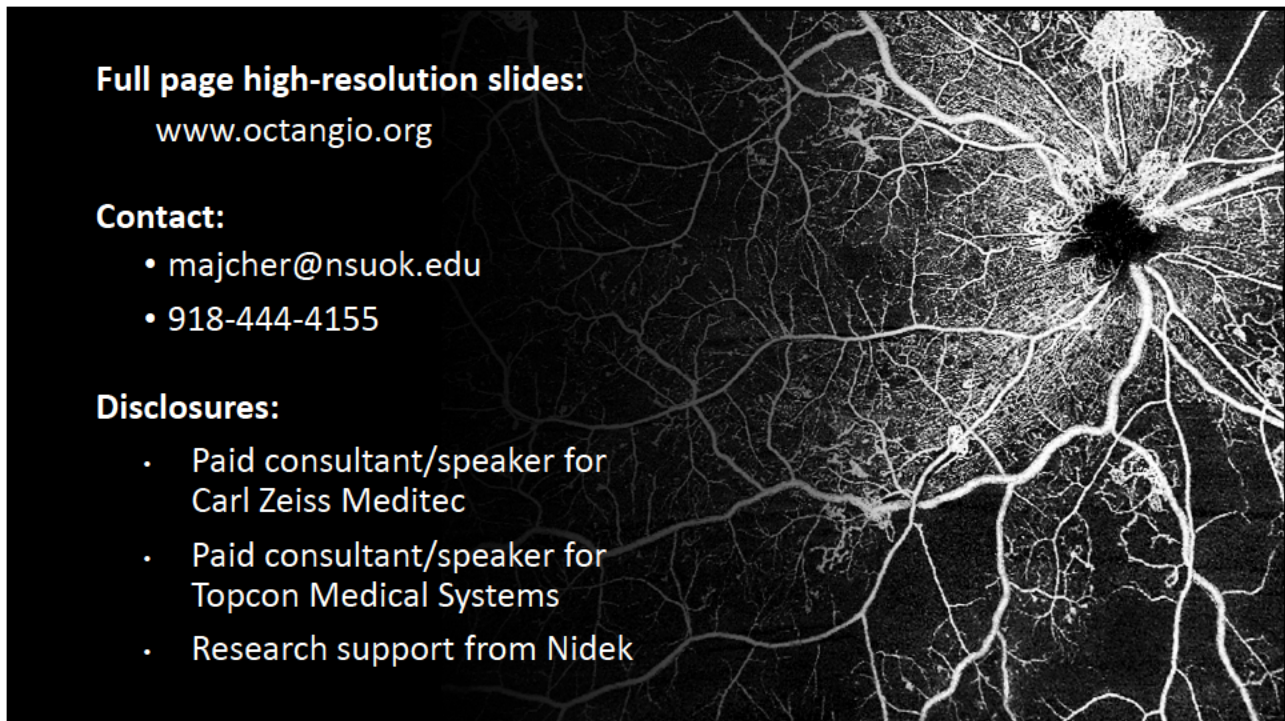


OPTICAL COHERENCE TOMOGRAPHY: REVOLUTIONIZING VITREORETINAL DISEASE

Carolyn Majcher, OD, FAAO
Oklahoma College of Optometry
majcher@nsuok.edu

1



Full page high-resolution slides:

www.octangio.org

Contact:

- majcher@nsuok.edu
- 918-444-4155

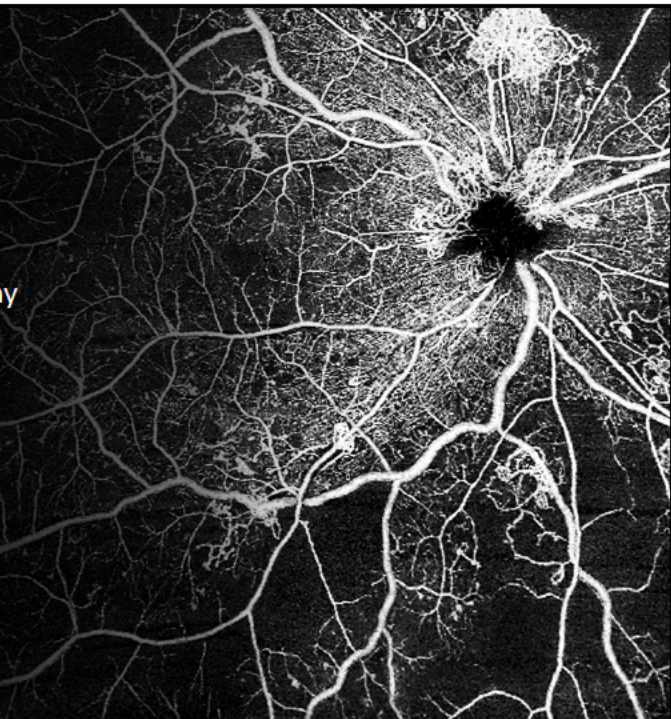
Disclosures:

- Paid consultant/speaker for Carl Zeiss Meditec
- Paid consultant/speaker for Topcon Medical Systems
- Research support from Nidek

2

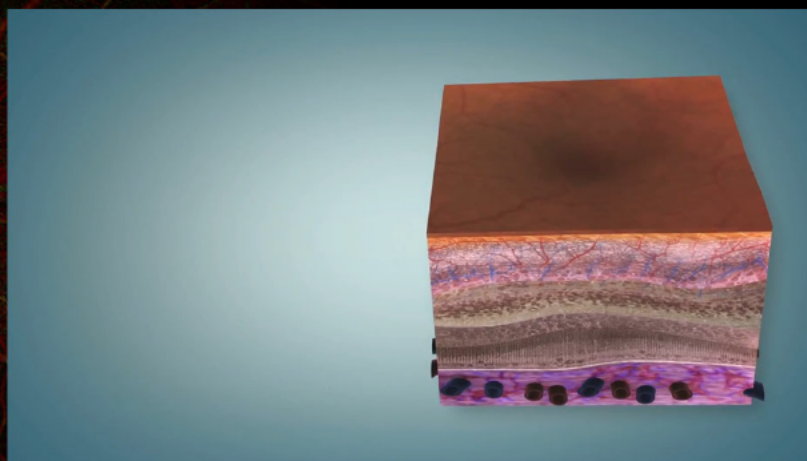
ROAD MAP

- **OCT displays/technologies**
 - En-face analysis
 - Enhanced depth imaging
 - OCT angiography
- **Interpretation**
 - Normal retinal & choroidal anatomy
 - Hyperreflective pathology
 - Hyporeflective pathology
- **Disease Applications/Cases**
 - Diabetic retinopathy
 - Venous occlusion
 - Misc macular disease
 - Age-related macular degeneration
 - Pachychoroid spectrum
 - Choroidal tumors
 - Peripheral lesions
 - Vitreoretinal interface pathology



