


Optometric  
Education  
Consultants

## OCT and OCT Angiography in Glaucoma

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March 18, 2023




1


### Disclosures- Greg Caldwell, OD, FAAO

All relevant relationships have been mitigated

- Lectured for: Alcon, Allergan, Aerie, B&L, BioTissue, Kala, Maculogix, Optovue, RVL, Heru, Santen
- Disclosure: Receive speaker honorariums
- Advisory Board: Allergan, Alcon, Dompe, Eyenovia Tarsus, Visus
- I have no direct financial or proprietary interest in any companies, products or services mentioned in this presentation
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- Envelope: PA Medical Director, Credential Committee
- Healthcare Registries - Chairman of Advisory Council for Diabetes and AMD
- The content of this activity was prepared independently by me - Dr. Caldwell
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2



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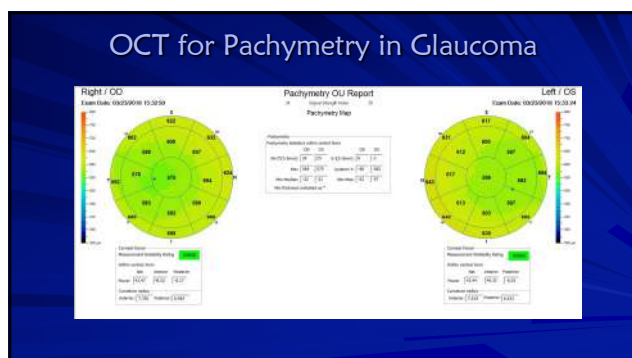
### OCT in my office:

- A. OCT
- B. OCT and OCT Angiography
- C. No OCT technology

3

## OCT Anterior Segment Applications in Glaucoma

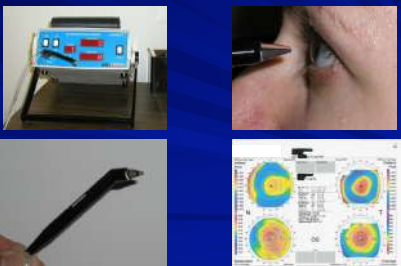
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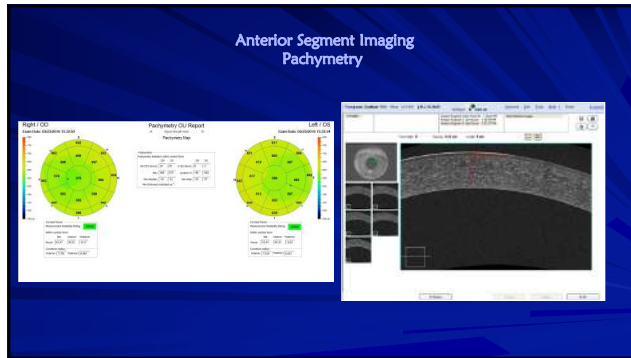
5

### Pachymetry

Ultrasonic versus Optical versus OCT



6



7

55-Year-Old Men

500 microns CCT and 21 mm Hg with Goldmann

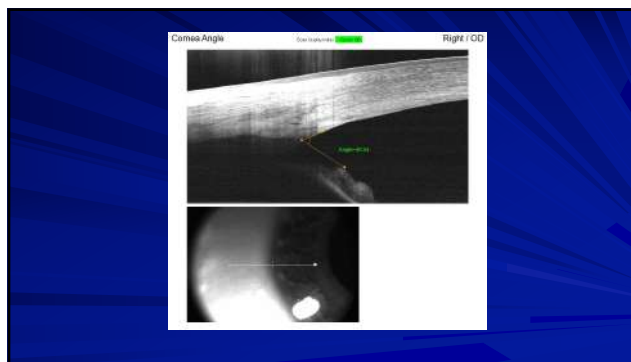
600 microns CCT and 21 mm Hg with Goldmann

What is the true IOP?

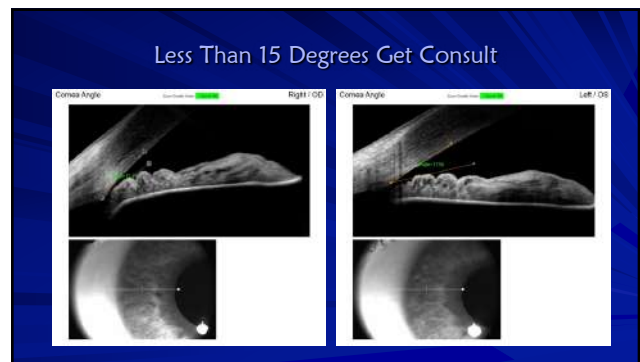
1. 18 mm Hg
2. 21 mm Hg
3. 24 mm Hg
4. Don't Know

Corneal Curvature  
Corneal Thickness  
Corneal Rigidity

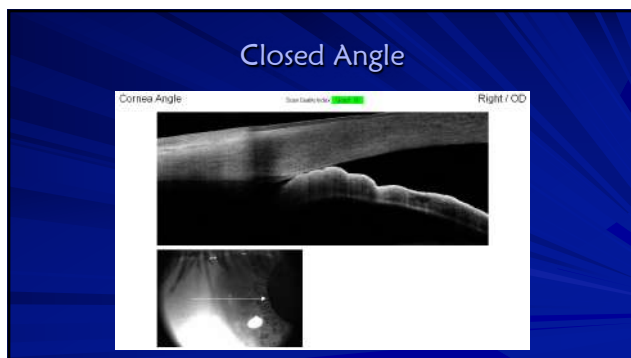
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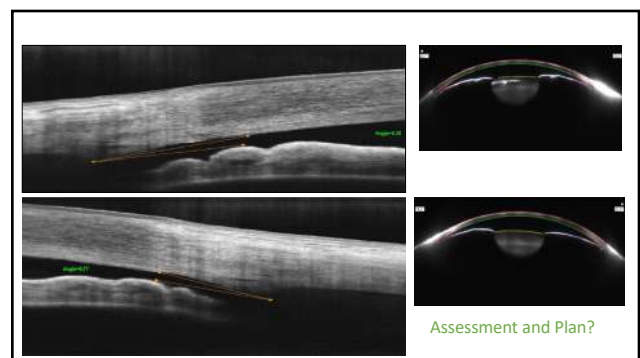
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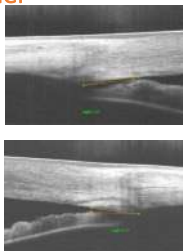
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12

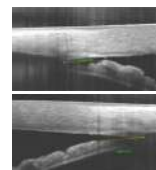
### Backed into a closure corner

- 30 YOF
- 2018: Referred for narrow angles
- BVA: +2.00 DS 20/20; +1.25 DS 20/20
- Gonio: "slit OU" Grade 1 OU
- IOP 18 mm OU
- Dx: PACS OU
- Plan LPI OU



### Backed into a closure corner

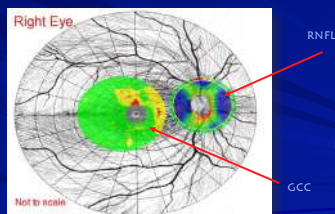
- Follow up (2018)
- No appreciable change after LPI
- Gonio: grade 1; no PAS, double hump sign
- Dx: plateau iris syndrome
- Plan: Discussion iridoplasty, pilocarpine, lens extraction
- Observation recommended
- Other glaucoma specialists may have different approach
  - welcome to second opinion
- Do not start any new medication without clearance
  - Cold and allergy meds



13

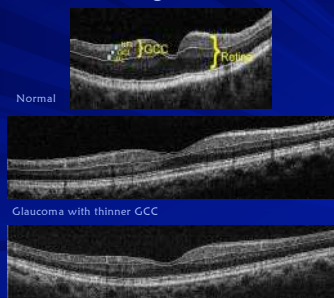
14

### Overlay of the RNFL and GCC



15

### GCC Thinning in Glaucoma

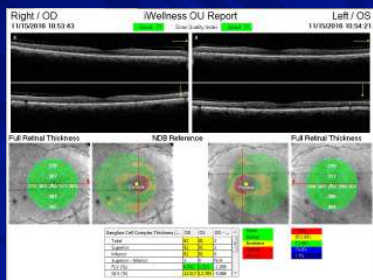


16

### Test

☞ This GCC thinning is most likely from glaucoma?

