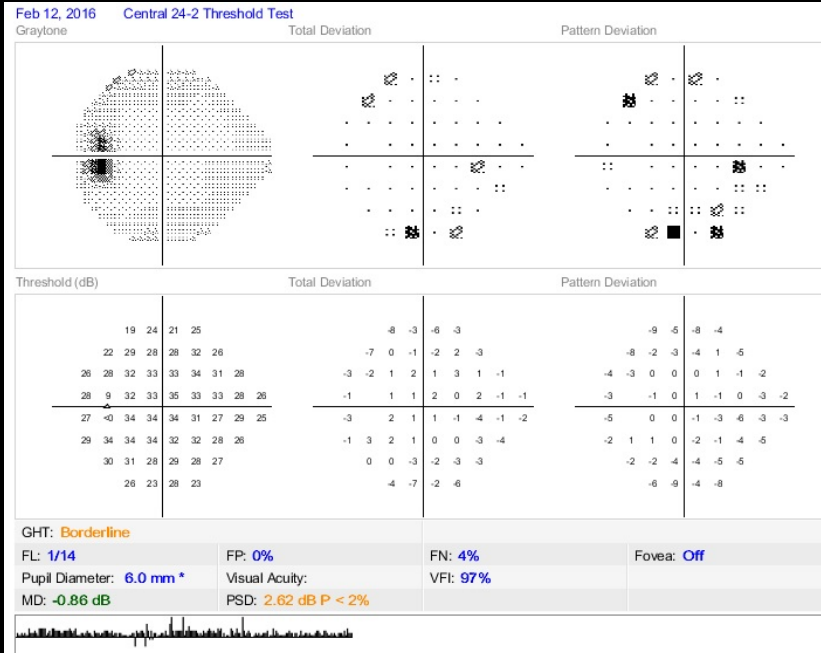




# CASE

## BASELINE DATA COLLECTION

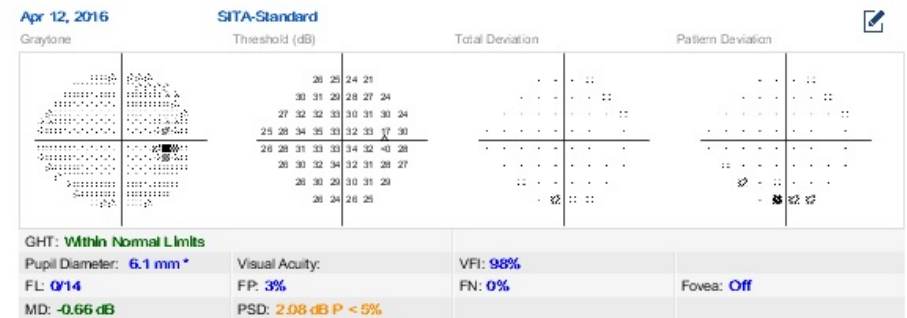
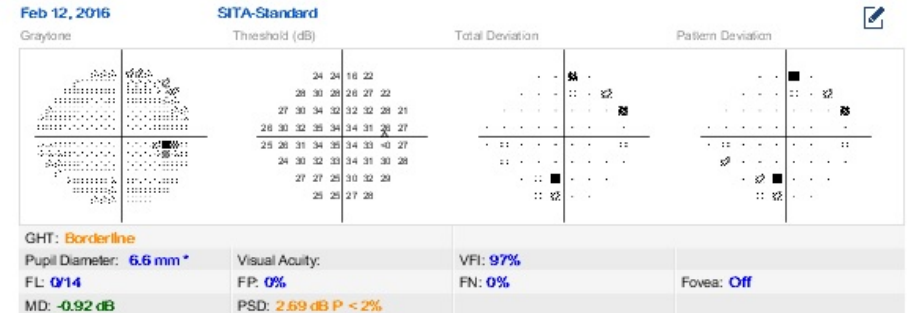
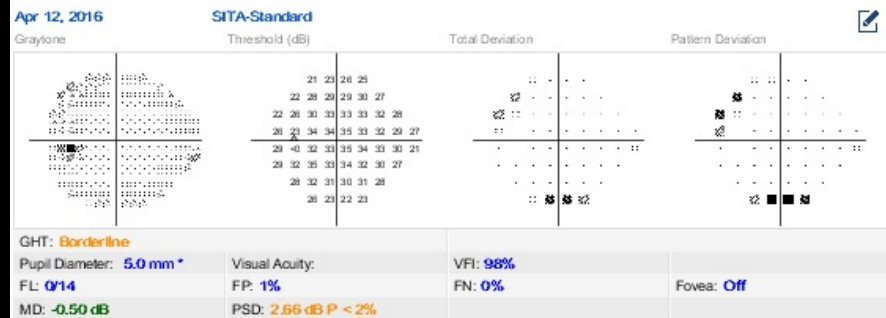
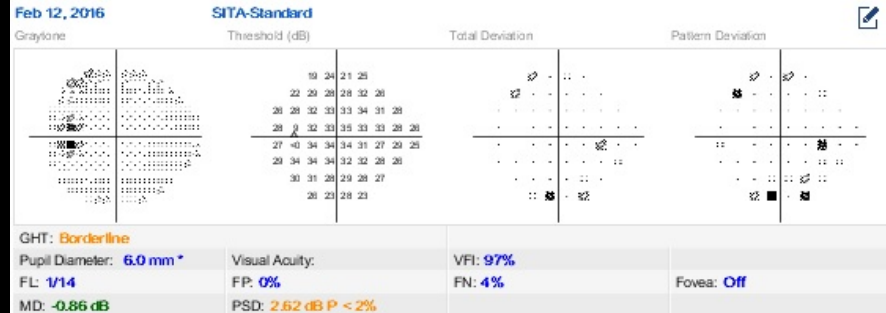
54 / AA / M  
 IOP: 19-20/24-28, PACHYM: 511/508, NO FAM HX, NO PIG / NO PEX  
 GONIO CBB 360 OU



IOP DATA	VISIT 1	VISIT 2 (1 mo)
OD	19	20
OS	28	24

# CASE REPEAT VF AND IOP CHECK

54 / AA / M  
IOP: 19-25/24-28, **PACHYM**: 511/508, NO FAM HX, NO PIG / NO PEX  
GONIO CBB 360 OU



IOP DATA	VISIT 1	VISIT 2 (1 mo)	VISIT 3 (2 mos)
OD	19	20	25
OS	28	24	26

# IS A FULL BASELINE OF TESTS ALWAYS NEEDED BEFORE TEATMENT?

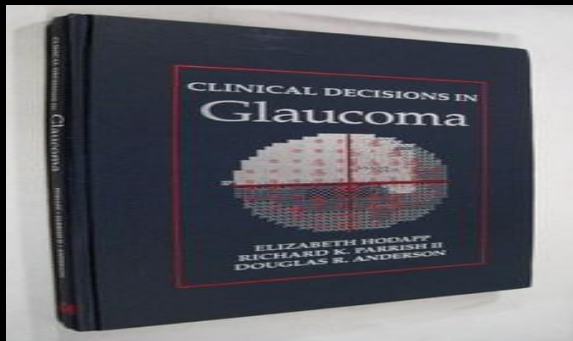
- NOT NECESSARILY IF
  - IOP EXTREMELY HIGH
  - PATIENT PRESENTS WITH SEVERE DAMAGE
  - PATIENT LEAVING AREA FOR EXTENDED TIME
  - OR
  - WE INHERIT SOMEONE ELSE'S GLAUCOMA PATIENT
    - OPTIONS
      - CONTINUE CURRENT REGIMEN
        - MONITOR FOR CHANGE
        - GET PRIOR NOTES AS THEY WILL HAVE BASELINE INFO YOU WANT
          - IOP, CCT, ONH/OCT, VF
      - INCREASE TREATMENT (INCREMENTALLY)
      - CONSIDER A DRUG HOLIDAY TO RE-ESTABLISH BASELINE IOP

# QUESTION

YOUR PATIENT HAS GLAUCOMA.  
YOU HAVE COLLECTED BASELINE DATA.  
NOW WHAT?



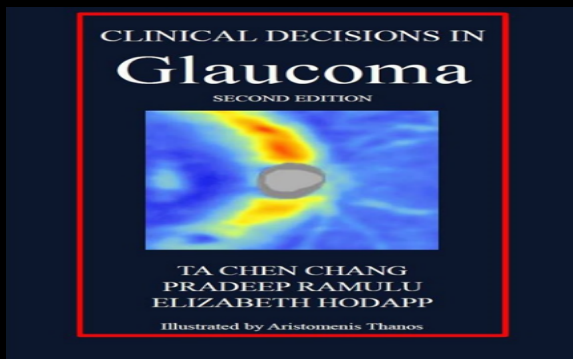
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# WHAT'S OUR "GOAL" WITH GLAUCOMA PATIENTS?

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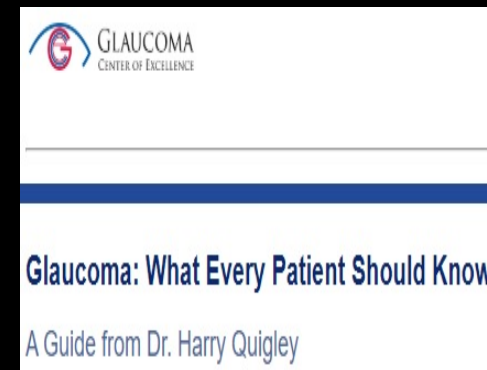
LOWER THE IOP

# WHAT'S OUR "GOAL" WITH GLAUCOMA PATIENTS?



# OUR “GOAL” WITH GLAUCOMA PATIENTS SHOULD BE

- HELP RETAIN ALL THE USEFUL  
VISION POSSIBLE FOR THE  
REMAINDER OF THEIR LIVES  
WITHOUT BADLY BOTHERING  
THEM WITH TREATMENT



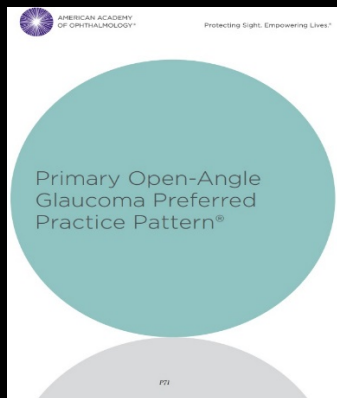
2011

<https://www.hopkinsmedicine.org/wilmer/services/glaucoma/book/index.html>



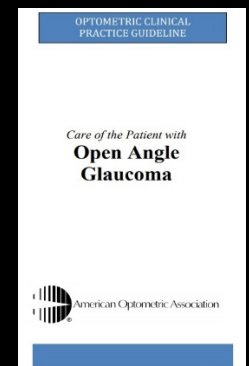
# GOALS / TARGETS FROM THE PPP / CPG

- “The goal of treatment is to maintain the IOP within a range at which visual field loss is unlikely to substantially reduce a patient’s health-related quality of life over his or her lifetime.”
- “The objective of treating glaucoma by lowering IOP is to prevent additional damage to the ON, thus preserving remaining visual function. This target is the range of IOPs below which additional damage to the ON is unlikely over the patient's lifetime.”