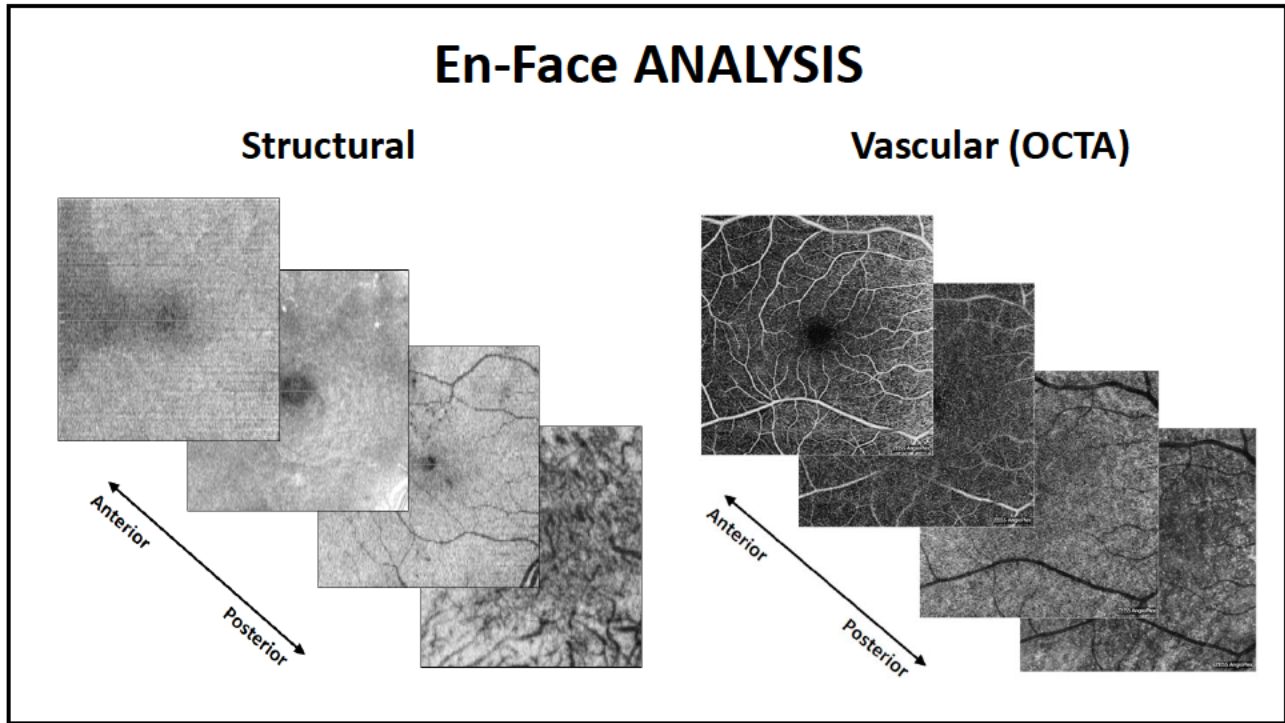
3

En Face ANALYSIS

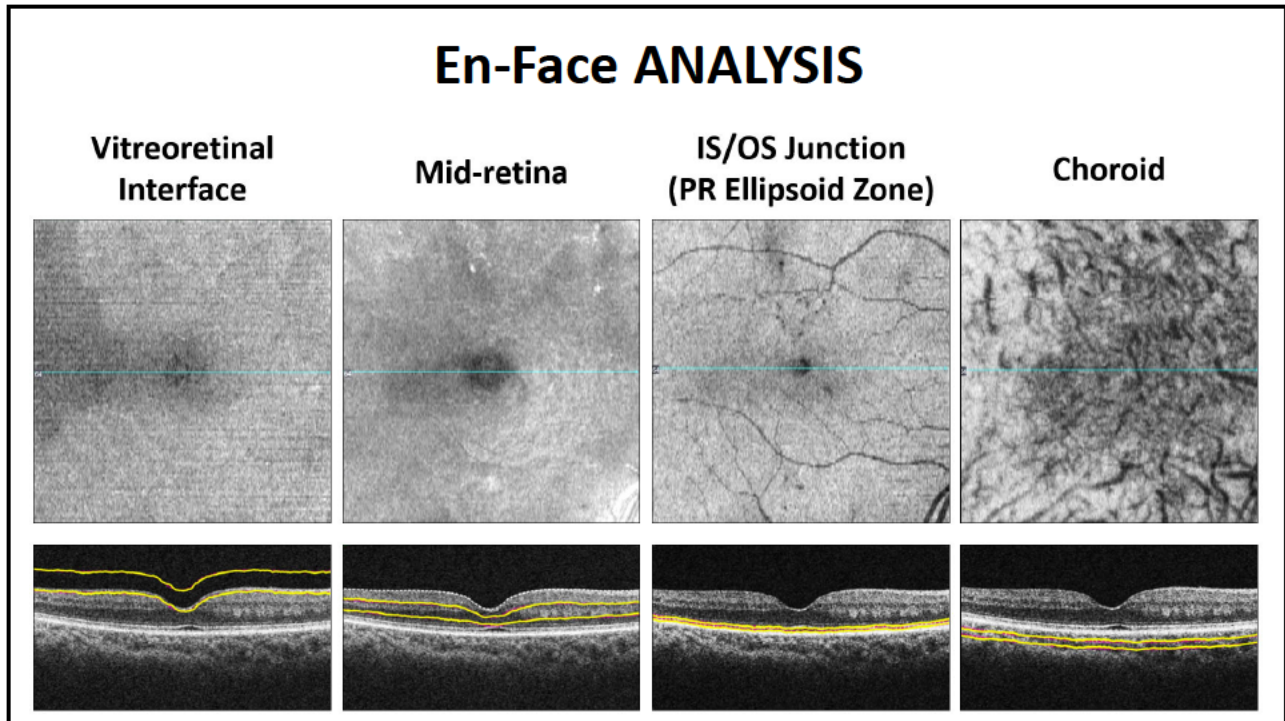


An en face image represents a slab of several retinal layers compressed into a 2D plane.