- \* Yes
- \* No
- \* I don't know



17

### Green, Red, Yellow, and Blue Disease

Physiologically Normal  
OCT measure structure

18

Saturday, March 18, 2023

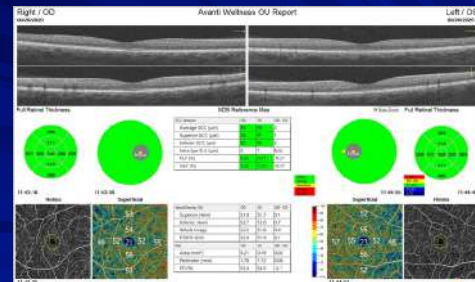
## Green, Red, Yellow, and Blue Disease

### Hints to this Disease

- If the disease is a bilateral disease
  - \* Glaucoma
    - It is usually asymmetric
- If the scans are symmetric
  - \* Then it most likely not disease – physiologically normal
  - \* Anatomical variation
    - Normal for that patient
- Another hint is the GCC expected values
  - \* 85-100 microns
  - \* 92-95 microns

19

## Symmetry and What is Being Tested

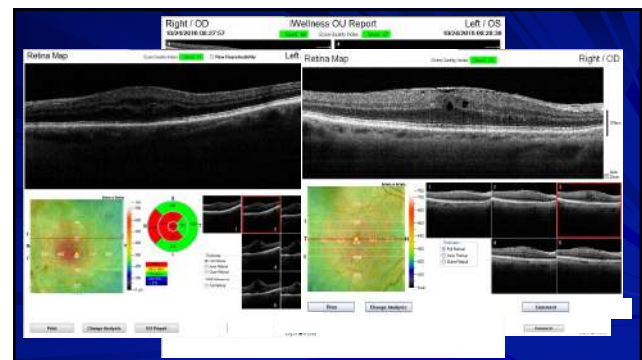


20

## 46-year-old woman with red-yellow disease

- OD -0.75 20/20
- OS -1.25 20/20
- Systemic hx: thyroid dysfunction, high cholesterol
  - Medications for the above
- IOPs 15 mm Hg OU 8:30 am

21

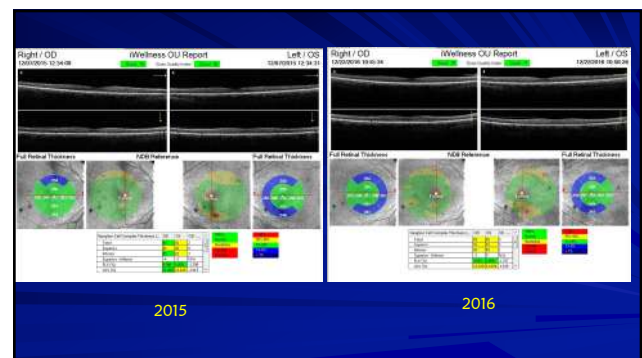


22

## 63-year-old woman with red, yellow, blue, and green disease

- |                               |       |
|-------------------------------|-------|
| OD plano/ +2.00               | 20/20 |
| OS -0.50/ +2.00               | 20/20 |
| IOPs 15-18 mm Hg OU 2011-2015 |       |

23



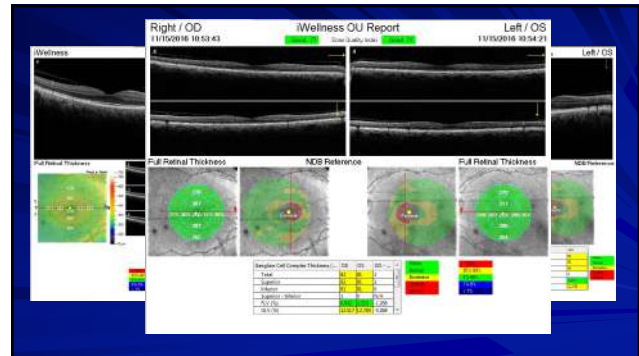
24



## 58-year-old with yellow disease

OD +1.00 20/20  
 OS +1.25 20/20  
 IOPs: 13/15 mm Hg at 11:24 am  
 (pay attention to FLV and GLV)

25

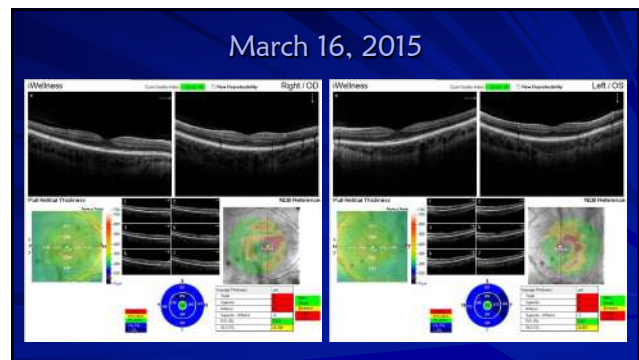


26

## 40 yo man with red, blue, green disease

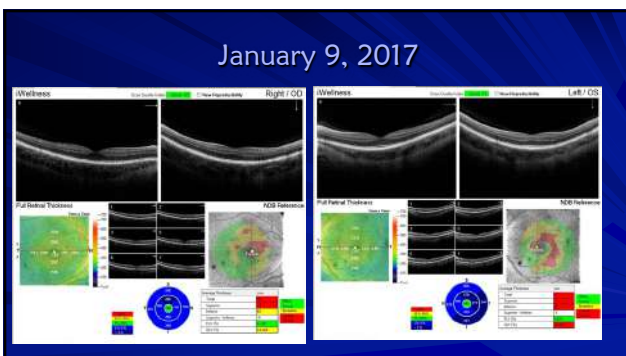
OD -7.50 - 0.75 x 110 20/20  
 OS -7.50 - 0.75 x 105 20/20  
 IOPs: 15/13 mm Hg at 6:30 pm

27



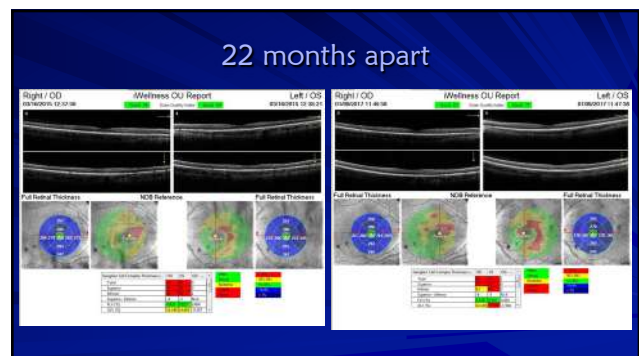
28

## January 9, 2017



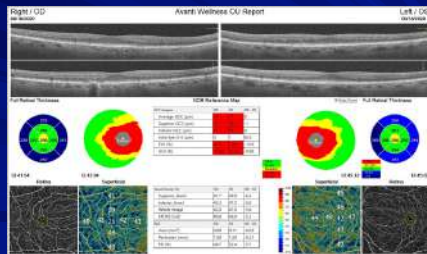
29

## 22 months apart



30

# 79-year-old woman with DM

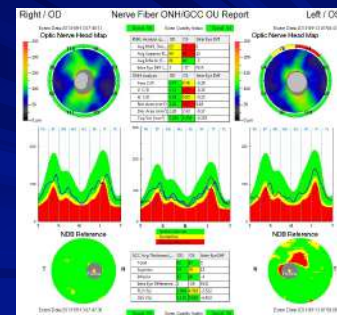
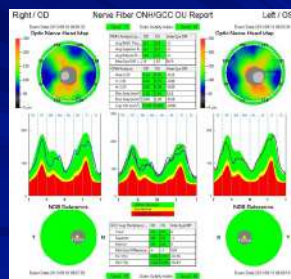


## Glaucoma

31

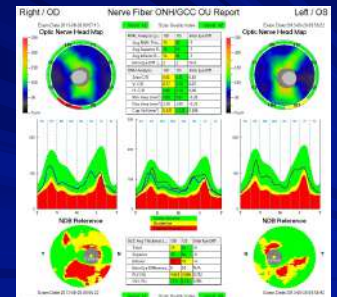
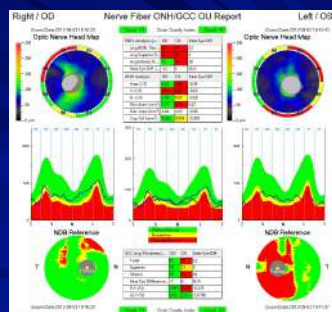
32

# NFL and GCC



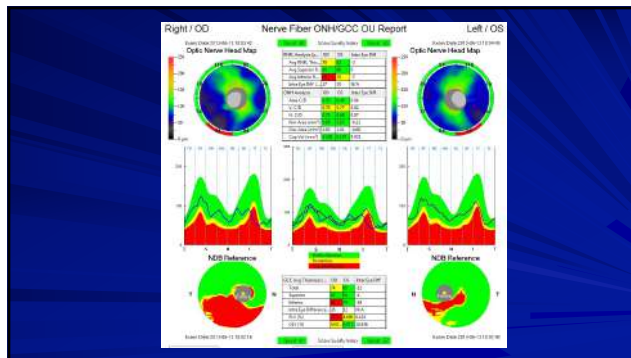
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34