AMERICAN ACADEMY OF  
OPHTHALMOLOGY  
*Preferred Practice Pattern*  
2020

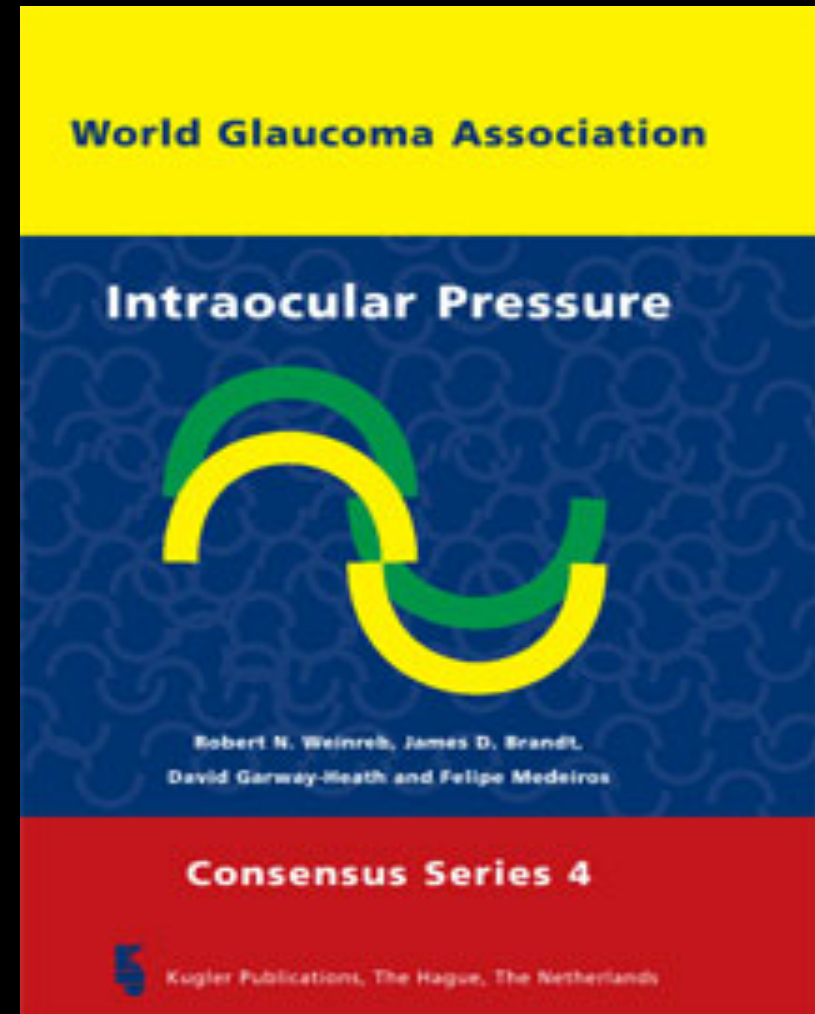
AOA CLINICAL PRACTICE  
GUIDELINES  
Care of the Patient with Open  
Angle Glaucoma  
1995 | 2nd Edition 2002 |  
Revised 2010



## 2. SET A TARGET IOP

# TARGET IOP

- RANGE AT WHICH CLINICIAN JUDGES THAT PROGRESSIVE DISEASE IS UNLIKELY TO AFFECT PATIENT'S QUALITY OF LIFE
- **IS AN ESTIMATE**, NOT A CERTAINTY
- RECORD IT
  - STUDIES SHOW NOT ENOUGH PRACTITIONERS ARE DOING THIS
- RE-EVALUATE IT
  - ADJUST UP OR DOWN



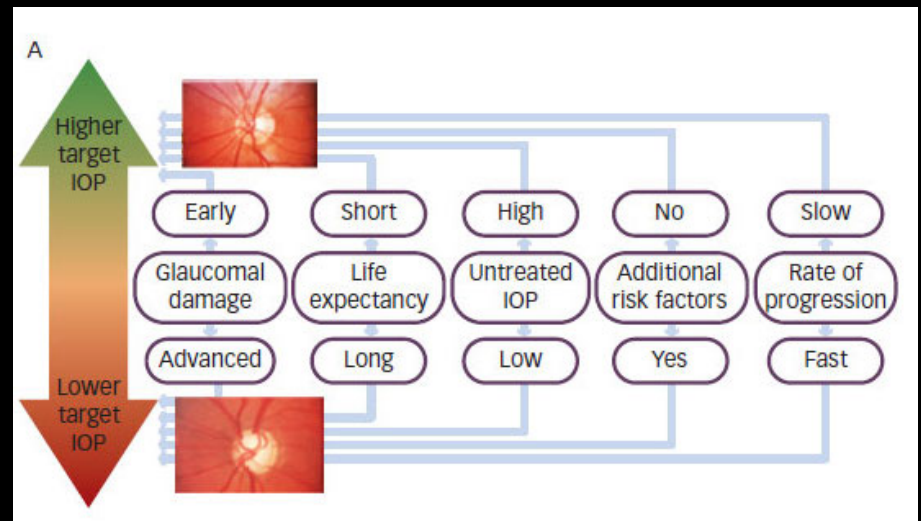
MAY 05, 2007

<https://wga.one/wga/consensus-4/>

# SETTING TARGET IOP

## CONSIDERATIONS

- STAGE OF GLAUCOMA
  - HOW IS THAT DONE
    - STRUCTURAL OR FUNCTIONAL ?
- AGE OF PATIENT
  - LIFE EXPECTANCY
- BASELINE IOP
  - HIGHEST OR AVERAGE?
    - I (AND OTHERS) PREFER HIGHEST
      - IF OUTLIERS, AVERAGE THOSE HIGHS
- ADDITIONAL FACTORS
  - THIN CCT
  - LOW HYSTERESIS
  - STATUS OF OTHER EYE
  - DID FIRST DEGREE RELATIVE LOSE VISION DUE TO GLAUCOMA?
  - RATE OF PROGRESSION



Traverso C E, et al. Back to the Future: Has Medical Treatment of Glaucoma Improved. European Ophthalmic Review, 2015;9(2):132–7

European Glaucoma Society (EGS) Guidelines. Terminology and guidelines for glaucoma (4th edition) 2014. Available at: <http://www.eugs.org> (accessed 24 June 2015).

# TARGET IOP

- EACH EYE SHOULD HAVE IT'S OWN TARGET IOP
- IT IS A RANGE, NOT A SINGLE NUMBER
- RECORD THE TARGET IN THE CHART
- WON'T GET SUED IF NOT REACHING IT
  - YOU HAVE DOCUMENTATION OF HOW YOU HAVE TRIED
- BUT IF NOT DOCUMENTED...
  - THAT'S NOT STANDARD OF CARE

# HOW TO DETERMINE TARGET IOP?

- IT IS BASED ON THE GLAUCOMA STAGE / SEVERITY
  - HOW IS THAT DETERMINED?
    - OPTIC NERVE
    - OCT
      - RNFL / GCC
    - VISUAL FIELD

# METHODS TO STAGE GLAUCOMA

Table 3

Clinical Stages of Primary Open Angle Glaucoma

<b>Mild</b>	ON	Mild concentric narrowing or partial localized narrowing of the neuroretinal rim; disc hemorrhage; cup/disc asymmetry
	NFL	Less bright reflex; fine striations to texture; large retinal blood vessels clear; medium retinal blood vessels less blurred; small retinal blood vessels blurred
	VF	Isolated paracentral scotomas; partial arcuate or nasal step; damage limited to one hemifield with fewer than 25% of points involved, mean deviation (MD) less than -6 dB
<b>Moderate</b>	ON	Moderate concentric narrowing of the neuroretinal rim; increase in the area of central disc pallor; a complete localized notch or loss of the neuroretinal rim in one quadrant; undermining of vessels
	NFL	Minimal brightness to reflex; no texture; large, medium, and small retinal blood vessels clear <sup>1</sup>
	VF	Partial or full arcuate scotoma in at least one hemifield; damage may involve both hemifields; fixation should not be involved; mean deviation between -6 and -12 dB
<b>Severe</b>	ON	Complete absence of the neuroretinal rim in at least three quadrants; bayoneting of vessels; markedly increased area of central disc pallor
	NFL	Reflex dark; no texture; large, medium, and small retinal blood vessels clear <sup>2</sup>
	VF	Advanced loss in both hemifields; 5°-10° central island of vision; MD worse than -12 dB, fixation may be involved

<sup>1</sup>As described by Quigley HA, Reacher M, Katz J, et al. Quantitative grading of nerve fiber layer photographs. Ophthalmology 1993; 100:1800-7.

<sup>2</sup>As described by Quigley HA, Dunkelberger BS, Green WR. Retinal ganglion cell atrophy correlated with automated perimetry in human eyes with glaucoma. Am J Ophthalmol 1989; 107:453-64.