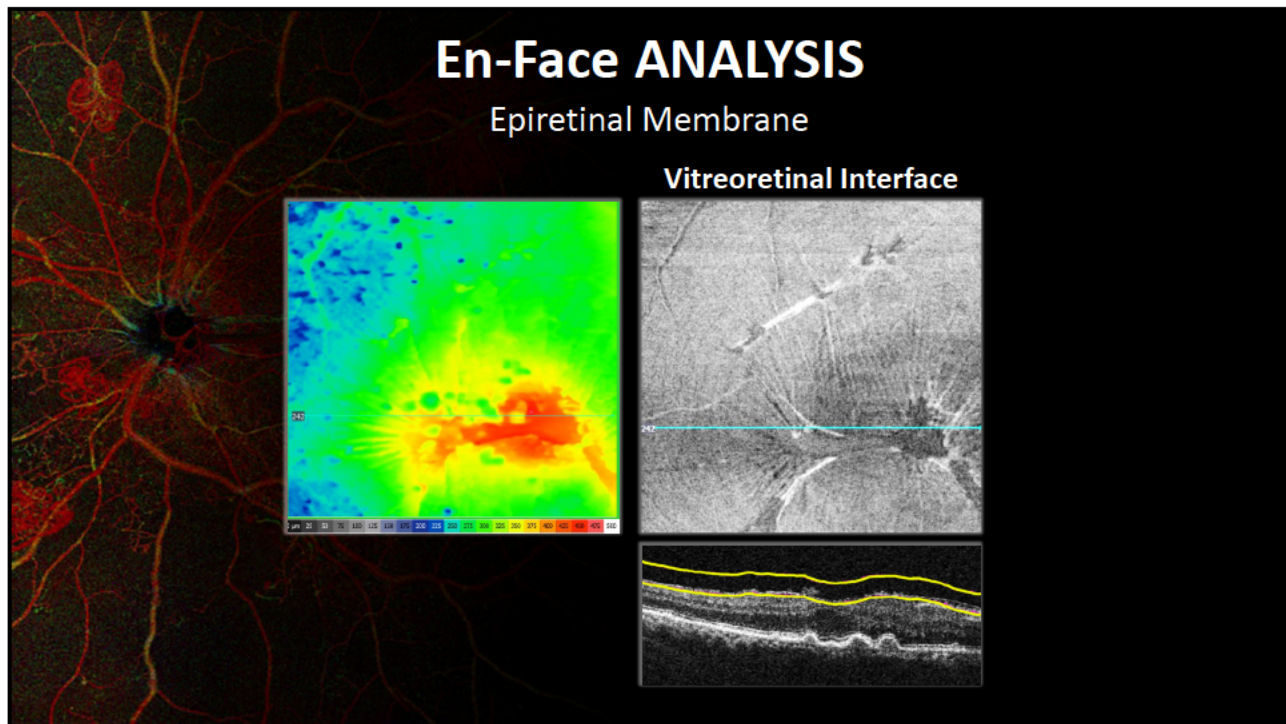
4



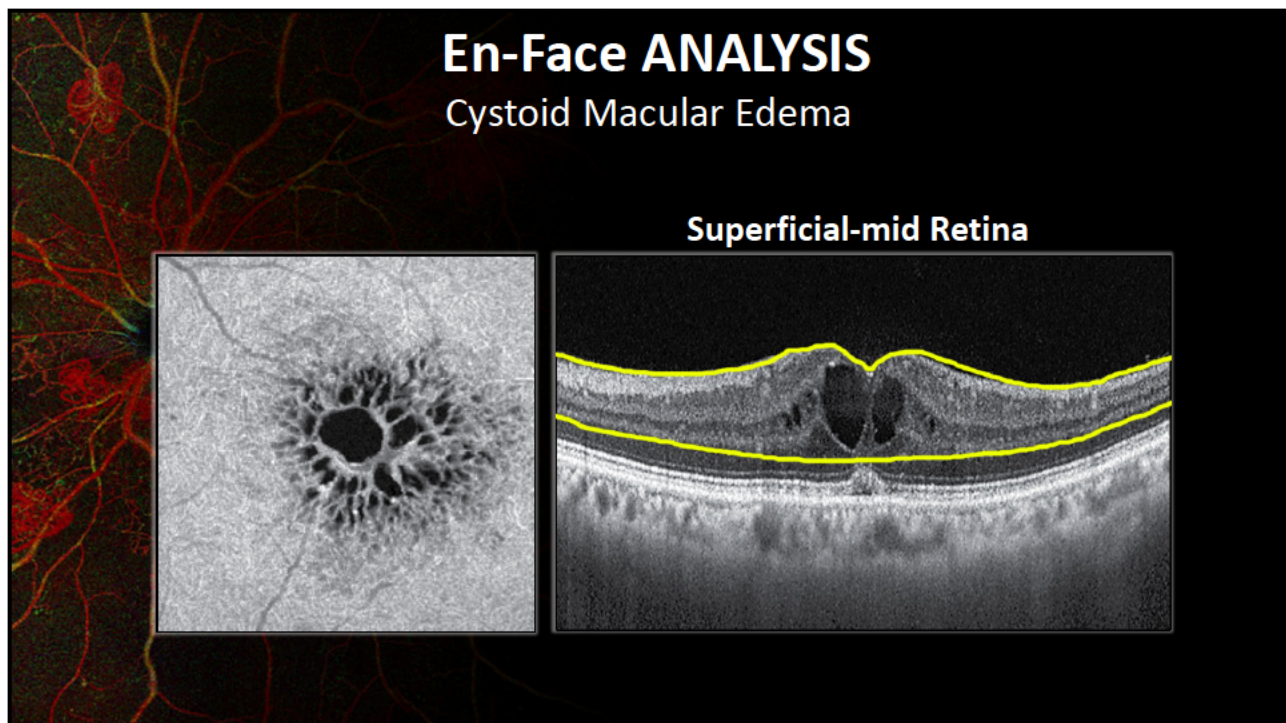
5



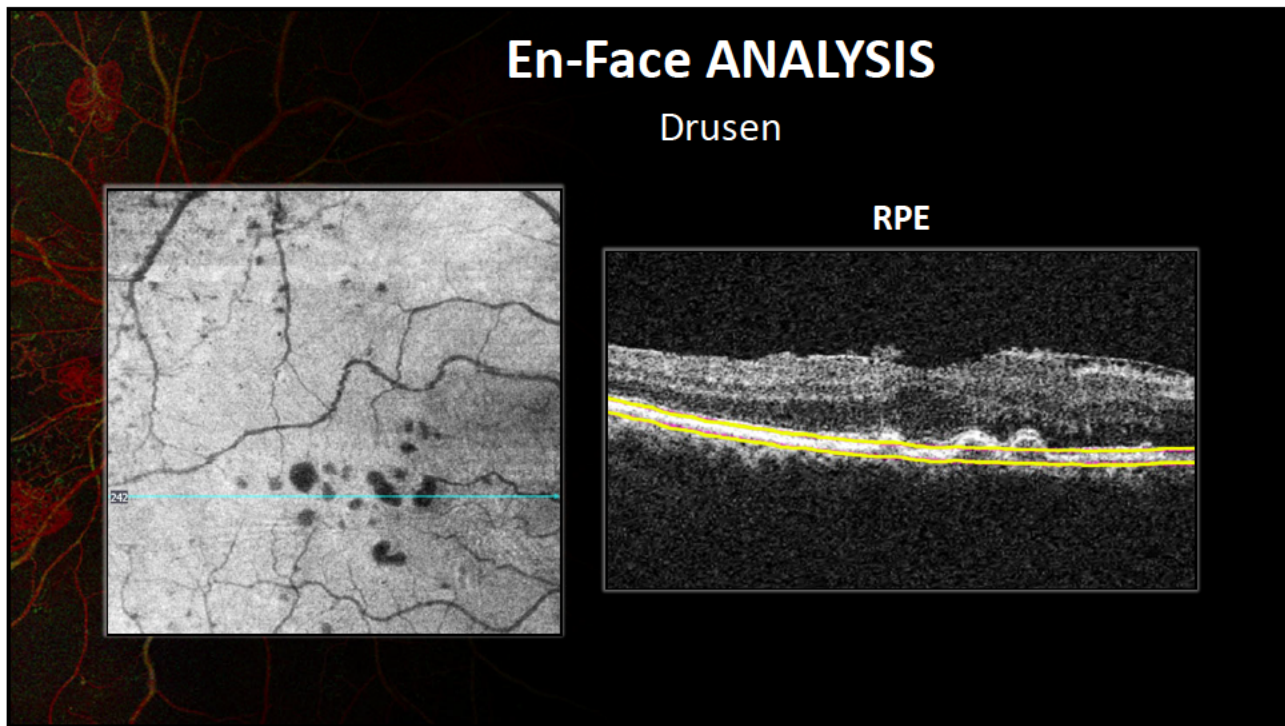
6



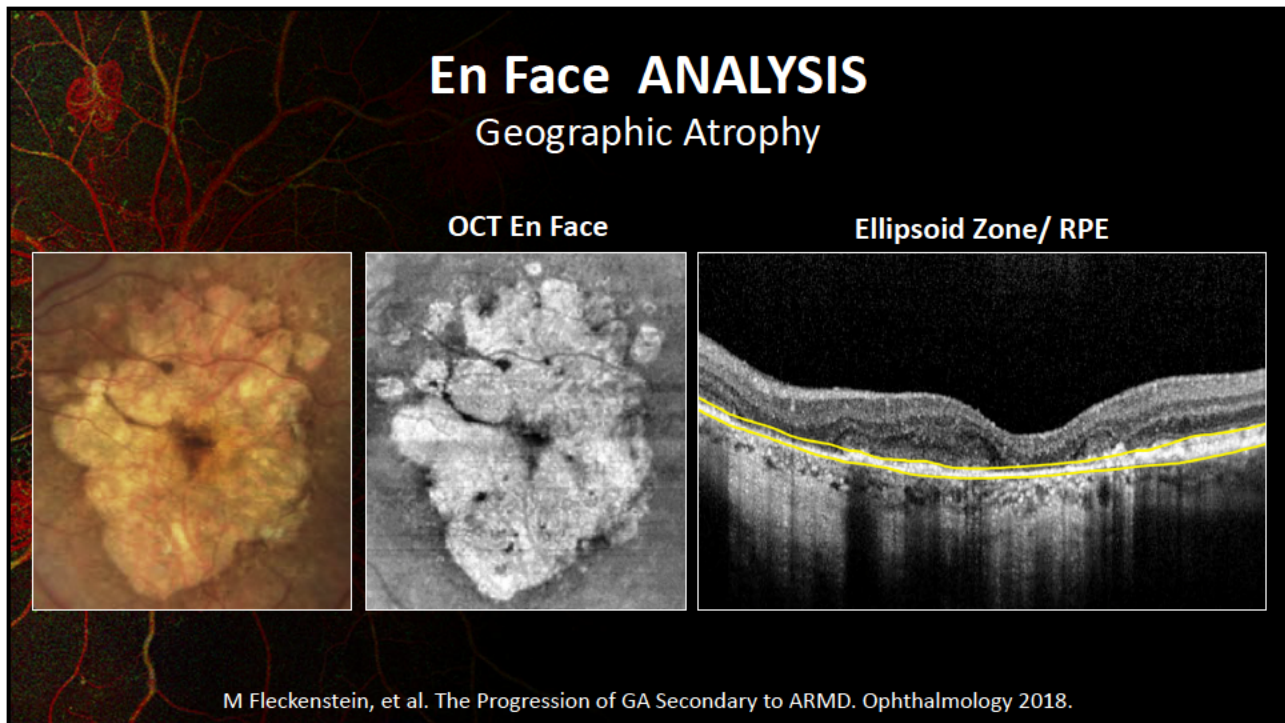
7



8



9



M Fleckenstein, et al. The Progression of GA Secondary to ARMD. Ophthalmology 2018.

10

IMAGE AVERAGING

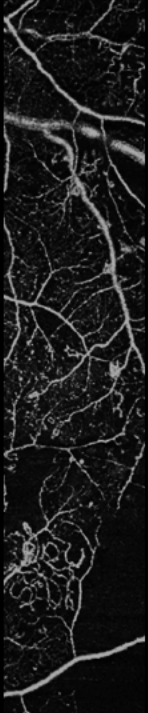
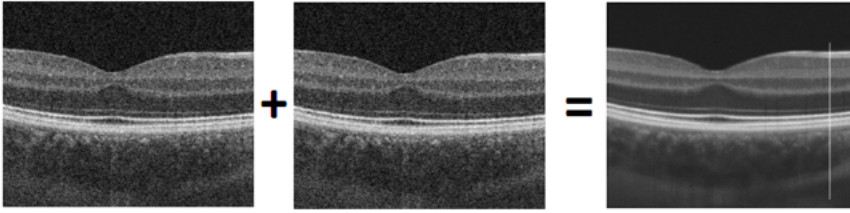


Image Averaging

- Overlay multiple B-scan images of the same retinal location
- Cancels out random noise (“speckle”, “static”)
- Fixation monitoring stabilizes image during multiple scans
- Good for imaging the vitreous or choroid



11

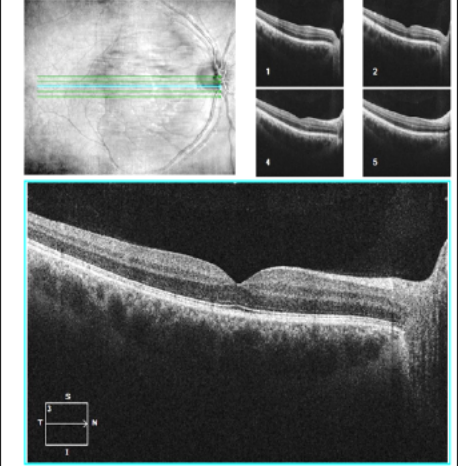
IMAGE AVERAGING

- Maximum resolution when all raster lines are condensed into one line

5 lines

High Definition Images: 5 Line Raster

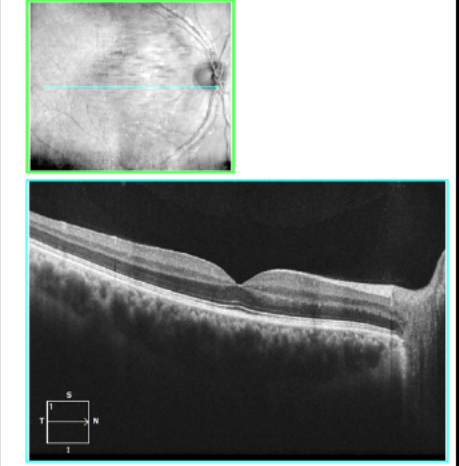
Scan Angle: 0° Spacing: 0.25 mm Length: 9 mm



