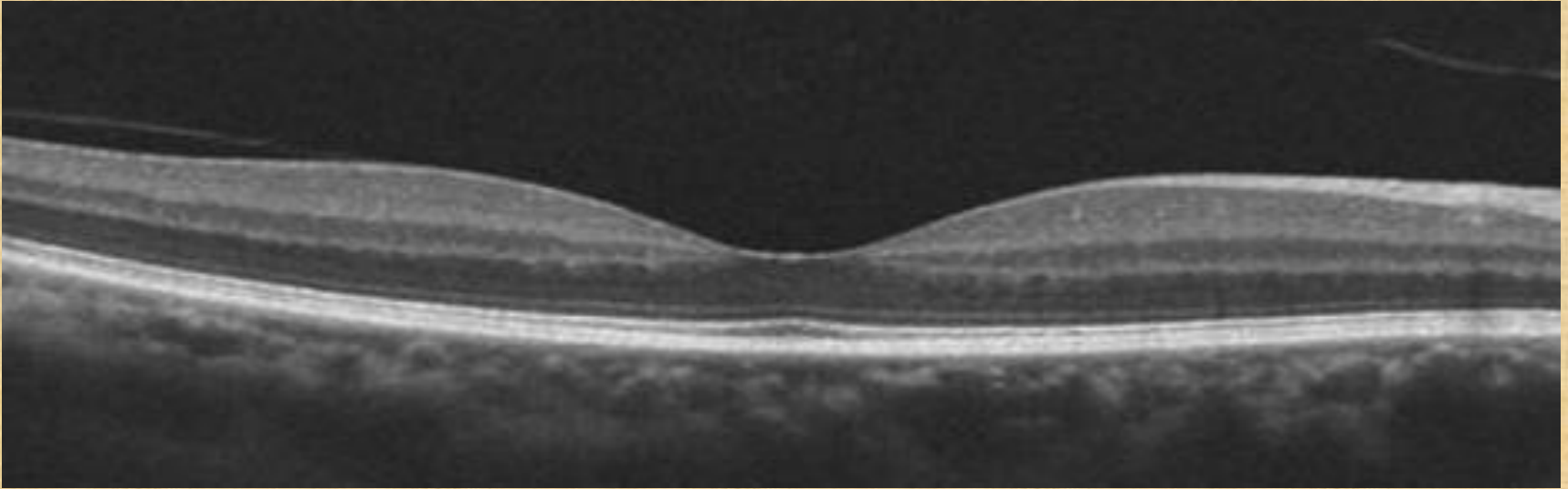


# OCTs: Not Just For Doctors



**GWCO conference**

**October 8, 2022**

**Robert Reed Jr OD**



**bobreed@cpuinc.net**

# 2022 GWCO Congress



## OCTs: Not Just For The Doctor

Robert Reed Jr OD

# Disclosure/Disclaimer

- I have no connections, nor financial arrangements with any company.
- I'd like to acknowledge and thank Optovue for providing some of the OCT images used in this talk
- I am NOT an expert in OCT, but have used the Optovue iScan instrument in my own office
- TAKE PICTURES OF SLIDES IF YOU WANT !

# Course objectives

**After attending class participant will:**

- 1. Be able to distinguish between OCT & Retinal photo images & location of retina being evaluated**
- 2. Discriminate major ocular conditions that OCT printouts can detect**
- 3. Apply their knowledge to real patients cases**

# Course Description

One of Optometry's most powerful tools is Ocular Coherent Tomography(OCT). It has arguably become the standard of care in evaluating ocular health. Although paraoptometricians perform the test, how much do you know about what the results show? OCT results of 10 major ocular problems will be presented to bring you "up to speed" in aiding your doctor. Your new skills will be reinforced with real patient cases.

# OCT: What is it?

→ OCT uses low-coherence interferometry to produce a two-dimensional image of optical scattering from internal tissue microstructures in a way that is analogous to ultrasonic pulse-echo imaging. ←

- **Brief History**
- **Retinal photography vs OCT view**
- **Ocular anatomy**
- **Reading a printout**
- **10 conditions through OCT**

# OCT Brief History

- **1991** Huang MD et al, Science. 1991; 254(5035): 1178-1181
- **1995** OCT1 research related 100 scans
- **2002** Stratus OCT (time domain) 500 scans
- **2007** Spectral OCT (fourier domain)
  - 27,000 – 40,000 scans
- **2017** OCT-A angiography
  - “synthetic” angiography(no needles or toxic reactions!)

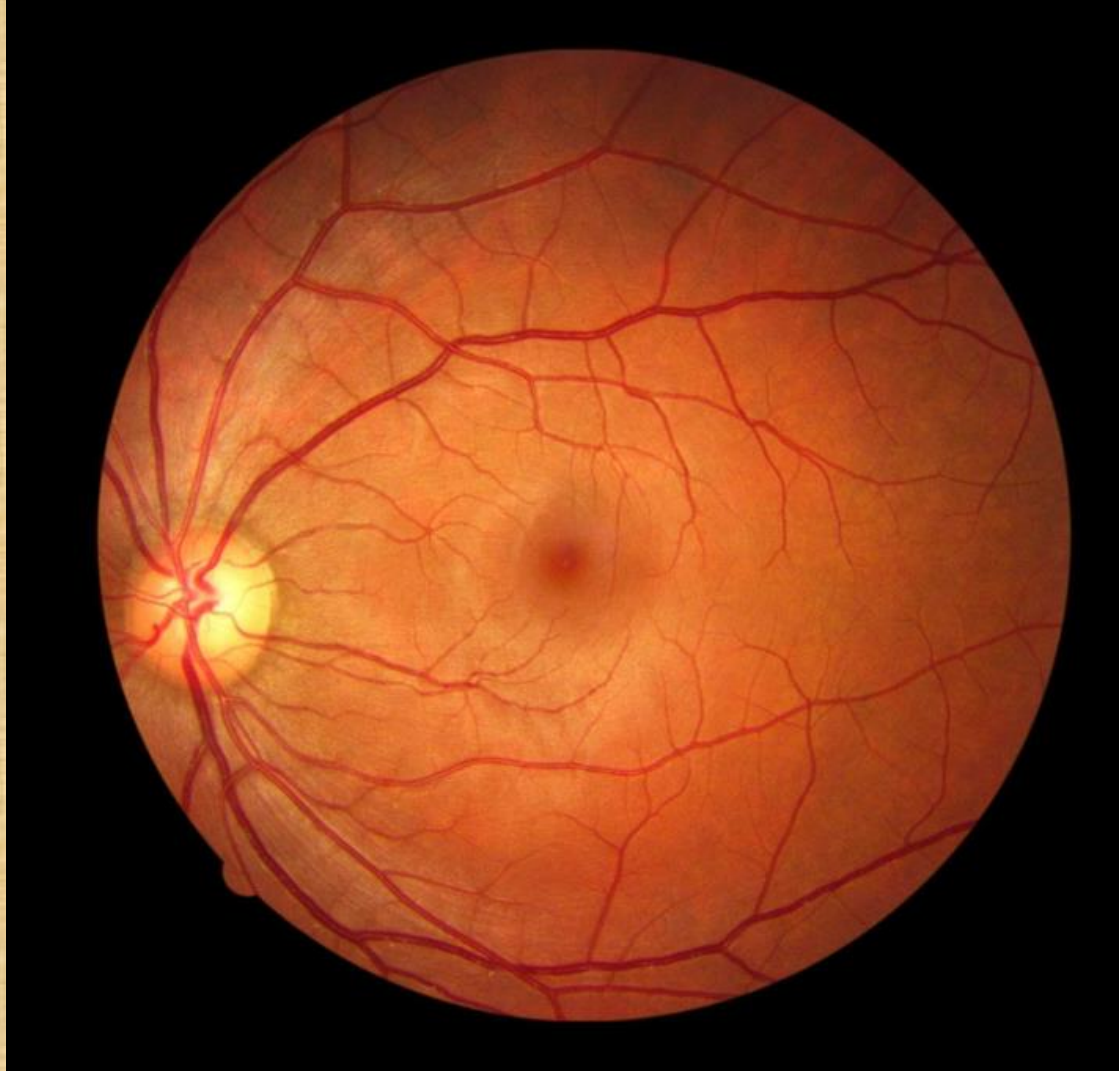
# Free rectal photography

with every Eye Test.

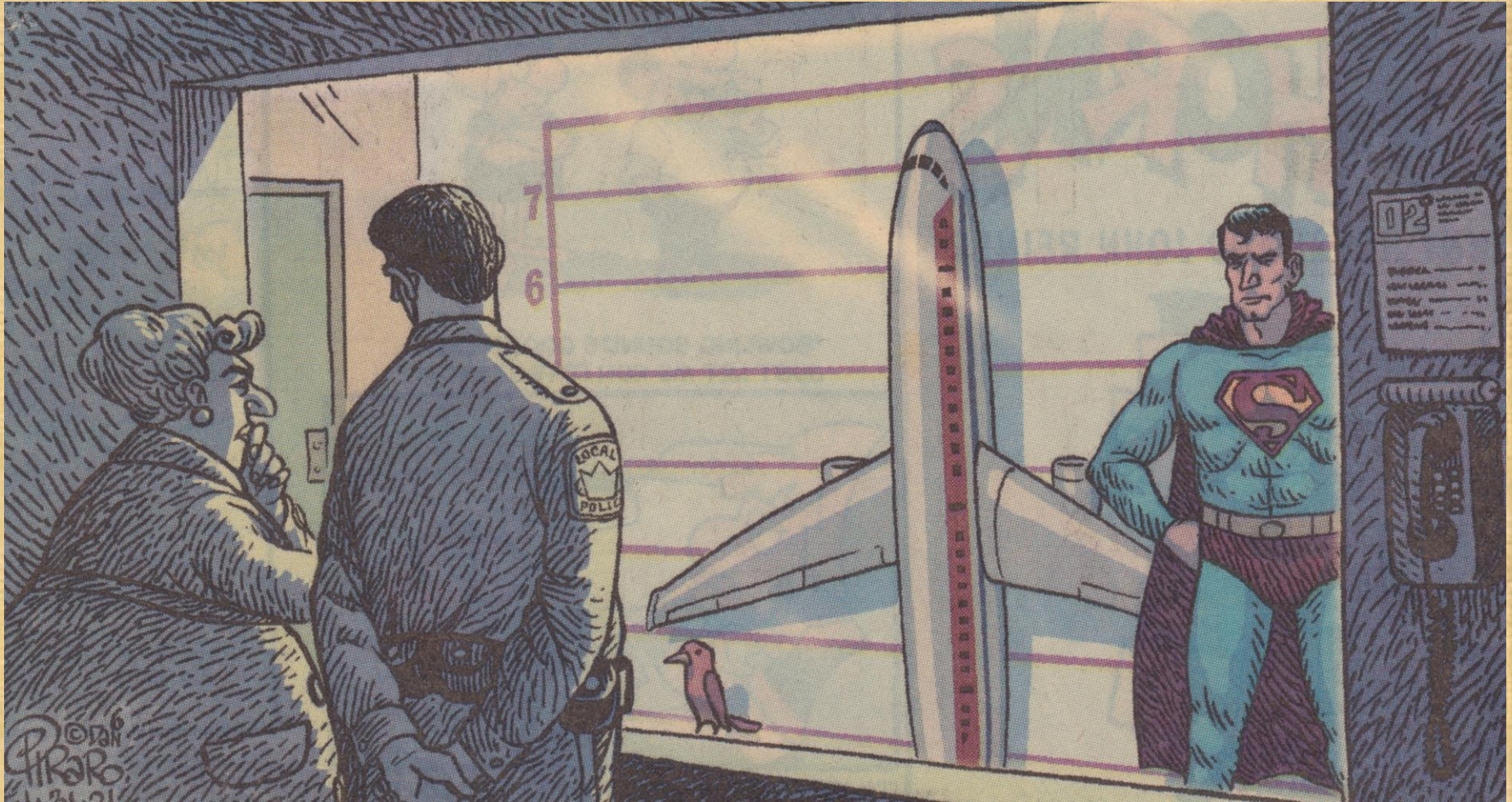




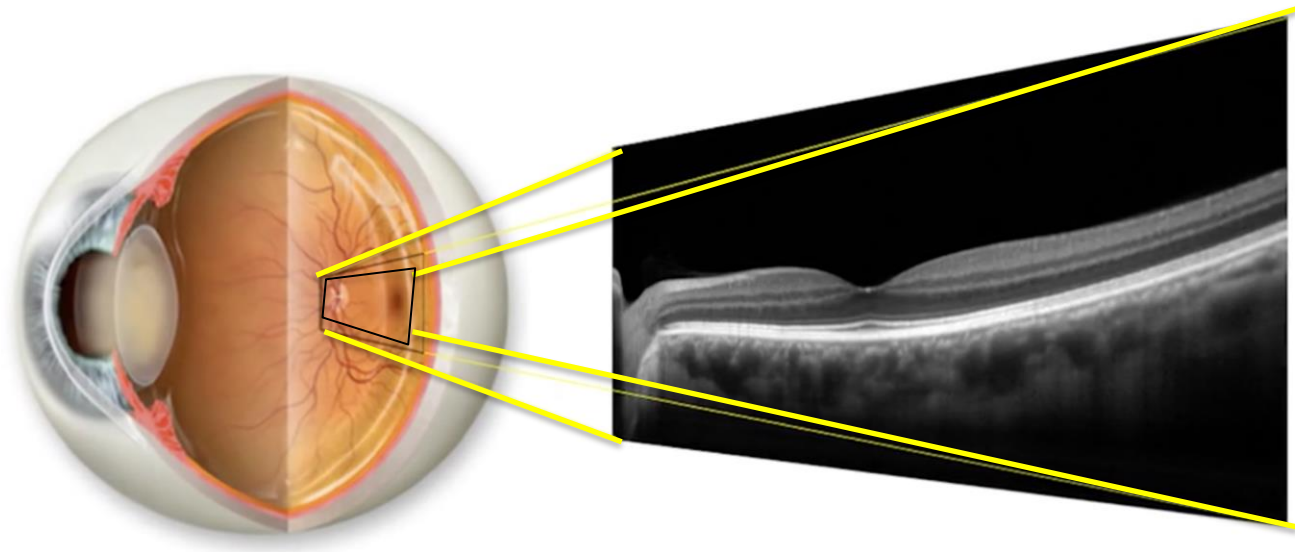
# Retinal Photography



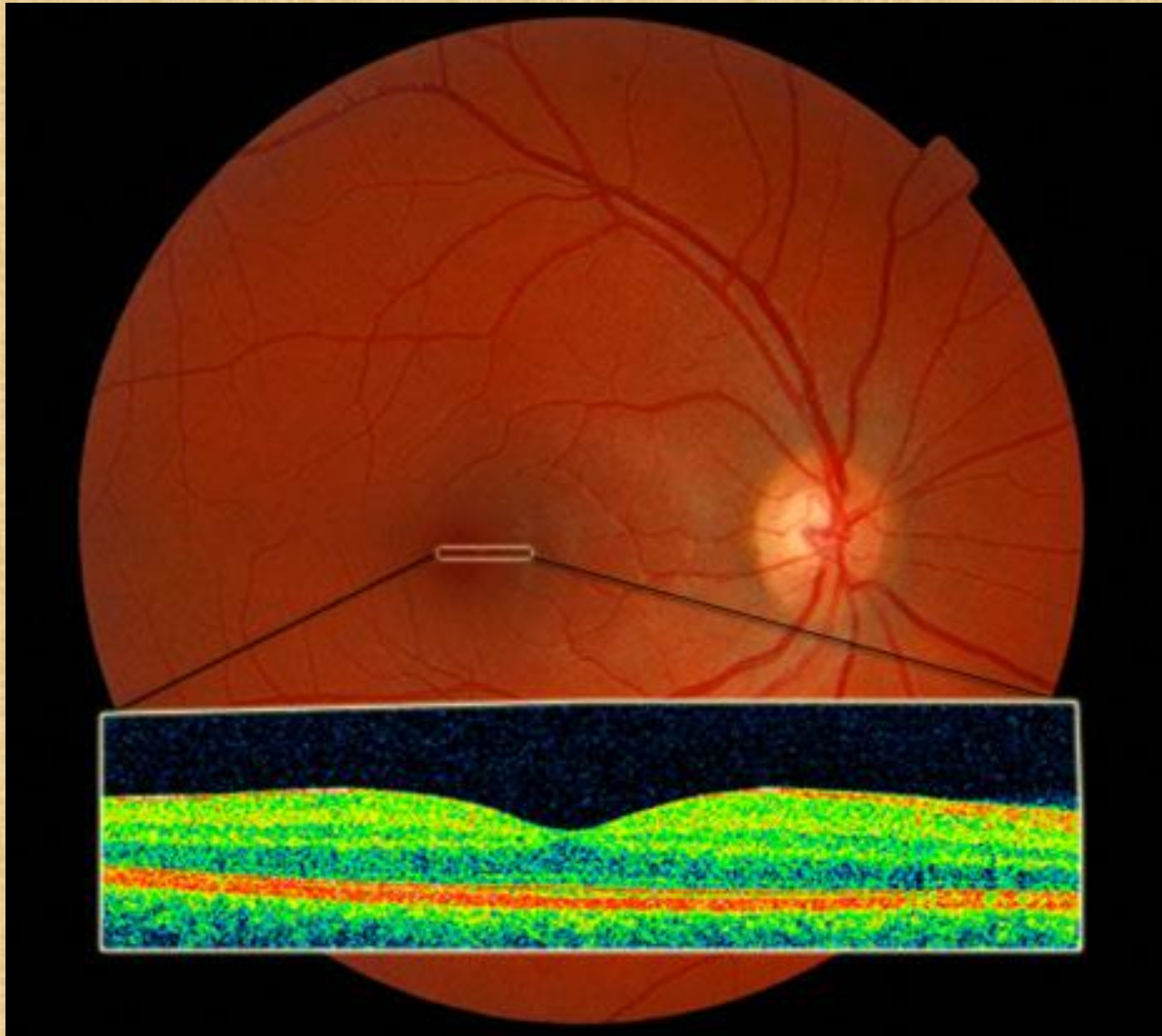
# What are we looking at?