	Mild	Moderate	Severe
AAO <sup>21</sup>	Optic disc cupping but no visual field loss	Glaucomatous neuropathy with visual field loss not within 5° of fixation	Visual field loss in both hemispheres or within 5° of fixation
Canadian guidelines <sup>30</sup>	C: D ratio <0.65 or mild visual field defect not within 10° of fixation	C: D ratio 0.7-0.85 or visual field defect not within 10° of fixation or both	C: D ratio >0.9 or visual field defect within 10° of fixation or both
International Classification of Diseases 10	Optic nerve abnormalities consistent with glaucoma + normal fields	Optic nerve abnormalities consistent with glaucoma + one hemifield abnormality, not within 5°	Optic nerve abnormalities consistent with glaucoma + both hemifield abnormality or within 5°

AAO: American Academy of Ophthalmology

AAO CPG

Care of the Patient with Open Angle Glaucoma 1995

2nd Edition 2002 | Revised 2010

Currently in the review process



# STAGING GLAUCOMA

## “SIMPLIFIED”

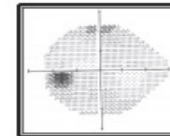


- PUBLISHED 2015, REVISED 2018
- <https://www.aao.org/Assets/5adb14a6-7e5d-42ea-af51-3db772c4b0c2/636713219263270000/bc-2568-update-icd-10-quick-reference-guides-glaucoma-final-v2-color-pdf?inline=1>

### Mild or Early Stage Glaucoma

ICD-10 7th digit “1”

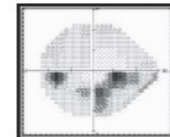
- Optic nerve abnormalities consistent with glaucoma
- but NO visual field abnormalities on any visual field test
- OR abnormalities present only on short-wavelength automated perimetry or frequency doubling perimetry



### Moderate Stage Glaucoma

ICD-10 7th digit “2”

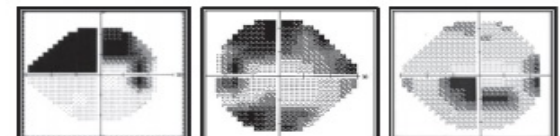
- Optic nerve abnormalities consistent with glaucoma
- AND glaucomatous visual field abnormalities in ONE hemifield and
- NOT within 5 degrees of fixation (note: 5 degrees = involvement of spots nearest fixation)



### Advanced, Late, Severe Stage

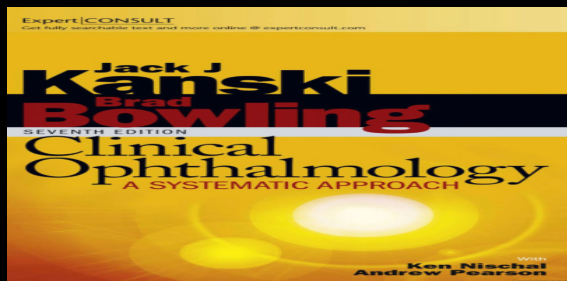
ICD-10 7th digit “3”

- Optic nerve abnormalities consistent with glaucoma
- AND glaucomatous visual field abnormalities in BOTH hemifields
- AND/OR loss within 5 degrees of fixation in at least one hemifield



# REMINDER

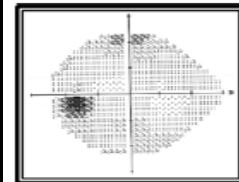
- **PREPERIMETRIC GLAUCOMA**
  - THE CONCEPT REFERS TO GLAUCOMATOUS DAMAGE, USUALLY MANIFESTED BY A SUSPICIOUS OPTIC DISC AND / OR THE PRESENCE OF RETINAL NERVE FIBER LAYER DEFECTS, IN WHICH **NO VISUAL FIELD ABNORMALITY** HAS DEVELOPED.
- THIS IS ACTUALLY
  - **MILD / EARLY GLAUCOMA**



## Mild or Early Stage Glaucoma

ICD-9 365.71; ICD-10 7th digit "1"

- Optic Nerve abnormalities consistent with glaucoma
- but NO visual field abnormalities on any visual field test
- OR abnormalities present only on short-wave-length automated perimetry or frequency doubling perimetry

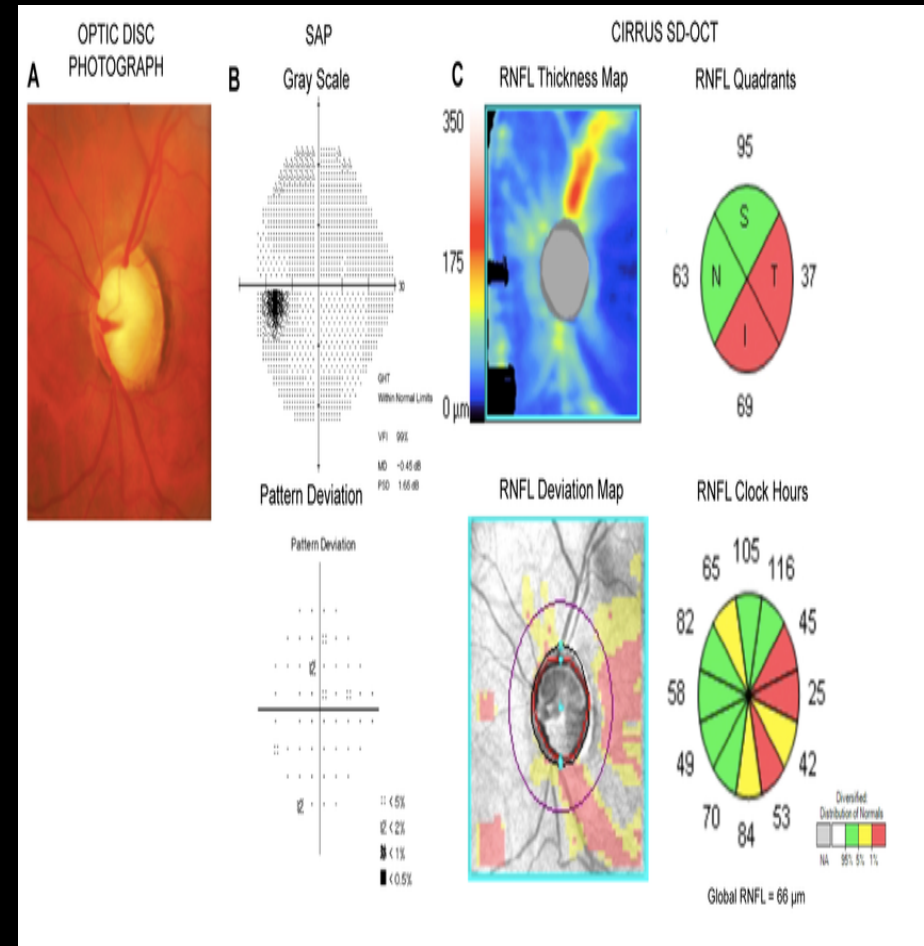


# ERR ON THE SIDE OF CAUTION

- SHOULD THE VISUAL FIELD BE NORMAL...
  - AND
    - THE OPTIC NERVE LOOKS GLAUCOMATOUS
  - OR
    - THE OCT RNFL / GCC LOOKS GLAUCOMATOUS
- **GRADE (STAGE) UP!**
  - SET THE SEVERITY AS ONE STEP HIGHER/WORSE
  - SET A LOWER TARGET IOP
- REMEMBER
  - THE VISUAL FIELD WILL EVENTUALLY CATCH UP

# EXAMPLE

- IMAGE INTERPRETATION
  - ONH
    - LARGE ONH
    - LARGE C/D
    - **INFERIOR NOTCH / RIM LOSS**
  - RNFL
    - MAP ABNORMAL INF
    - INF QUAD **<1%**
    - CLOCK HOURS
      - MULTIPLE **<1%** AND **<5%**
  - VISUAL FIELD
    - NORMAL (SO FAR)
- STAGE OF GLAUCOMA?
  - VF IS CLEAN = MILD?
    - HOWEVER
      - ERR ON SIDE OF CAUTION
  - GO WITH MODERATE
    - VF WILL EVENTUALLY CATCH UP



Gracitelli, Carolina & Abe, Ricardo & Medeiros, Felipe. (2015). Spectral-Domain Optical Coherence Tomography for Glaucoma Diagnosis. The Open Ophthalmology Journal. 9. 68-77

# DO CLINICAL TRIALS HELP WITH TARGET IOP?

Study	Type of glaucoma	Baseline IOP	Percentage IOP reduction	Progression	Mean IOP level
Ocular Hypertension Treatment Study <sup>[29]</sup>	Open angle	24.9	20%	4.4/9.5%	19.3
Early Manifest Glaucoma Trial <sup>[27]</sup>	POAG	20.6	25%	45/62%	Mean fall 5.2 mmHg
Collaborative Normal Tension Glaucoma Study <sup>[38]</sup>	NTG		30%	12/35%	
Collaborative Initial Glaucoma Treatment Study Medical <sup>[26]</sup>	POAG	27	38%	15% progressed and 15% improved	17-18 mmHg
Surgical <sup>[26]</sup>		27	46%		14-15 mmHg
Advanced Glaucoma Intervention Study <sup>[28]</sup>	POAG	23.7-24.8	IOP mean 12.3 mmHg	Did not progress	
Stewart <i>et al.</i> <sup>[39]</sup>	POAG	19.5±3.8		0% 6% 26%	<12 mmHg<17 mmHg mmHg ≥ 18 mmHg
Sihota <i>et al.</i> <sup>[15]</sup>					
Early	POAG and PACG	24.9±8	32%-43%	18.7%	<18 mmHg
Moderate		28.3±5	44%	21.3%	<18 mmHg
Advanced		27.7±9	50%	2.3%	12 mmHg

IOP: Intraocular pressure, POAG: Primary open-angle glaucoma, PACG: Primary angle-closure glaucoma

Sihota, Ramanjit et al. "Simplifying "target" intraocular pressure for different stages of primary open-angle glaucoma and primary angle-closure glaucoma." Indian journal of ophthalmology vol. 66,4 (2018): 495-505.

- YES AND NO
- CLINICAL TRIAL PATIENTS MEET CERTAIN PARAMETERS
  - THEY ARE NOT THE SAME AS REAL WORLD PATIENTS
- HOWEVER, THEY ARE **PROOF THAT LOWERING IOP WORKS**

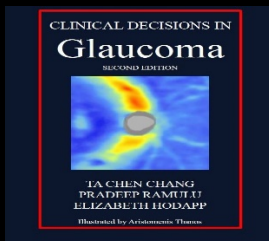
# REASONABLE INITIAL TARGET IOP

## POAG IOP > 21mmHg

- EARLY

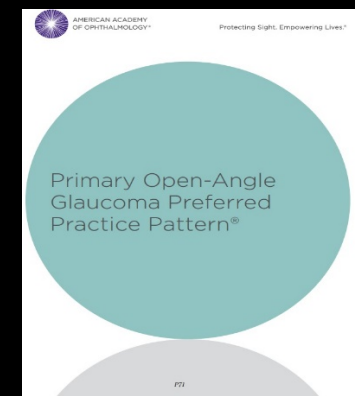
- LOWER IOP BY 25%

- LOWERING IOP BY 25% OR MORE HAS BEEN SHOWN TO SLOW PROGRESSION OF POAG.
- INITIAL TREATMENT GOAL IN A POAG PATIENT IS TO REDUCE IOP 20-30% BELOW BASELINE



Drs. Chang, Ramulu and Hodapp  
*Clinical Decisions in Glaucoma*  
2<sup>nd</sup> Edition, 2016

AMERICAN ACADEMY OF  
OPHTHALMOLOGY  
*Preferred Practice Pattern*  
2020



# AS SEVERITY INCREASES, THERE IS LESS AGREEMENT

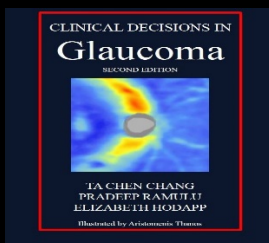
- FIXATION SPARED WITH MODERATE LIFE EXPECTANCY
  - IOP GOAL IS < 17 mmHg
- FIXATION THREATENED OR LOSS OR LONG LIFE EXPECTANCY
  - IOP GOAL IS < 14 mmHg

Stage of Disease	Recommend IOP Range (mmHg)
Early Glaucoma	15-17
Moderate Glaucoma	12-15
Advanced Glaucoma	10-12

Initial recommended target pressure range.<sup>5</sup>

SUMMARY TABLE FROM  
Lifferth A. Optometric Management,  
Volume: 55, Issue: July 2020, page(s): 46

Sihota, Ramanjit et al. "Simplifying "target" intraocular pressure for different stages of primary open-angle glaucoma and primary angle-closure glaucoma."  
Indian journal of ophthalmology vol. 66,4 (2018): 495-505.