1 line

High Definition Images: HD 5 Line Raster

Scan Angle: 9° Spacing: 0 mm Length: 9 mm

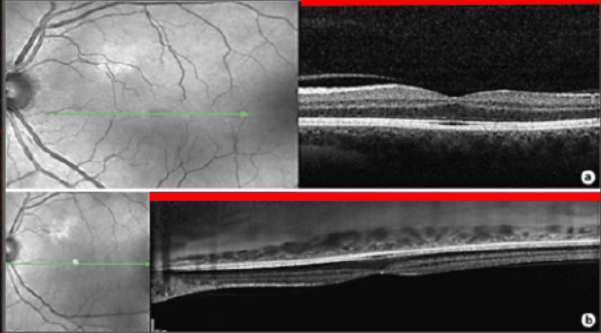


12

ENHANCED DEPTH IMAGING

Enhanced Depth Imaging (EDI)

- Spaide & Margolis 2009
- Imaged the choroid by positioning the patient slightly closer to the machine and inverting the image
- Places choroida/sclera closer to the **zero delay line**
- Improved visualization of the choroid, sclera, RPE/bruchs membrane complex
- Penetrates an additional 500-800µm deeper




13


ENHANCED DEPTH IMAGING

EDI Embedded Systems


Topcon DRI OCT Triton SS OCT



Optovue Avanti/RTVue



Heidelberg Spectralis

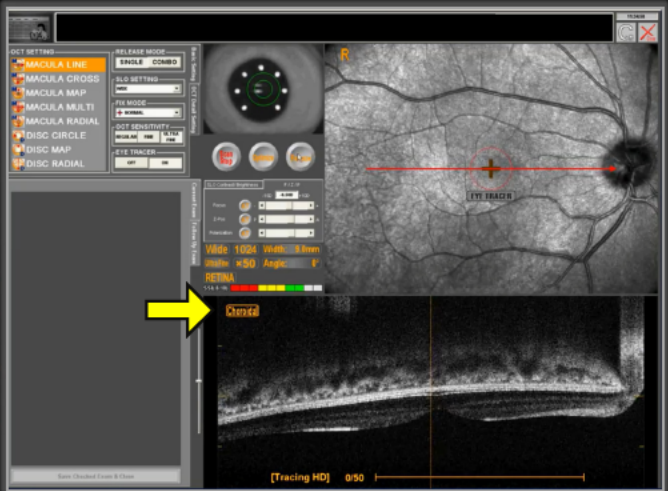



14

ENHANCED DEPTH IMAGING

Invert image for "Choroidal Mode"

Nidek RS-3000 Advance 2

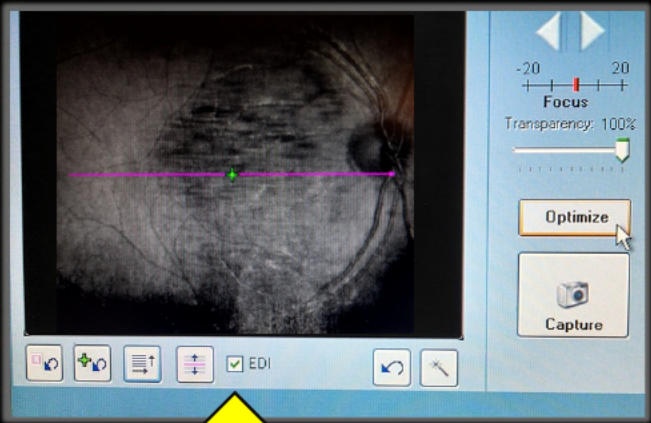



The screenshot shows the software interface for the Nidek RS-3000 Advance 2. On the left, there is a menu for 'OCT SETTINGS' with options like 'MACULA A LINE', 'MACULA CROSS', 'MACULA MAP', 'MACULA MULTI', 'MACULA RADIAL', 'DISC CIRCLE', 'DISC MAP', and 'DISC RADIAL'. The 'REVERSE' section is active, showing 'INVERT' and 'COMBO' buttons. A yellow arrow points to the 'INVERT' button. The main display shows a cross-sectional OCT scan of the retina with a red line indicating the scan path. Below the scan, there are technical parameters: 'WAVE: 1000', 'WAVE: 8 mm', 'WAVE: +50', 'Angle: 1', and 'RETRNA'. At the bottom, it says '[Tracing HD] 0/50'.

15

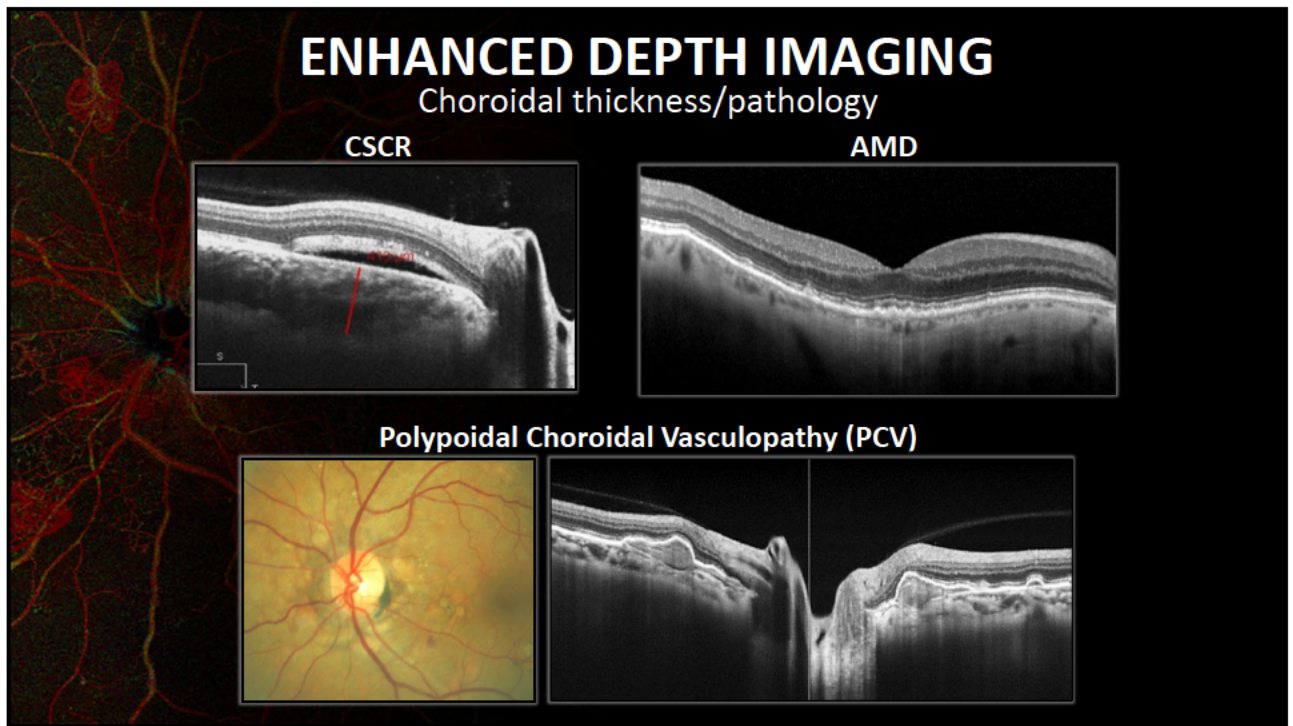
ENHANCED DEPTH IMAGING

ZEISS Cirrus-HD OCT (500/5000)