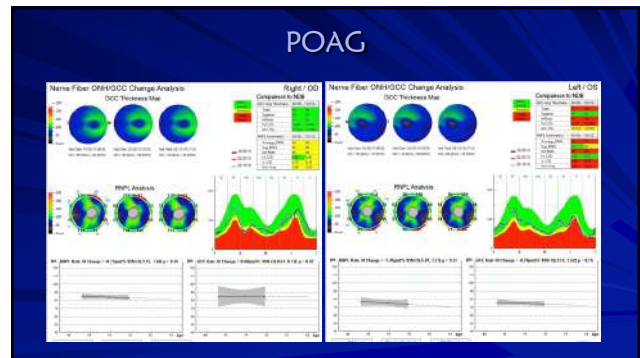


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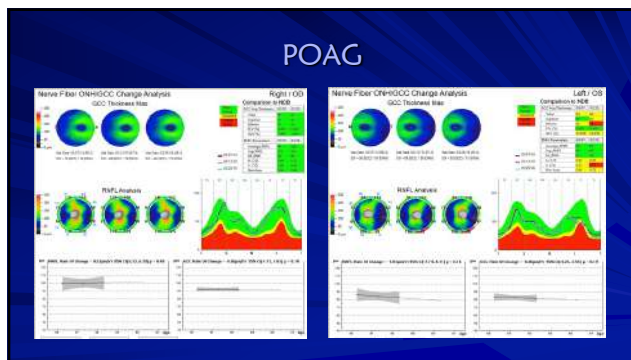
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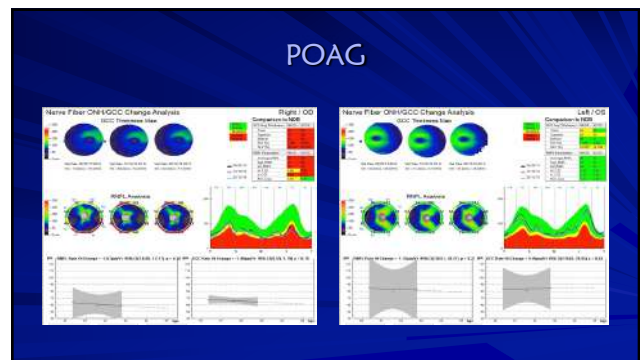
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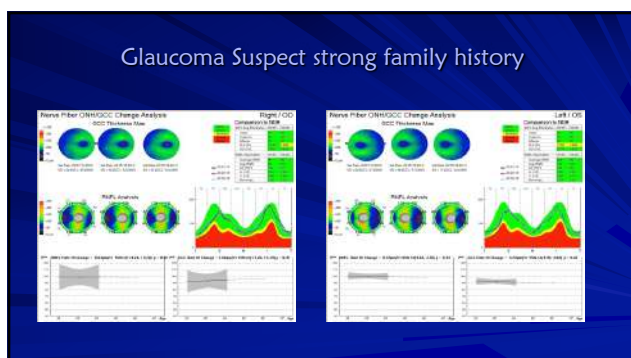
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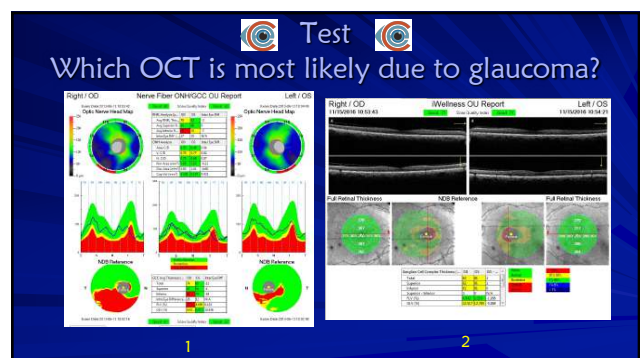
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40



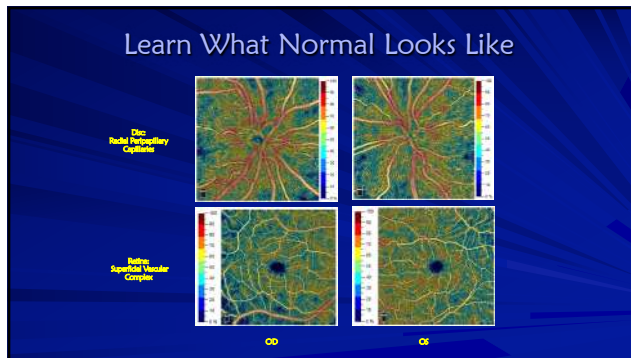
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42

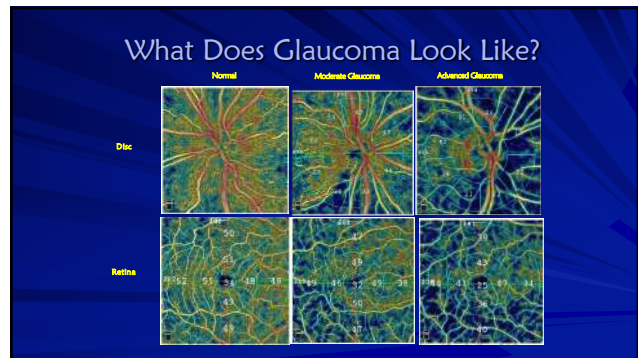


## Learn What Normal Looks Like



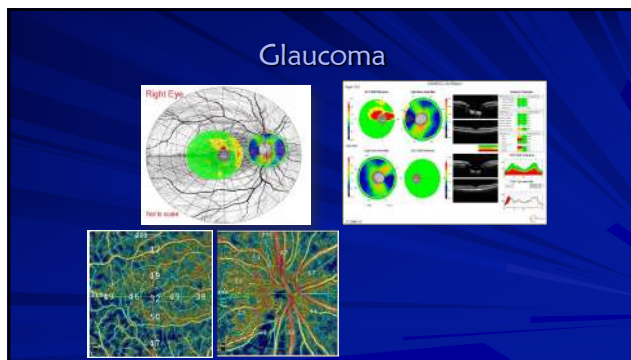
43

## What Does Glaucoma Look Like?



44

## Glaucoma

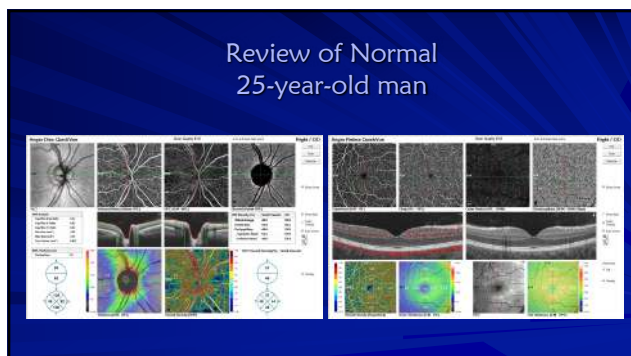


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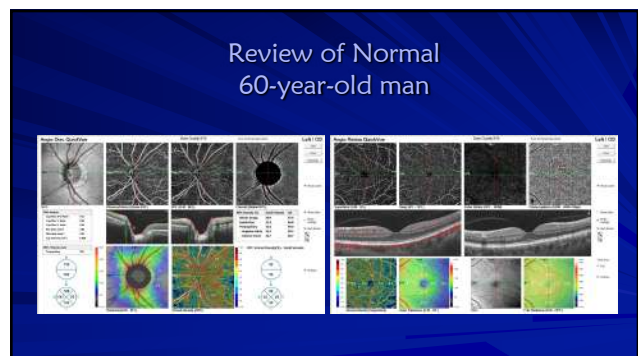
## How Does OCTA Change the Way You See Glaucoma?