Drs. Chang, Ramulu and Hodapp  
*Clinical Decisions in Glaucoma*  
2<sup>nd</sup> Edition, 2016



# ALTERNATIVE SUGGESTION

- OC HTN OR HIGH RISK GLAUCOMA SUSPECT
  - 20-25%
- MILD GLAUCOMA
  - 20-30%
- MODERATE GLAUCOMA
  - 30-40%
- SEVERE GLAUCOMA
  - 40-50%
- MODIFY UP OR DOWN IF
  - ONH CHANGE
  - OCT CHANGE
  - VF CHANGE



# WHEN NOT TO SET TARGET IOP

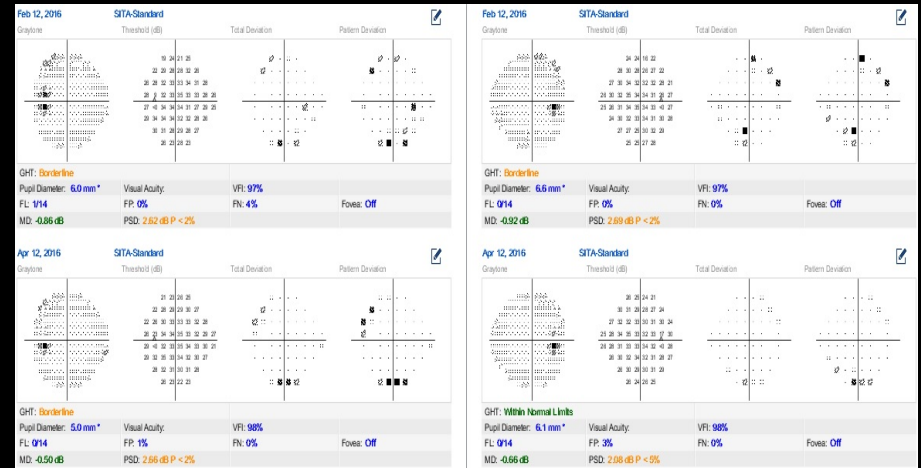
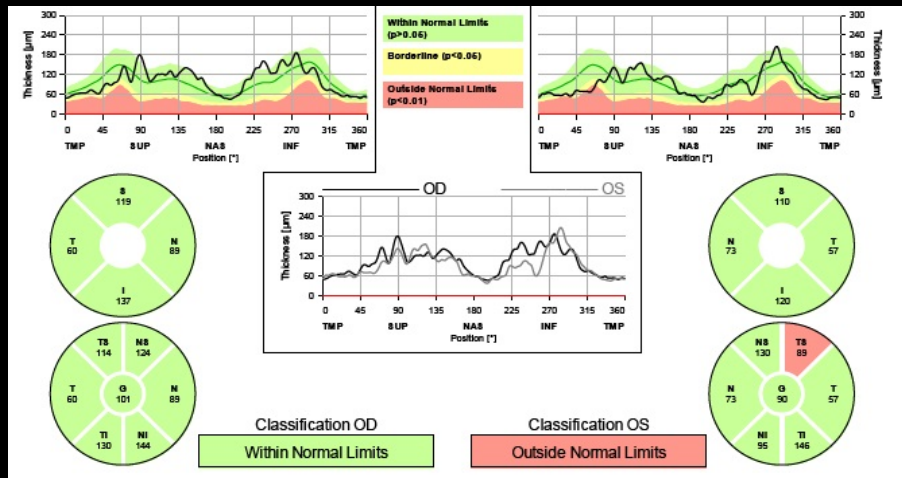
- IN ACUTE GLAUCOMA (HIGH IOP CRISIS)
- FOR A BLIND EYE WHEN THE GOAL IS COMFORT
- IN A 95yo PATIENT WITH MINIMAL DAMAGE
- WHEN ACHIEVING TARGET IOP COULD CAUSE MORE DAMAGE THAN THE GLAUCOMA ITSELF

QUIGLEY HA. GLAUCOMA TODAY November/December 2018. Target IOP: To Set or Not to Set?

# CASE

## TARGET IOP DETERMINATION

54 / AA / M  
 IOP: 19-25/24-28, PACHYM: 511/508, NO FAM HX, NO PIG / NO PEX  
 GONIO CBB 360 OU



- DX:
- OD HIGH RISK G SUSPECT
- OS MILD GLAUCOMA (ONH/OCT)

•HIGHEST IOP 25/28

•GOAL: 20-30% IOP REDUCTION

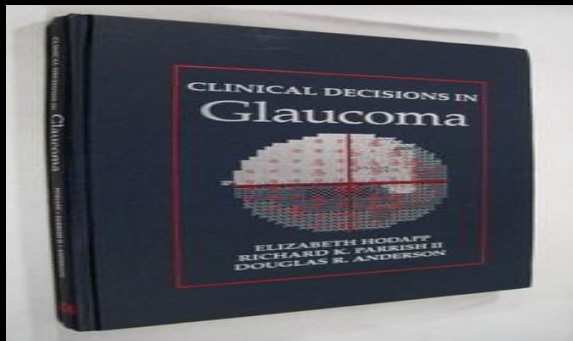
•TARGET IOP RANGE: OD 17-20 / OS 20-23

IOP DATA	VISIT 1	VISIT 2 (1 mo)	VISIT 3 (3 mos)
OD	19	20	25
OS	28	24	26

# QUESTION

YOUR PATIENT HAS GLAUCOMA.  
YOU HAVE COLLECTED BASELINE DATA.  
YOU HAVE SET A TARGET IOP.  
NOW WHAT?

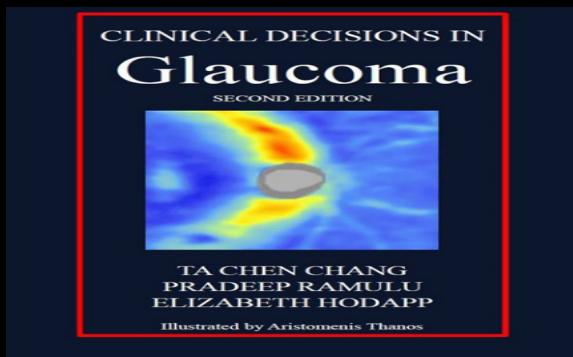
# NOW WHAT?



Drs. Hodapp, Parrish and Anderson  
Clinical Decision in Glaucoma 1993

and again in

Drs. Chang, Ramulu and Hodapp  
Clinical Decisions in Glaucoma 2<sup>nd</sup> Edition, 2016



There are five basic steps to follow in managing a patient with glaucoma:

- ~~1. Establish a good baseline.~~
- ~~2. Set a reasonable target for intraocular pressure (IOP).~~
3. Lower the pressure.
4. Follow up with the patient to see if the target pressure is maintained and if the glaucomatous damage progresses.
5. Modify the target pressure and treatment as indicated by the patient's course.

### 3. LOWER THE IOP

# WHY?

- IOP LOWERING IS THE ONLY PROVEN METHOD TO TREAT GLAUCOMA



Study	Average Baseline IOP	Baseline	Percent of Patients Who Progressed Despite Treatment
EMGT <sup>2</sup>	20.6	25%	45%
CIGTS <sup>3</sup>	27	38%	15% (15% actually showed improvement)
AGIS <sup>4</sup>	23.7-24.8	40%	0% (no progression with mean IOP 12.3 mmHg)

Early Manifest Glaucoma Trial = EMGT; Collaborative Initial Glaucoma Treatment Study = CIGTS; Advanced Glaucoma Intervention Study = AGIS

## SUMMARY TABLE FROM

Lifferth A. Optometric Management, Volume: 55, Issue: July 2020, page(s): 46

## Glaucoma Clinical Trials: IOP Lowering and Progression

Study	IOP Reduction	% Progression Tx / no Tx
OHTS <sup>[1]</sup>	20% target	4.4% / 9.5% (over 5 yrs)
EMGT <sup>[2]</sup>	25% (average)	45% / 62% (over 6 yrs)
CNTGS <sup>[3]</sup>	30% target	12% / 35% (over 7 yrs)
CIGTS <sup>[4]</sup> (med)	~35% (average)	Mean progression near 0
CIGTS <sup>[4]</sup> (surg)	~48% (average)	Mean progression near 0
AGIS <sup>[5]</sup>	< 18 at all visits	Mean progression near 0

\*10% reduction in risk with every 1 mm Hg of additional IOP lowering

1. Kass MA, et al. *Arch Ophthalmol*. 2002;120:701.
2. Heijl A, et al. *Arch Ophthalmol*. 2002;120:1268.
3. CNTG Study Group. *Am J Ophthalmol*. 1998;126:498.
4. Lichter PR, et al. *Ophthalmology*. 2001;108:1943.
5. AGIS Investigators. *J Am J Ophthalmol*. 2000;130:429.