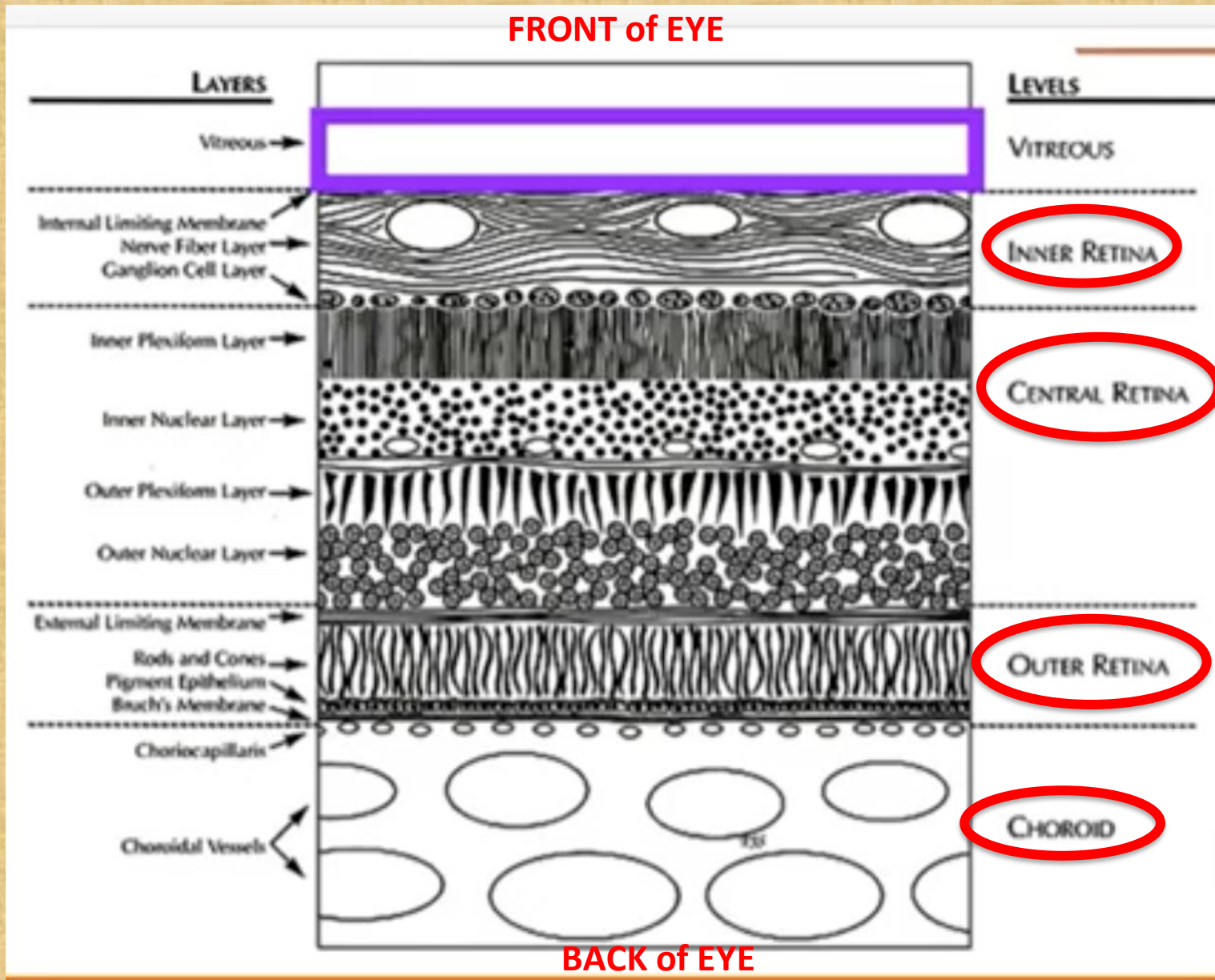
# Retinal view vs OCT



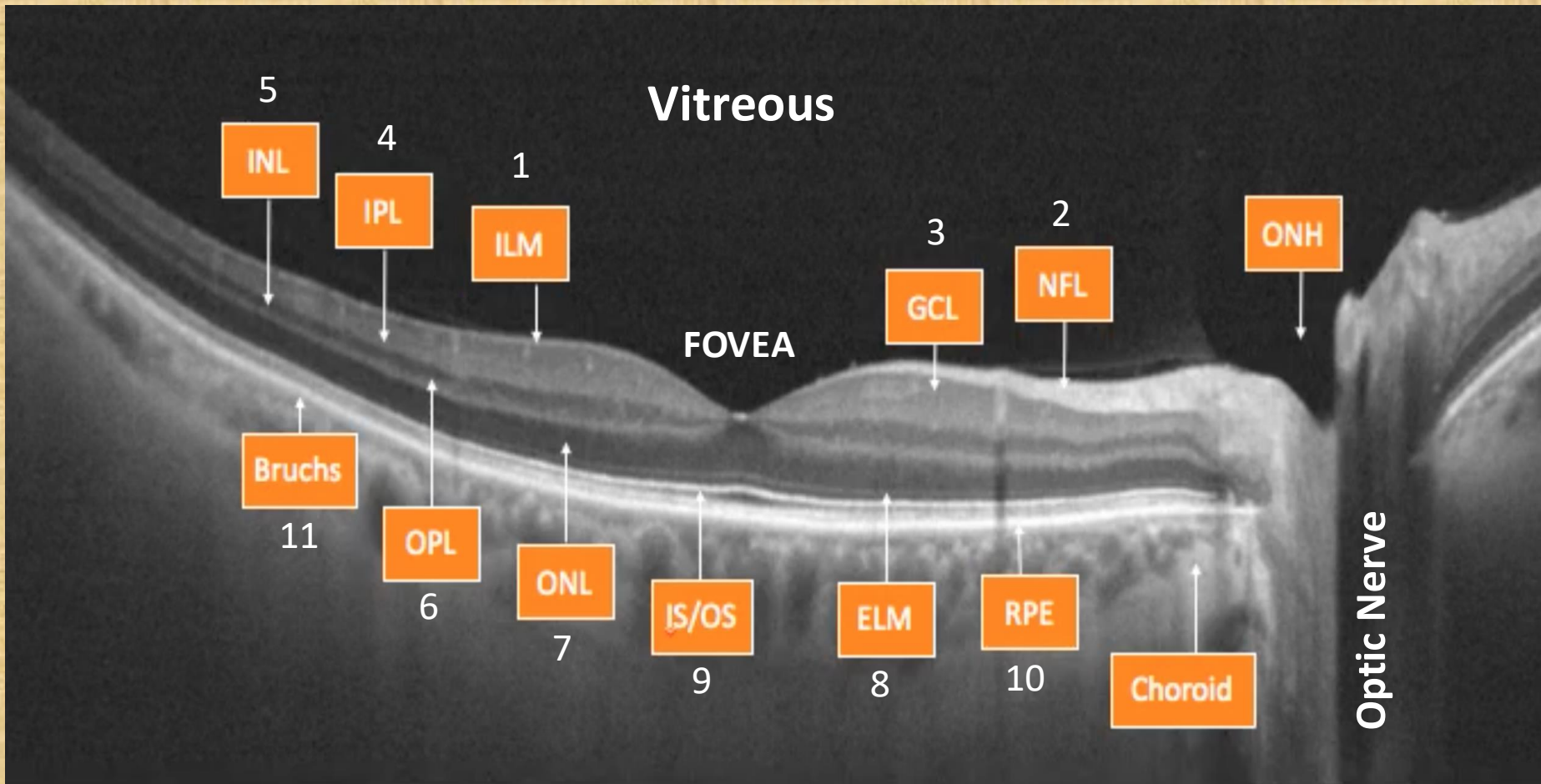
# Retinal view vs OCT



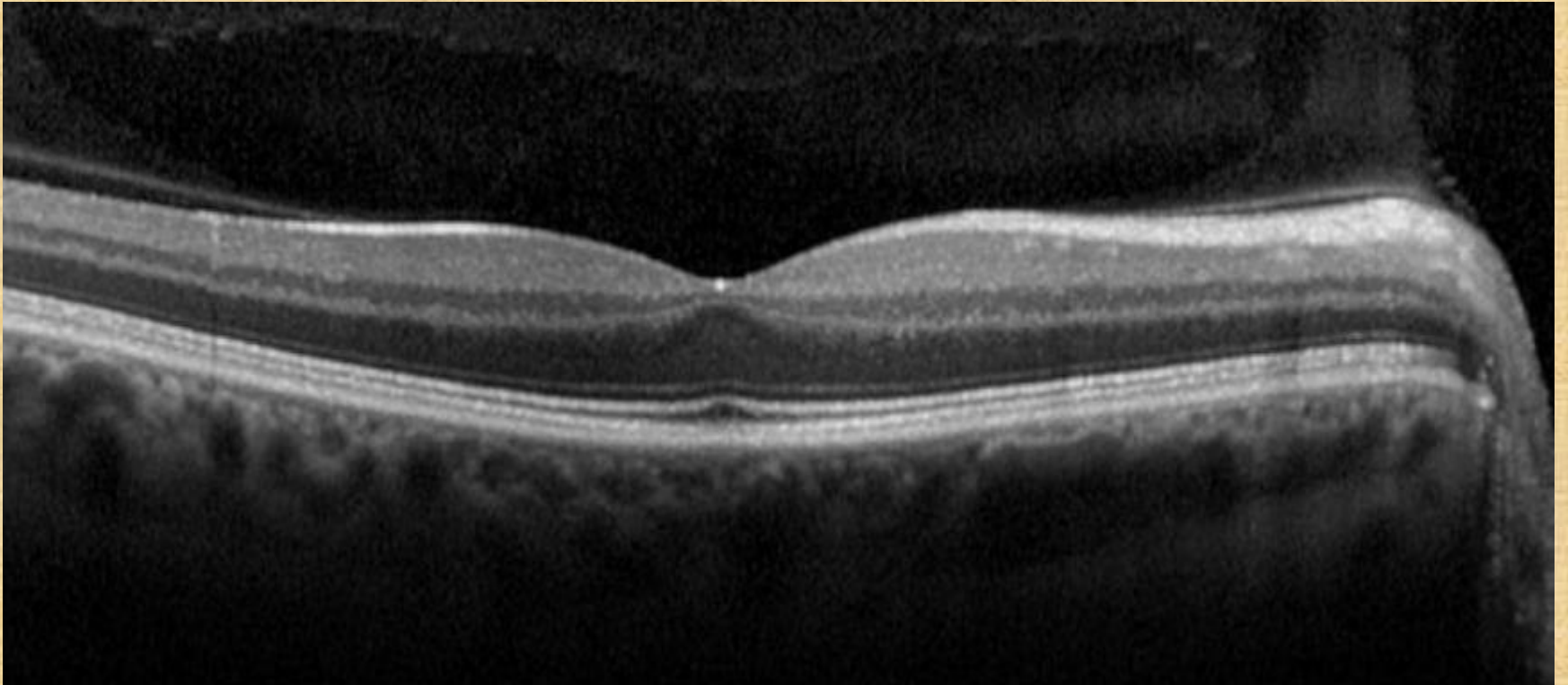
# Retinal Anatomy



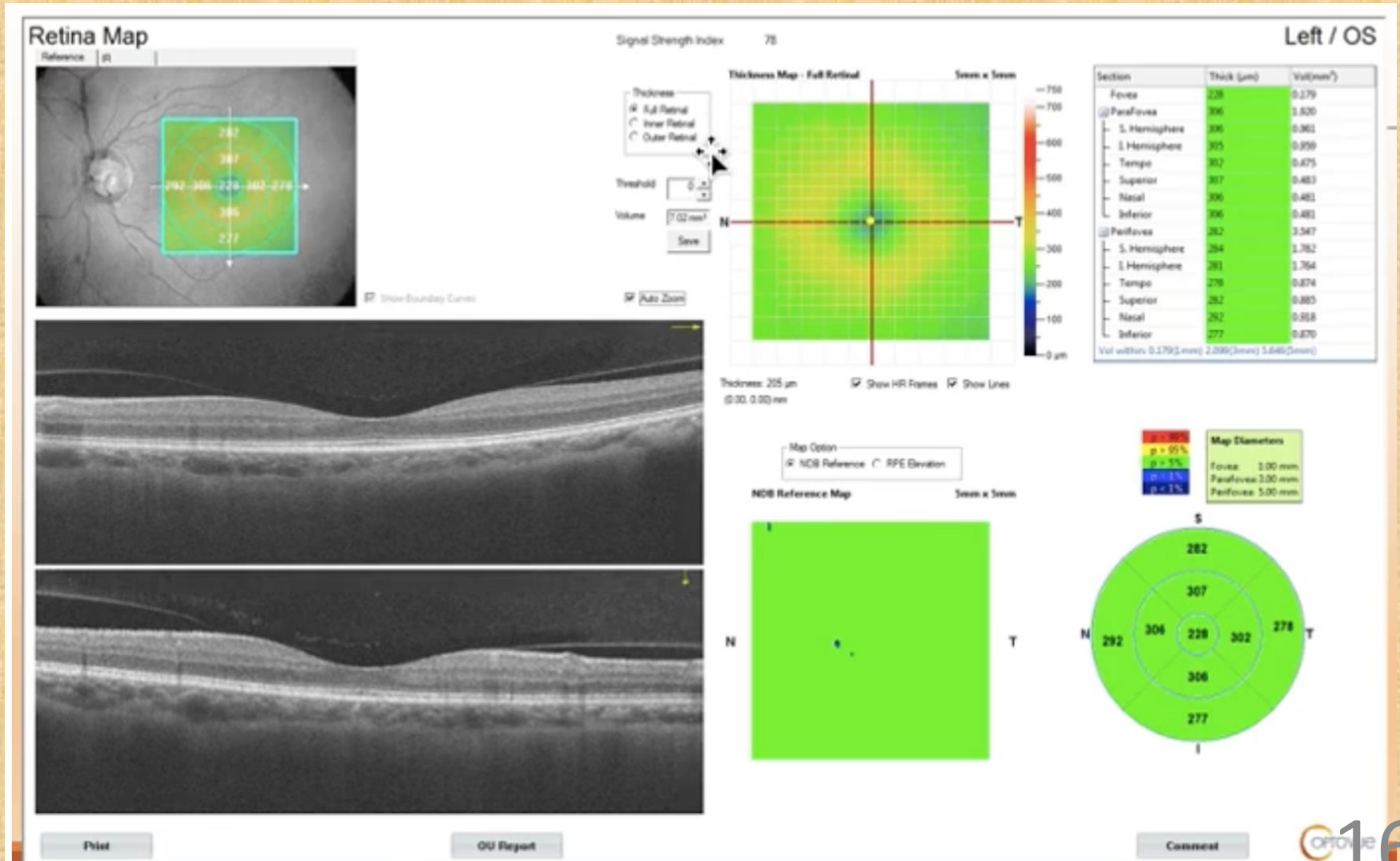
# Retina layers in OCT



# OCT normal view



# OCT printout





# iWellness printout

Right / OD

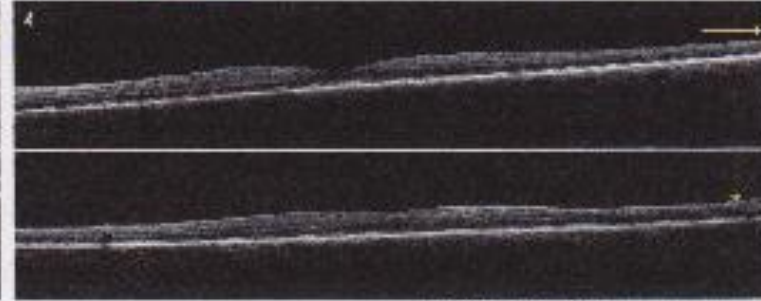
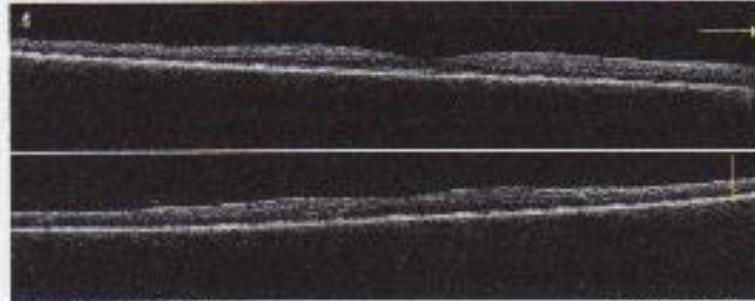
02/13/2016 14:04:27

iWellness OU Report

Good: 53 Scan Quality Index Good: 53

Left / OS

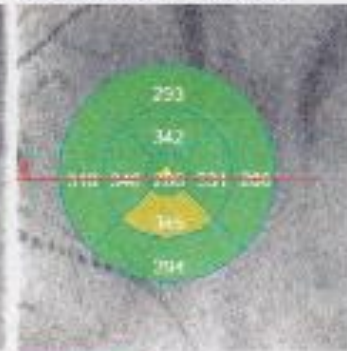
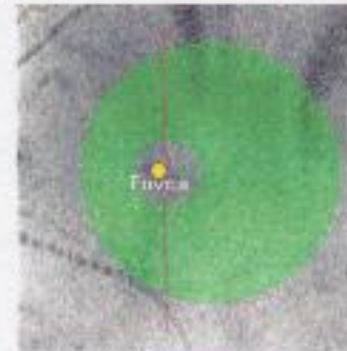
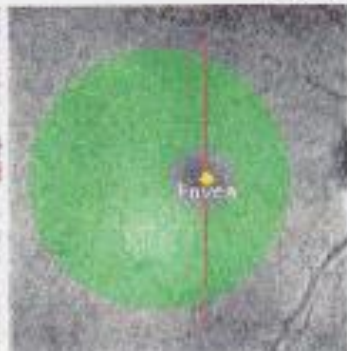
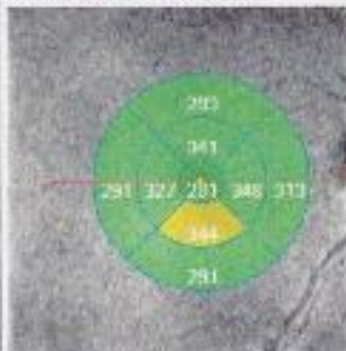
02/13/2016 14:06:15



Full Retinal Thickness

NDB Reference

Full Retinal Thickness

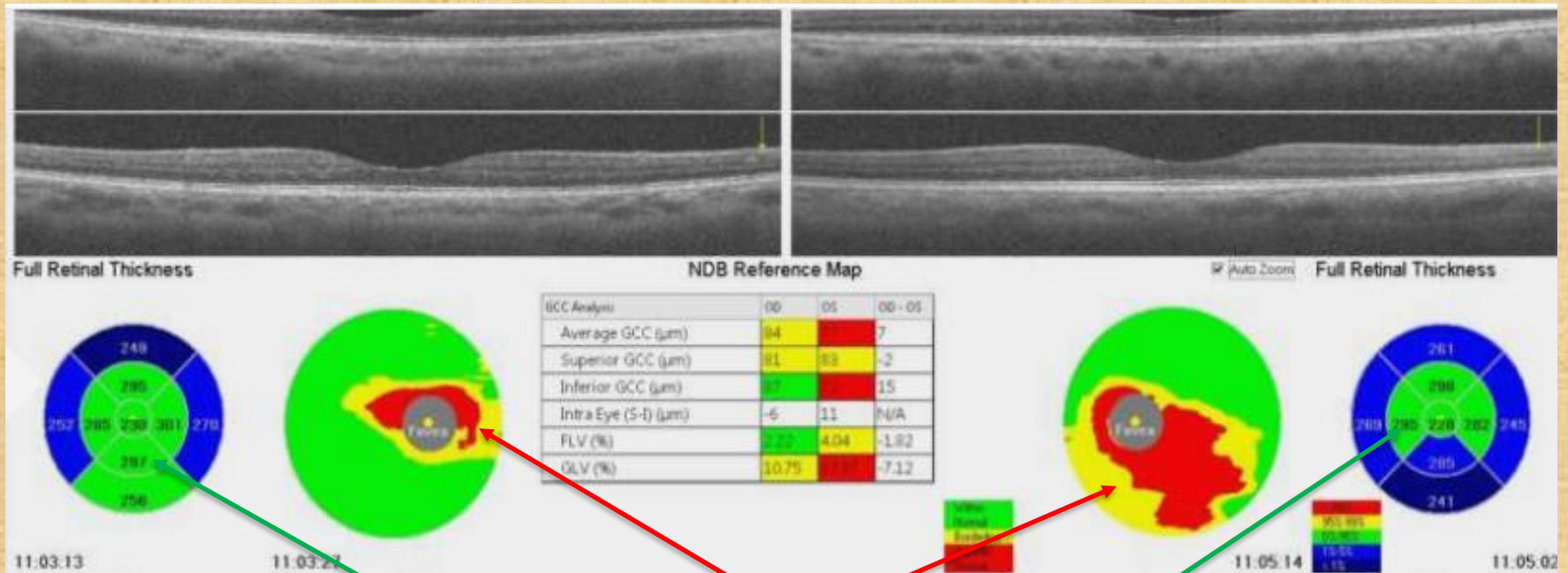


Ganglion Cell Complex Thickness (µm)	OD	OS	OD - OS
Total	305	313	2
Superior	317	306	2
Inferior	307	305	1
Superior - Inferior	-5	-6	N/A
FLV (%)	0.013	0.015	-0.042
GLV (%)	0.163	0.084	0.079