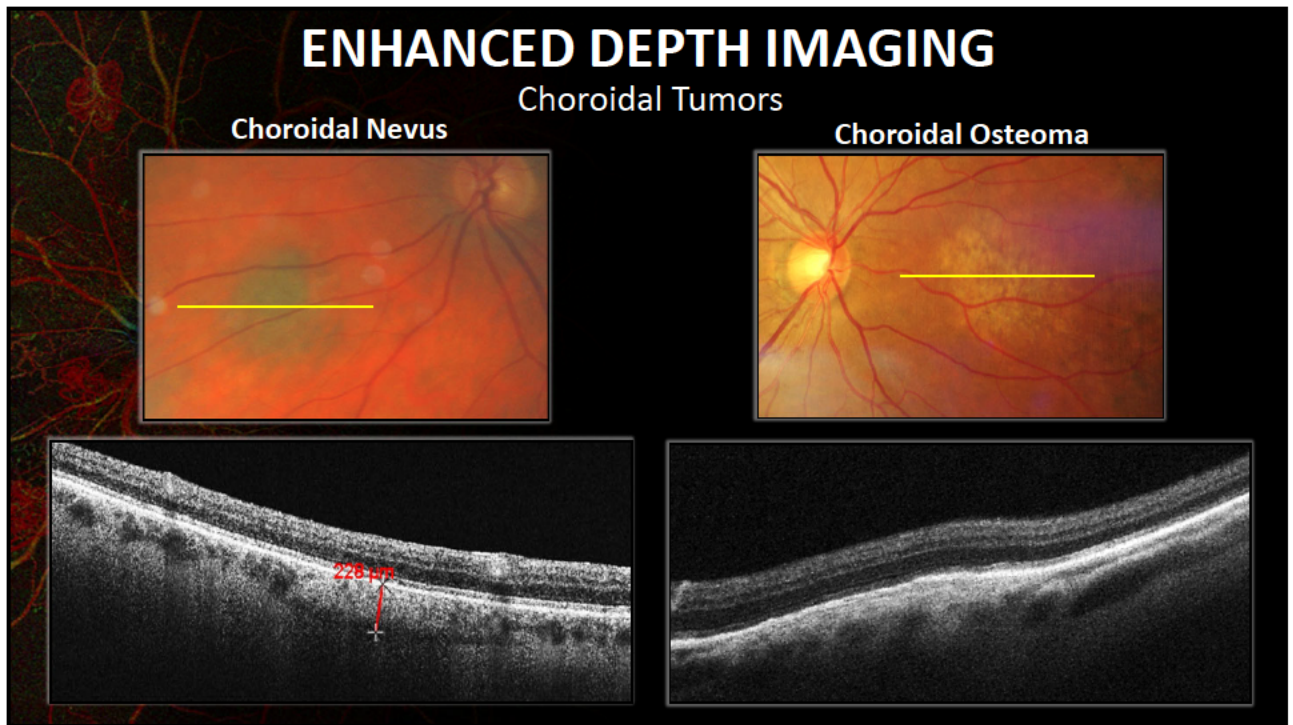


The screenshot shows the software interface for the ZEISS Cirrus-HD OCT. The main display shows a cross-sectional OCT scan of the retina with a purple line indicating the scan path. On the right side, there are controls for 'Focus' (ranging from -20 to 20) and 'Transparency: 100%'. Below these are 'Optimize' and 'Capture' buttons. At the bottom, there is a toolbar with various icons, including a checked 'EDI' checkbox. A yellow arrow points to the 'EDI' checkbox.