# HOW TO LOWER THE IOP

- MEDICATION

- MECHANISM

- INCREASE OUTFLOW
    - DECREASE PRODUCTION

- OPTIONS

- TOPICAL, ORAL, A/C IMPLANT

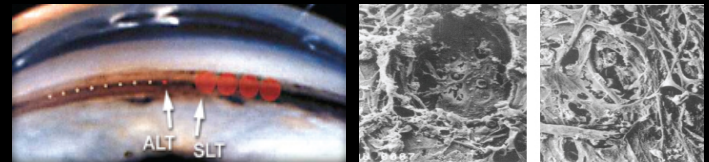


- LASER

- MECHANISM

- INCREASE OUTFLOW
    - DECREASE PRODUCTION

- OPTIONS: ALT, SLT, MLT



- SURGERY

- MECHANISM

- INCREASE OUTFLOW
    - DECREASE PRODUCTION

- OPTIONS

- MIGS

- TRABECTOME, KAHOOK DUAL BLADE, GATT, TRAB 360 / OMNI, VISCO 360 / OMNI, ABIC
      - ISTENT, HYDRUS, ~~CYPASS~~, XEN GEL IMPLANT

- TRABECULECTOMY

- WITH / WITHOUT MMC / 5-FU

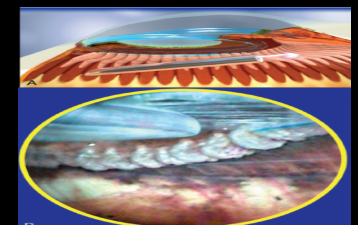
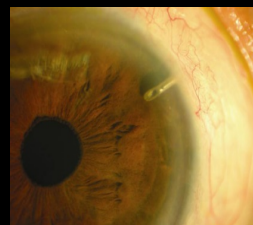
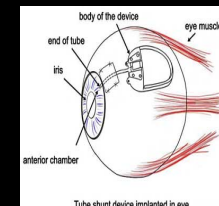
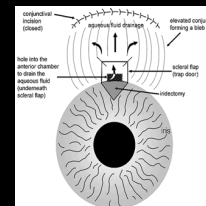
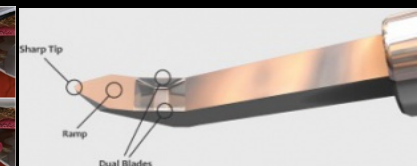
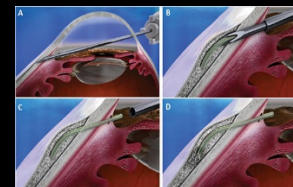
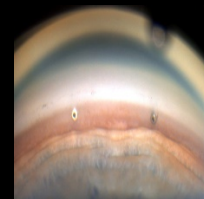
- TUBE / SHUNT / GLAUCOMA DRAINAGE DEVICE

- VALVED OR NONVALVED

- EXPRESS SHUNT

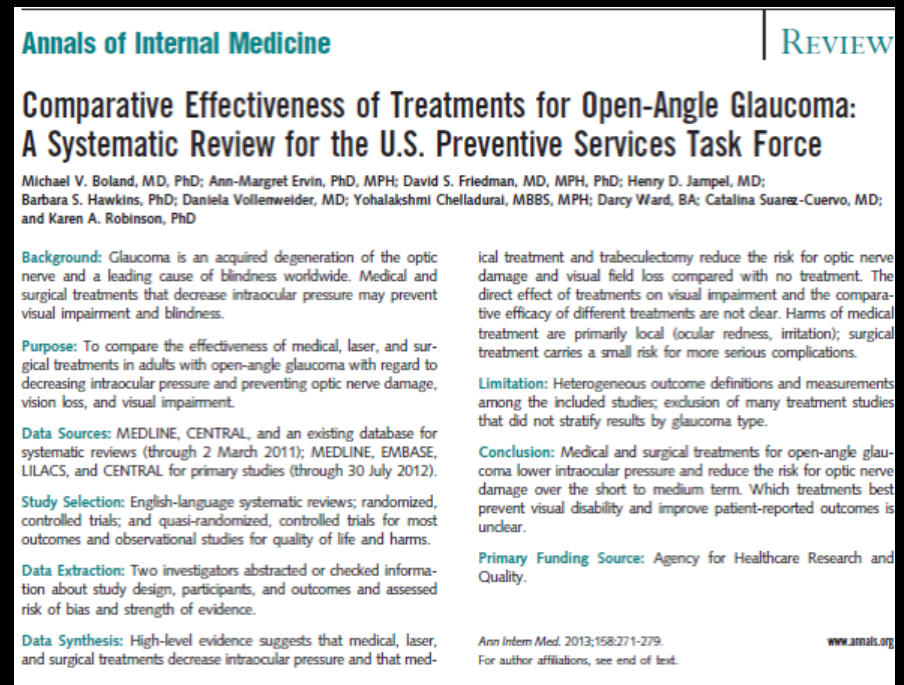
- CYCLOPHOTOCOAGULATION

- EXTERNAL: MICROPULSE TSCPC
      - INTERNAL: ECP
      - END STAGE: TSCPC



# WHICH METHOD IS BEST?

- EACH PATIENT IS DIFFERENT
  - NOT EVERYONE CAN / SHOULD OR WANTS TO USE DROPS
- MEDICINE, LASER, SURGERY
  - ALL LOWER IOP
  - ALL REDUCE RISK OF OPTIC NERVE DAMAGE, VF LOSS, BLINDNESS
- SAFETY
  - EACH HAS POTENTIAL SIDE EFFECTS
  - SOME ARE CONTRAINDICATED IN CERTAIN PATIENTS
- THINGS TO CONSIDER
  - PATIENT PREFERENCES
  - DISEASE STATE
  - TARGET IOP
  - MEDICAL COMORBIDITIES



BOLAND MV, ERVIN AM, FRIEDMAN DS, ET AL. Comparative effectiveness of treatments for open-angle glaucoma: a systematic review for the US Preventive Services Task Force. Ann Intern Med. 2013; 158(4):271-279.

# WHAT'S IT GOING TO TAKE TO REACH YOUR TARGET?

- 20-30% REDUCTION (OC HTN / NTG / MILD)
  - 1-2 TOPICAL MEDICATIONS
  - POSSIBLY
    - LASER OR MIGS
- 30-40% REDUCTION (MILD-MODERATE)
  - 2-3 TOPICAL MEDICATIONS
  - POSSIBLY
    - LASER, MIGS
- 40-50% REDUCTION (MODERATE-SEVERE)
  - 3-4 TOPICAL MEDICATIONS
  - POSSIBLY
    - LASER, ORAL CAI
    - INCISIONAL SURGERY (TRABECULECTOMY OR TUBE)
    - CYCLODESTRUCTIVE PROCEDURE

# QUESTION

WHEN TREATING OCULAR HTN  
OR GLAUCOMA, **WHAT DO YOU DO FIRST?**

- A. START CHOLINERGIC (1950s)
- B. START BETA-BLOCKER (1978)
- C. START ALPHA-AGONIST (1987)
- D. START CARBONIC ANHYDRASE INHIBITOR (1994)
- E. START PROSTAGLANDIN (1997)
- F. START COMBINATION (1997)
- G. START RHO-KINASE INHIBITOR (2017)
- H. SEND FOR ALT / SLT
- I. SEND FOR MIGS
- J. SEND FOR TRAB / TUBE

# WHAT'S FIRST LINE ?

- PHARMACOLOGIC

- IF PATIENTS PREFER TO AVOID PROCEDURE

OR

- LASER

- IF PATIENT HAS DIFFICULTY WITH DROP ADHERENCE
    - EXPENSE, INTOLERANCE
    - DESIRES TO AVOID DAILY MEDICATION USE
  - MUST FOLLOW CLOSELY
    - MAY NOT REACH TARGET IOP
    - MAY ONLY LAST 1-5 YEARS

- WHO DECIDES?

- PATIENT AND DOCTOR

# SURGERY

- WHY NOT FIRST?
  - RISK OF COMPLICATIONS
    - SCARRING, CATARACT
    - OTHER VISION-THREATENING COMPLICATIONS
- WHEN WOULD SURGERY BE...
  - FIRST
    - IF SEVERE VF LOSS AT BASELINE
  - SECOND (OR THIRD)
    - IF FAIL TO RESPOND TO MEDICATION OR LASER

# WHAT SHOULD BE FIRST?

- **PRO DROPS**

- NEWER DROPS HAVE MORE EFFICACY THAN THOSE AT TIME OF GLAUCOMA LASER TRIAL
- NO POST-OP IOP SPIKE
- SOUNDS LESS RISKY TO PATIENTS
- PATIENTS ARE MORE MOTIVATED TO RETURN
- LASER DOESN'T ALWAYS WORK / WEARS OFF

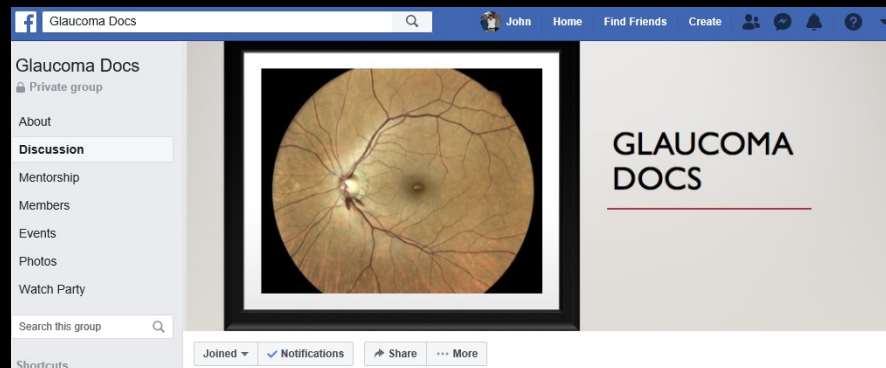
- **PRO LASER**


- GLAUCOMA LASER TRIAL
  - SHOWED ALT PATIENTS HAD LOWER IOP AT LONG-TERM FOLLOW-UP
  - BETTER C/D SCORES, BETTER VF SCORES, MEDICATION USE WAS LOWER
- LESS MEDICATION SIDE EFFECTS
- POOR DROP COMPLIANCE INCREASES PATIENT RISK
- SLT MORE EFFECTIVE WHEN DONE FIRST-LINE



# WHAT ARE “GLAUCOMA DOCS” DOING?

FEBRUARY 2020 FACEBOOK POLL












 **Rahul Minkeyfromaladdin Gupta** created a poll. February 2

Let us hypothetically ignore ancillary case-specific factors (age, trabecular pigmentation, highest known eye-pressure, typical eye-pressure, patient-dexterity or other traits, local cost, et cetera):

Which is your typical favor for initial treatment of primary open-angle glaucoma?

Thank you.