- Shows early changes in the retina and optic disc
- Adds new information to the diagnosis
- Aids in progression detection

46

Review of Normal  
25-year-old man

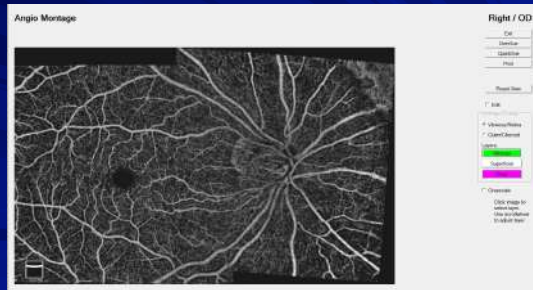
47

Review of Normal  
60-year-old man

48



## 60-Year-Old Montage OD



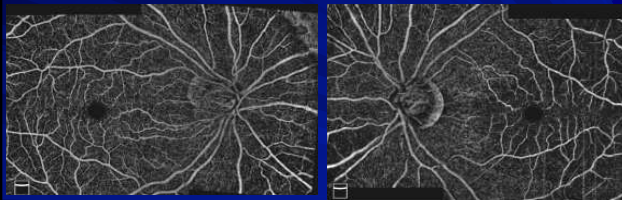
49

## 60-Year-Old Montage OS



50

## 60-Year-Old Montage OU



51

## Bonus on Visual Fields

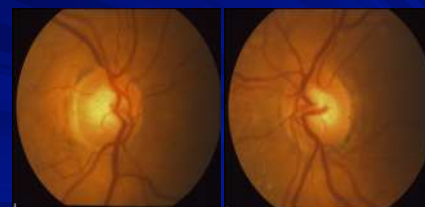
52

## 50-year-old woman

- ~ Recently has moved to the area and needs followed for her "ocular hypertension"
- ~ Diagnosed 18 months ago
- ~ Currently is using Travatan qd OU (PM)
- ~ VA 20/15 OU
- ~ Externals: unremarkable
- ~ SLE: slight hyperemia OU
- ~ IOP: 13 OD and 14 OS @ 8:30 AM

53

## ONH Appearance

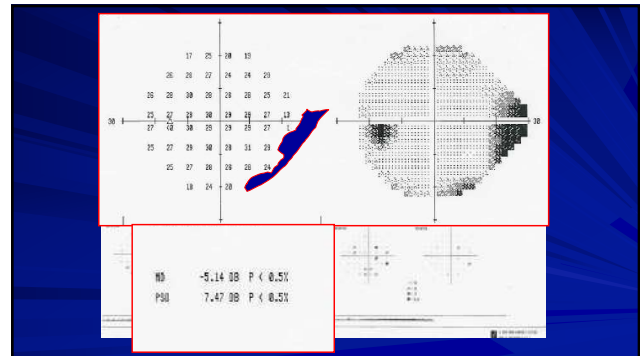


54

## Review of Records

- ☞ Diurnal IOP without medication
  - ★ OD 16-19 8:00 AM thru 5:30 PM
  - ★ OS 17-20 8:00 AM thru 5:30 PM
- ☞ Pachys
  - ★ OD 505
  - ★ OS 505
- ☞ VF results

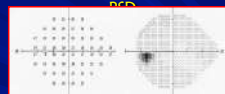
55



56

## MD and PSD

- ☞ MD
  - ★ 54 spots on 24-2
  - ★ All 54 spots reduced by 1 DB (54DB)
  - ★ MD 1DB
- ☞ PSD
  - ★ 54 spots on 24-2
  - ★ 27 spots reduced by 2 DB (54 DB)
  - ★ MD 1 DB
- ☞ High PSD (Localized loss)
  - ★ 13.5 spots reduced by 4 DB (54DB)
  - ★ MD 1 DB



Moderate PSD (More localized loss)

- ★ 3.00 DB

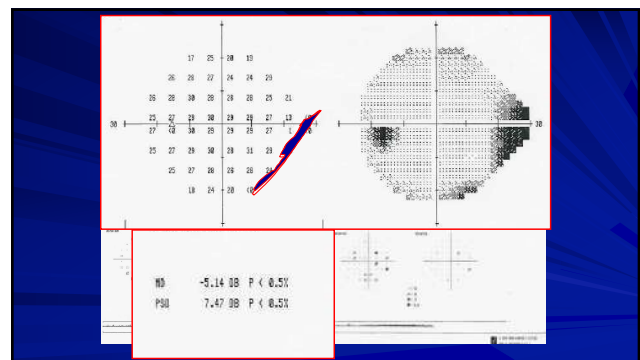
High PSD (Localized loss)

- ★ 5.00 DB

MD -1.33 DB

PSD 1.33 DB

57



58

## Discussion

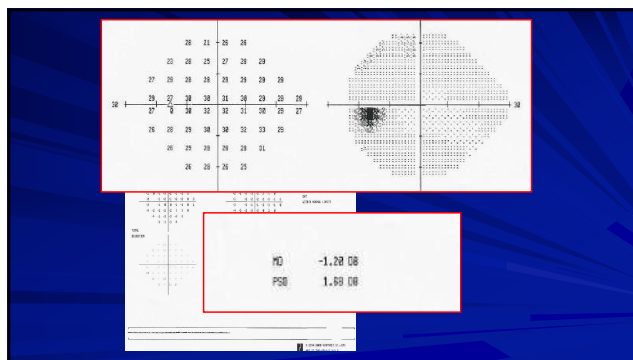
Why is this patient being treated?

59

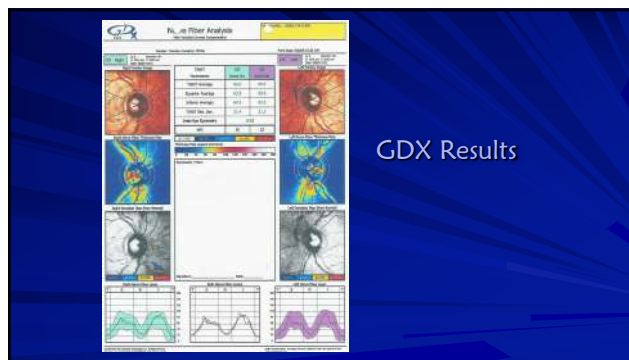
## Treatment

- ☞ Repeat visual field
- ☞ Discontinue Travatan
- ☞ Get GDx nerve fiber analysis

60



61



62

### Cranium Keeper

- ~ Do not back door patients into the ocular hypertension treatment study
  - \* Via thin pach results
- ~ A patient needs to be suffering from ocular hypertension to use the study
- ~ Thin pachs tell us:
  - \* Patients with ocular hypertension are at high, medium or low risk for development
- ~ If you have a diagnostic instrument learn how it works and make proper interpretations

63

### Test

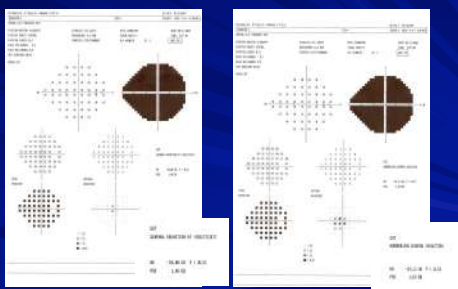
- ~ What's the Mean Deviation (MD) on a 24-2 Threshold Visual Field?
  - \* +5 db
  - \* 0 db
  - \* -5 db
  - \* -12 db
  - \* -32 db
  - \* -50 db



64

### Thoughts on Mean Deviation (MD)

What is the Mean Deviation on a visual field of a blind eye?



65

### Thoughts on Mean Deviation (MD)

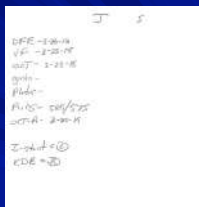
- ~ Turn on your VF let it run
  - \* 30 DB (decibel)
- ~ 0-5 (1/6) 30% reduction
- ~ 5-10 (1/3) 40% reduction
- ~ >10 (1/2) 50% reduction
- ~ How many DB difference to reliable VF should cause a RAPD?
  - \* 3 DB for a small APD, the larger the difference the greater the APD



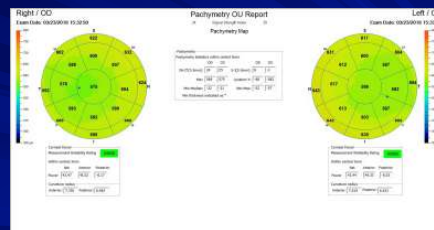
66

## 68-year-old woman with glaucoma

- Wants second opinion for glaucoma management
- Recently had cataract surgery OS with iStent
  - September 25, 2017
  - Dorzolamide 2% BID OS, Lumigan 0.01% QD OS
- Our practice recently performed cataract surgery and Kahook dual blade (KDB) MIGS
  - July 24, 2018
- IOP<sub>cat</sub>: 12 and 16 at 11:27 am