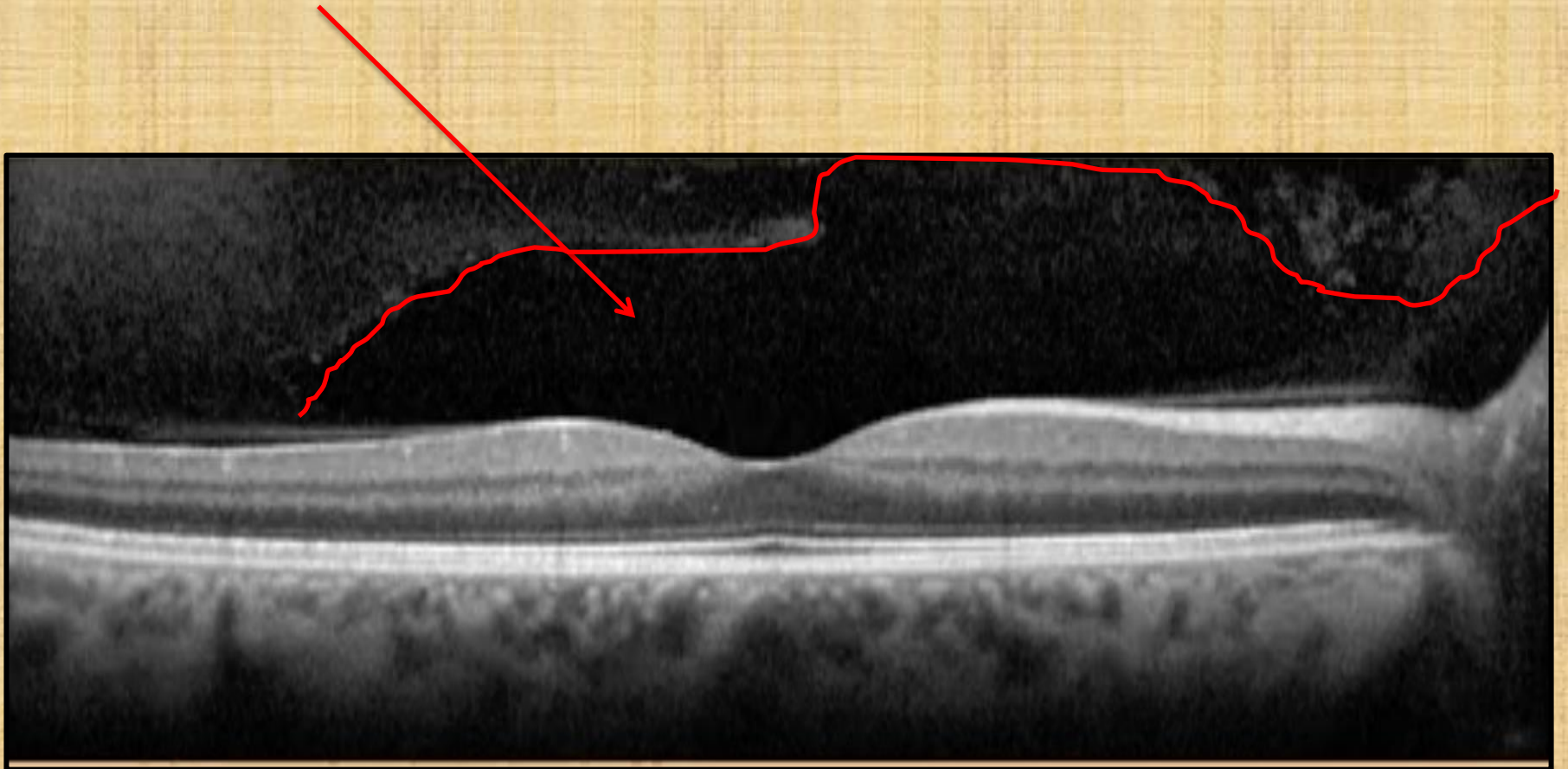


iWellness EADW

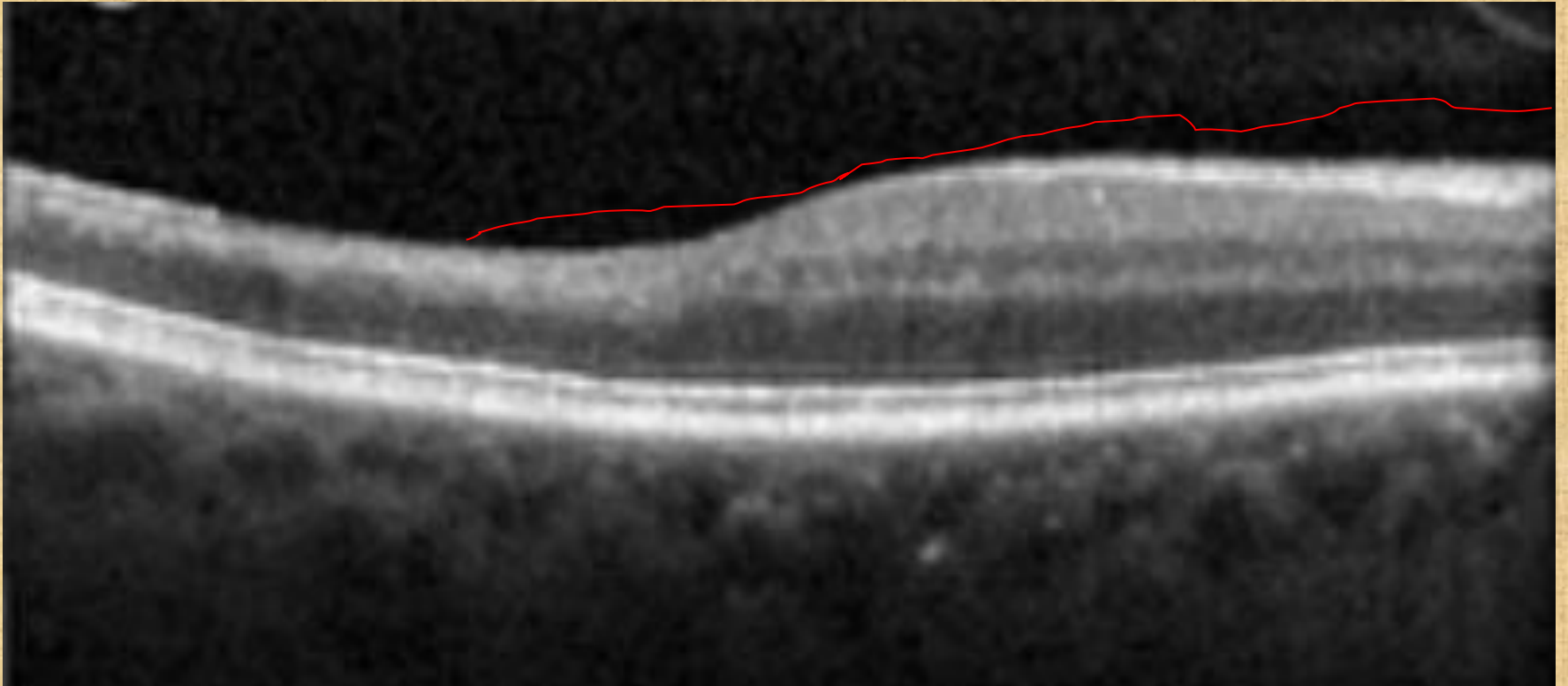
# iWellness printout



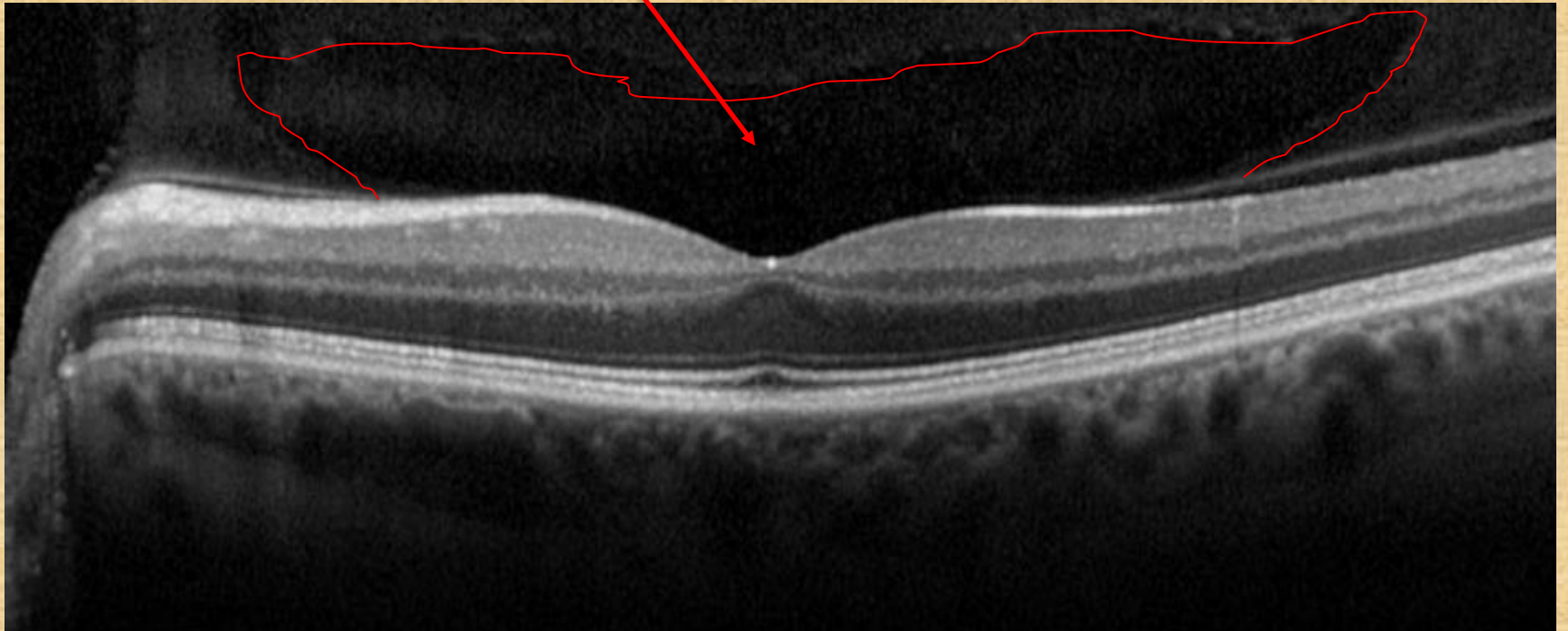
# Posterior Vitreous Detachment



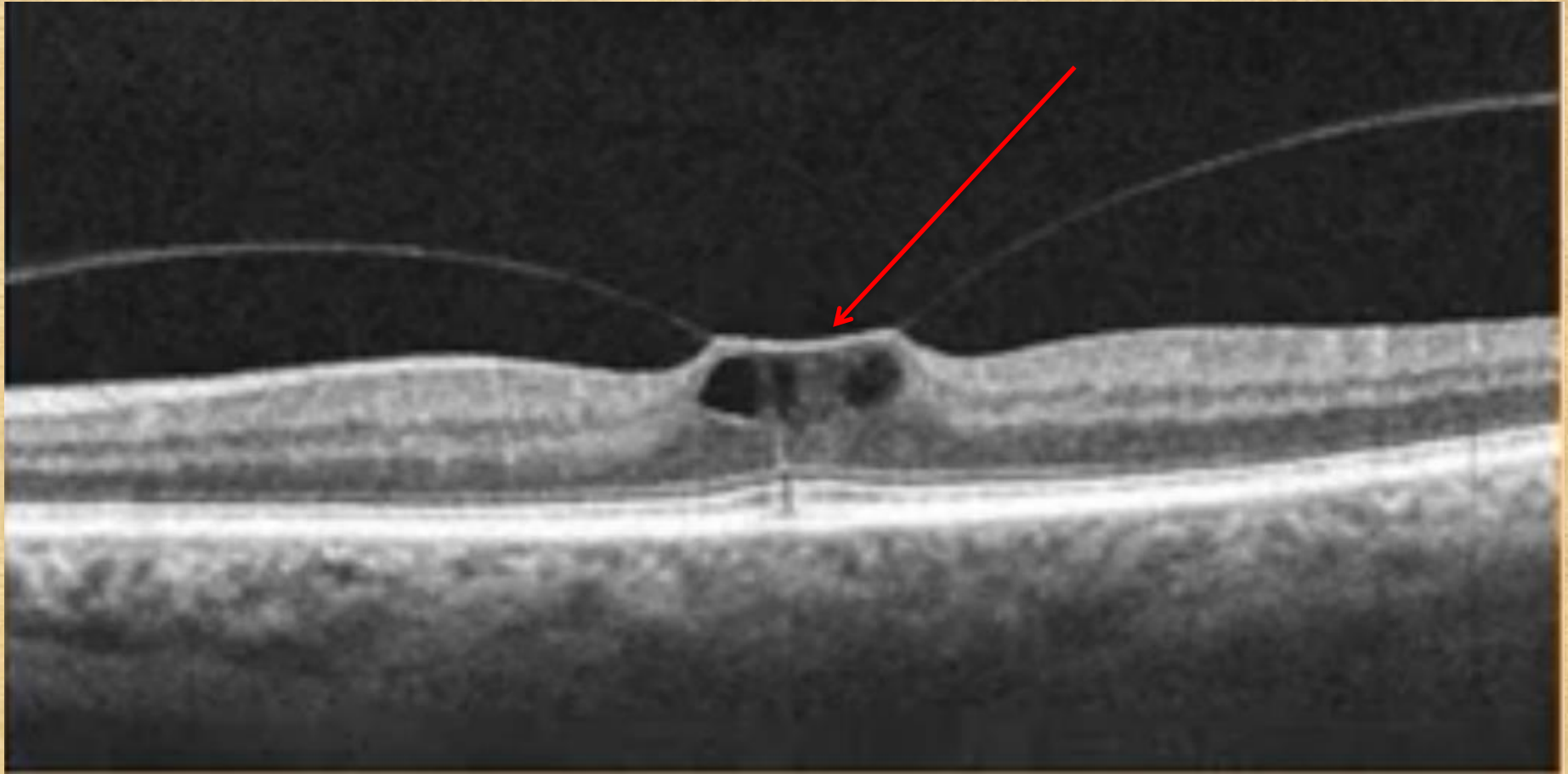
# Post Vitreous Detachment



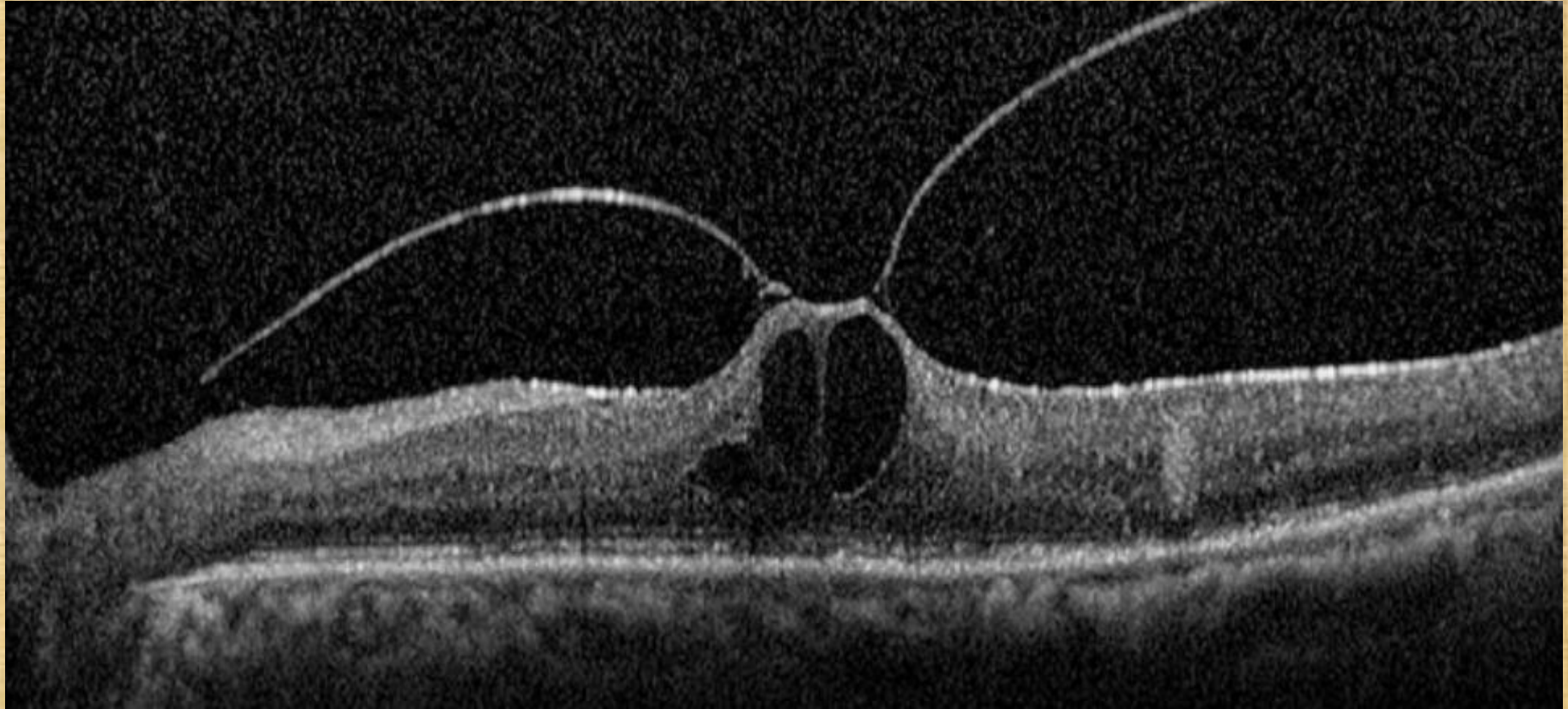
# Post Vitreous Detachment



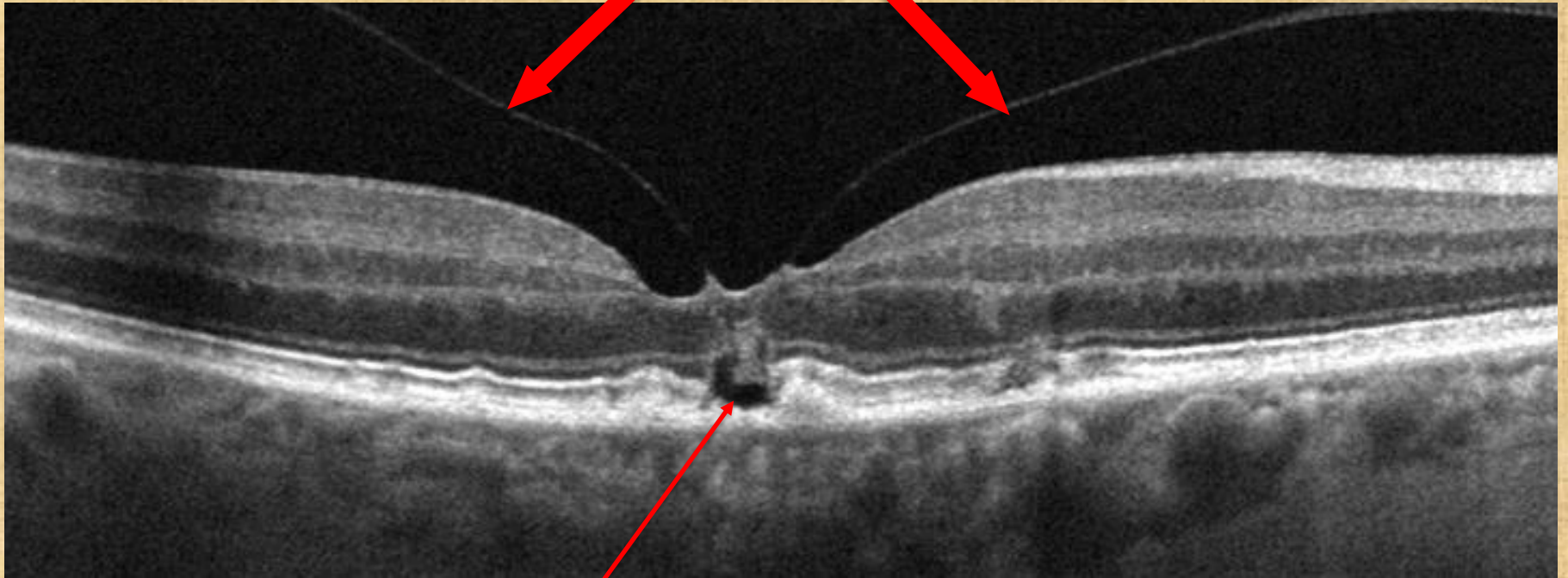
# Vitreous Traction



# Vitreous Traction

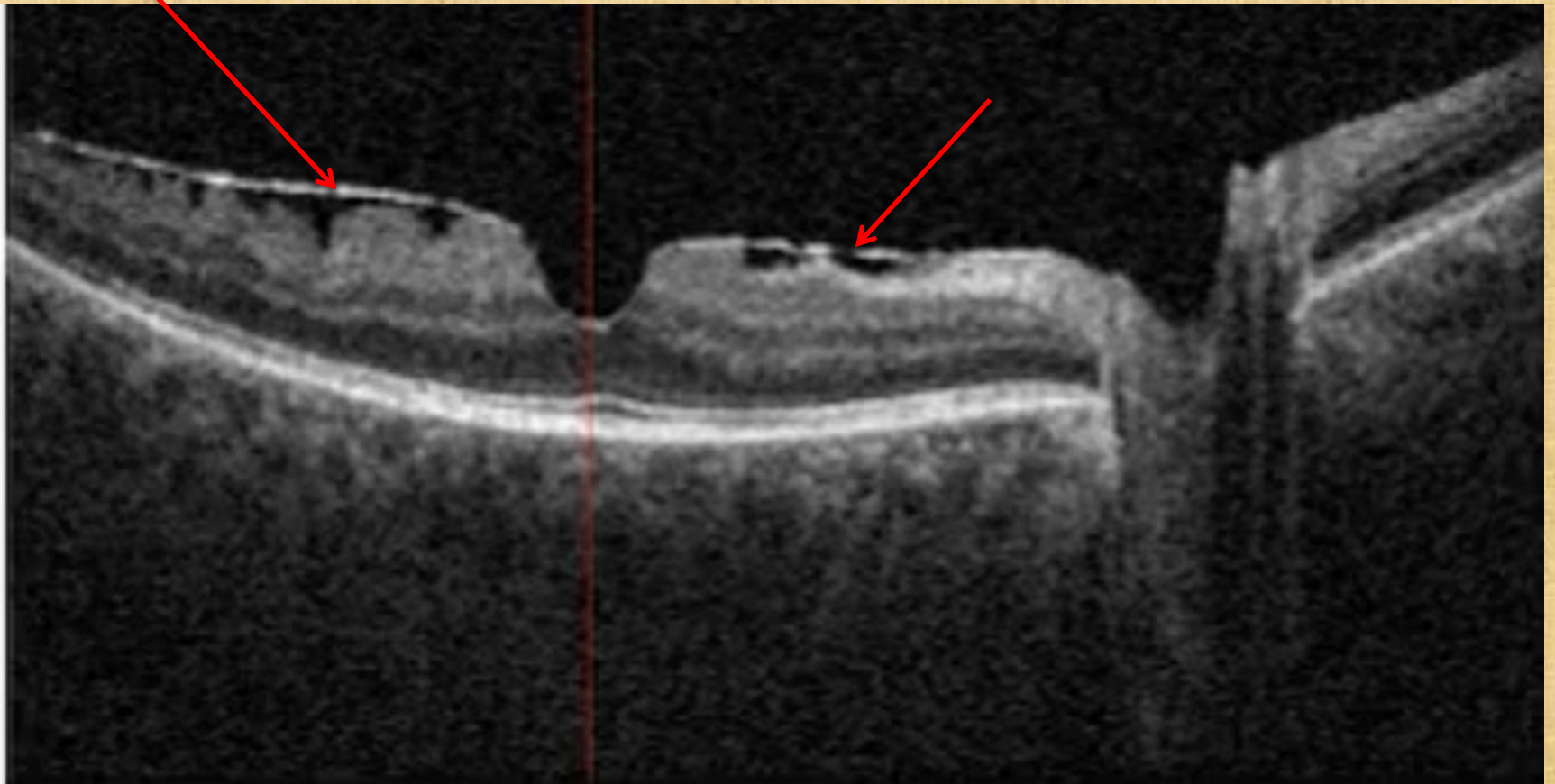


# Vitreous Traction

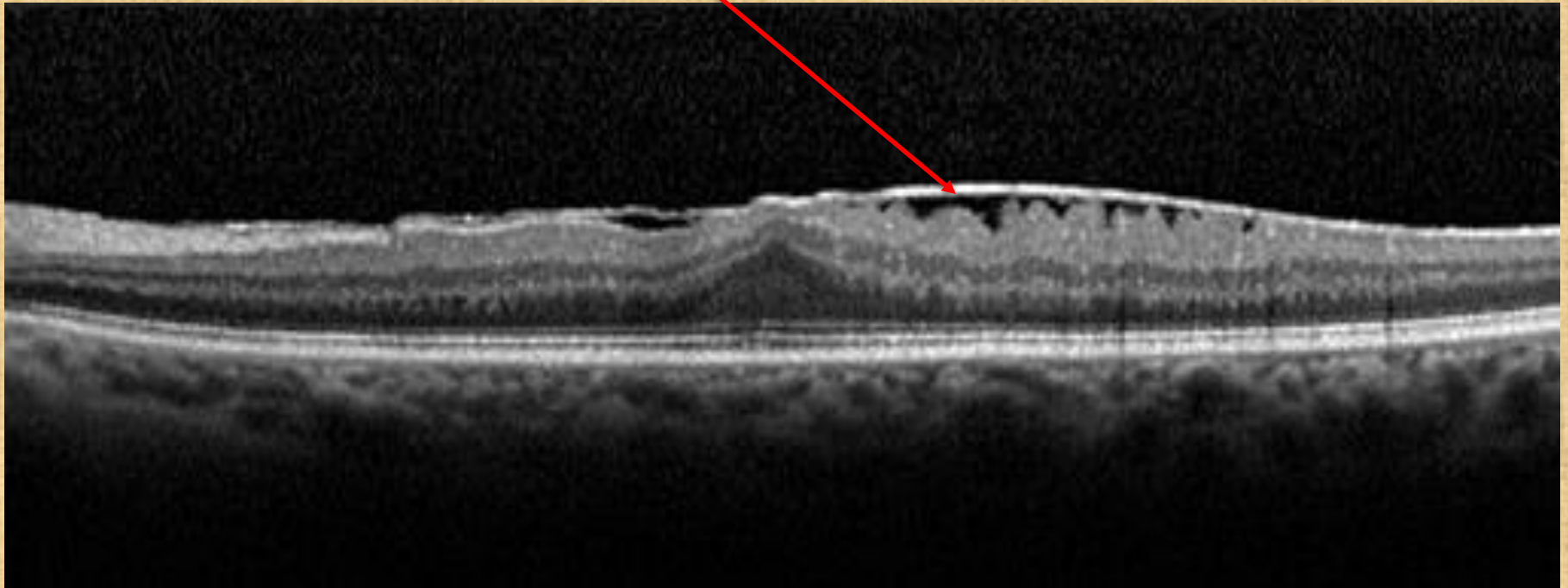




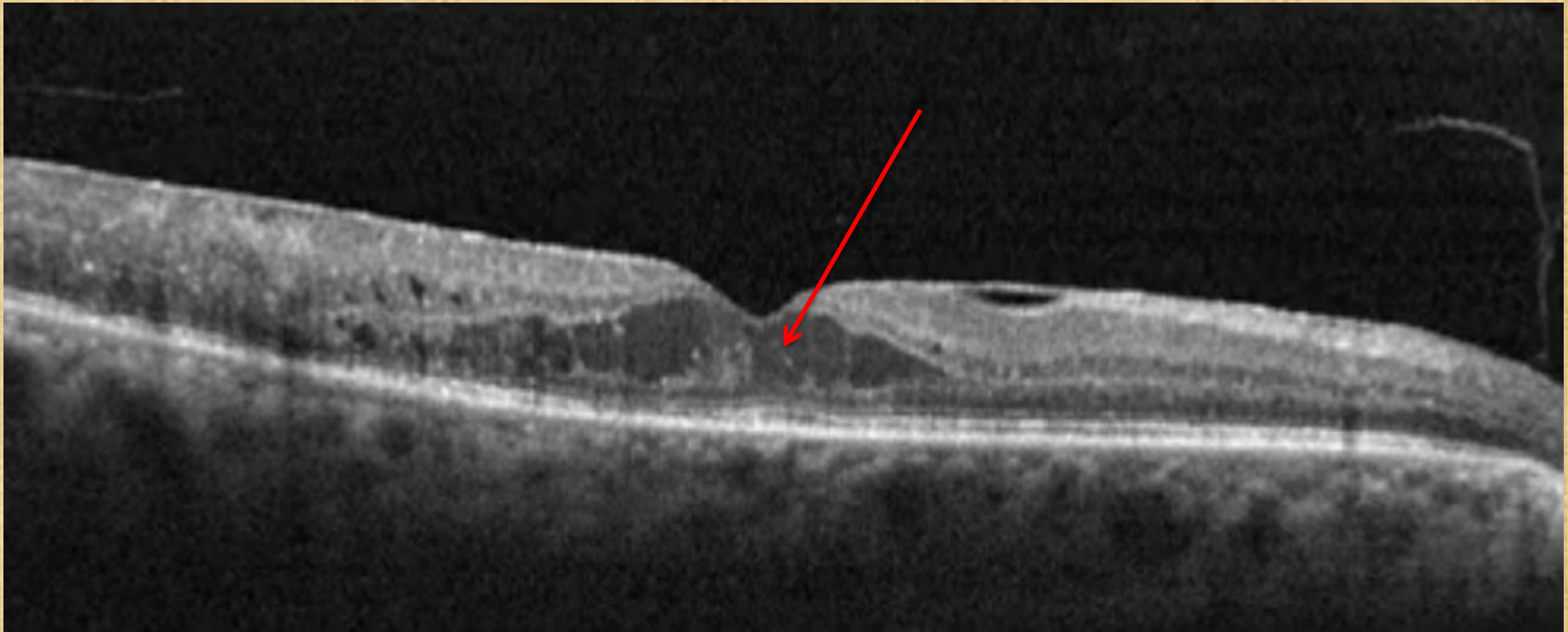
# Epi-Retinal Membrane



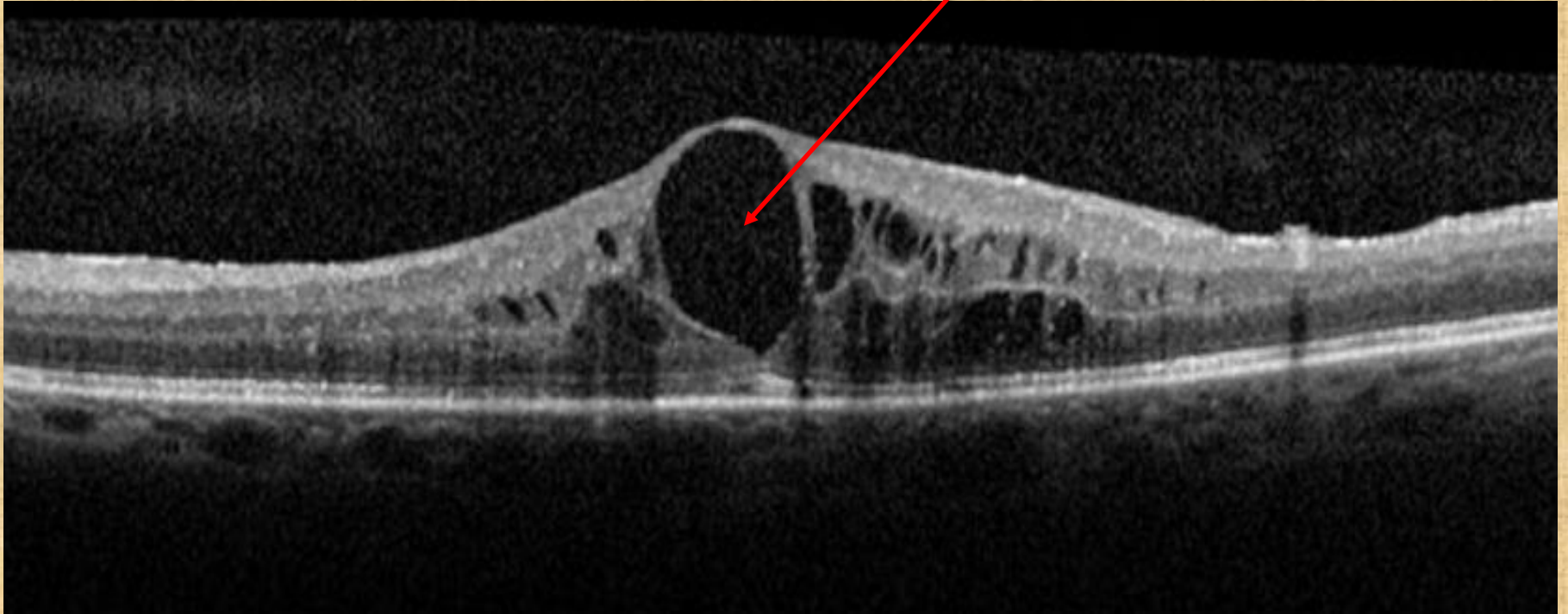
# Epi-Retinal Membrane



# Cystoid Macular Edema

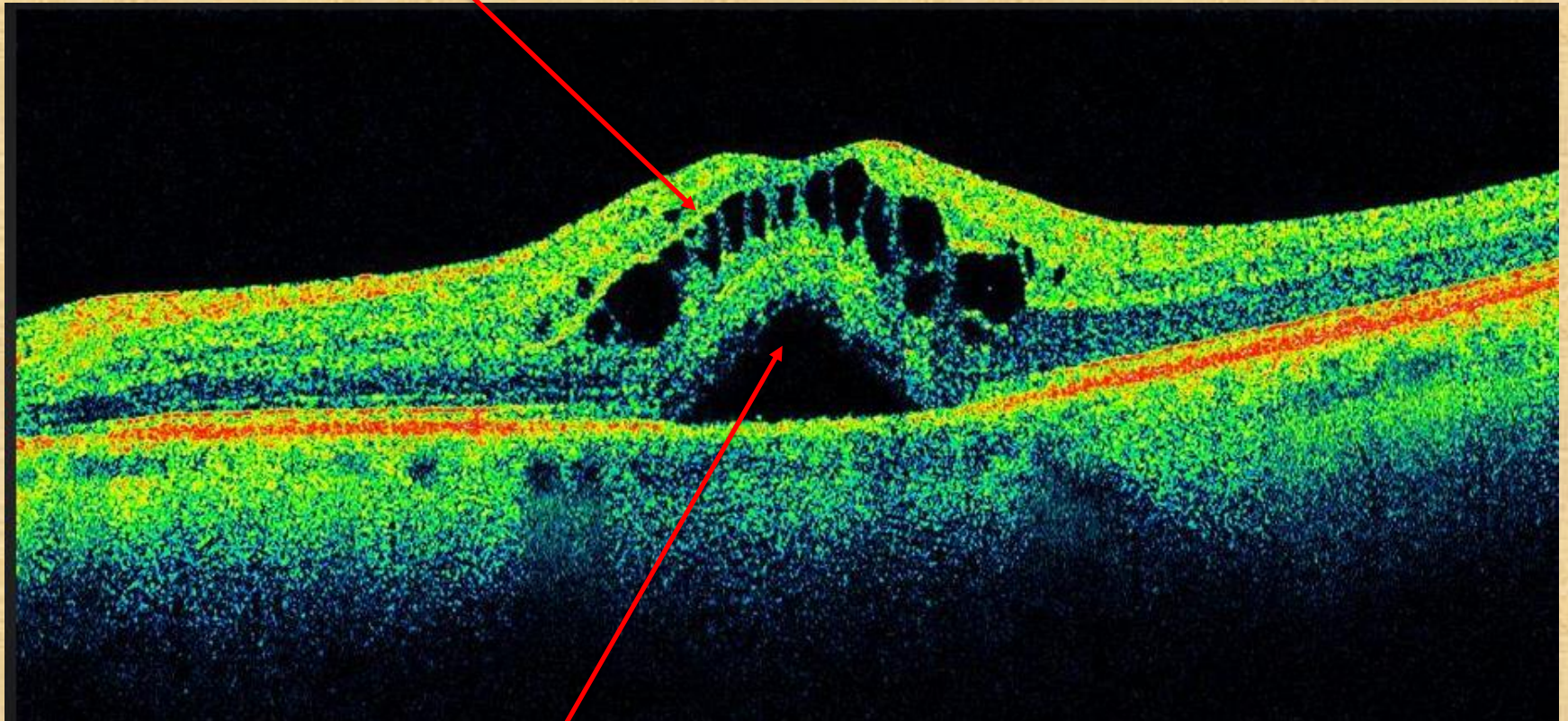