- ☒ Eye drop    +31
- ☐ About fifty–fifty eye-drop versus laser (here, case-dependent)    
- ☐ Selective- or argon-laser trabeculoplasty (S.L.T. or A.L.T.) 
- ☐ Other (please specify in comments) 

# WHICH DROP TO USE FIRST?

PROSTAGLANDINS

MIOTICS

BETA-BLOCKERS

FIXED-DOSE  
COMBINATIONS

CARBONIC ANHYDRASE  
INHIBITORS

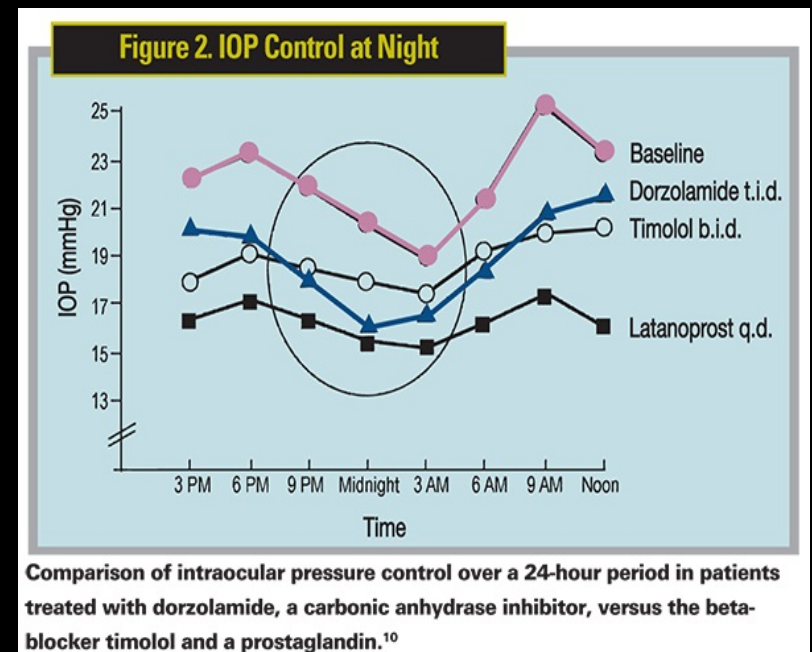


Rho-Kinase  
INHIBITORS

ALPHA-AGONISTS

# WHEN DECIDING WHICH DROP TO USE

- CONSIDER
  - THE PATIENT
    - EVERYONE IS DIFFERENT
  - EFFICACY
    - MAGNITUDE OF IOP LOWERING
    - **ABILITY TO FLATTEN THE DIURNAL CURVE**
  - SIDE EFFECTS / TOLERABILITY
  - DOSING FREQUENCY / CONVENIENCE
  - COST



# IOP LOWERING EFFICACY



## IOP-Lowering Efficacy: Prostaglandin Analogues vs Other Antiglaucoma Treatments

Treatment	Mean Change From Baseline as % Change in IOP	
	Peak	Trough
Bimatoprost	33	28
Travoprost	31	29
Latanoprost	31	28
Timolol	27	26
Brimonidine	25	18
Betaxolol	23	20
Dorzolamide	22	17
Brinzolamide	17	17

IOP = intraocular pressure  
Adapted with permission from van der Valk R et al. *Ophthalmology*. 2005;112:1177-1185.

9

van der Valk, Rikkert et al. "Intraocular pressure-lowering effects of all commonly used glaucoma drugs: a meta-analysis of randomized clinical trials." *Ophthalmology* vol. 112,7 (2005): 1177-85.

**TROUGH** = 24 HOURS AFTER LAST QHS DRUG OR 12 HOURS AFTER LAST Q12H DRUG

# QUESTION

WHICH CLASS OF MEDICATIONS MEETS  
MOST / ALL OF THESE CRITERIA?

# PROSTAGLANDINS

- TRADITIONAL OPTIONS

- XALATAN (1996)
  - GENERIC 0.005% (2011)
  - XELPROS (NO BAK, 2018)
- RESCULA (2000)
  - D/C THEN REINSTATED 2013
- LUMIGAN
  - 0.03% (2001)
    - NOW AVAIL GENERIC
    - ALSO = LATISSE
  - .01% (2010) = NAMEBRAND
- TRAVATAN (2001)
  - TRAVATAN Z 0.004% (NO BAK, 2006)
- ZIOPTAN (2012)

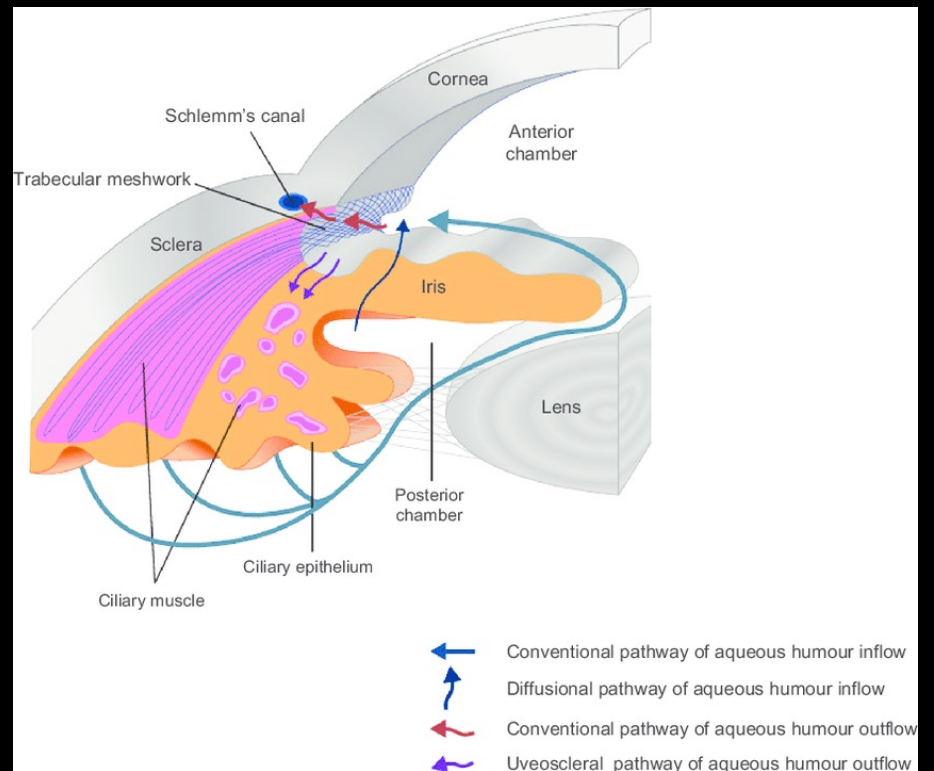


- PROSTAGLANDIN +
- VYZULTA (2017)



# PROSTAGLANDINS

- MECHANISM
  - ALL ENHANCE UVEOSCLERAL OUTFLOW
  - LUMIGAN MAY AID TM OUTFLOW
- EFFICACY
  - 25-35% REDUCTION OF IOP
- COMMENTS
  - IOP STARTS LOWERING AT 3-4 HRS
  - MAXIMUM IOP EFFECT 8-12 HRS
  - 24-36 HR DURATION
    - MAYBE LONGER
    - DON'T TELL YOUR PATIENTS!
- DOSING
  - ONCE A DAY (PREFER QHS)





# PROSTAGLANDINS: IS THERE A DIFFERENCE?

## IOP

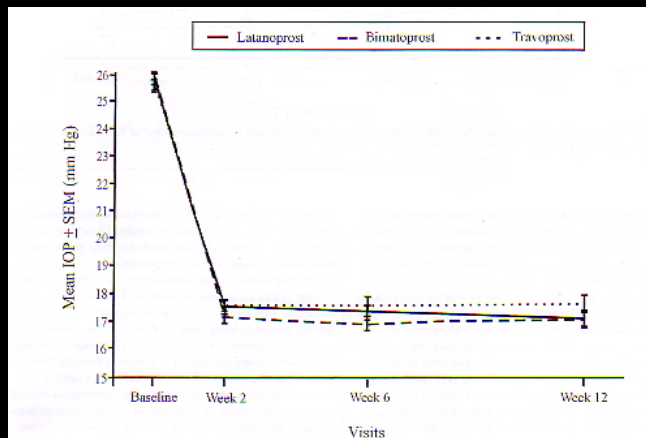


FIGURE 5. Unadjusted 8:00 AM mean intraocular pressure (IOP) levels by treatment and visit (intent-to-treat population).

## HYPEREMIA

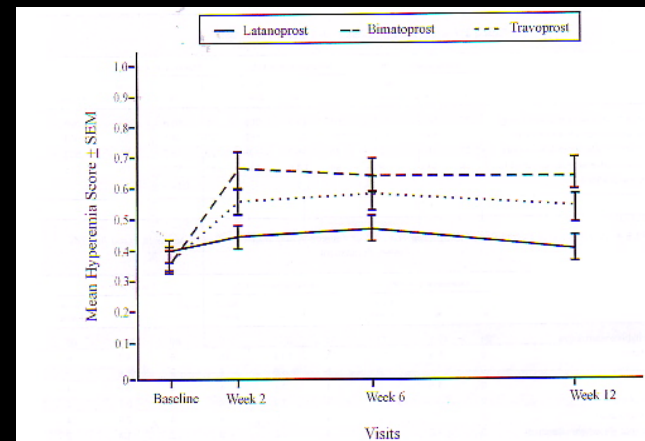
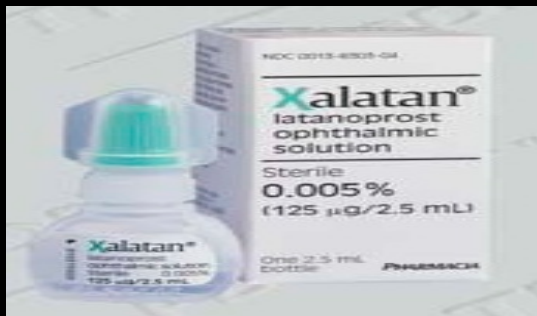


FIGURE 9. Mean hyperemia (investigators' assessments) score by treatment and visit.



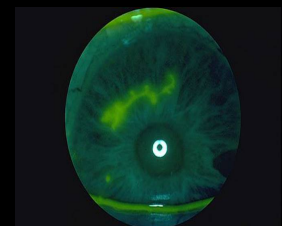
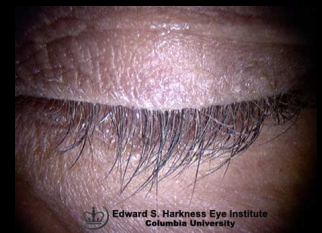
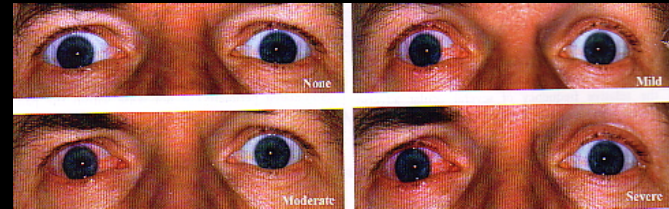
Parrish RK, ET AL. XLT STUDY. *AJO*. May 2003: 688-703



# PROSTAGLANDINS

- OCULAR SIDE EFFECTS

- >10%
  - FOREIGN BODY SENSATION
  - EYE PAIN, STINGING, HYPEREMIA
  - DISCHARGE
  - INCREASED EYELASH LENGTH
- 1-10%
  - PUNCTATE KERATITIS, BLUR
  - EYELASH THICKENING, BURNING
  - EYELID PAIN, TEARING, CRUSTING, PHOTOPHOBIA
  - IRIS HYPERPIGMENTATION (MELANIN)
- <1%
  - HYPERPIGMENTATION OF EYELIDS
  - HSK, MACULAR EDEMA, UVEITIS, TRICHIASIS
  - PERIORBITAL / LID CHANGES (SULCUS DEEPENING)
    - PROSTAGLANDIN ASSOCIATED PERIORBITOPATHY