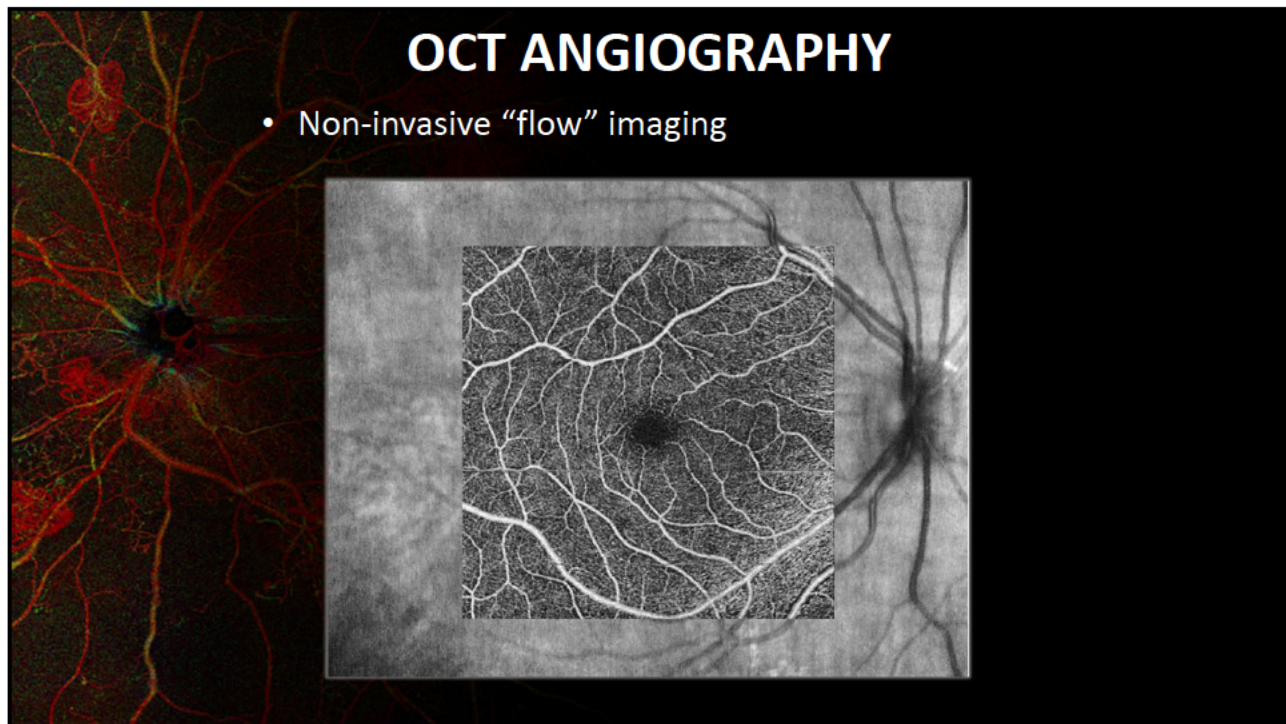
16



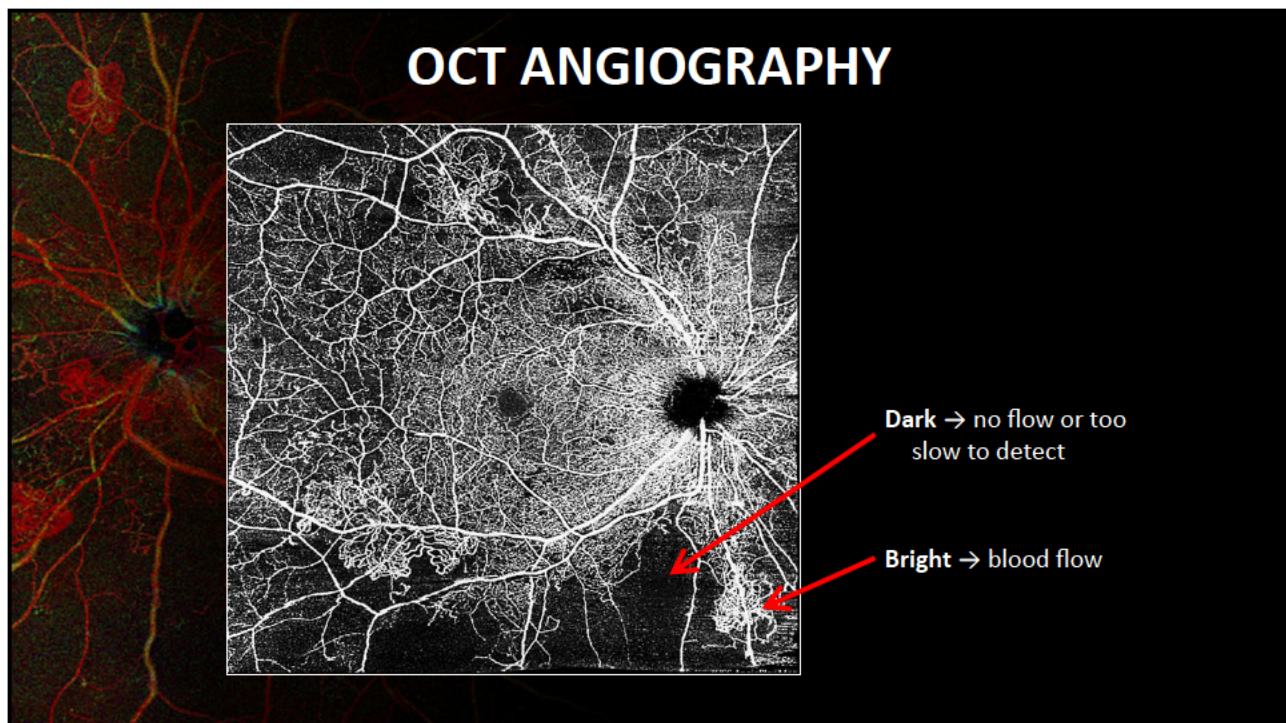
17



18



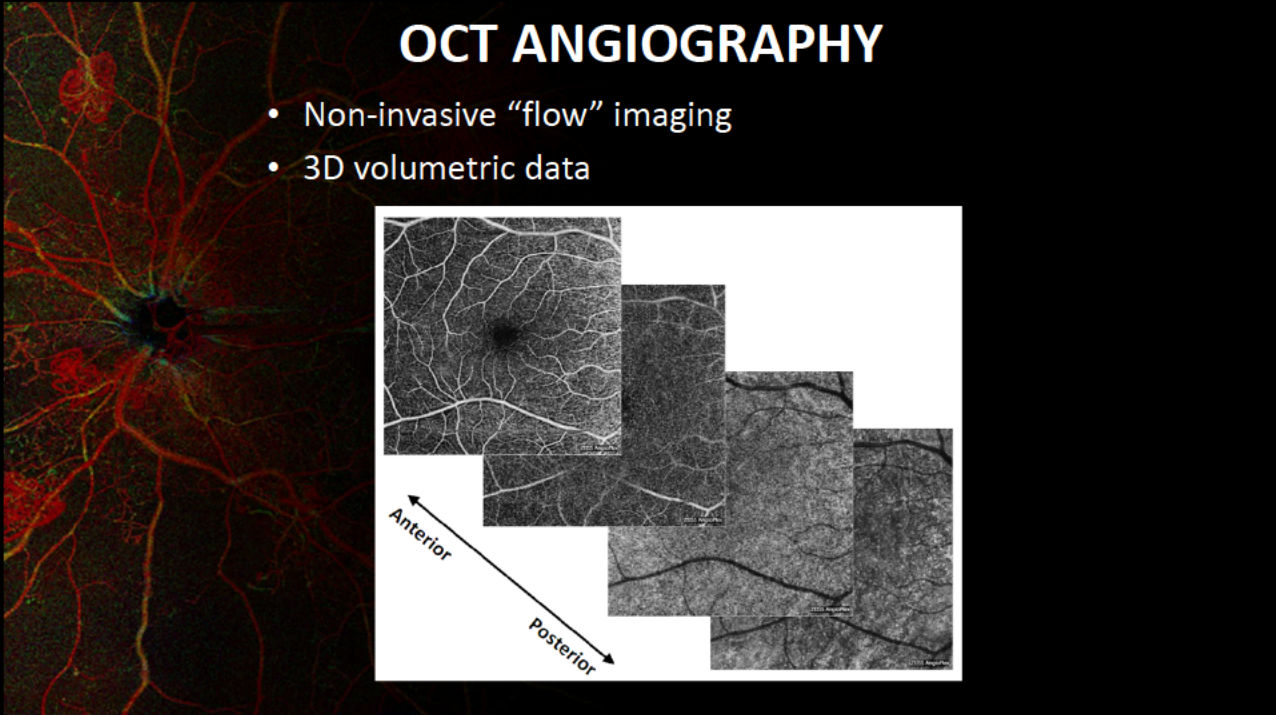
19



20

OCT ANGIOGRAPHY

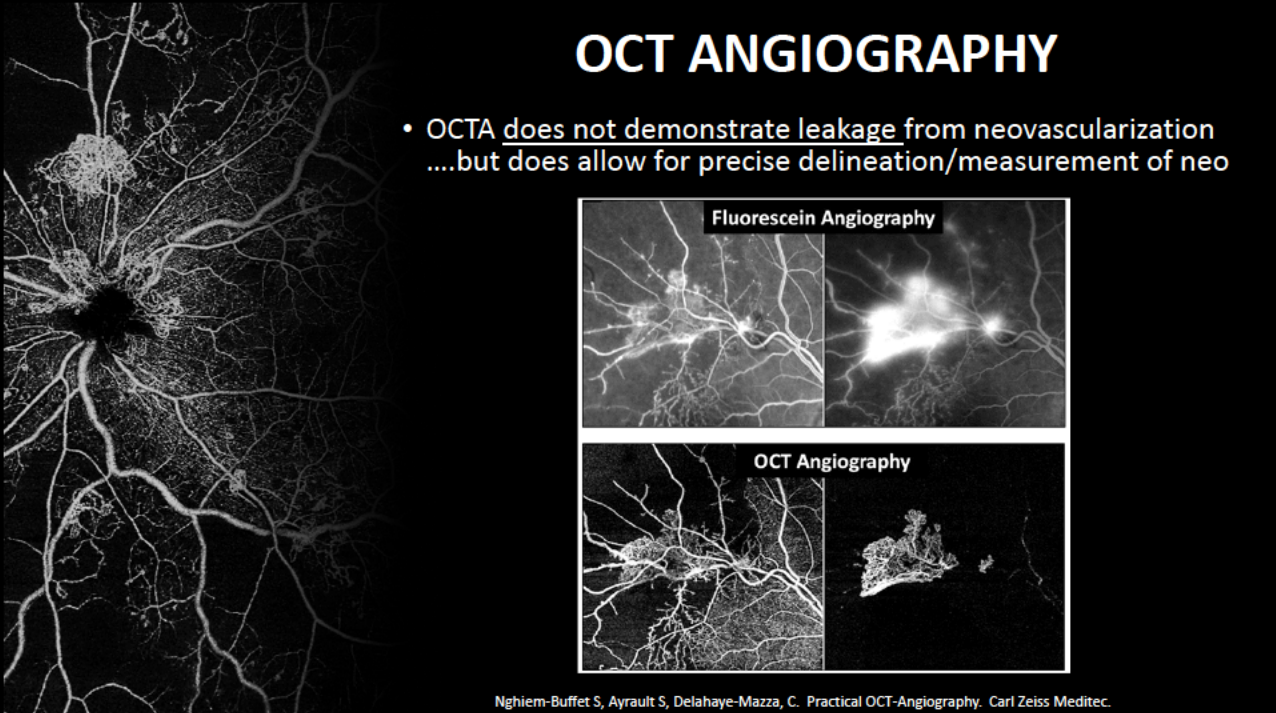
- Non-invasive “flow” imaging
- 3D volumetric data



21

OCT ANGIOGRAPHY

- OCTA does not demonstrate leakage from neovascularization
....but does allow for precise delineation/measurement of neo