# Cystoid Macular Edema



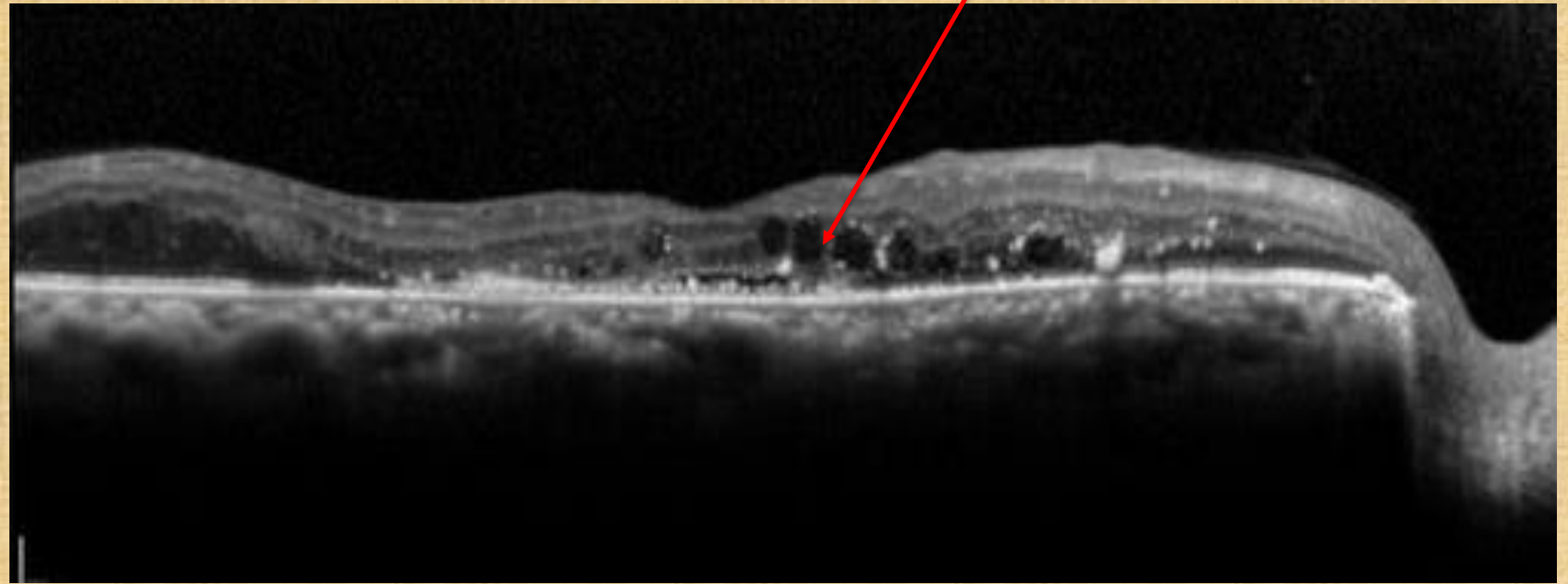
# Cystoid Macular Edema

Old Stratus OCT

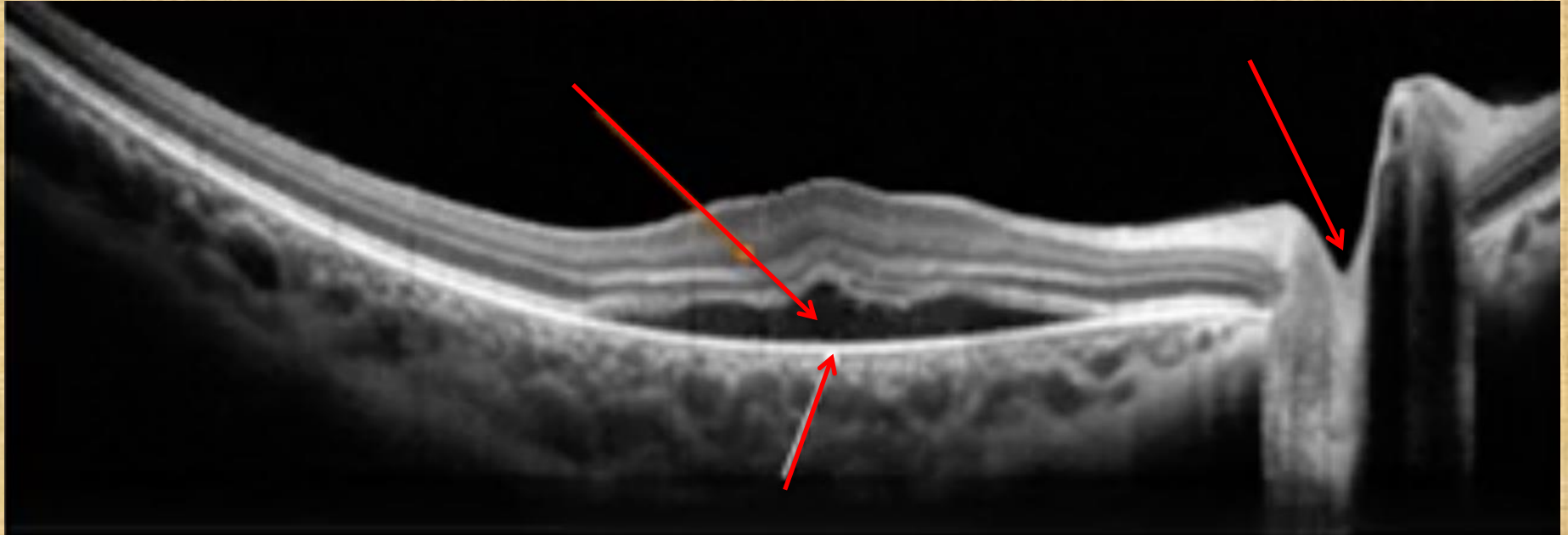


Central Serous Retinopathy

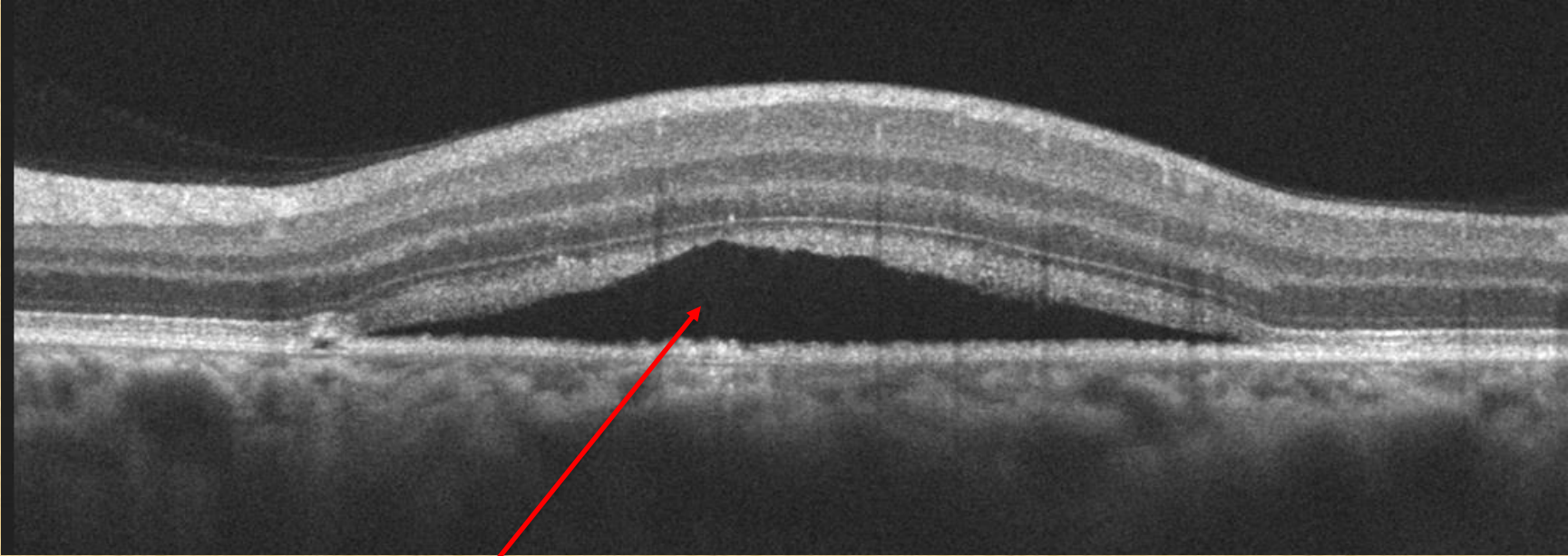
# Cystoid Macular Edema



# Central Serous Retinopathy

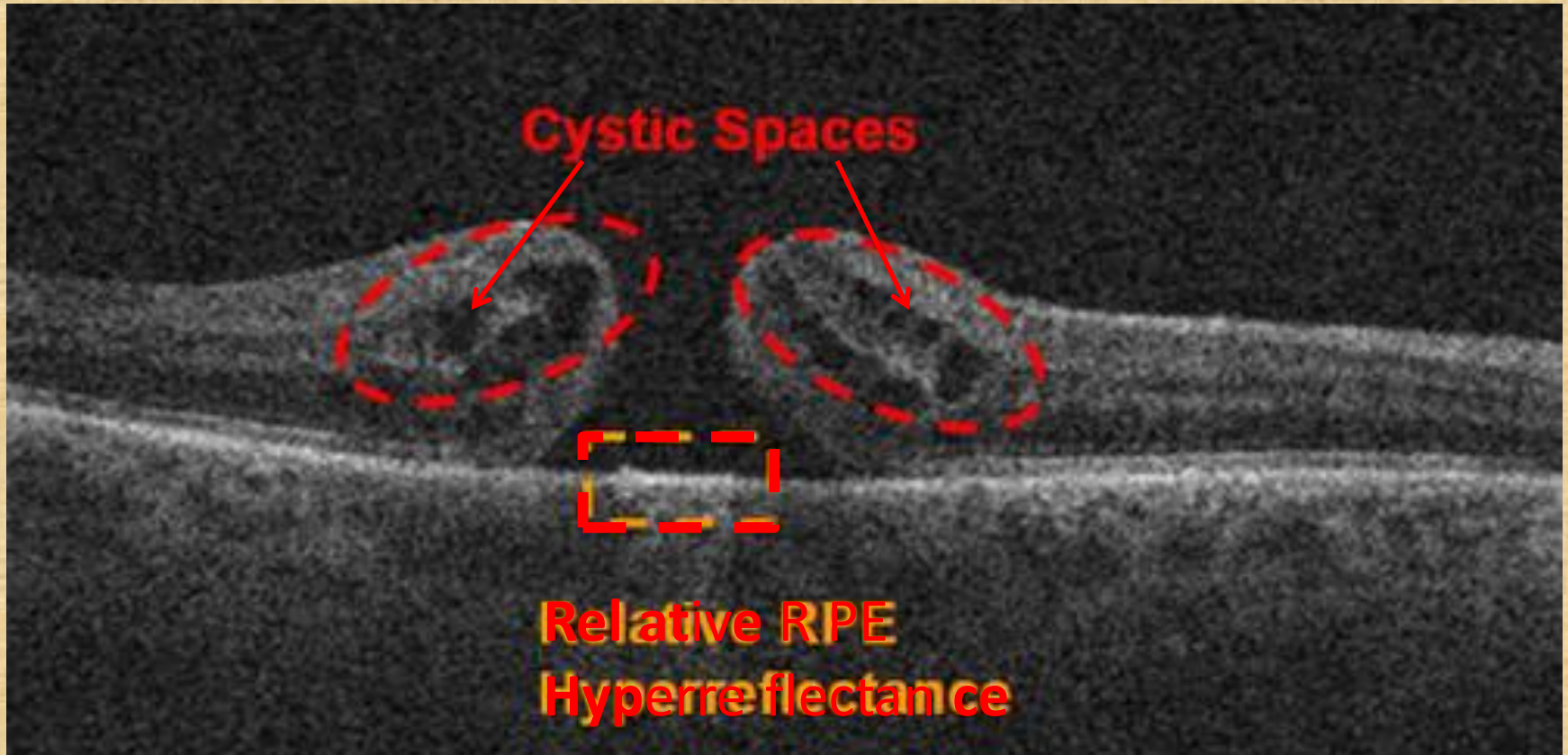


# Central Serous Retinopathy

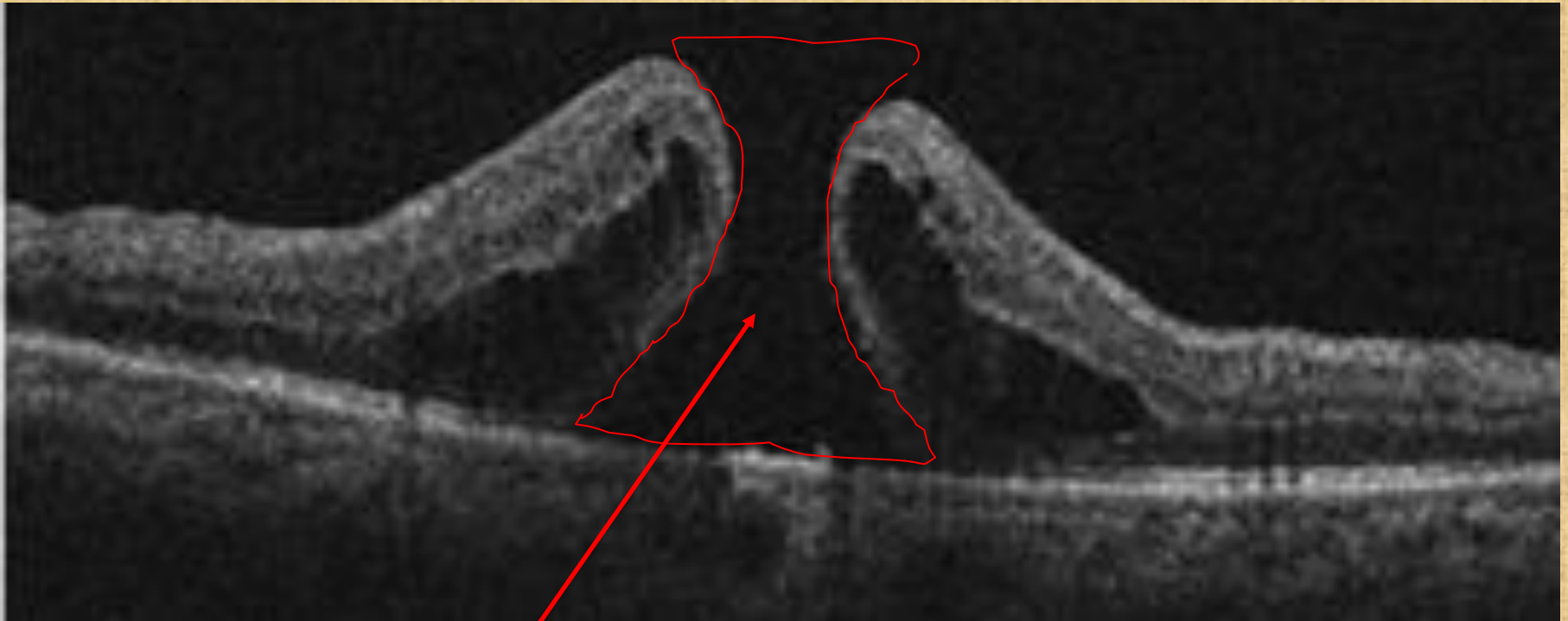




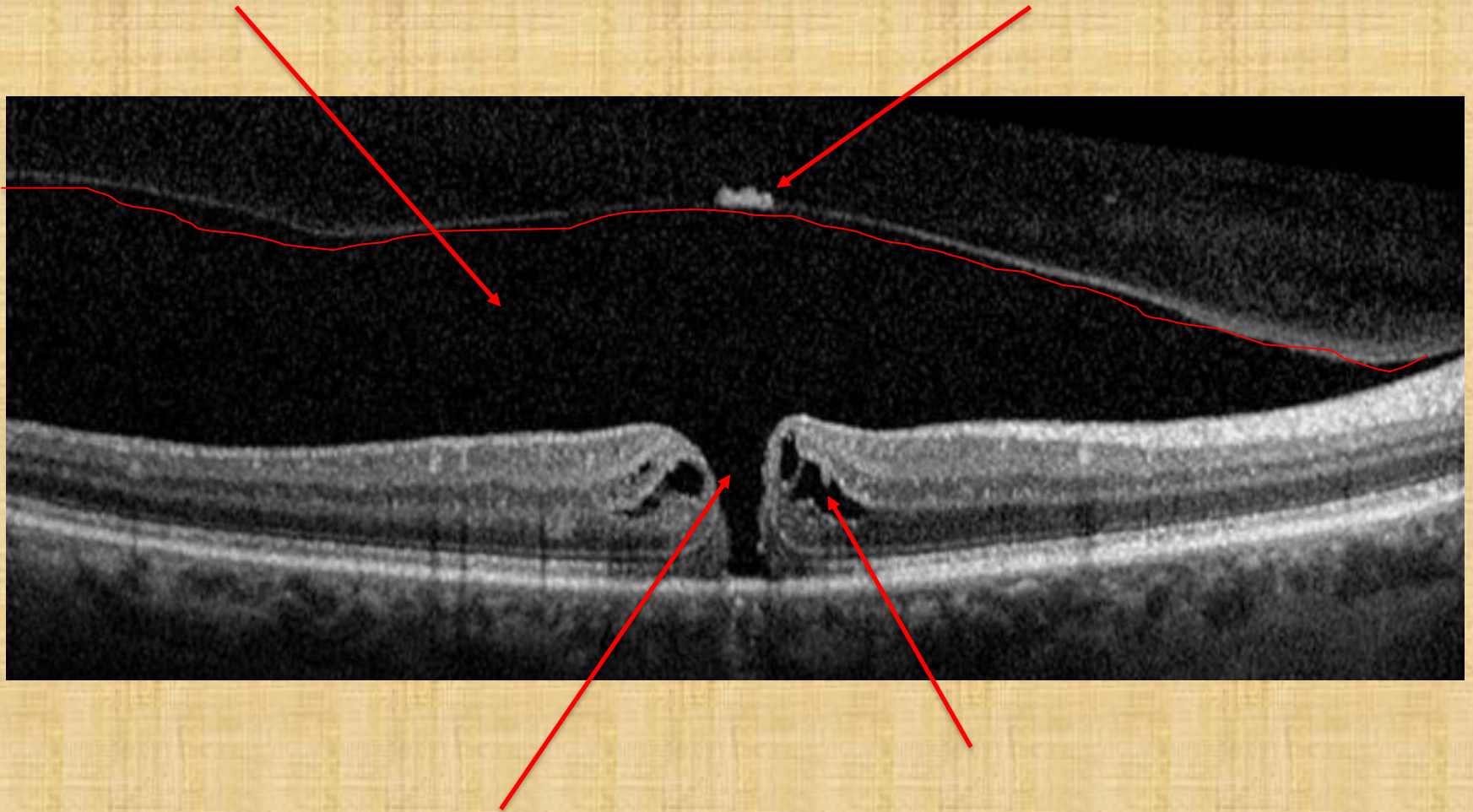
# Macular Hole



# Macular Hole

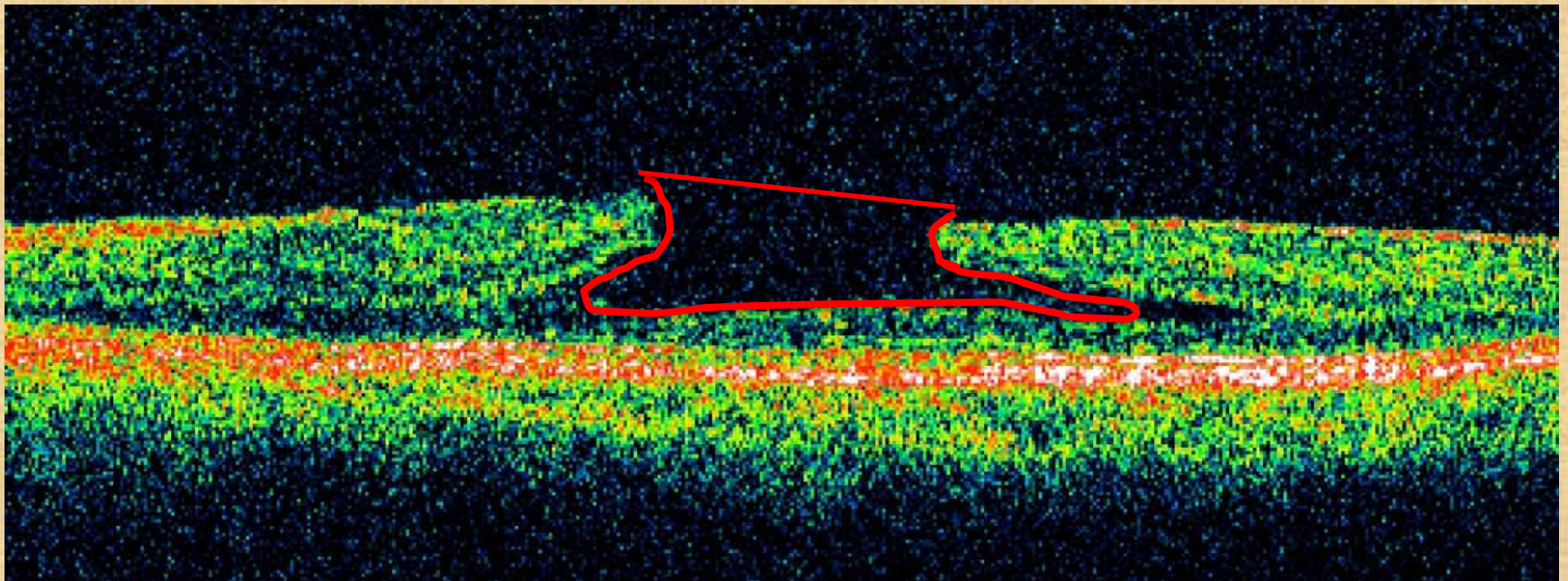


# Macular Hole

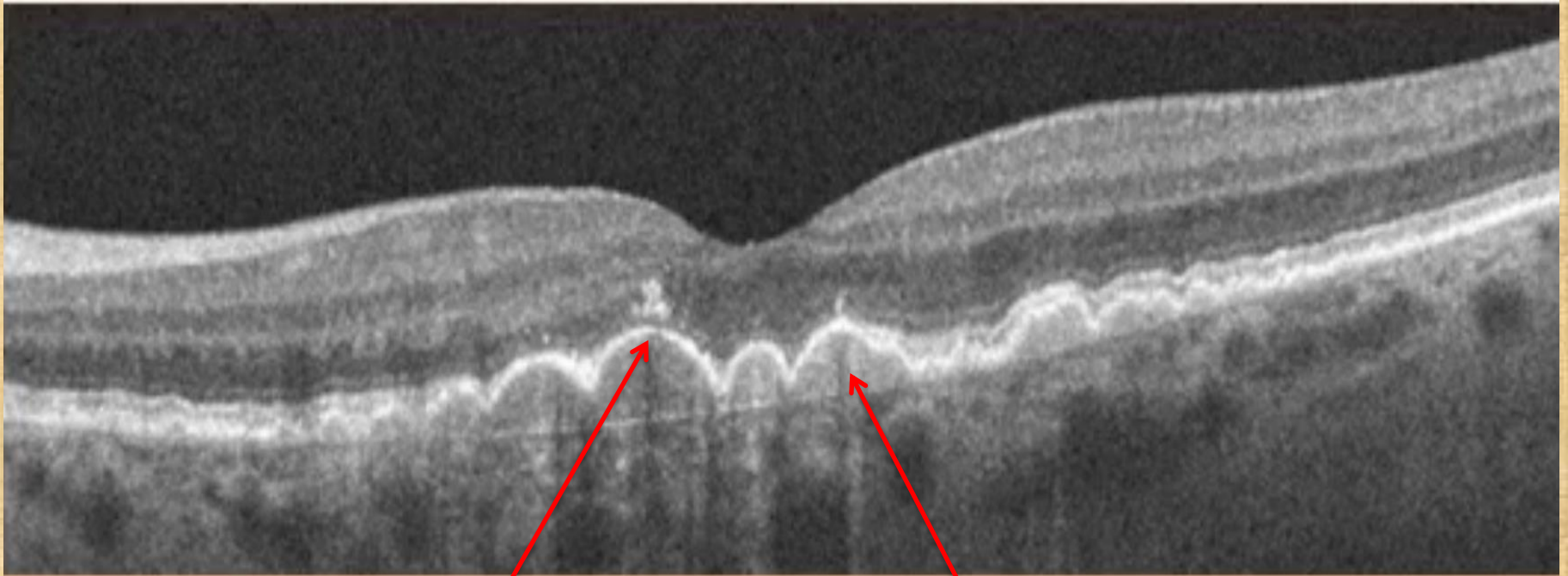


# Macular Hole

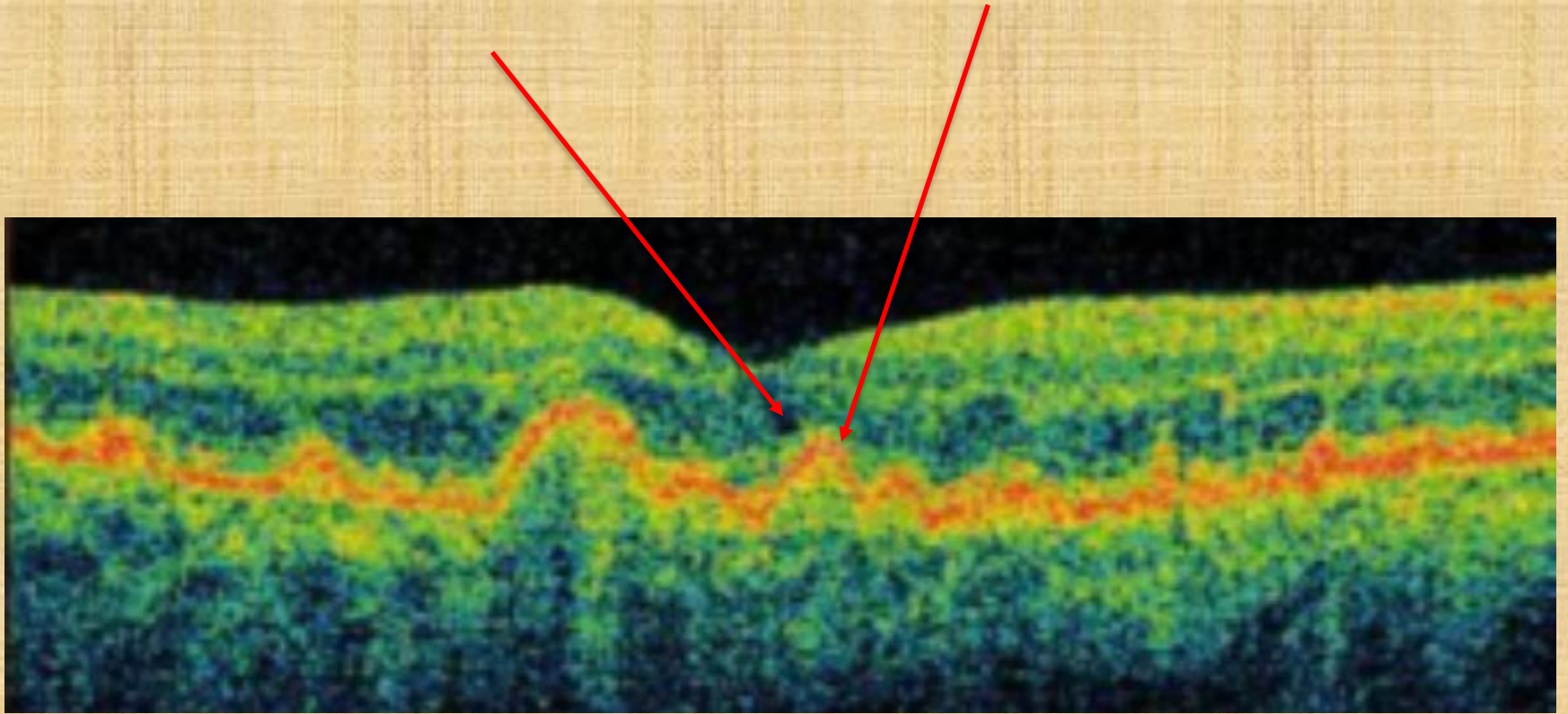
old Stratus OCT image



# Dry Macular Degeneration

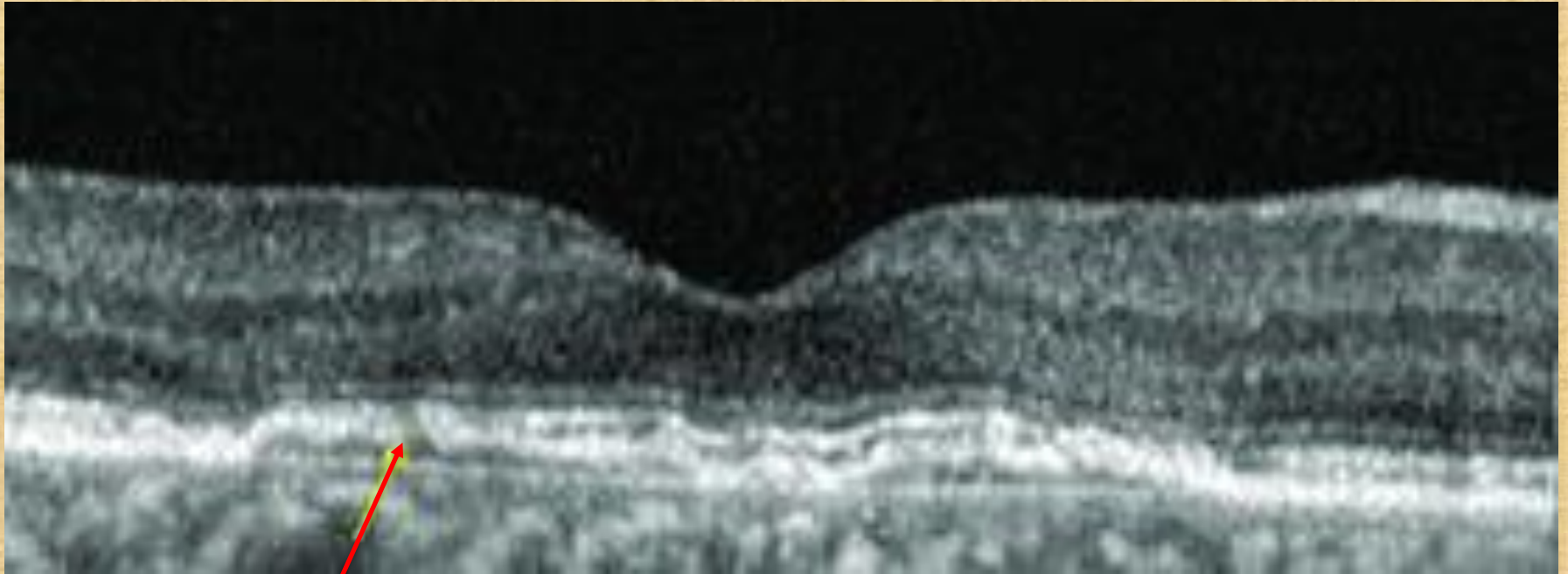