# PROSTAGLANDINS

- SYSTEMIC SIDE EFFECTS
  - 1-10%
    - INFLUENZA, ARTHRALGIA, BACK PAIN, MYALGIA, SKIN RASH
    - NASOPHARYNGITIS, UPPER RESPIRATORY TRACT INFECTION
  - <1%
    - ANGINA, ASTHMA, DIZZINESS, DYSPNEA, HEADACHE, PALPITATIONS
- CONTRAINDICATIONS / WARNINGS / PRECAUTIONS
  - IRIS PIGMENTATION CHANGES MAY BE PERMANENT
  - PERIOcular SKIN / LASH CHANGES MAY REVERSE AFTER STOPPING
  - AVOID IN THOSE WITH
    - PRIOR / ACTIVE INFLAMMATION AND / OR HSK
  - USE WITH CAUTION
    - APHAKES, TORN POSTERIOR LENS CAPSULE, THOSE AT RISK OF MAC EDEMA
- OTHER
  - TOPICAL NSAIDS MAY DIMINISH LOWERING OF PROSTAGLANDIN

# WHEN TO USE PROSTAGLANDINS

- **YES FOR**

- 1<sup>ST</sup> LINE PRIMARY OPEN ANGLE GLAUCOMA
- 1<sup>ST</sup> LINE OC HTN / GLAUCOMA SUSPECT
- 1<sup>ST</sup> LINE PSEUDOPHAKIA WITH GLAUCOMA
- PIGMENTARY GLAUCOMA
- PSEUDOEXFOLIATIVE GLAUCOMA
- TRAUMATIC / ANGLE RECESSSION GLAUCOMA
- NORMAL TENSION GLAUCOMA
- CHRONIC NARROW ANGLE GLAUCOMA

- **NO FOR**

- ACUTE ANGLE CLOSURE GLAUCOMA
- UVEITIC GLAUCOMA
- NEOVASCULAR GLAUCOMA

# PROSTAGLANDINS: COSTS

- AS OF 11/11/21 FROM GOOD RX COUPON/CLUBS/MAIL
  - LATANOPROST
    - GENERIC 0.005% \$10-20
    - XELPROS 0.005% (BAK FREE) - (\$67 @ DRUGS.COM)
  - BIMATROPROST
    - LUMIGAN 0.01% \$222-237
    - GENERIC 0.03% \$33-64
  - TRAVOPROST
    - GENERIC TRAVTAN Z (BAK FREE) 0.004% \$48-108
  - TAFLUPROST
    - ZIOPTAN 0.0015% (PF) \$153-218
  - LATANOPROSTENE BUNOD
    - VYZULTA 0.024% \$219-234

# QUESTION

SHOULD I USE GENERICS?

# GENERICS

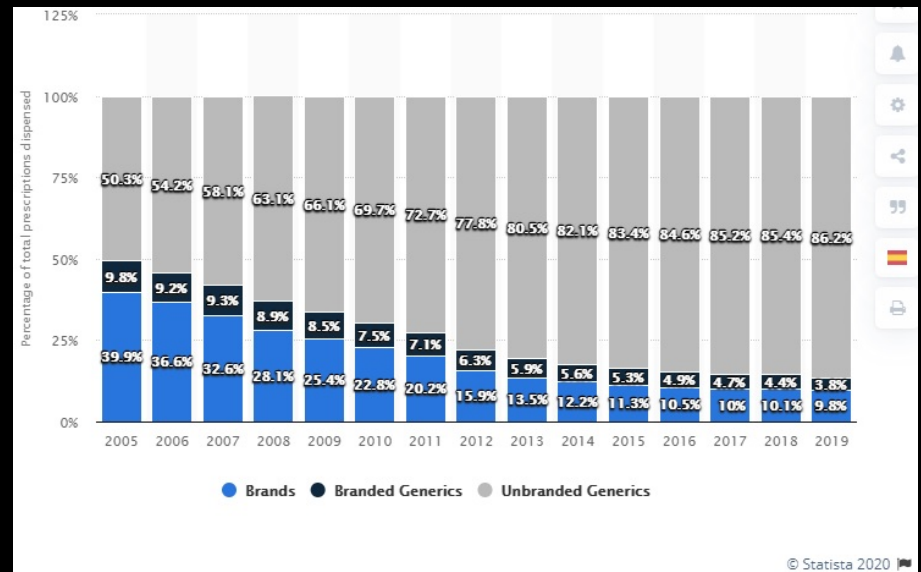
- PROS

- REQUIRED TO HAVE
  - SAME ACTIVE INGREDIENT
  - ROUTE OF ADMINISTRATION
  - DOSING
  - MANUFACTURED TO SAME QUALITY STANDARDS AS REFERENCE MEDICATION

- CONS

- NOT REQUIRED TO HAVE
  - SAME INACTIVE INGREDIENT(S)
  - SAME BOTTLE / PACKAGING
- SOME PROVIDERS AND PATIENTS HAVE LESS CONFIDENCE IN GENERICS
- REDUCED REVENUE FOR INNOVATOR COMPANIES

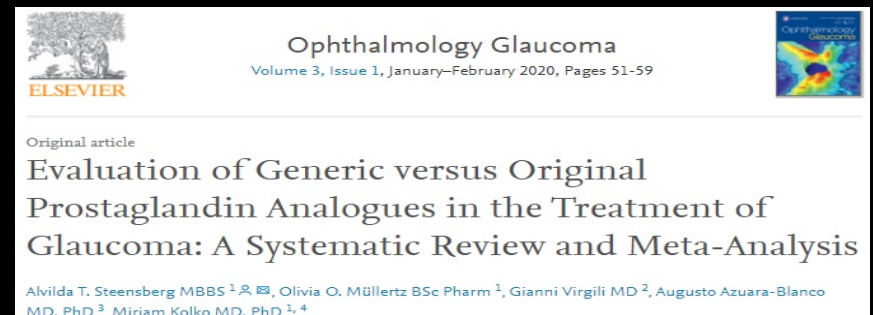
US DRUG PRESCRIPTIONS DISPENSED 2005-2019



<https://www.statista.com/statistics/205042/proportion-of-brand-to-generic-prescriptions-dispensed/>

# GENERICS AND GLAUCOMA

- 2019 REVIEW
  - LOOKED AT 2015 MEDICARE PART D PRESCRIBING PATTERNS
  - 36 GLAUCOMA DRUGS
  - RESULTS
    - WITHIN EACH CLASS ODS/MDS CHOOSE THE SAME DRUG
    - **LATANOPROST CHOSEN MOST OFTEN**
- 2009 11.7% vs 2018 55.2%
- METANALYSIS
  - STUDIES ARE QUESTIONABLE AND POSSIBLY IMPACTED BY BIAS
  - OVERALL
    - **IOP SIMILAR BUT NOT 100%**
    - **TOLERABILITY SIMILAR**
  - BOTTLE DESIGNS MAY NEED TO BE REGULATED (TEND TO STREAM OUT)
  - DIFFERENCES IN
    - COMPOSITION AND PROPERTIES



# SHOULD YOU USE GENERICS?

- IS IT UP TO YOU BUT...PROBABLY
- AT THE VA (TO KEEP TAXPAYER COSTS DOWN)
  - GENERIC
    - LATANOPROST
    - TIMOLOL
    - BRIMONIDINE
    - DORZOLAMIDE
    - DORZOLAMIDE / TIMOLOL
- RECOMMENDATION TO YOU
  - GO FOR IT
    - TRIAL AND ERROR TO SEE HOW PATIENT DOES
  - IF NOT AS EFFECTIVE
    - CONSIDER WRITING “DISPENSE AS WRITTEN” ON RX
- HOWEVER,
  - WHEN POSSIBLE SUPPORT MANUFACTURERS
    - WE WILL CONTINUE TO NEED NEW PRODUCTS



# QUESTION

WHAT IF YOUR PATIENT CHOOSES LASER  
FIRST AND WANTS TO KNOW MORE?

# CAN OPTOMETRISTS DO ALT/SLT?

- LASER FOR GLAUCOMA (ALT / SLT)
  - OK 1998
  - KY 2011
  - LA 2014
  - AK 2019
  - AR 2020

- FROM ANAGRAM 02/22/21

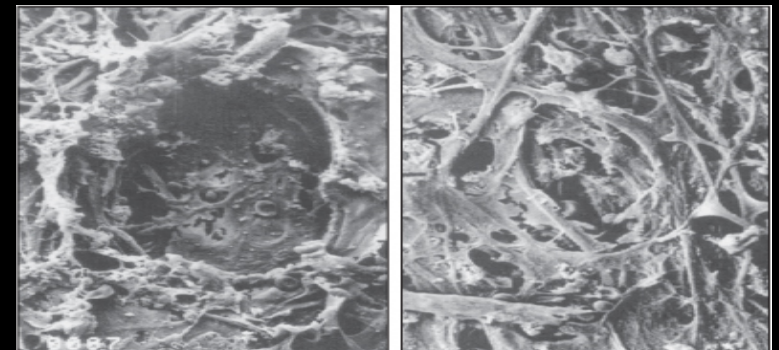
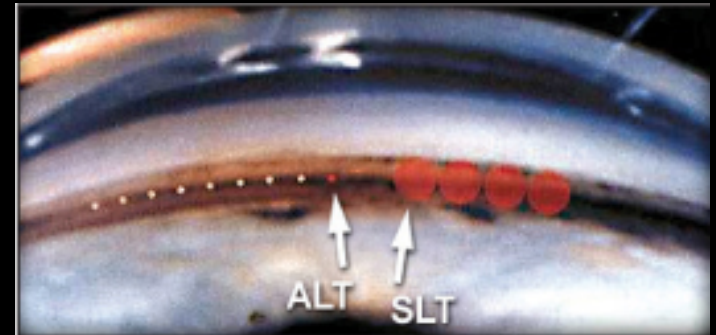


## Florida Laws and Rules for Optometric Physicians

(4) Surgery of any kind, including the use of lasers, is expressly prohibited. Certified optometrists may remove superficial foreign bodies. For the purposes of this ...