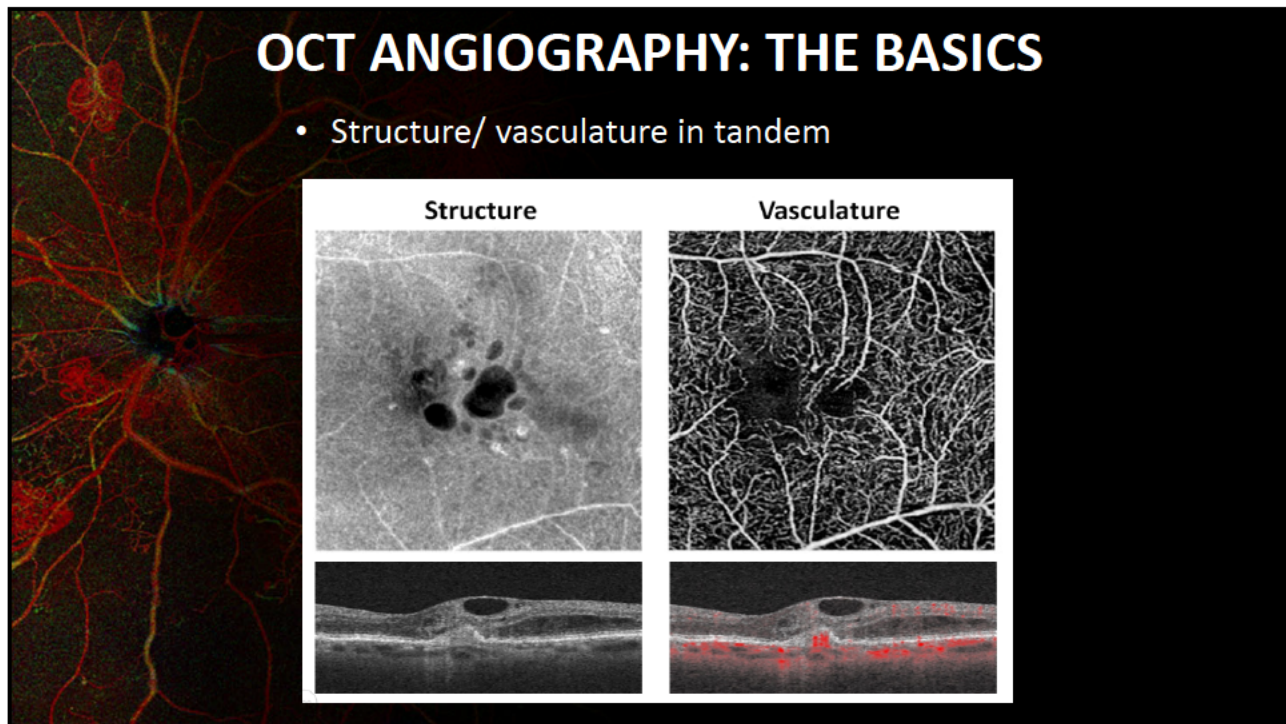


Fluorescein Angiography

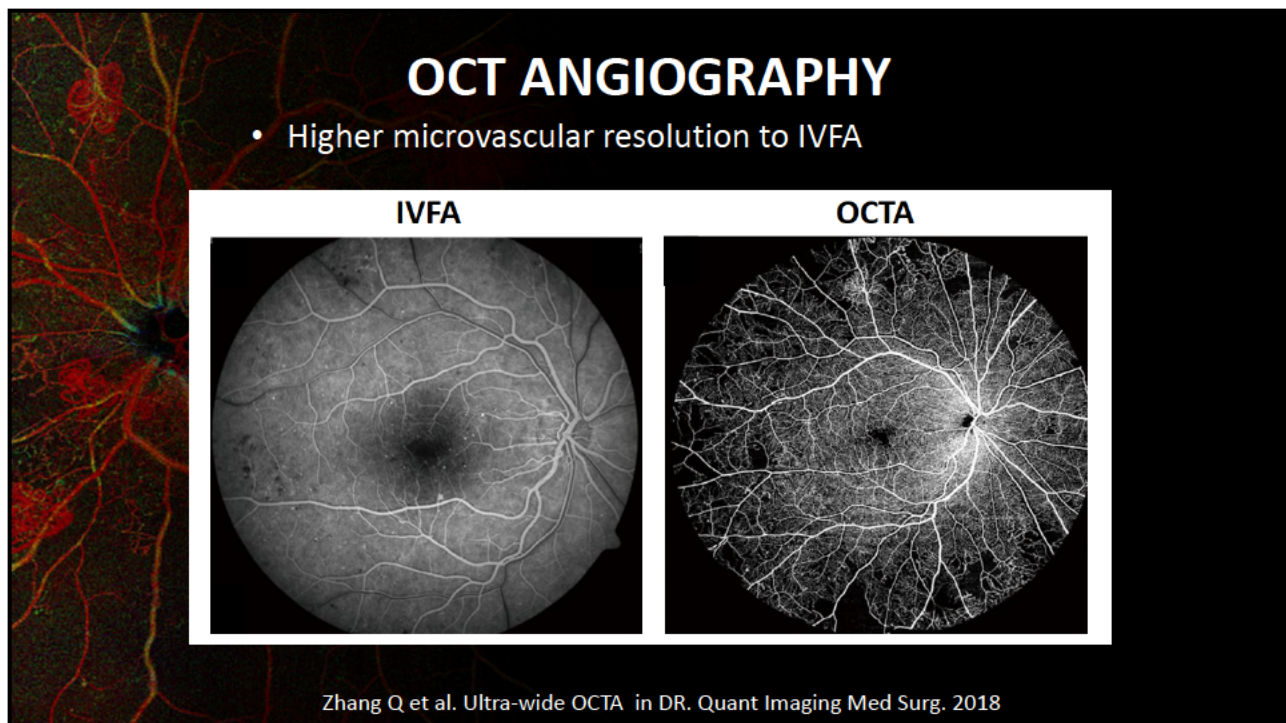
OCT Angiography

Nghiem-Buffet S, Ayrault S, Delahaye-Mazza, C. Practical OCT-Angiography. Carl Zeiss Meditec.