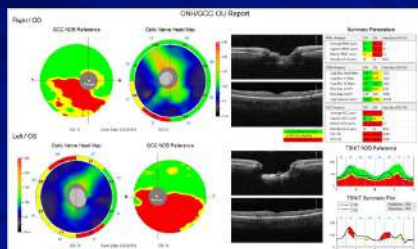
## OCT for Pachymetry in Glaucoma



67

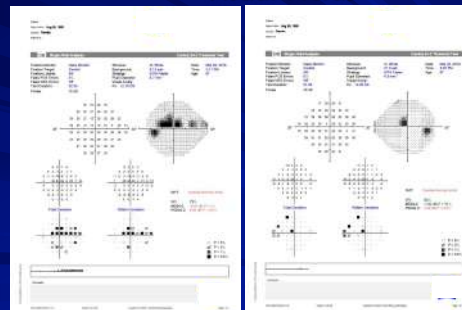
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## OCT GCC and NFL



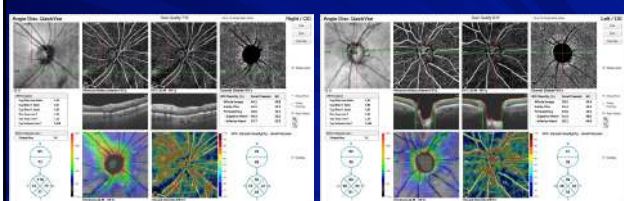
69

## Visual Fields



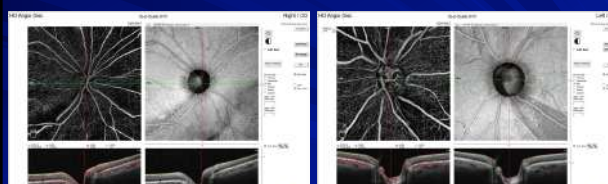
70

## Angiography and AngioAnalytics of Disc



71

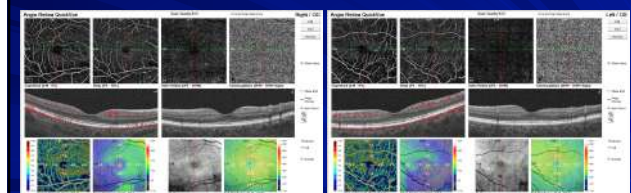
## En Face Radial Peripapillary Capillaries (RPC)



72



## Angiography and AngioAnalytics of Retina



73

## Montage OD



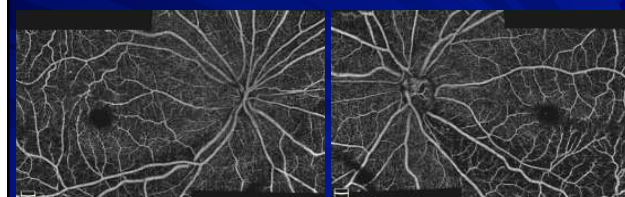
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## Montage OS



75

## Montage OU



76

## Update 2021

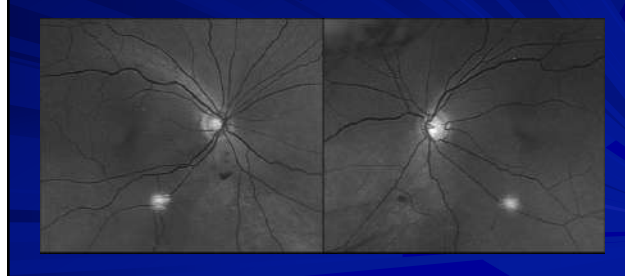
May 24, 2021



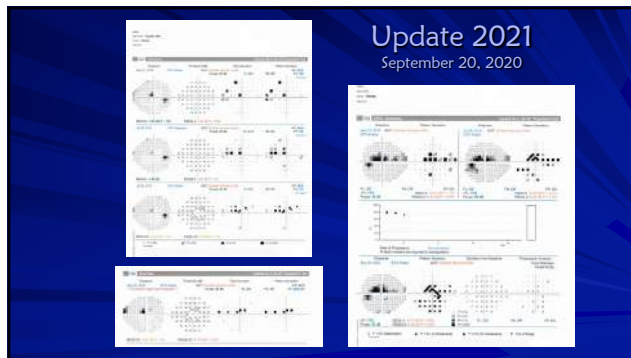
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## Update 2021

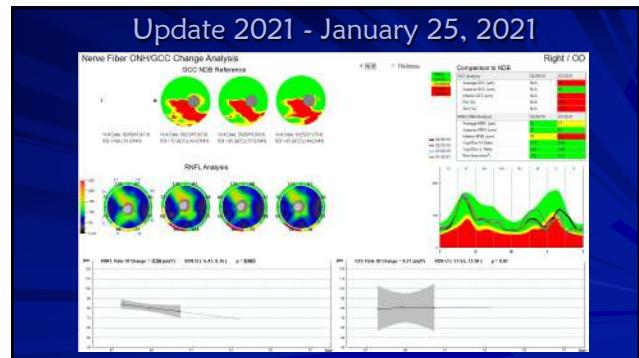
May 24, 2021



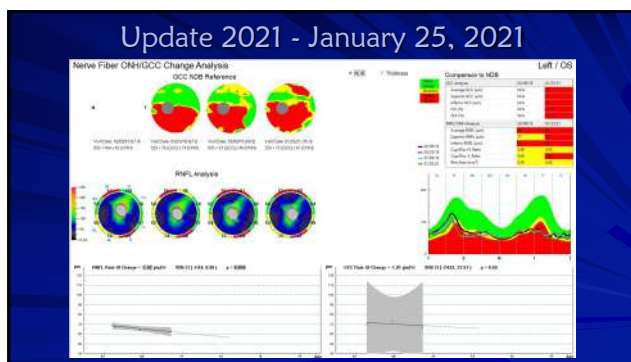
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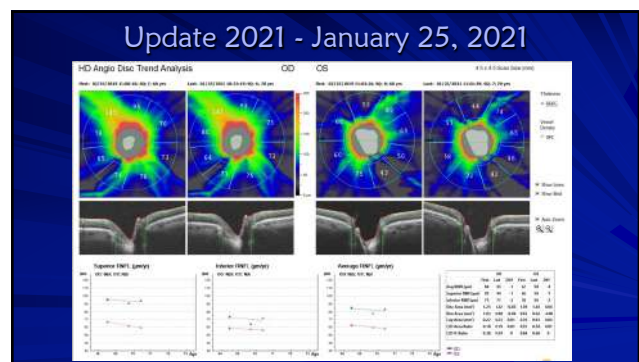
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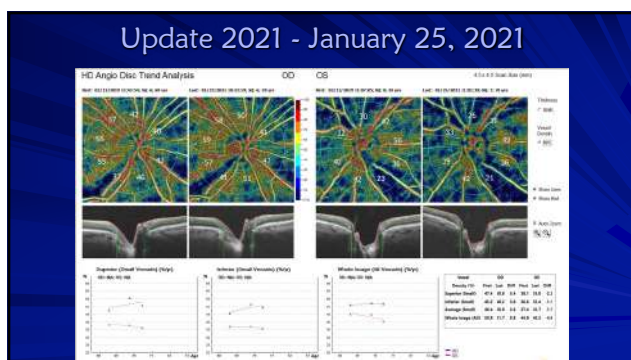
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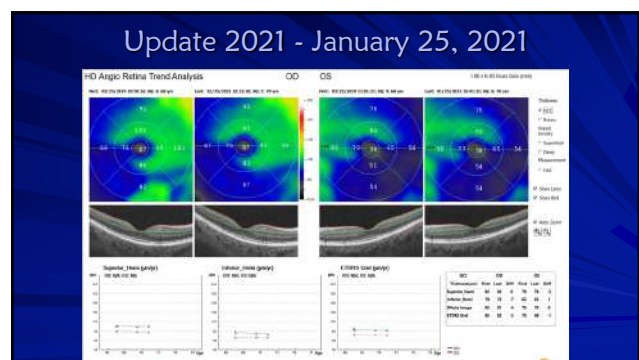
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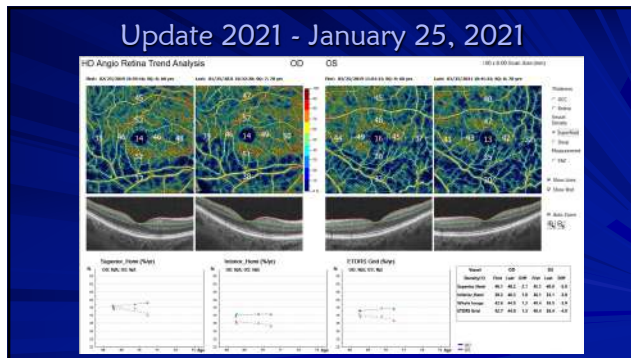
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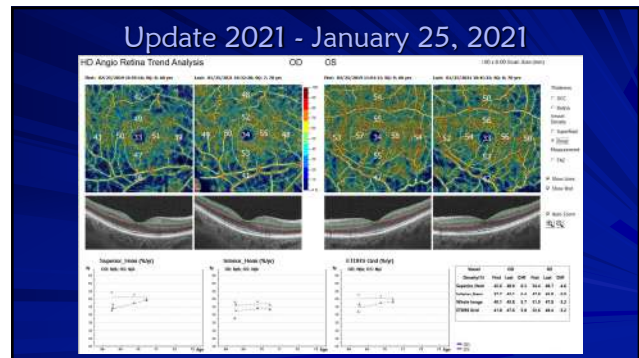
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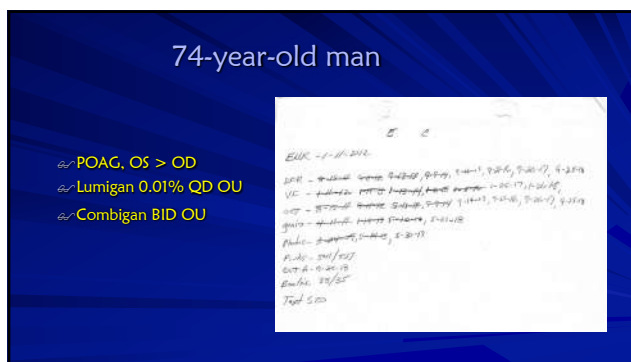
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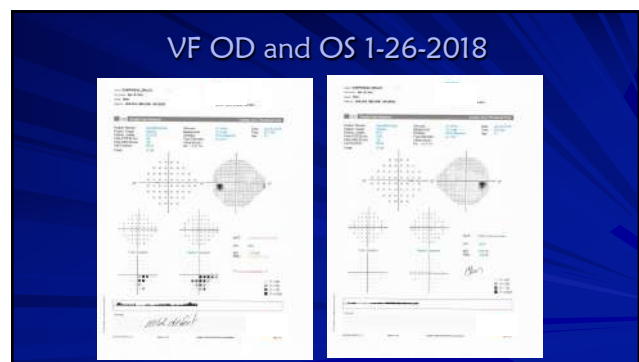
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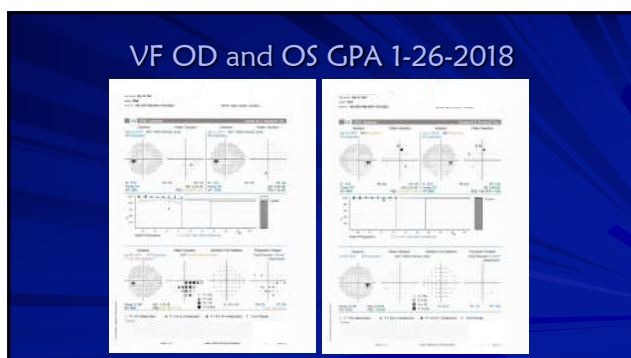
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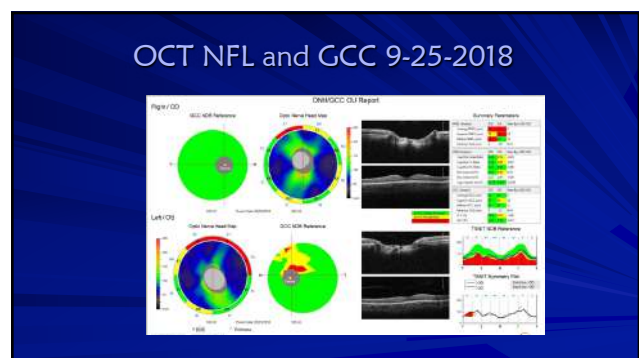
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88