# Dry Macular Degeneration

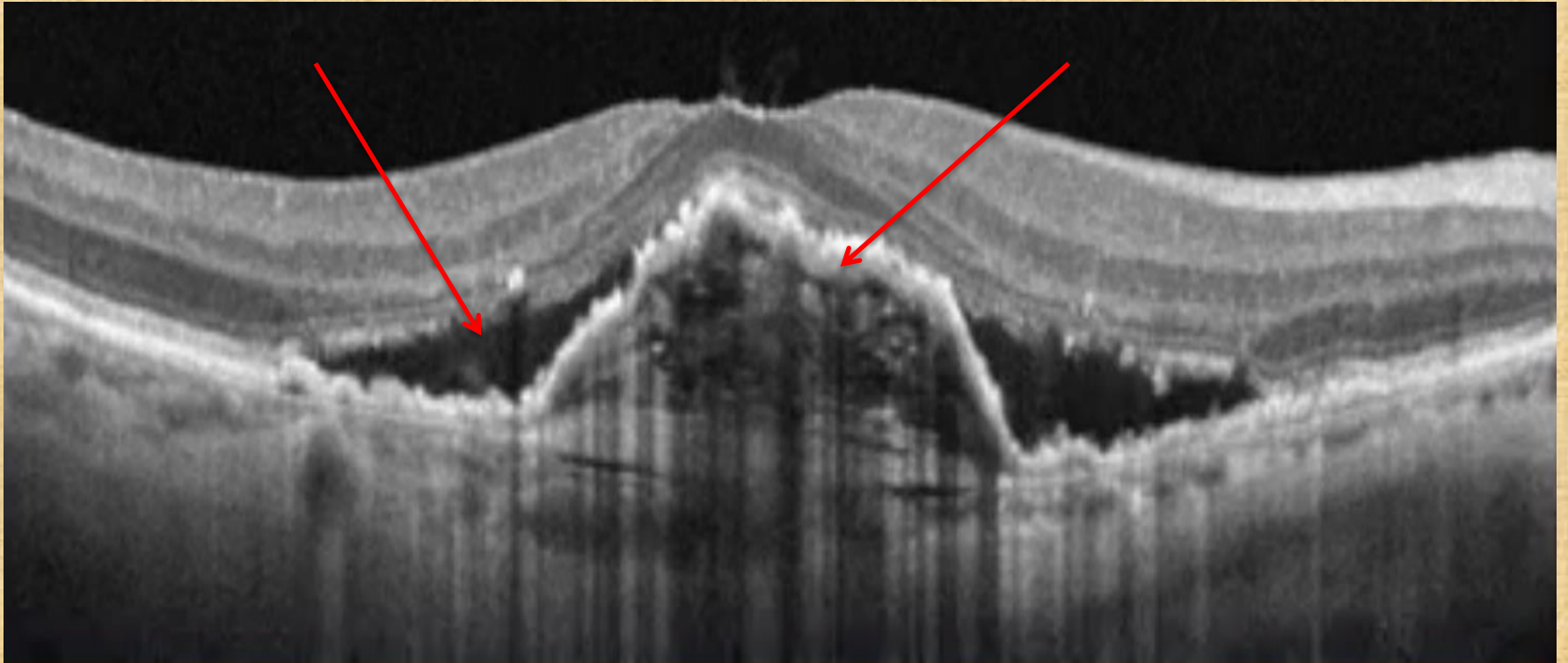


**Old Stratus OCT**

# Dry Macular Degeneration

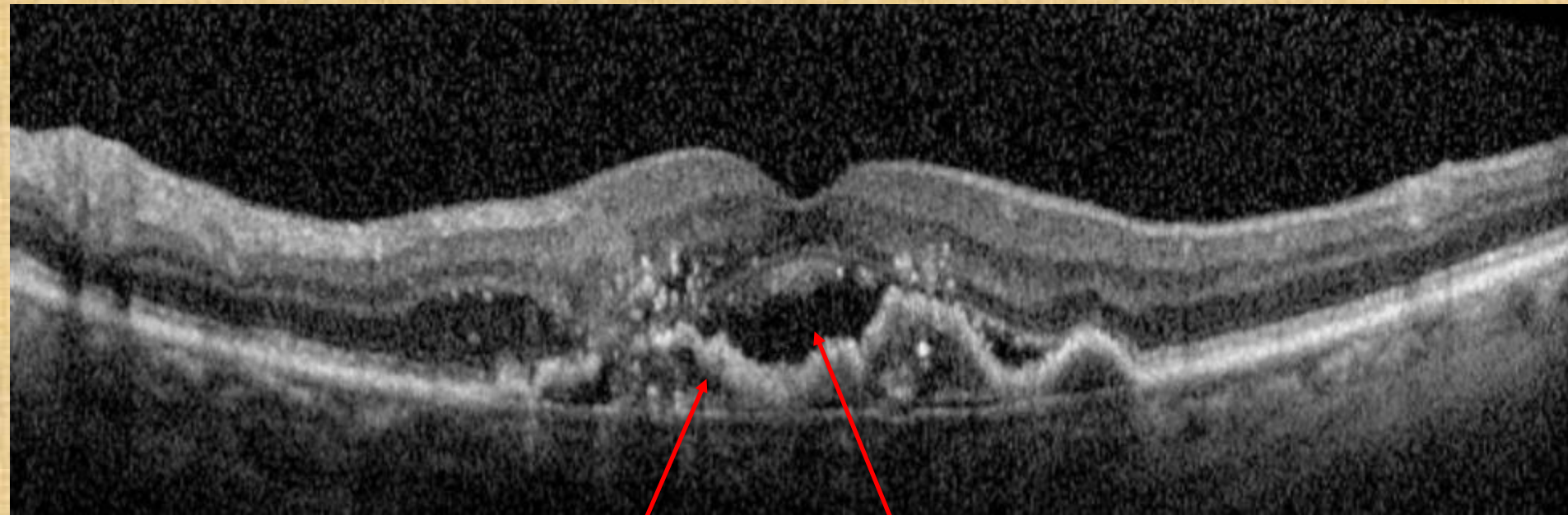


# Wet Macular Degeneration

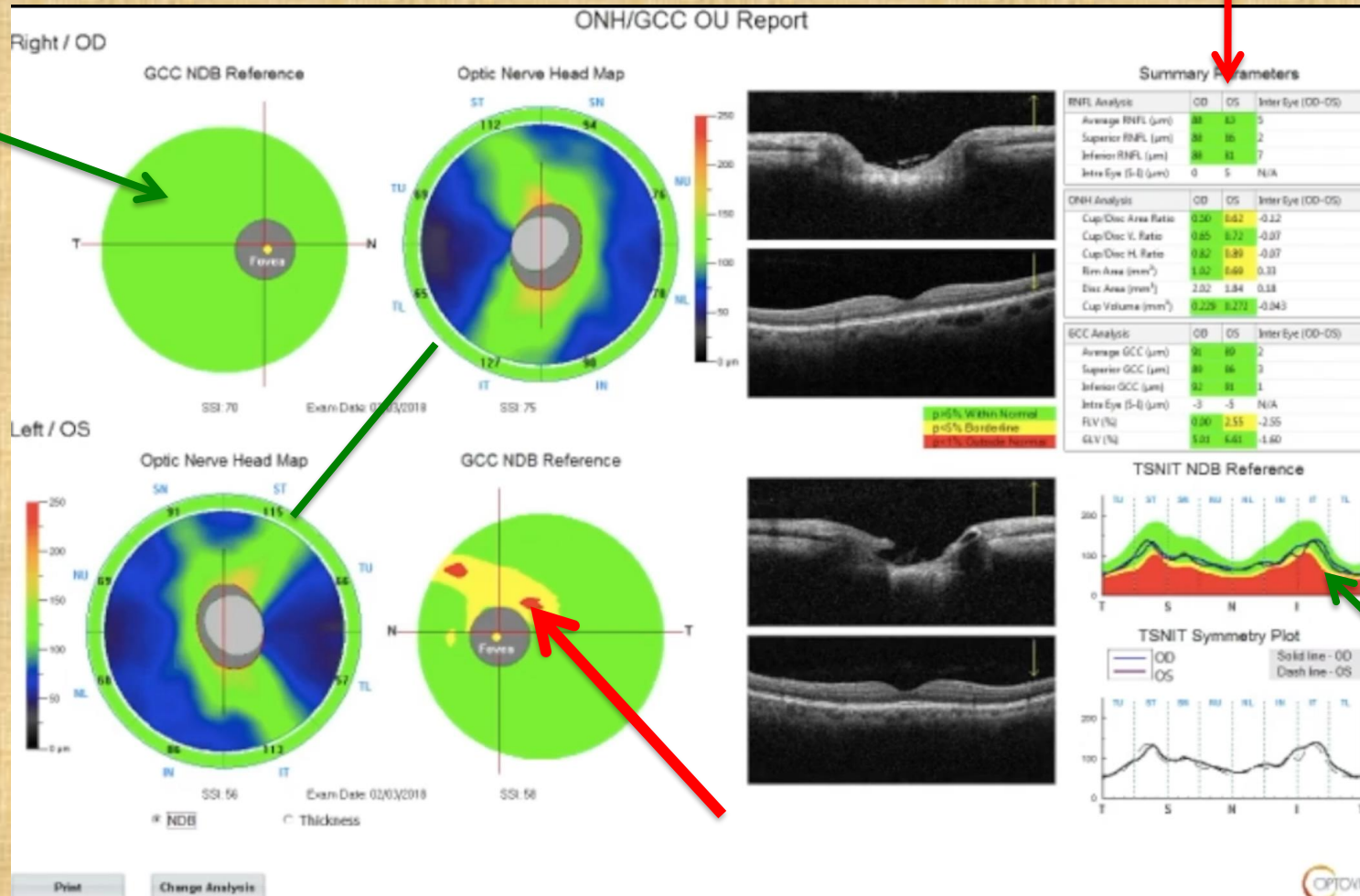




# Wet Macular Degeneration

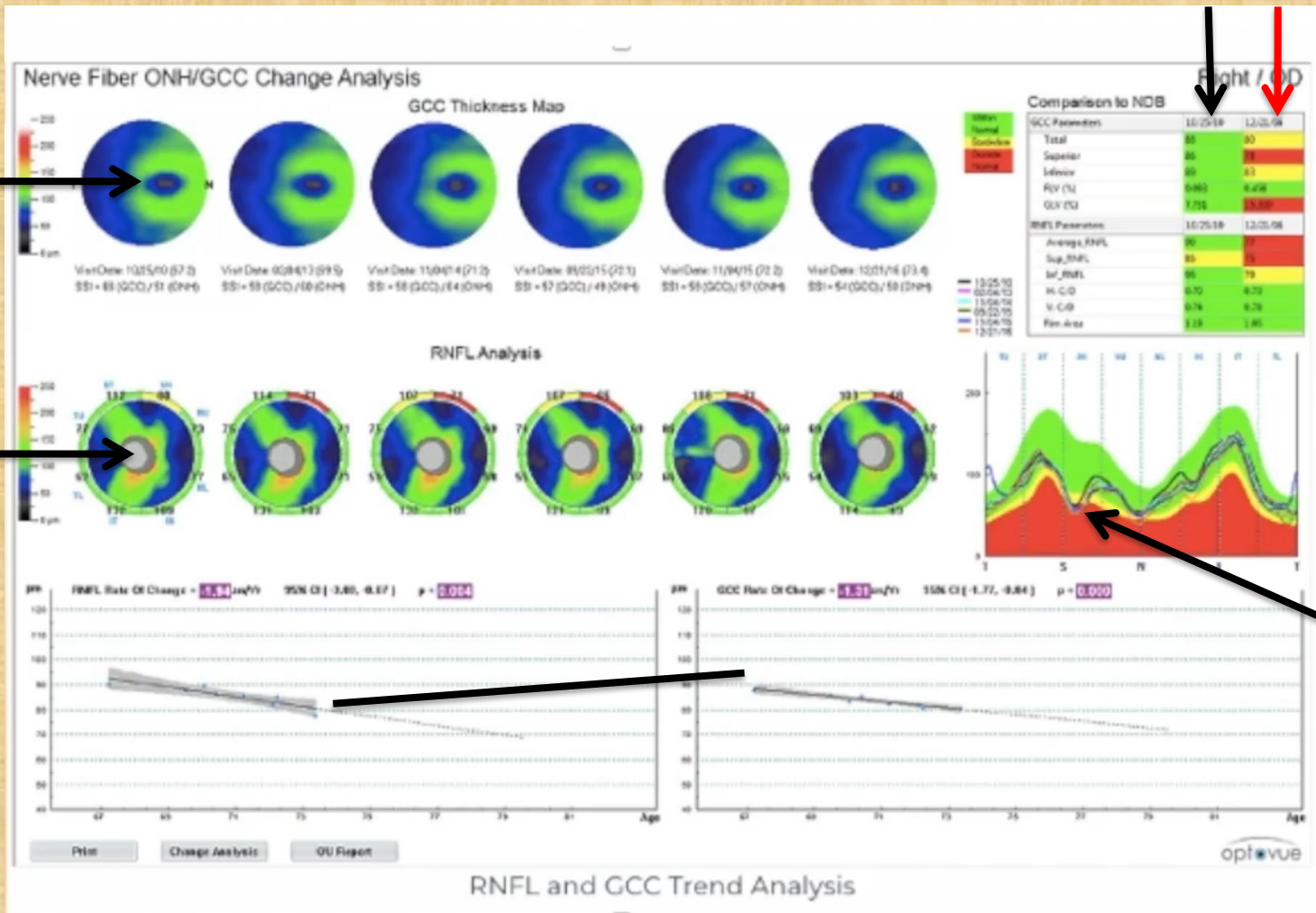


# Glaucoma

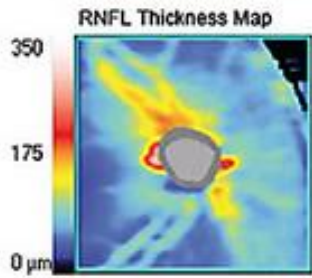


ONH/GCC analysis / TSNIT graph / symmetry graph

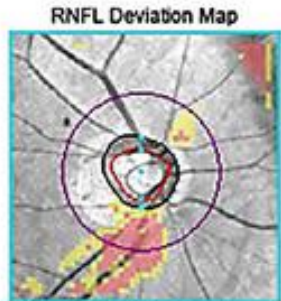
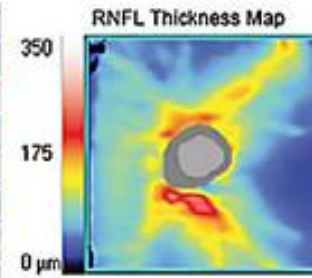
# Glaucoma progression



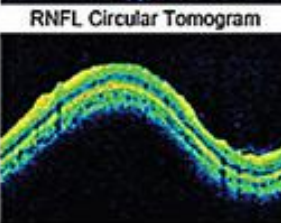
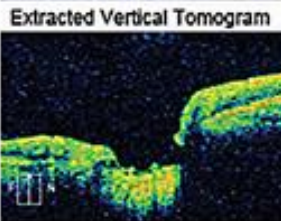
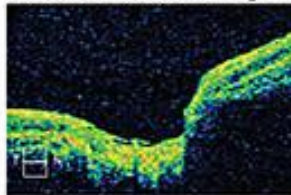
# Glaucoma



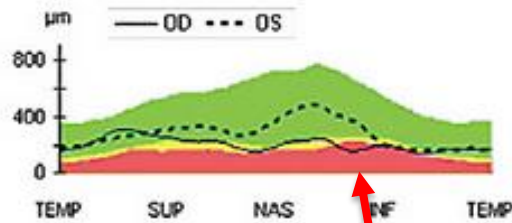
	OD	OS
Average RNFL Thickness	94 μm	103 μm
RNFL Symmetry	26%	