# LASER TRABECULOPLASTY

- OPTIONS
  - ARGON LASER TRABECULOPLASTY
    - ALT
  - SELECTIVE LASER TRABECULOPLASTY
    - SLT
  - MICROPULSE LASER TRABECULOPLASTY
    - MLT
- MECHANISM IS NOT CLEAR
  - INCREASE AQUEOUS OUTFLOW
  - THEORIES
    - MECHANICAL
    - CELLULAR
    - BIOCHEMICAL



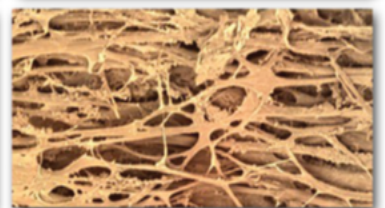
Without MicroPulse



**Trabecular meshwork after ALT**

CW laser exposures can cause high thermal rise resulting in tissue damage

With MicroPulse



**MLT**

Meshwork remains intact without the signs of tissue damage while still as effective as ALT\*

# TRABECULOPLASTY

- **CONSIDERED FOR**

- NON-COMPLIANT PATIENTS
- MEDICATION INEFFECTIVENESS
- MEDICATION CONTRAINDICATIONS
- UNABLE TO INSTILL MEDICATIONS
- CANNOT AFFORD MEDICATIONS
- TYPES OF PATIENTS
  - PSEUDOEXFOLIATIVE GLAUCOMA
  - PIGMENTARY GLAUCOMA
  - PRIMARY OPEN-ANGLE GLAUCOMA
  - OCULAR HYPERTENSION

- **NOT CONSIDERED FOR**

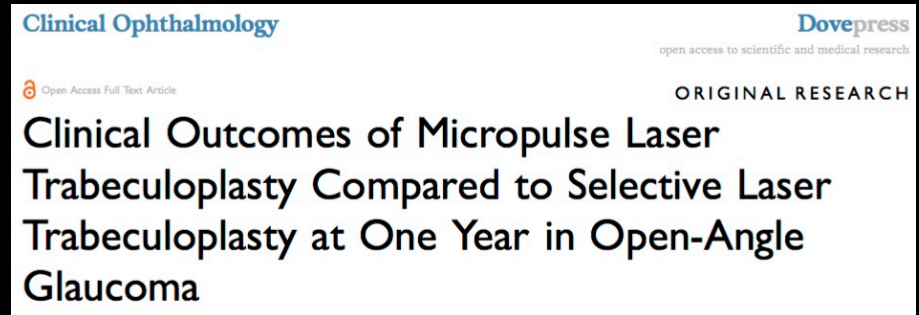
- ANGLE RECESSION
- DEVELOPMENTAL GLAUCOMA
- UVEITIC GLAUCOMA
- NEOVASCULAR GLAUCOMA
- TRAUMATIC GLAUCOMA
- ICE SYNDROMES
- STEROID INDUCED GLAUCOMA
- SIGNIFICANT PAS
- CORNEAL EDEMA
- ANTERIOR SEGMENT INFLAMMATION
- NON-PIGMENTED OR TM IS NOT VISIBLE

# SLT CLINICAL TRIAL RESULTS

- EFFICACY
  - IOP REDUCTIONS OF 22-28% AFTER 36-49 WEEKS
- SLT VS ALT
  - SIMILAR EFFECT ON IOP
- UNCONTROLLED OAG MAX MEDS, PRIOR FAILED ALT
  - +70% WITH > 3 MM HG IOP DROP
  - -24% POST-OP IOP SPIKE  $\geq$  5 mm Hg
- SLT VS MEDICATION
  - SLT MED STUDY (PROSPECTIVE, RANDOMIZED, DOUBLE-ARM, 17 CTRS, 94 EYES)
    - SLT (58 EYES)
      - 100 APPLICATIONS, 360 DEGREES (REPEATED IF ABOVE TARGET)
      - RESULTS: IOP 6.7 mmHg LOWER AFTER 8 MONTHS
    - MEDICATION (36 EYES)
      - MED CHANGED IF ABOVE TARGET
      - RESULTS: IOP 7.6 mmHg LOWER AFTER 8 MONTHS

# MICROPULSE LASER TRABECULOPLASTY

- FDA APPROVED
- NOT AS WIDELY EMBRACED
- FEWER STUDIES
- 2021 STUDY VS SLT
  - IOP LOWERING AT 1YR
    - SIMILAR TO SLT
    - SLT SEEMED TO HAVE BETTER SUCCESS
  - FEWER POST-LASER IOP SPIKES



Clinical Ophthalmology 2021;15 243–251

# LASER FIRST?

- LASER IN GLAUCOMA AND OCULAR HYPERTENSION STUDY (LiGHT)
  - SLT VS EYE DROPS AS FIRST-LINE
  - 718 PATIENTS
    - 356 SLT VS 362 EYE DROPS
  - RESULTS AT 36 MOS
    - AT TARGET IOP
      - 93% SLT
      - 91.3% ON DROPS
    - SLT MORE COST EFFECTIVE

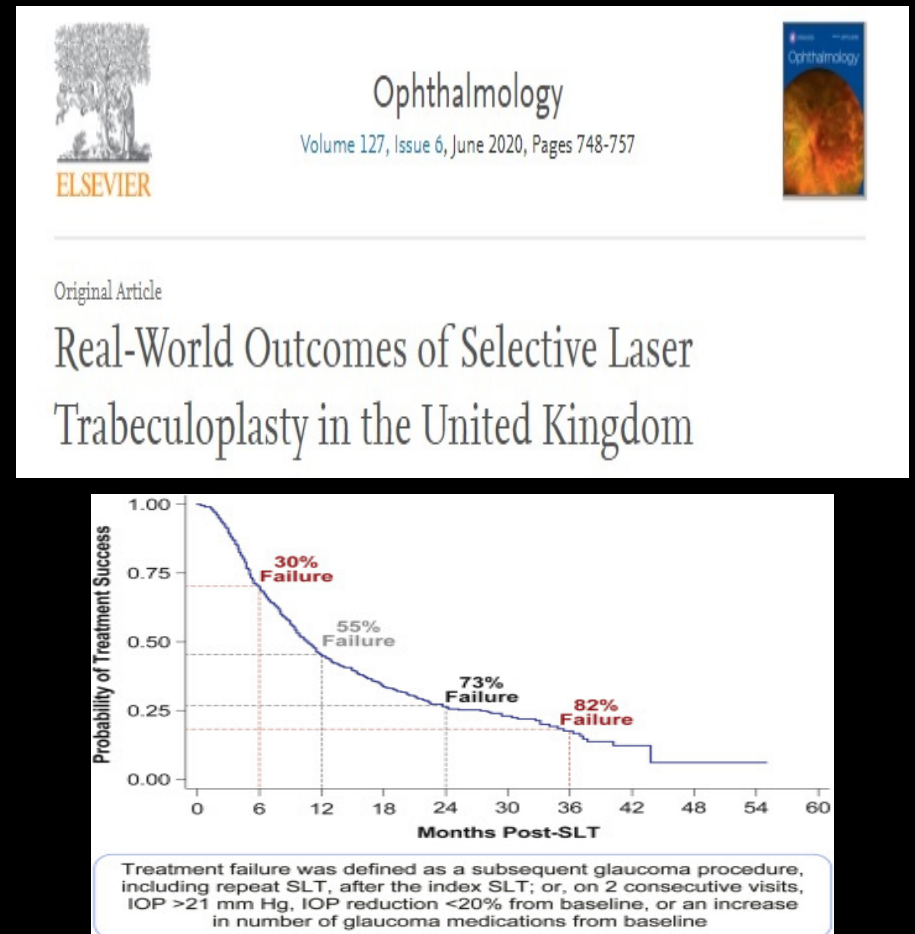


Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LiGHT): a multicentre randomised controlled trial

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\*

# SLT REAL WORLD RESULTS

- UK STUDY
  - 831 SLT-TREATED EYES
    - EVAL AT 12, 18, 24, 36 MOS
  - FAILURE WAS
    - IOP > 21 mmHg
    - INCREASE IN G MEDS
    - SUBSEQUENT GLAUCOMA PROCEDURE
- RESULTS
  - 70% SUCCESS AT 6 MOS
    - DECREASES WITH TIME
  - 27% SUCCESS AT 24 MOS
  - HIGHER INITIAL IOP
    - BETTER SUCCESS



Khawaja, Anthony P et al. "Real-World Outcomes of Selective Laser Trabeculoplasty in the United Kingdom." *Ophthalmology* vol. 127,6 (2020): 748-757.



# CASE

54 / AA / M  
IOP: 19-25/24-28, PACHYM: 511/508, NO FAM HX, NO PIG / NO PEX  
GONIO CBB 360 OU

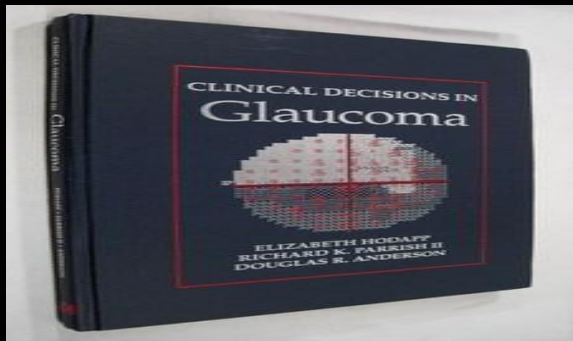
IOP DATA	VISIT 1	VISIT 2 (1 mo)	VISIT 3 (3 mos)	VISIT 4 (4 mos)
OD	19	20	25	16
OS	28	24	26	16
MEDS:	None	None	None	Latanoprost qhs ou

- DX: HIGH RISK G SUSPECT OD  
MILD GLAUCOMA OS
- GOAL: 20-30% IOP REDUCTION (FROM HIGHEST IOP 25/28)
- TARGET RANGE: OD 17-20 / OS 20-23
- RESULT: IOP 16/16 ON LATANOPROST QHS OU
  - LOWER THAN TARGET RANGE ON ONE IOP LOWERING MEDICATION
- RTC 4 MOS FOR VA / IOP CHECK

# QUESTION

YOUR PATIENT HAS GLAUCOMA.  
YOU HAVE COLLECTED BASELINE DATA.  
YOU HAVE SET A TARGET IOP.  
YOU HAVE LOWERED THE IOP.  
NOW WHAT?

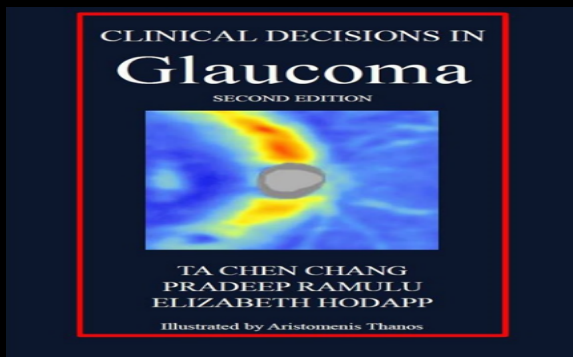
# NOW WHAT?



Drs. Hodapp, Parrish and Anderson  
Clinical Decision in Glaucoma 1993

and again in

Drs. Chang, Ramulu and Hodapp  
Clinical Decisions in Glaucoma 2<sup>nd</sup> Edition, 2016



There are five basic steps to follow in managing a patient with glaucoma:

- ~~1. Establish a good baseline.~~
- ~~2. Set a reasonable target for intraocular pressure (IOP).~~
- ~~3. Lower the pressure.~~
4. Follow up with the patient to see if the target pressure is maintained and if the glaucomatous damage progresses.
5. Modify the target pressure and treatment as indicated by the patient's course.