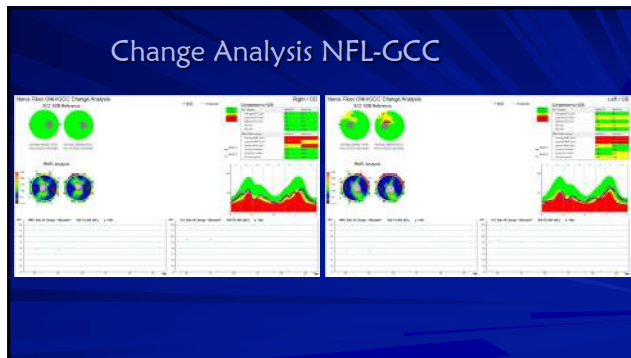


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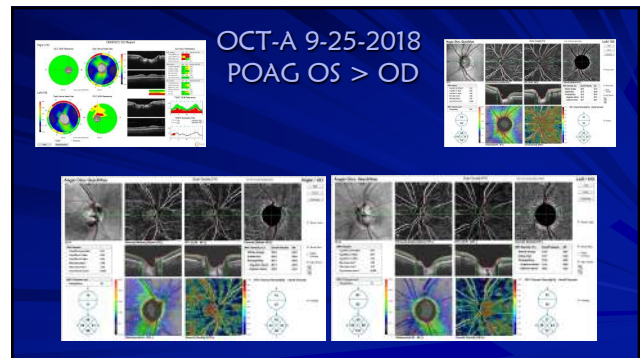


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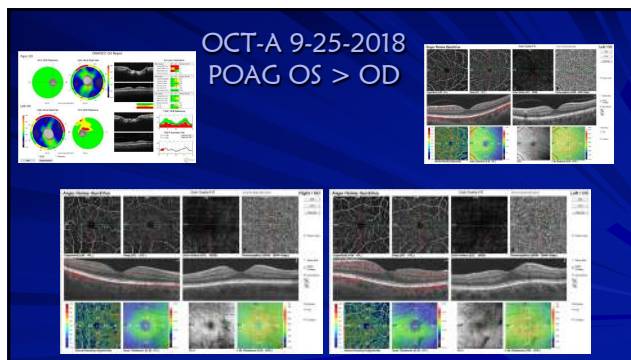