Rim Area	0.94 mm <sup>2</sup>	1.32 mm <sup>2</sup>
Disc Area	2.14 mm <sup>2</sup>	2.41 mm <sup>2</sup>
Average C/D Ratio	0.73	0.65
Vertical C/D Ratio	0.70	0.69
Cup Volume	0.373 mm <sup>3</sup>	0.301 mm <sup>3</sup>



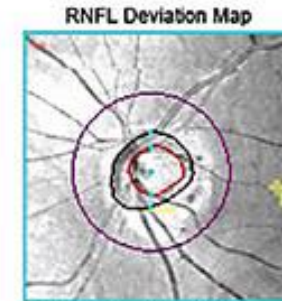
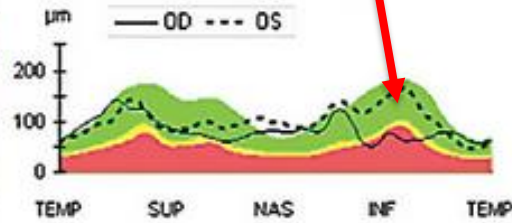
Disc Center(-0.12,-0.06)mm  
Extracted Horizontal Tomogram



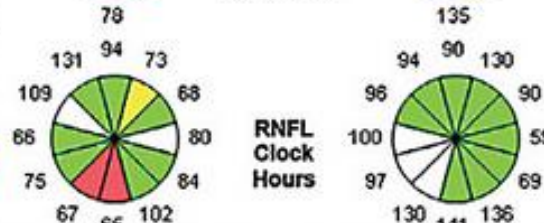
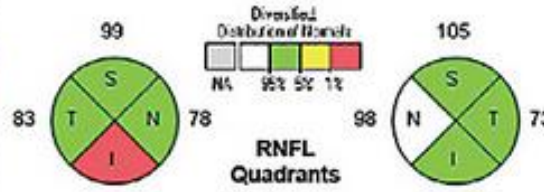
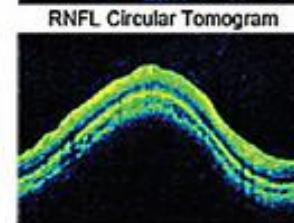
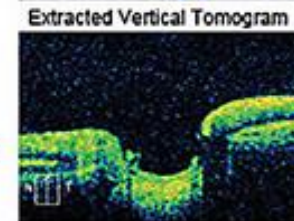
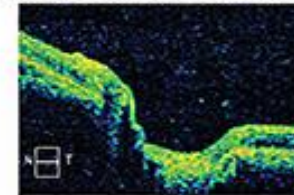
### Neuro-retinal Rim Thickness



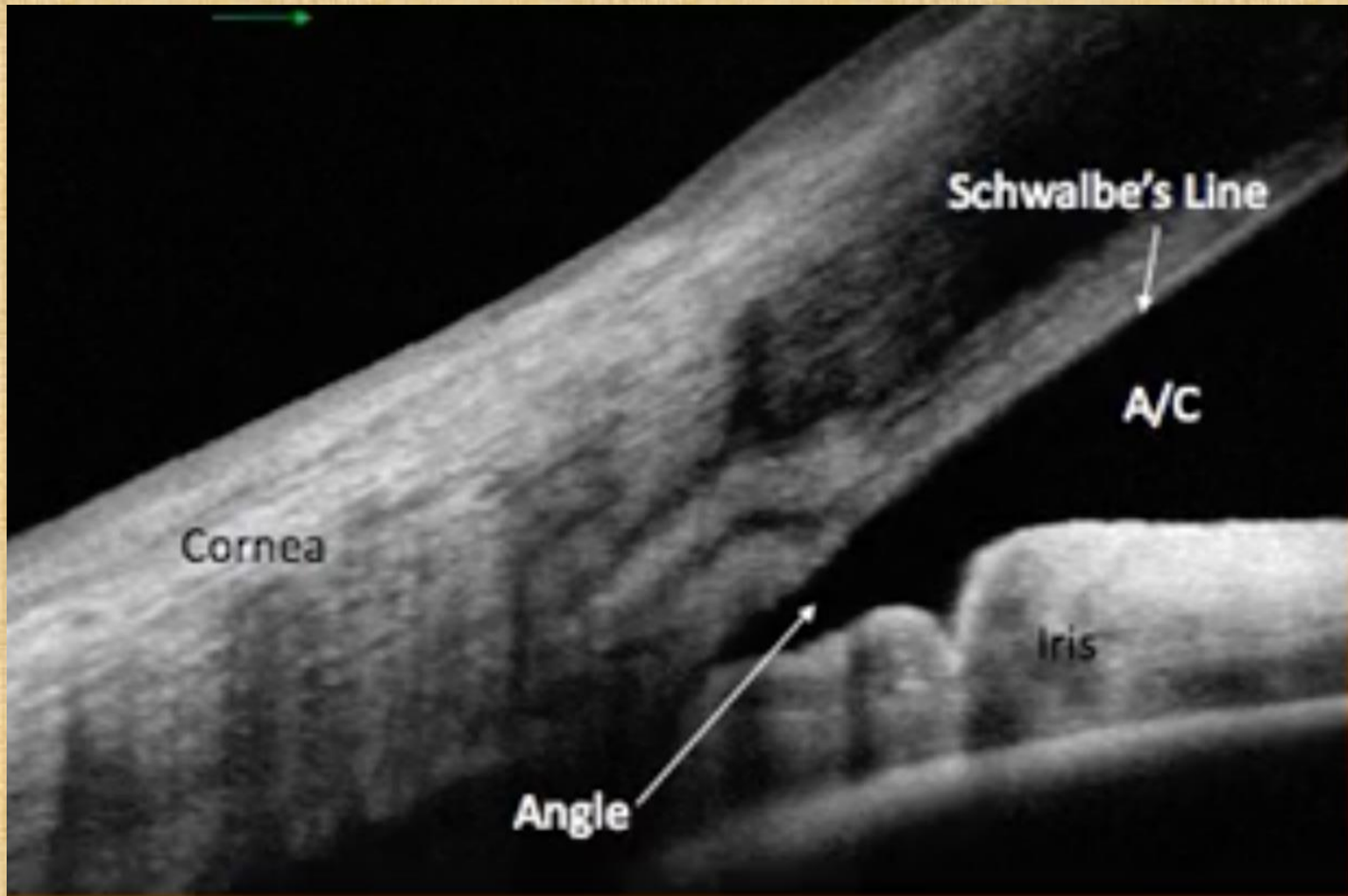
### RNFL Thickness



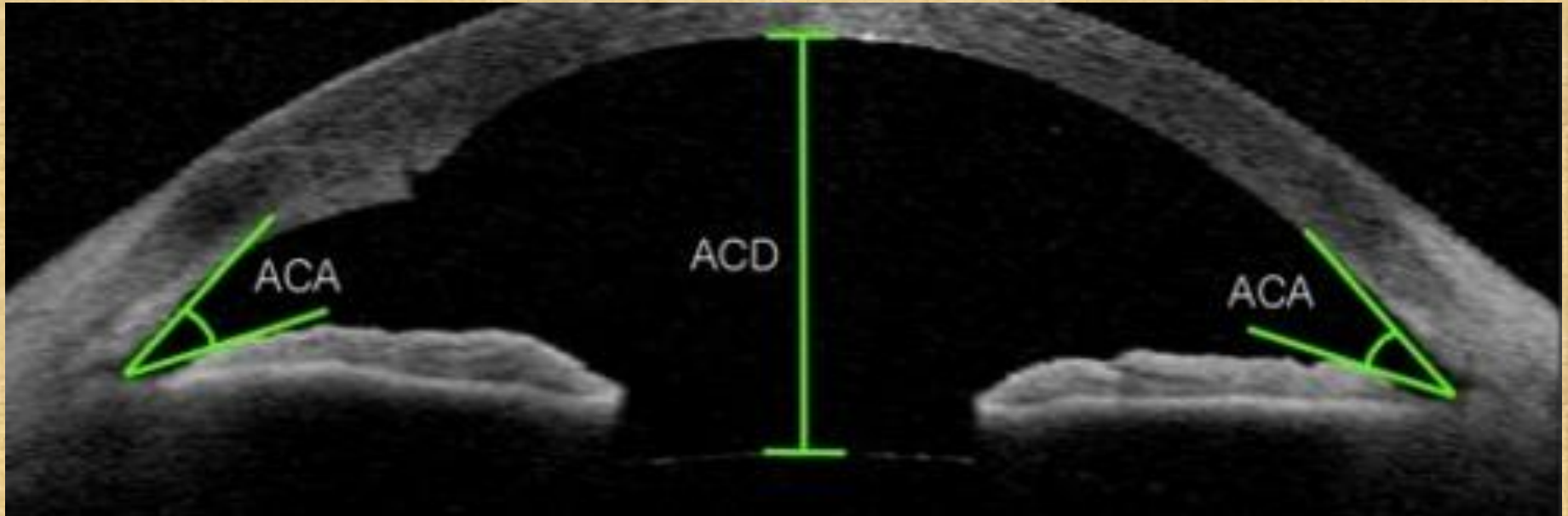
Disc Center(-0.21,-0.06)mm  
Extracted Horizontal Tomogram



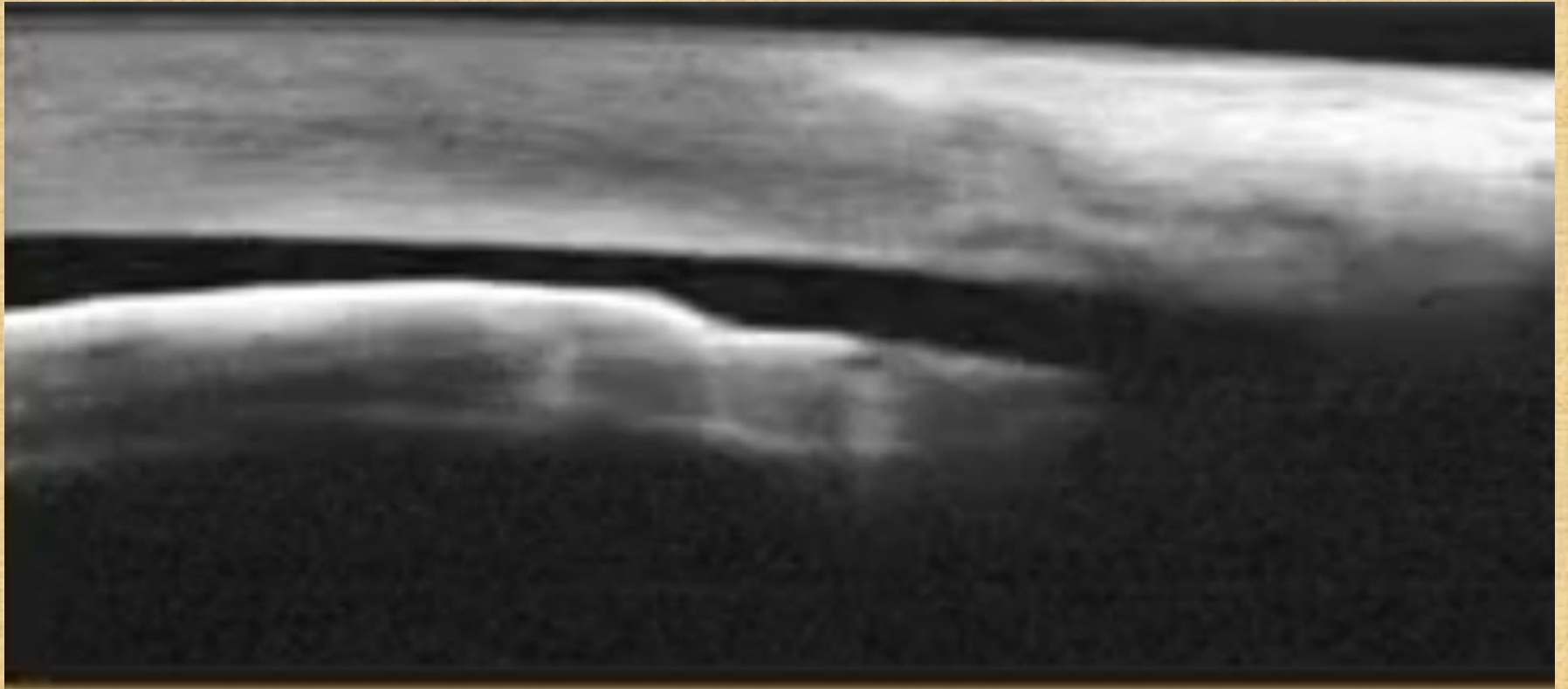
# Glaucoma - Angles



# Glaucoma - Angles

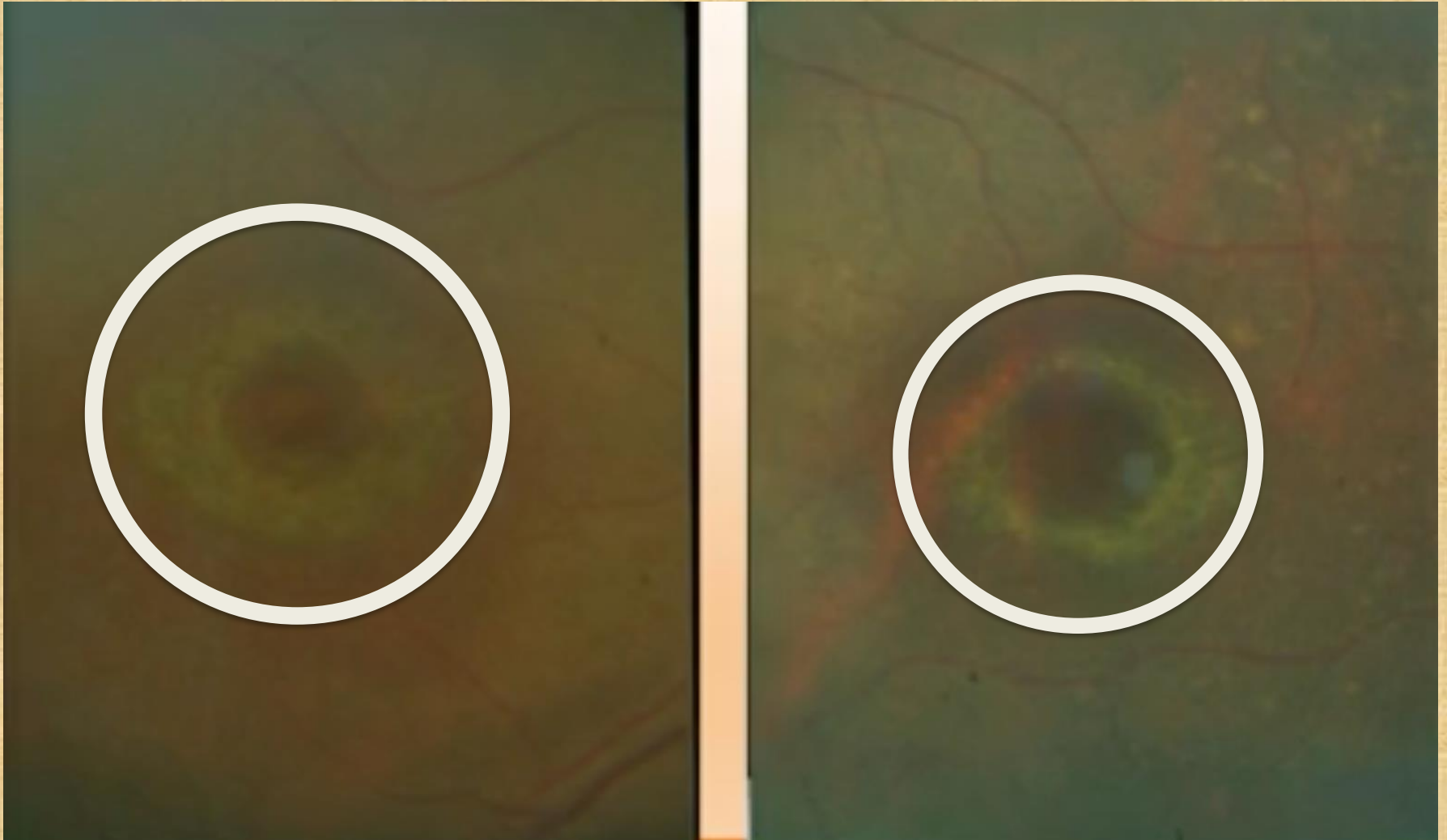


# **Glaucoma - Angles**



**Narrow Angle**

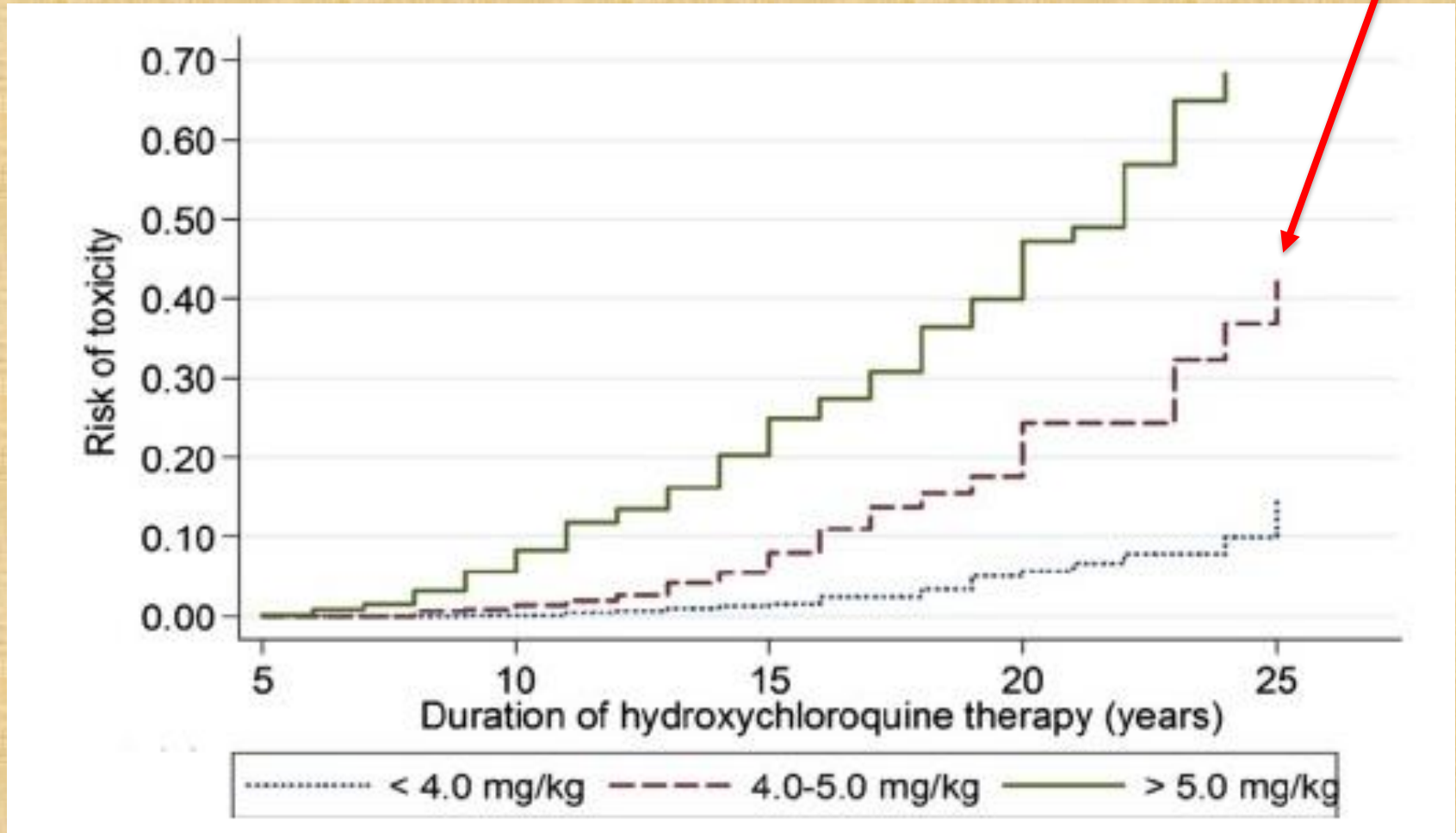
# Plaquenil Toxicity



**“Bulls eye” maculopathy**



# Plaquenil Toxicity



Toxicity related to dose/wt(mg/kg) X time(yrs)

# Plaquenil Toxicity Risks

1 – High Dose : > 5.0 mg/kg

Typical dose is 4 – 5 mg/kg = 200mg/d - 400mg/d  
@150lb = 2.9mg/kg - 5.9mg/kg  
@200lb = 2.2mg/kg - 4.4mg/kg

2 - Time :	< 5yr	1 - 2% chance
	15y	5 – 20% chance
	20y	10 – 50% chance
	25y	15 – 70% chance

3 - Renal Disease

4 - Tamoxifen prescription

5 - Other macular disease

# Plaquenil Screenings

## Recommended

Baseline SLE, 10-2 VF, Fundus photos, OCT

After 5 years annual SD-OCT, mfERG, or AF

## NOT recommended (not sensitive enough)

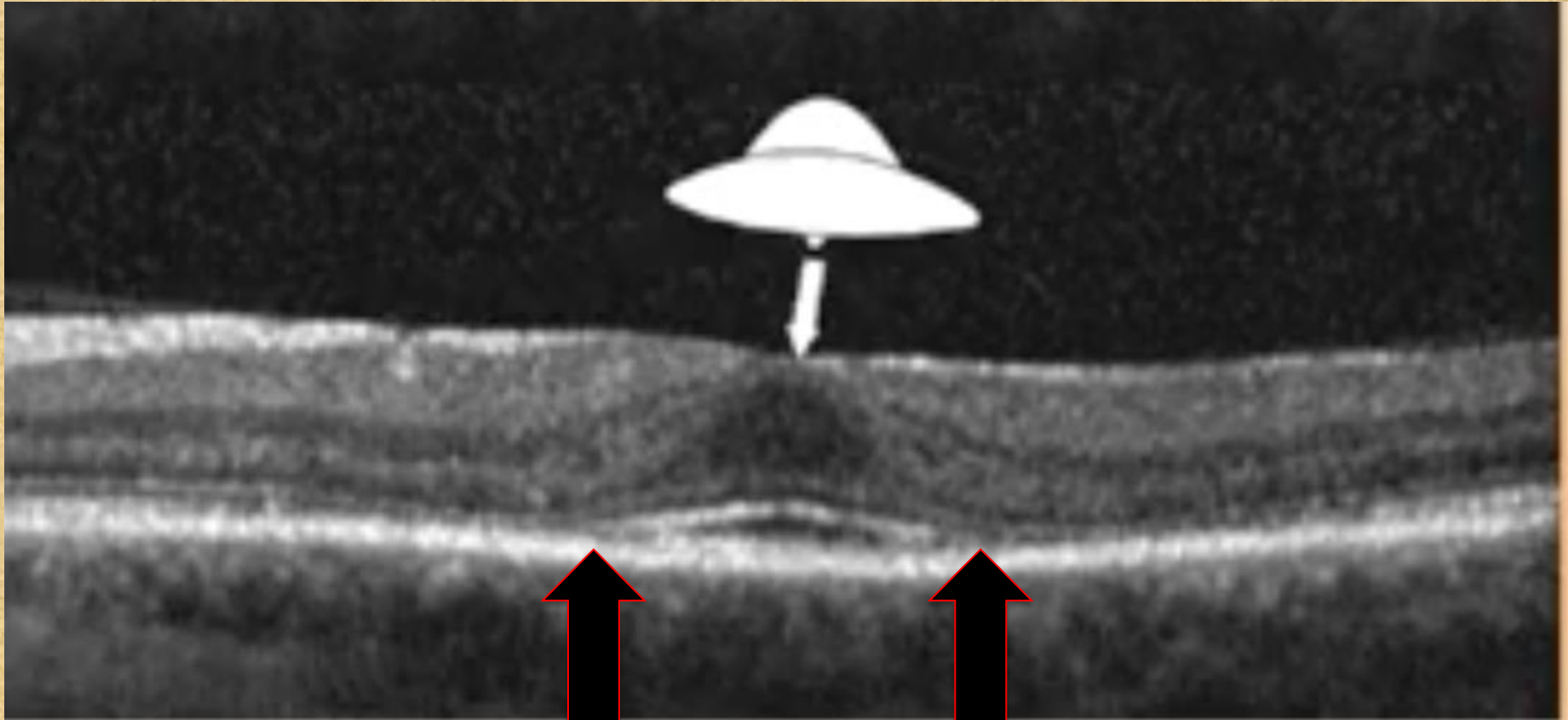
TD OCT

FA

ERG, EOG

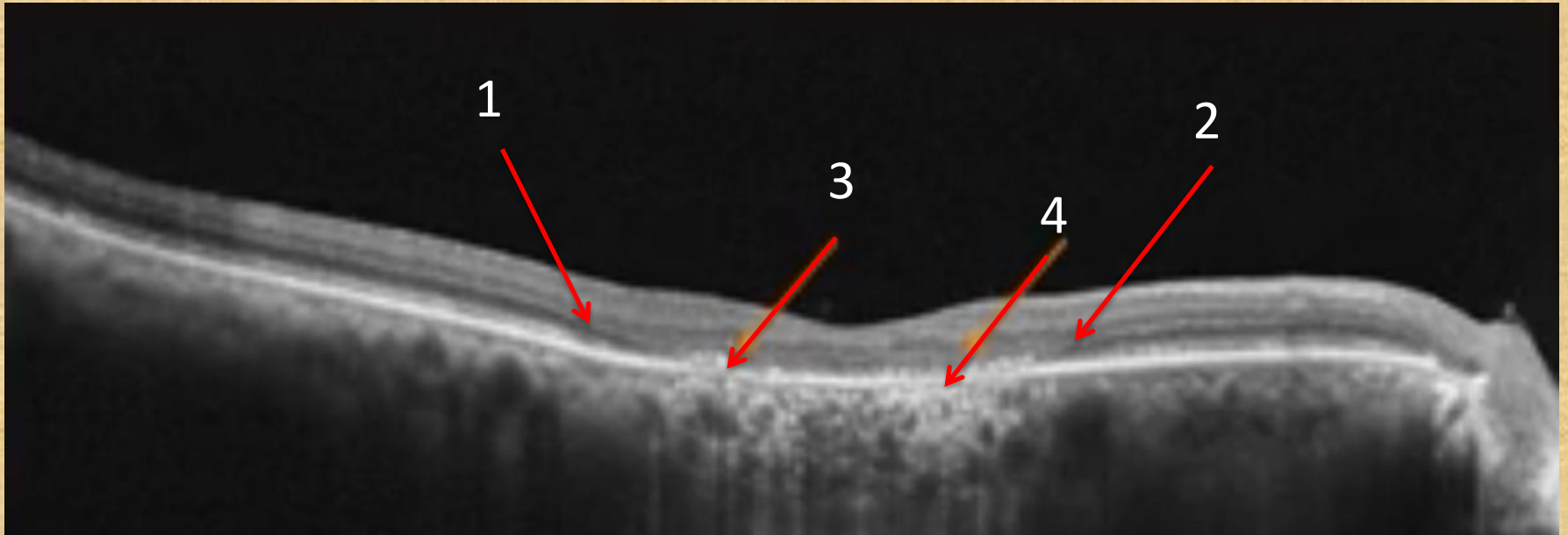
Color testing or Amsler Grid

# Plaquenil Toxicity



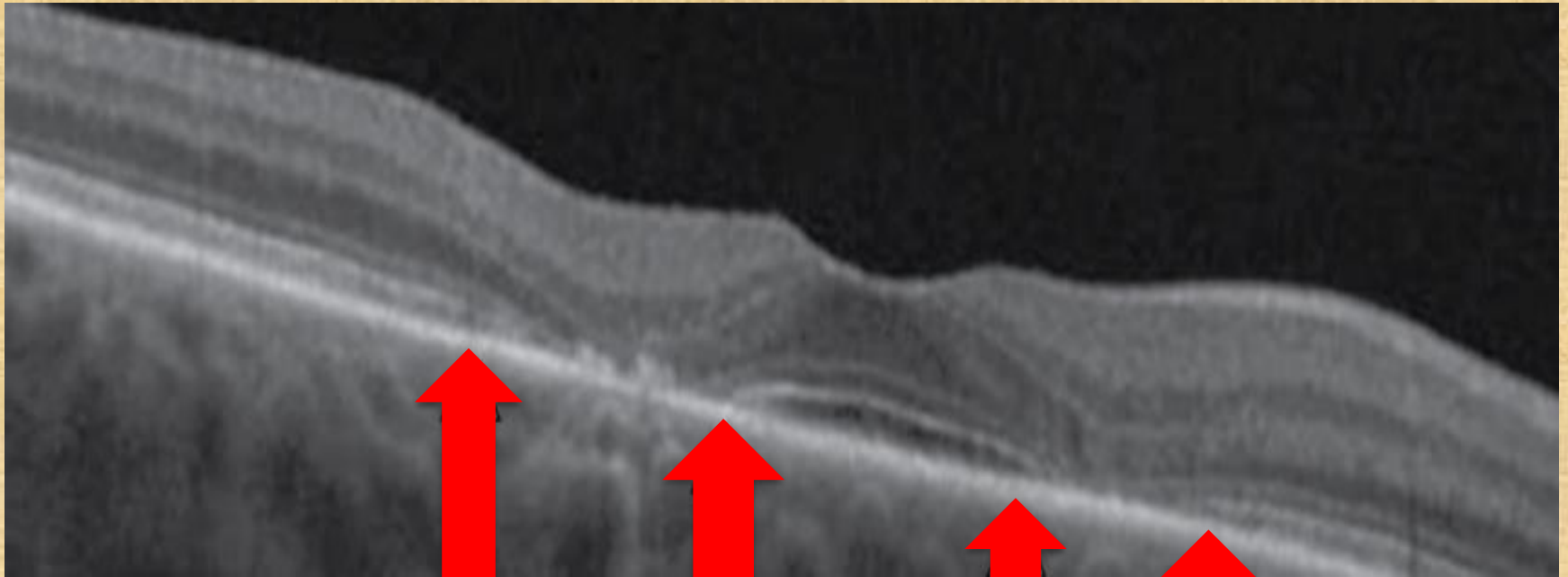
The “flying saucer” sign

# Plaqueenil Toxicity



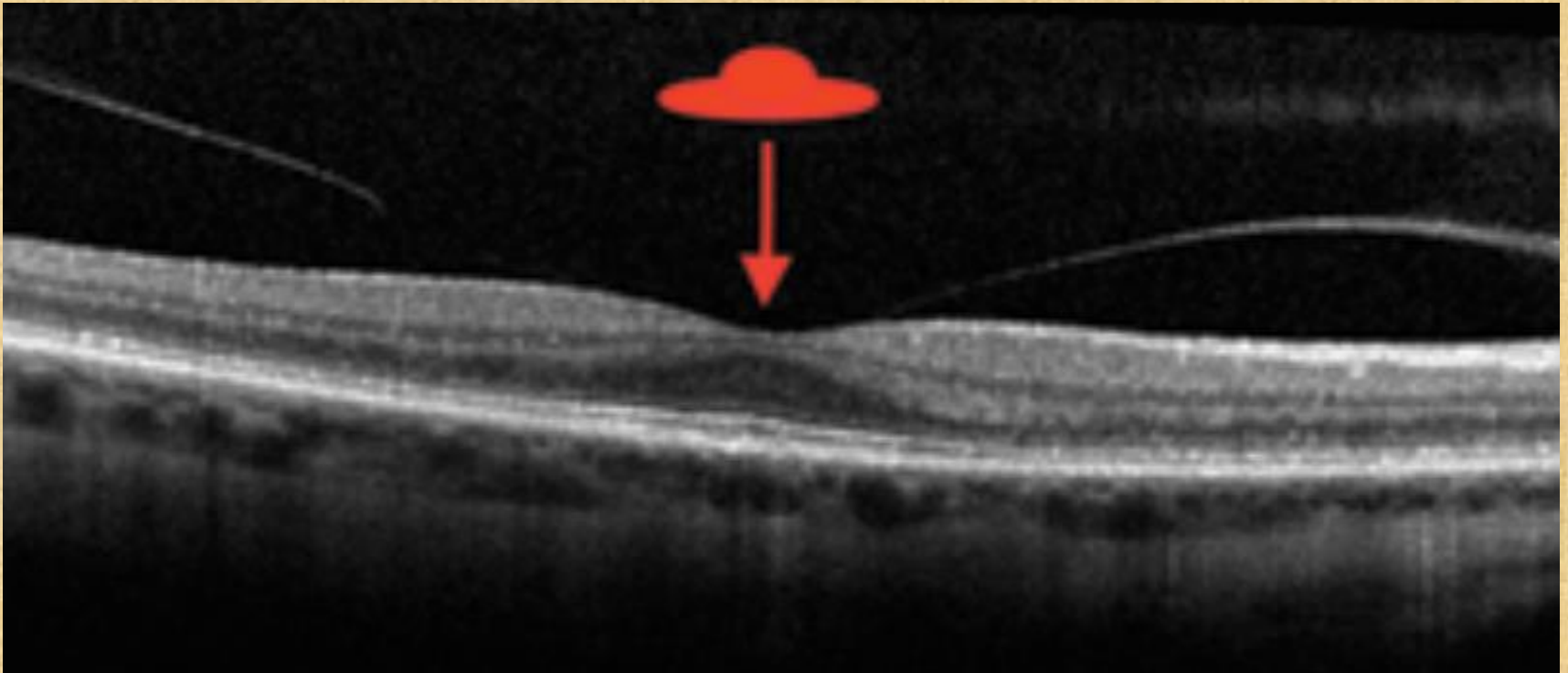
**1 & 2 – collapsing outer retinal layers thinner**  
**3 & 4 - granules bind to melanin at RPE layer**