91



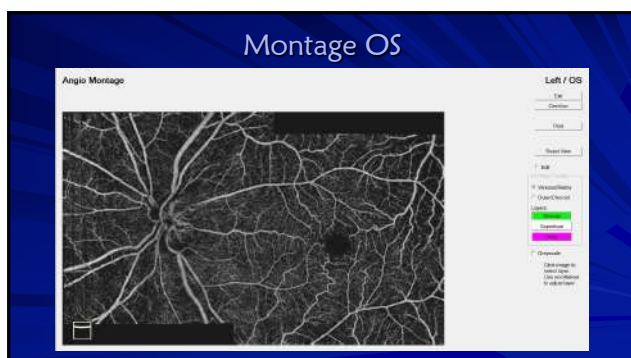
92



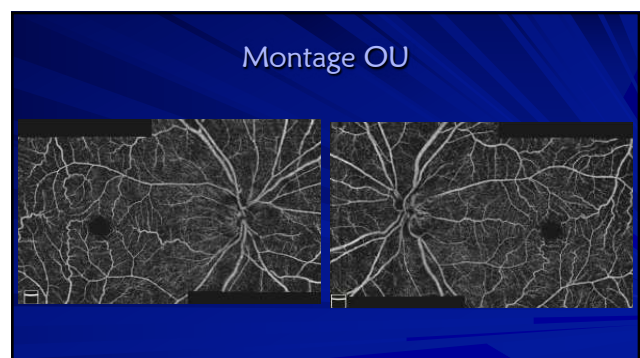
93



94



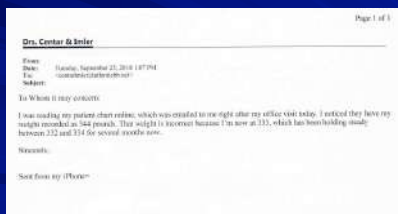
95



96

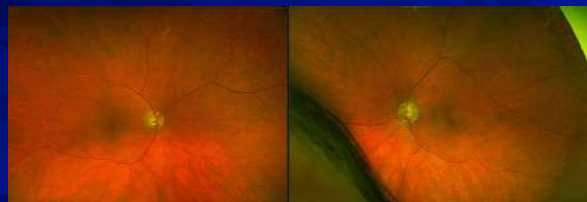


They do read their EHR  
communication



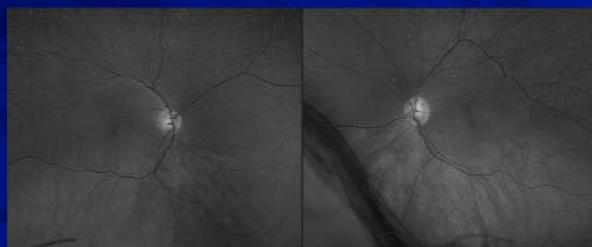
97

Update 2021- June 8, 2021



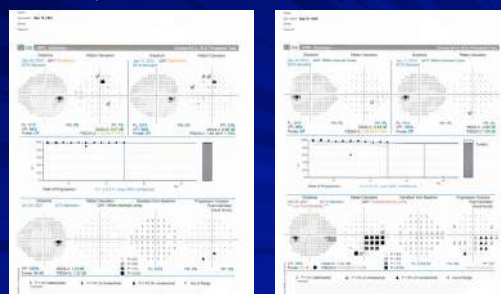
98

Update 2021- June 8, 2021



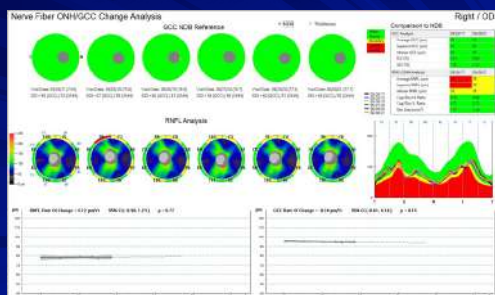
99

Update 2021- January 29, 2021



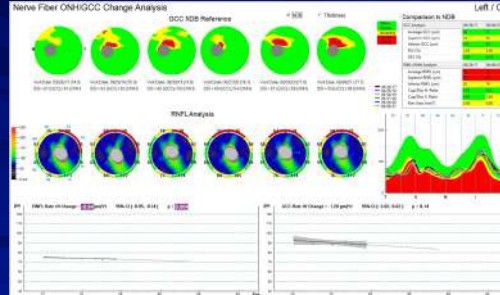
100

Update 2021- June 8, 2021

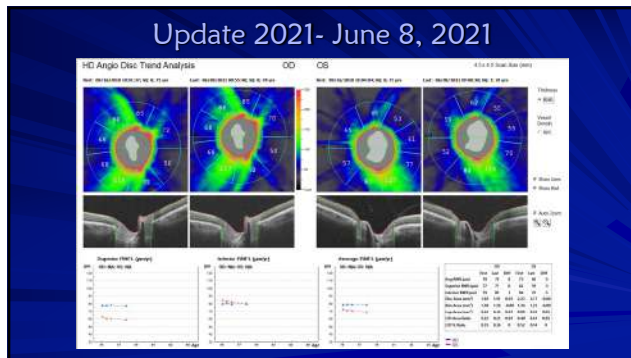


101

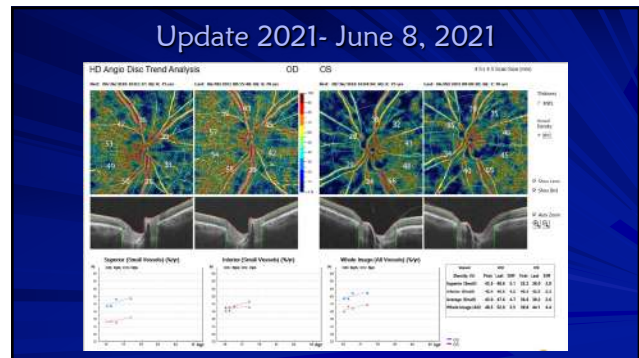
Update 2021- June 8, 2021



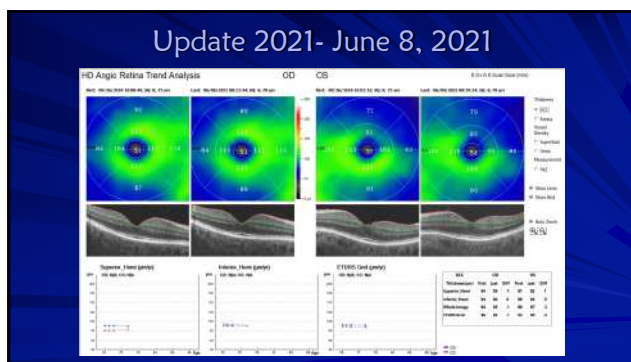
102



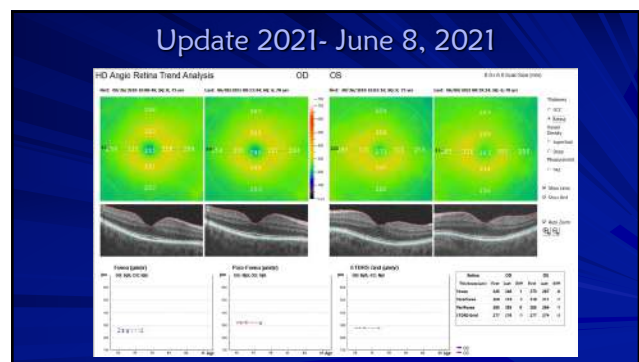
103



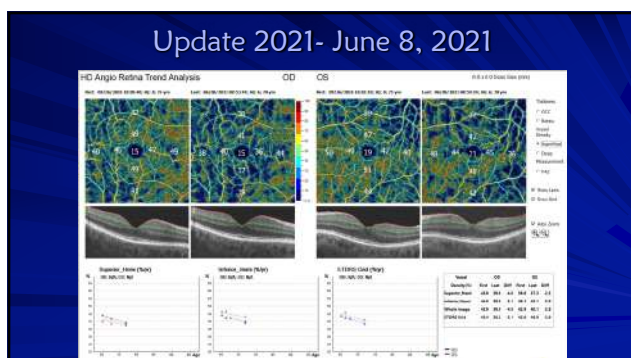
104



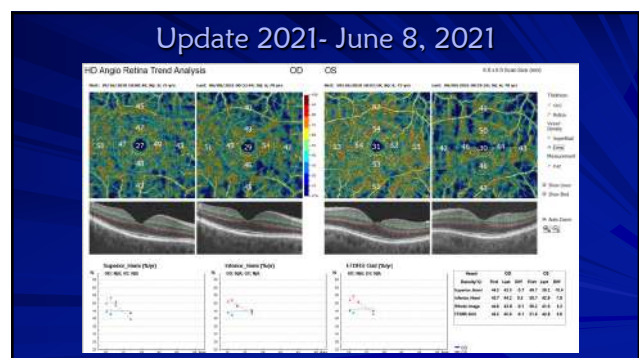
105



106



107



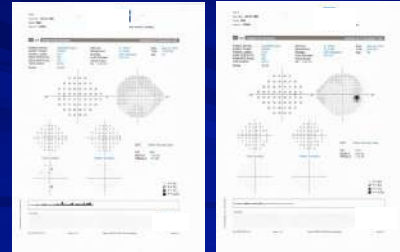
108

## 51-year-old man

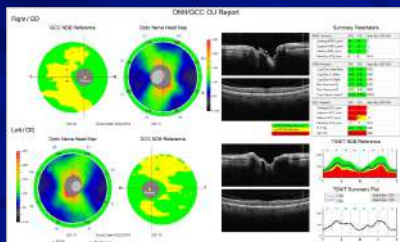
- ~ Ocular Hypertension since 2014
  - ★ No treatment
- ~ Pigment Dispersion
- ~ Baseline IOP or Tmax 26/26
  - ★ 2014— March 2018
- ~ Today 30/32, new Tmax 9-25-18

DFE - 3-20-18  
 VF - 3-20-18  
 OCT - 3-20-18  
 MD - 3-20-18  
 RUS - 3-20-18  
 OCT-A - 9-25-18  
 Baseline: 26/26 IOP  
 2014 - 2018  
 Pigment Dispersion  
 2014 - 2018