# Plaquenil Toxicity

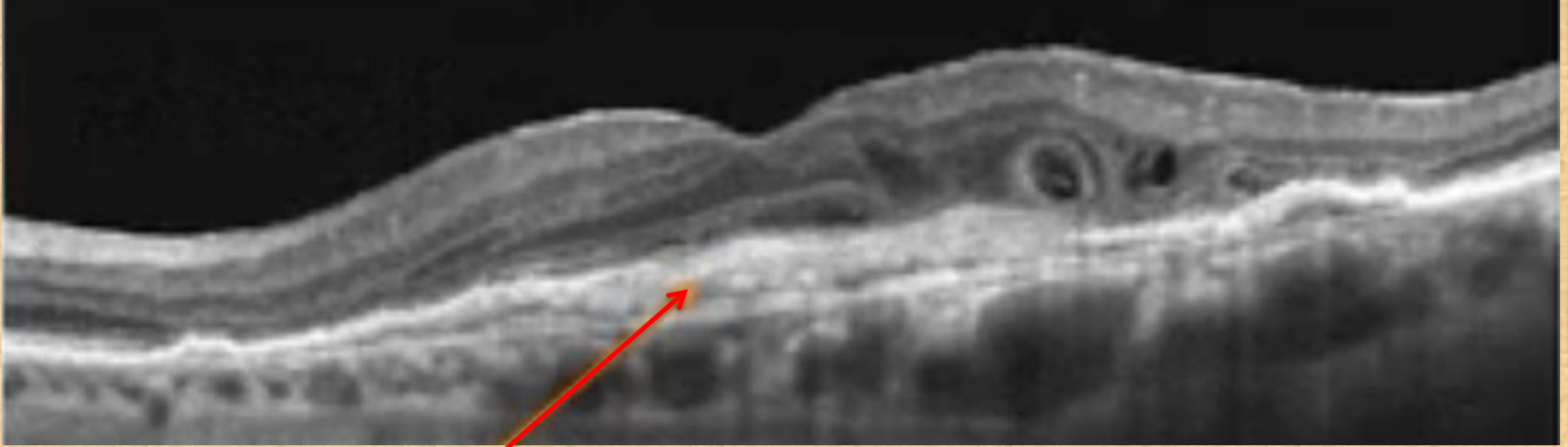


**Collapsing outer retinal layers**

# Plaquenil Toxicity



# Diabetic Retinopathy



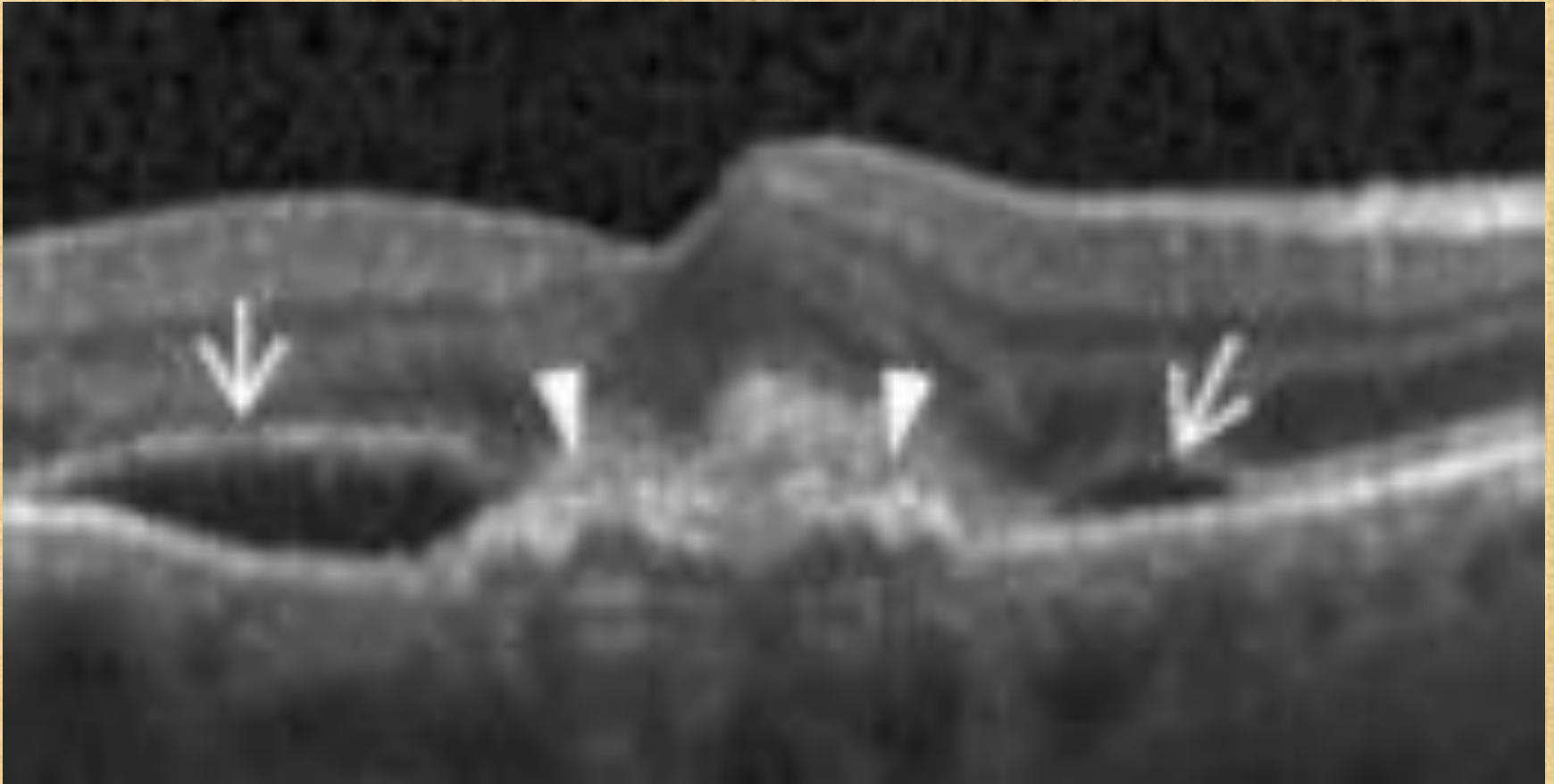
**Choroidal Neo-Vascular Membrane**

**Diabetes can have many different effects**

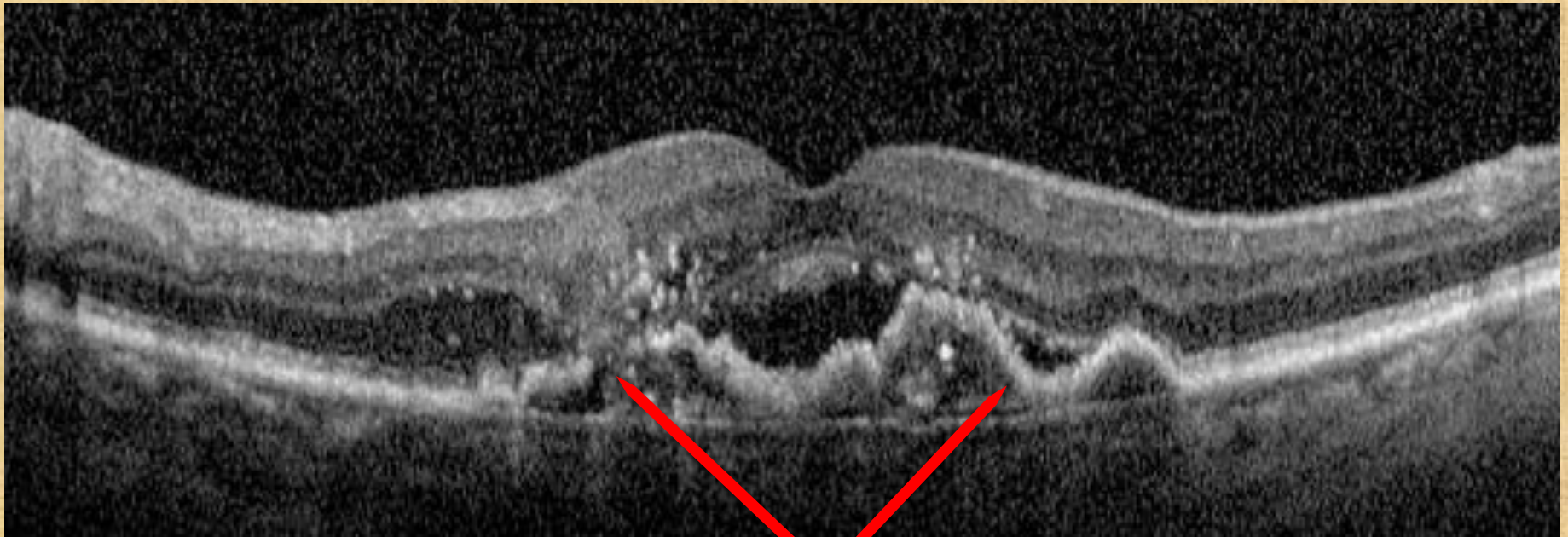
**OCT-A is superior method for seeing early changes in the retinal/choroid structures**



# Diabetic Retinopathy



# Diabetic Retinopathy



**Choroidal Neo-Vascular Membrane**

# Diabetic Retinopathy



# Patient # 1



A) Normal

**B) Central Serous Retinopathy**

**C) Pigment Epithelial Detachments**

D) Plaquenil Toxicity

E) None of the above

# Patient # 2



A) Normal

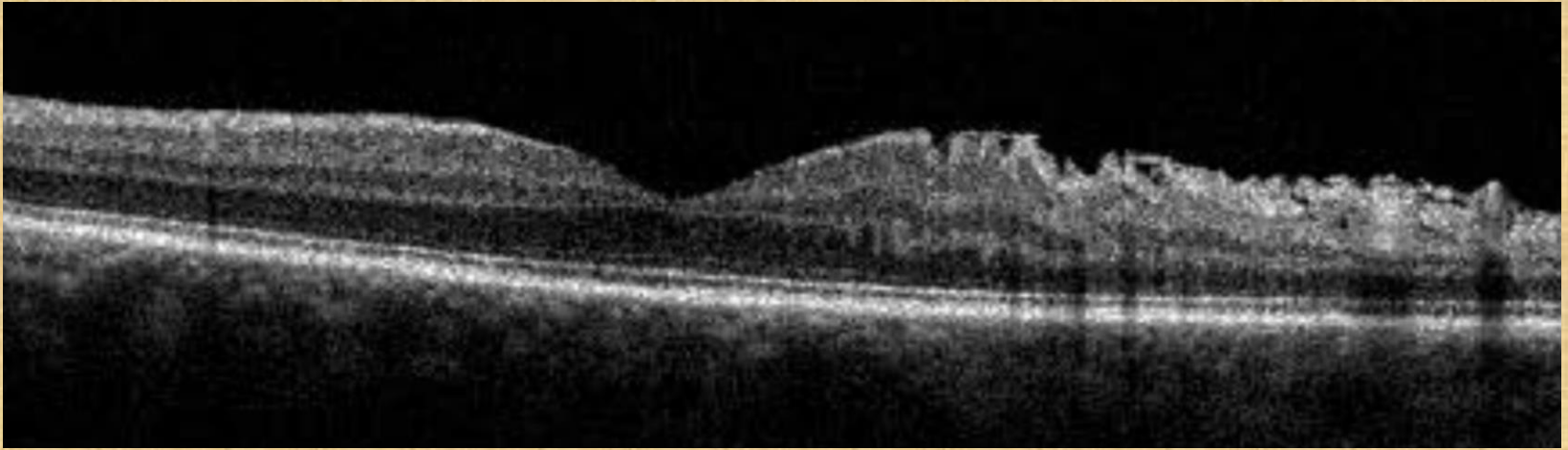
**B) Macular Degeneration Dry**

C) Macular Degeneration Wet

D) Diabetes

E) None of the above

# Patient # 3



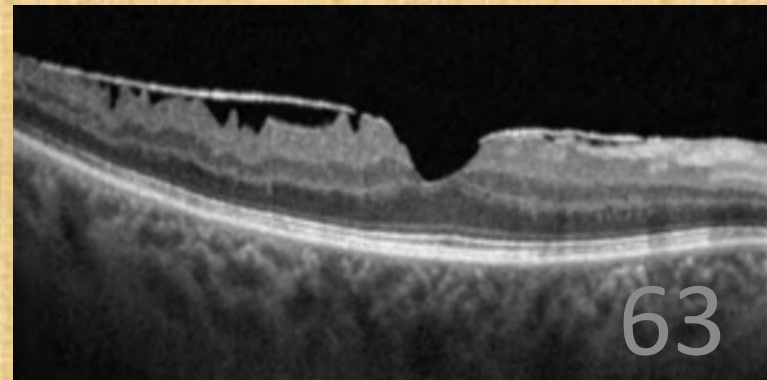
A) Normal

B) Posterior vitreous detachment

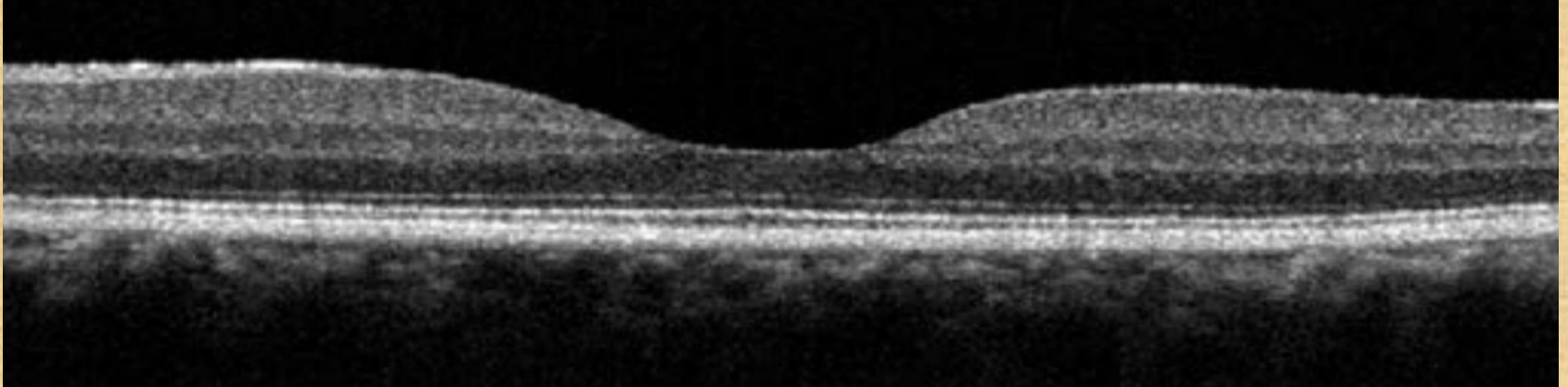
**C) Epiretinal membrane**

D) Macular hole

E) None of the above



# Patient # 4



**A) Normal**

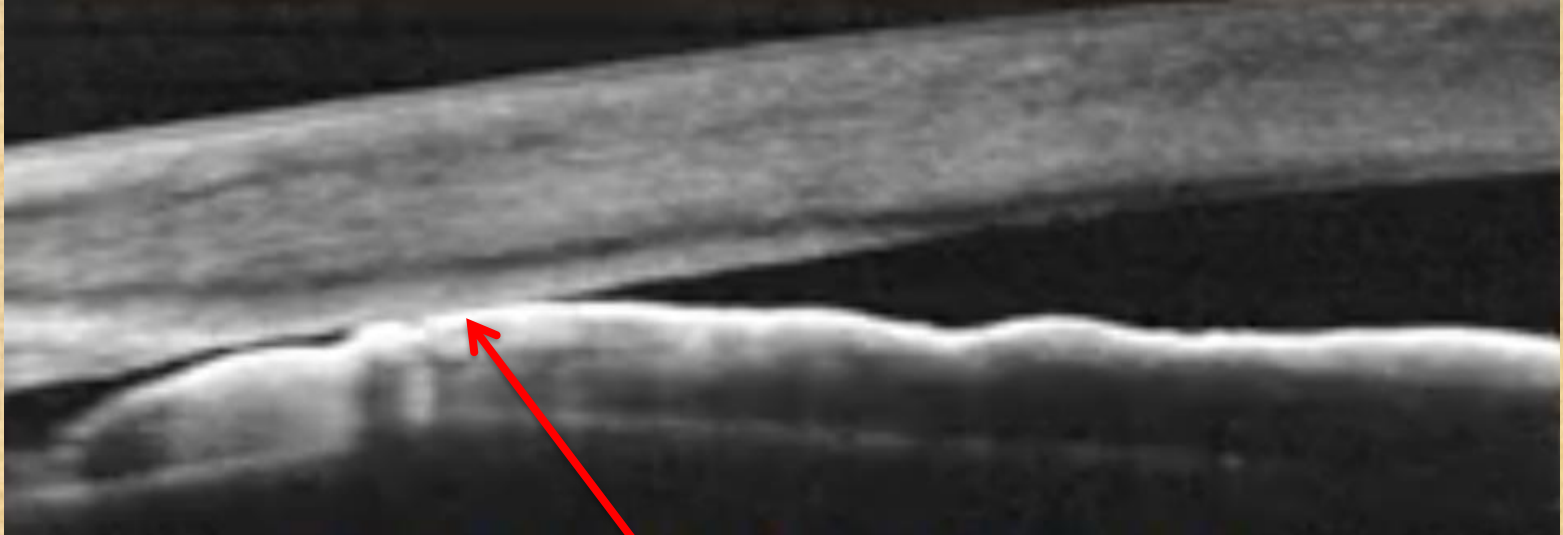
**B) Macular hole**

**C) Plaquinel toxicity**

**D) Diabetes**

**E) None of the above**

# Patient # 5



- A) Normal
- B) Open Angle
- C) Narrow Angle**
- D) Central Serous Retinopathy
- E) None of the above



# Patient # 6



A) Normal

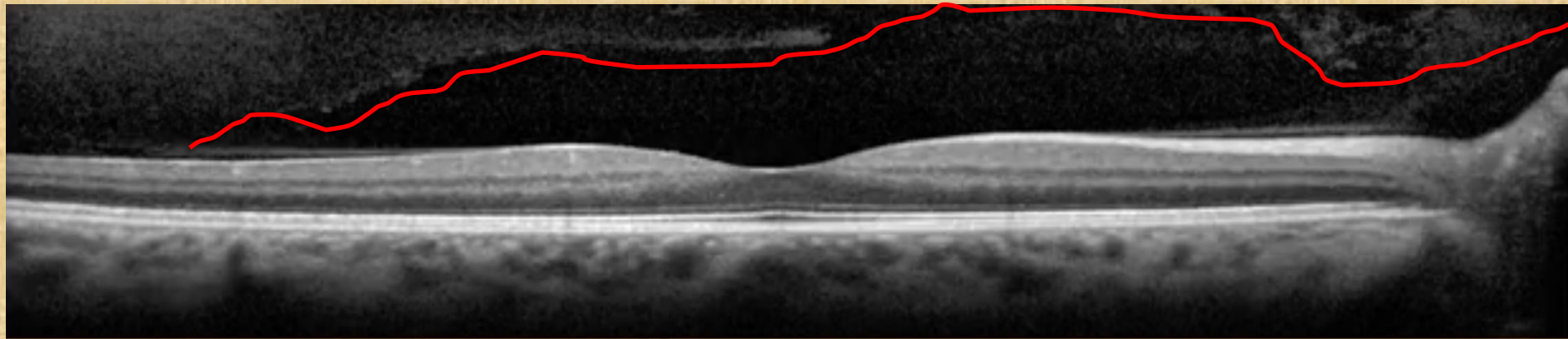
B) Central Serous Retinopathy

C) Macular Cystoid Edema

**D) Plaquenil Toxicity**

E) None of the above

# Patient # 7



A) Normal

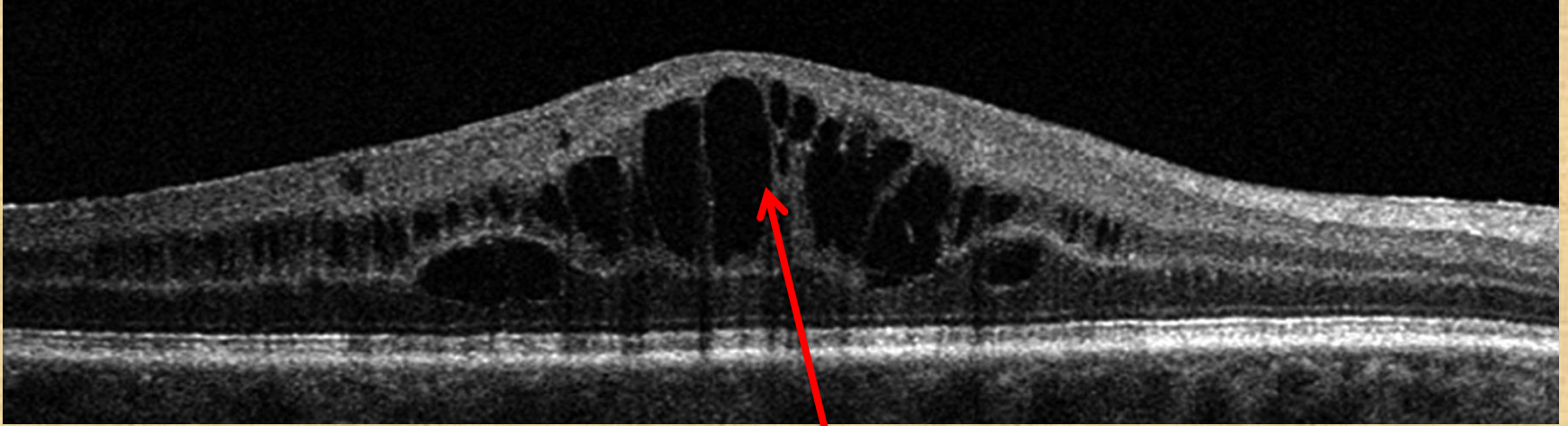
**B) Posterior vitreous detachment**

C) Posterior vitreous detachment with traction

D) Macular hole

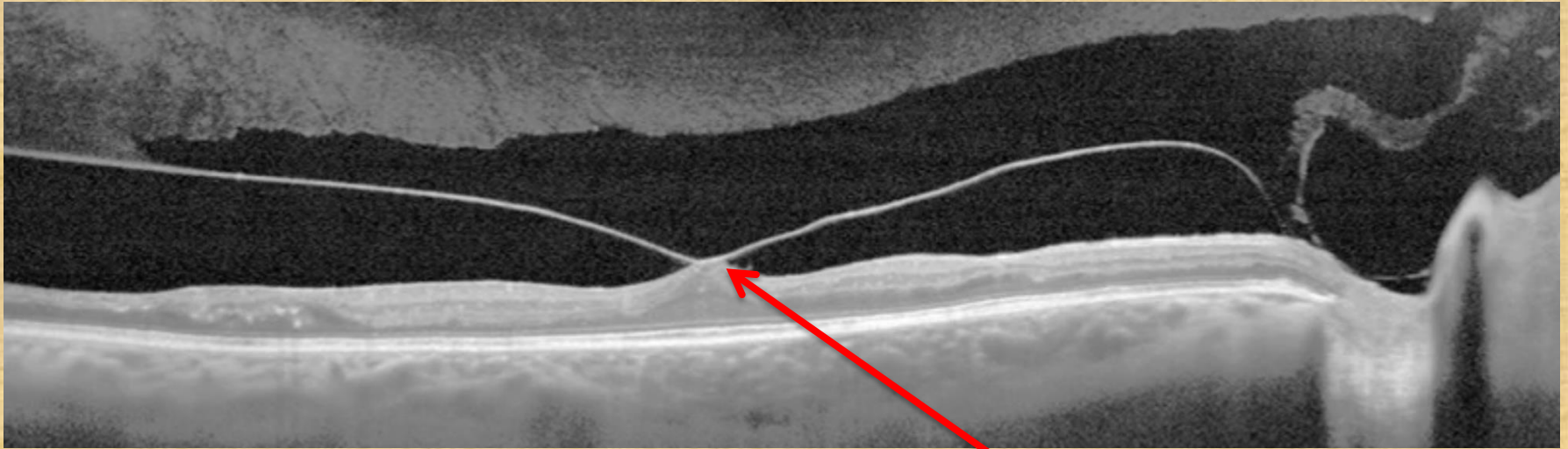
E) None of the above

# Patient # 8



- A) Normal
- B) Posterior vitreous detachment
- C) Macular hole
- D) Cystoid Macular Edema**
- E) None of the above

# Patient # 9



A) Normal

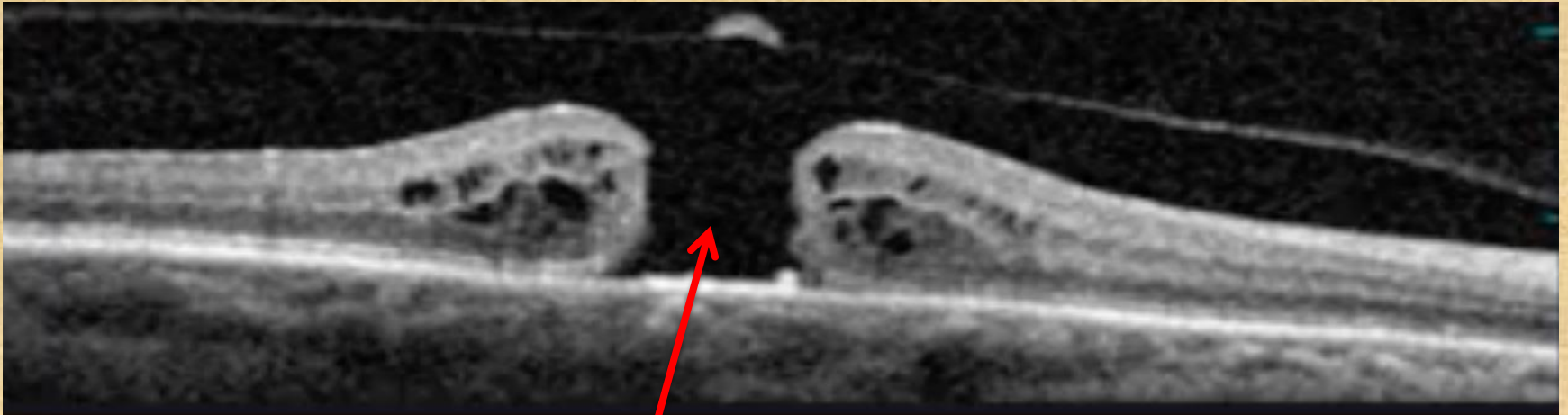
B) Posterior Vitreous Detachment

**C) Posterior Vitreous Detachment with traction**

D) Epiretinal Membrane

E) None of the above

# Patient # 10



A) Normal

B) Posterior vitreous detachment

C) Posterior vitreous detachment with traction

**D) Macular hole**

E) None of the above

# WRAP IT UP

- **OCT is a significant tool in Optometry's medical future**
- **While widely utilized it “should be standard to screen ALL patients for baseline” (IMHO)**
- **Paraoptometrics are VITAL in the data collection AND evaluation of OCT findings**

# **Housekeeping**

**Be sure to get your Credit slip**

**THANK YOU for all YOU DO!**

**PARAs ROCK!**

**Next Up – Reefer Madness**