109

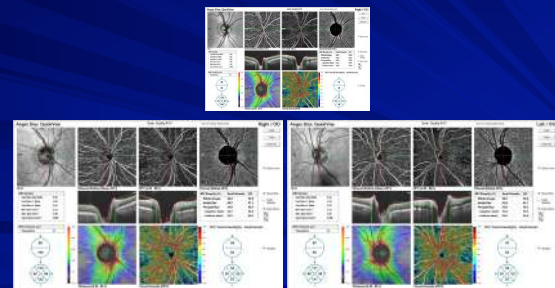
VF 24-2 Sita-Faster  
9-25-2018

110

OCT NFL and GCC  
3-22-18

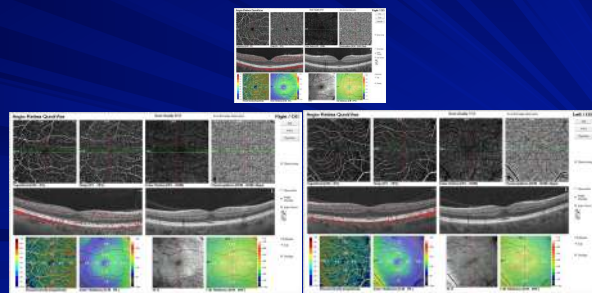
111

## OCT-A 9-25-2018



112

## OCT-A 9-25-2018



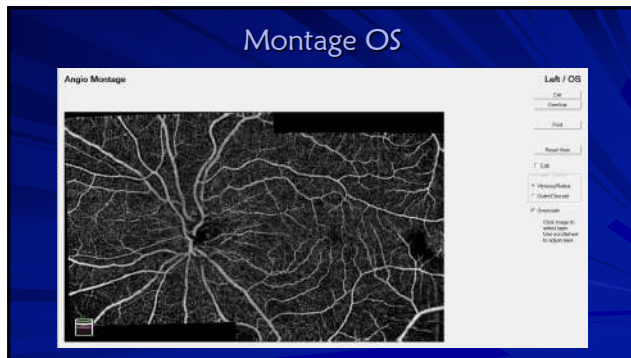
113

## Montage OD

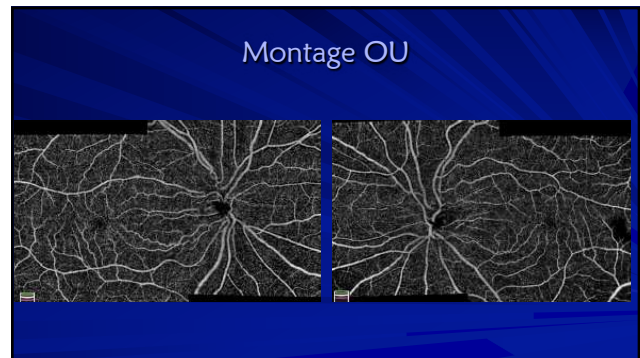


114

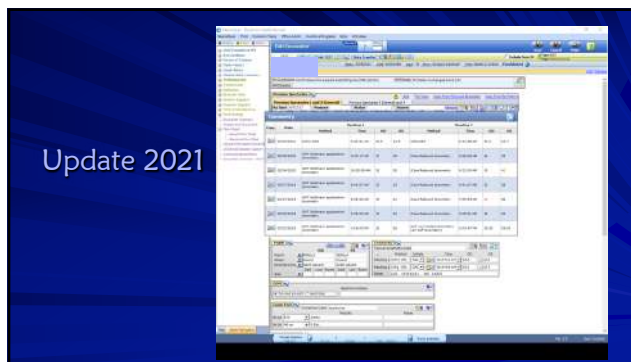




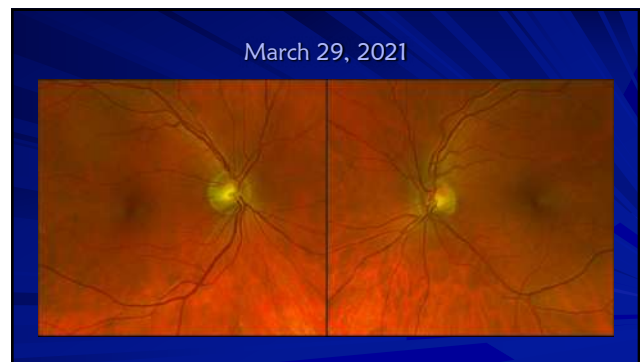
115



116



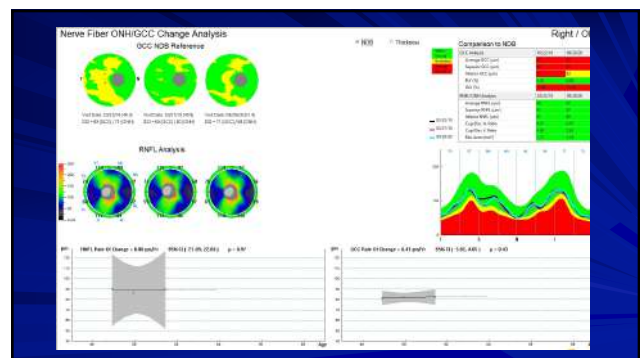
117



118

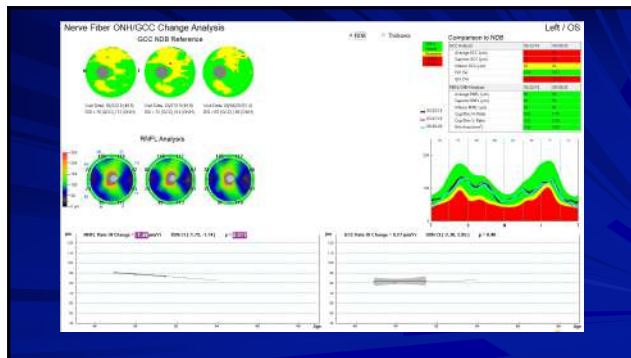


119

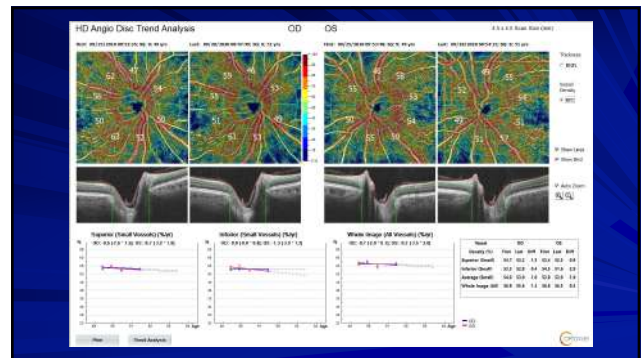


120

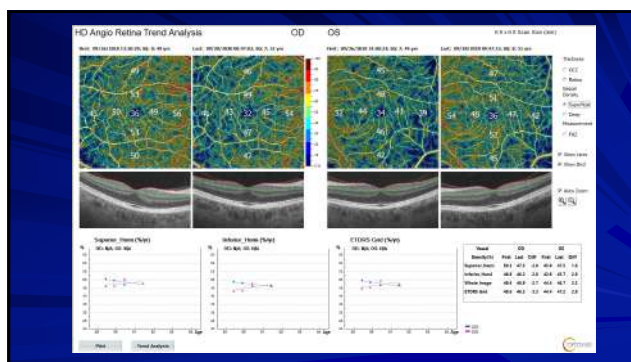




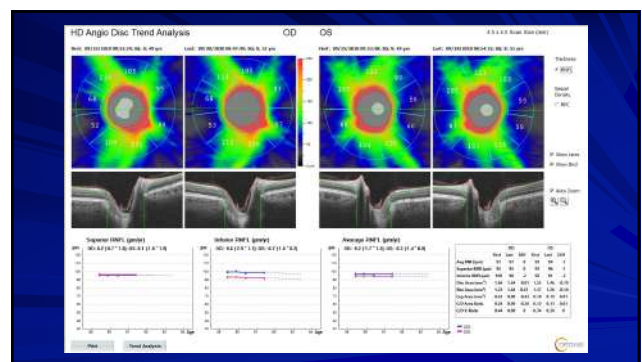
121



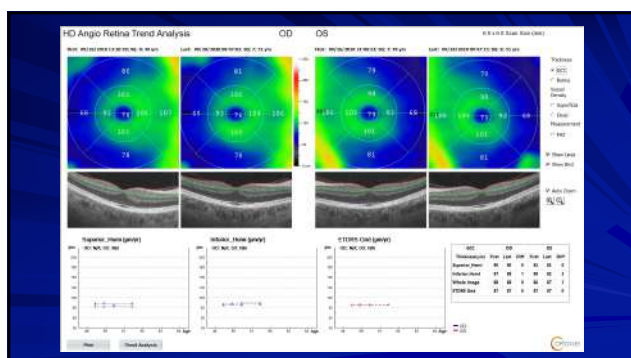
122



123



124



125

IOPs 38 and 32

- ~ Ocular hypertension versus glaucoma reviewed with patient
- ~ OCT results reviewed with patient
- ~ Patient elects to monitor
  - ★ RTC in 4 months for IOP ck and Visual Field 24-2 OU

126

### How Does OCTA Change the Way You See Glaucoma?


- Shows early changes in the retina and optic disc
- Adds new information to the diagnosis
- Aids in progression detection

127


### Question?

I feel more comfortable in interpreting an OCT or OCT-A for the diagnosis, management, or treatment of glaucoma?

- ★ Strongly agree
- ★ Agree
- ★ Disagree
- ★ Strongly disagree



128




Optometric  
Education  
Consultants

### Questions and Thank You

### OCT and OCT Angiography in Glaucoma

Greg Caldwell, OD, FAAO  
March 18, 2023



129