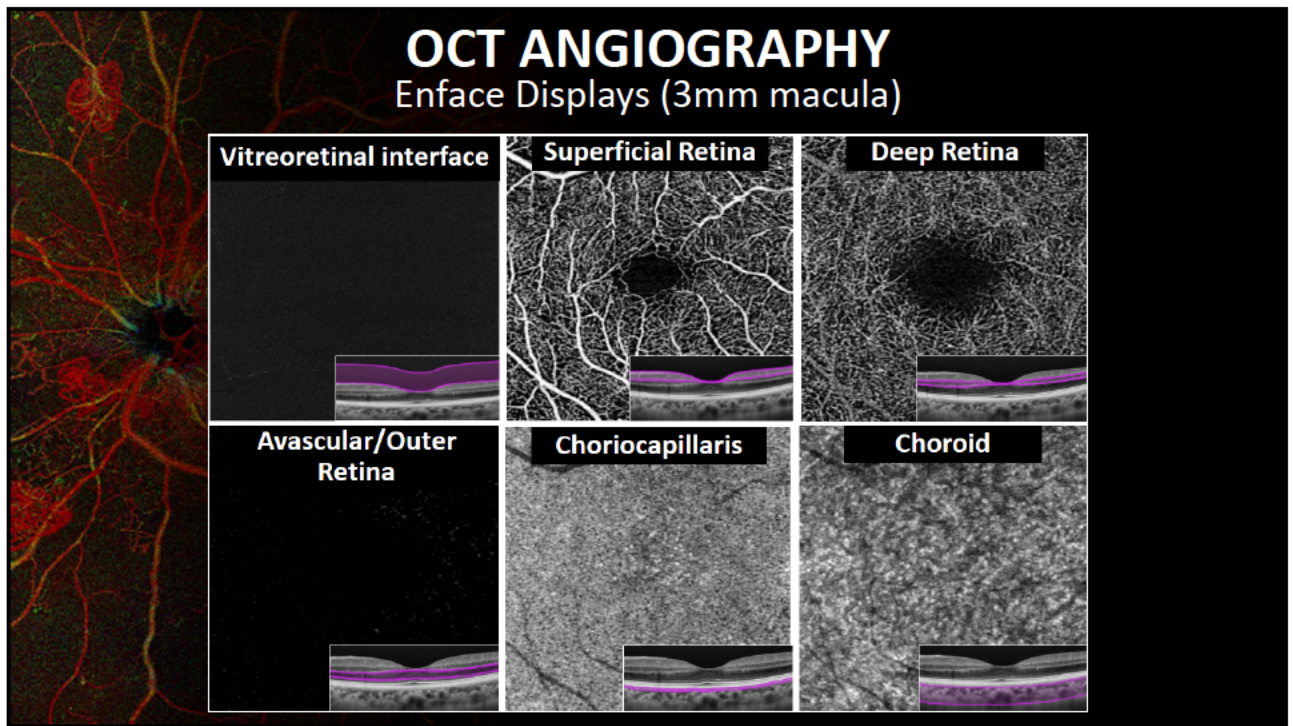
22



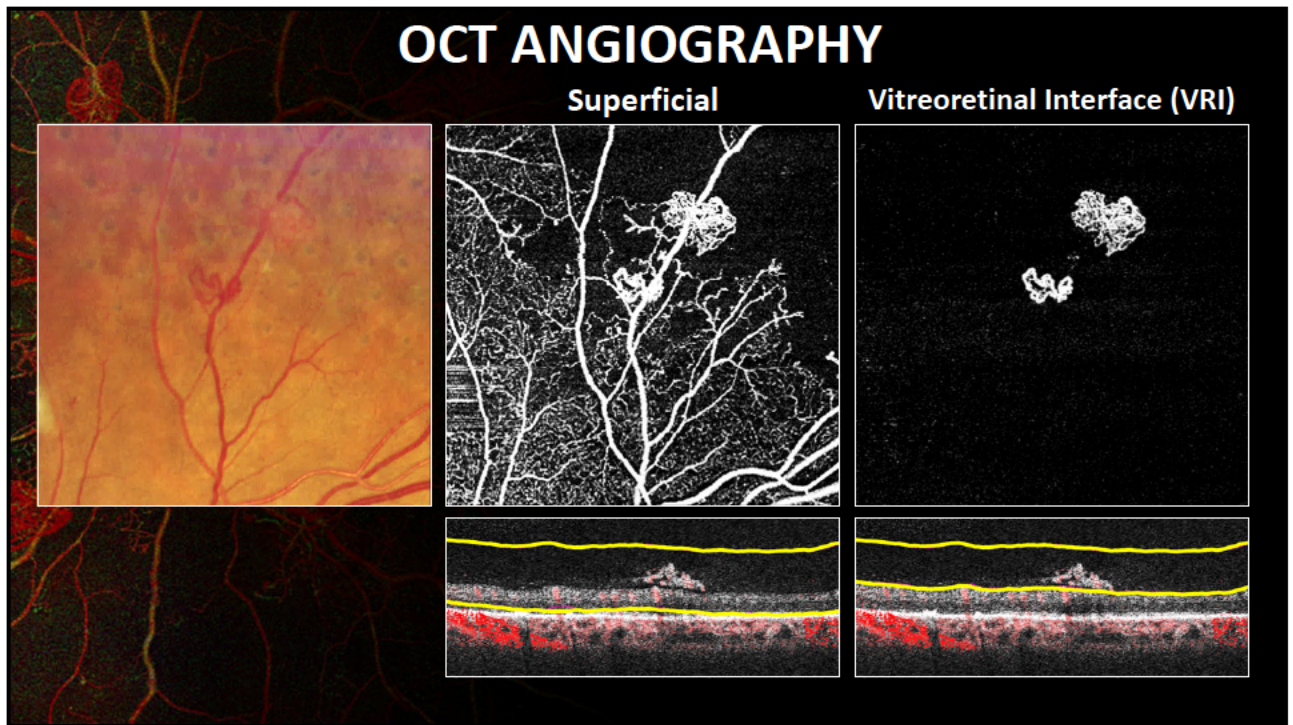
23



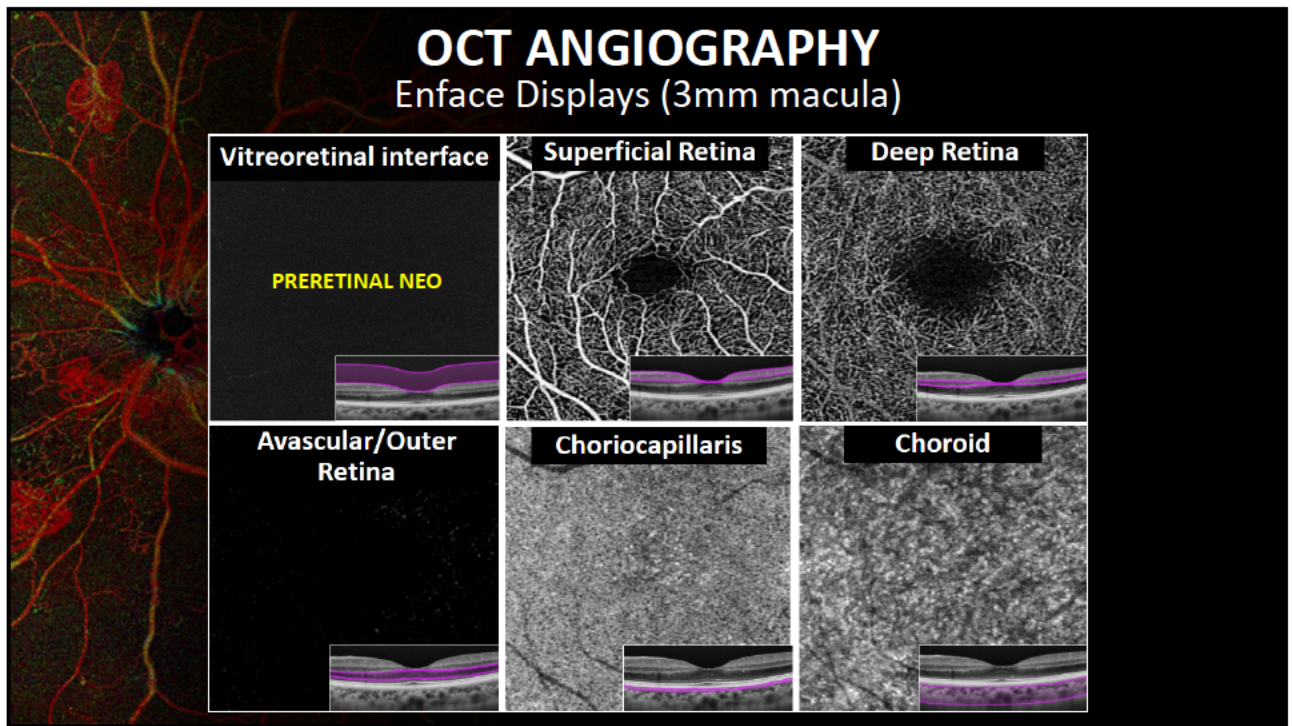
24



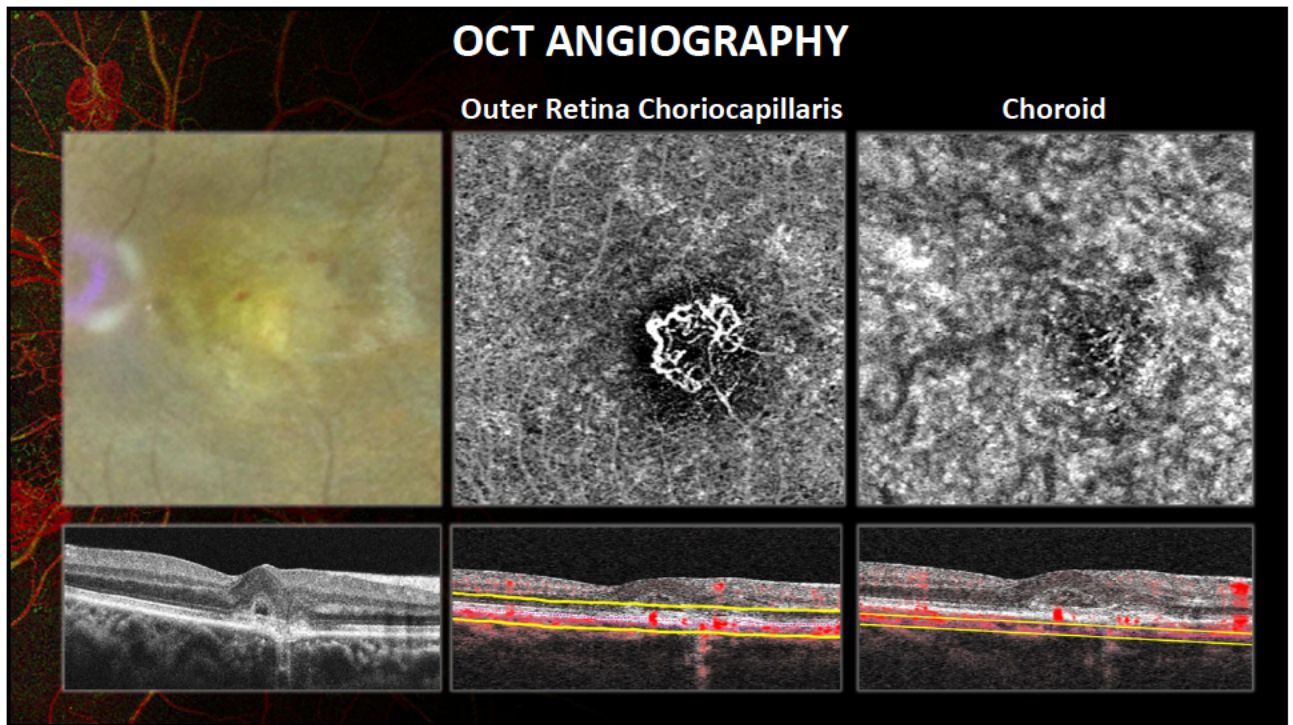
25



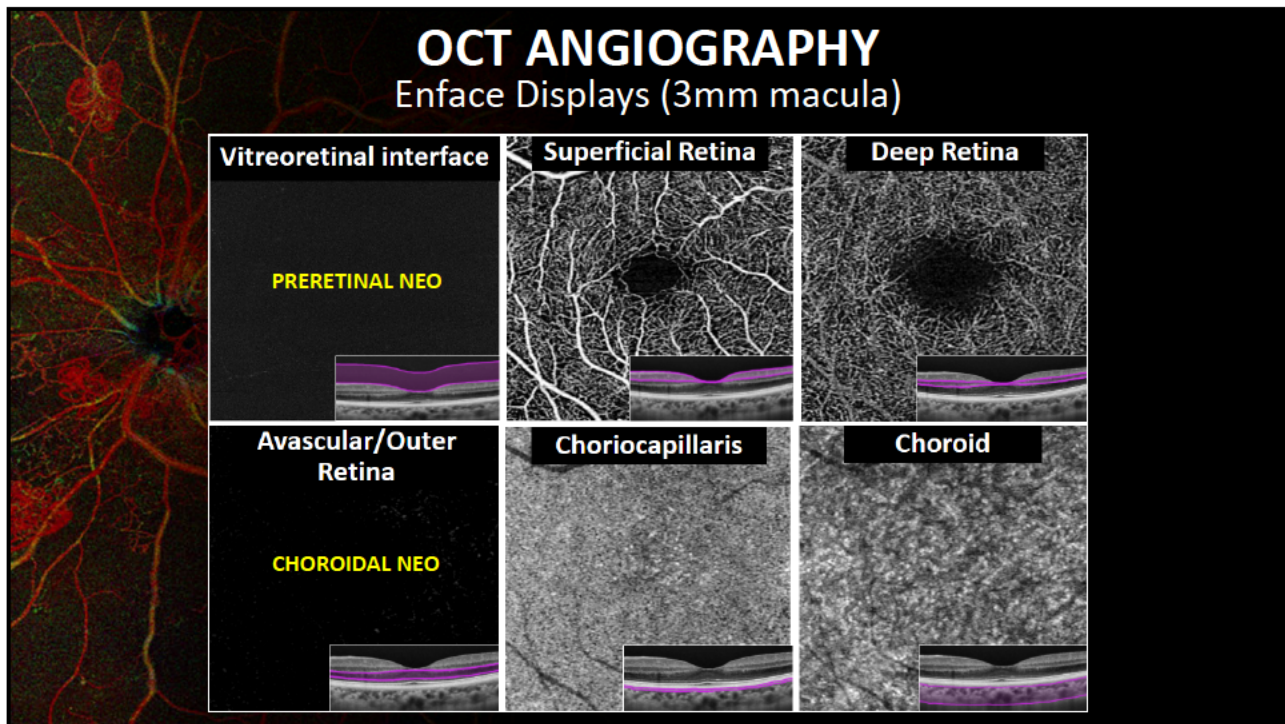
26



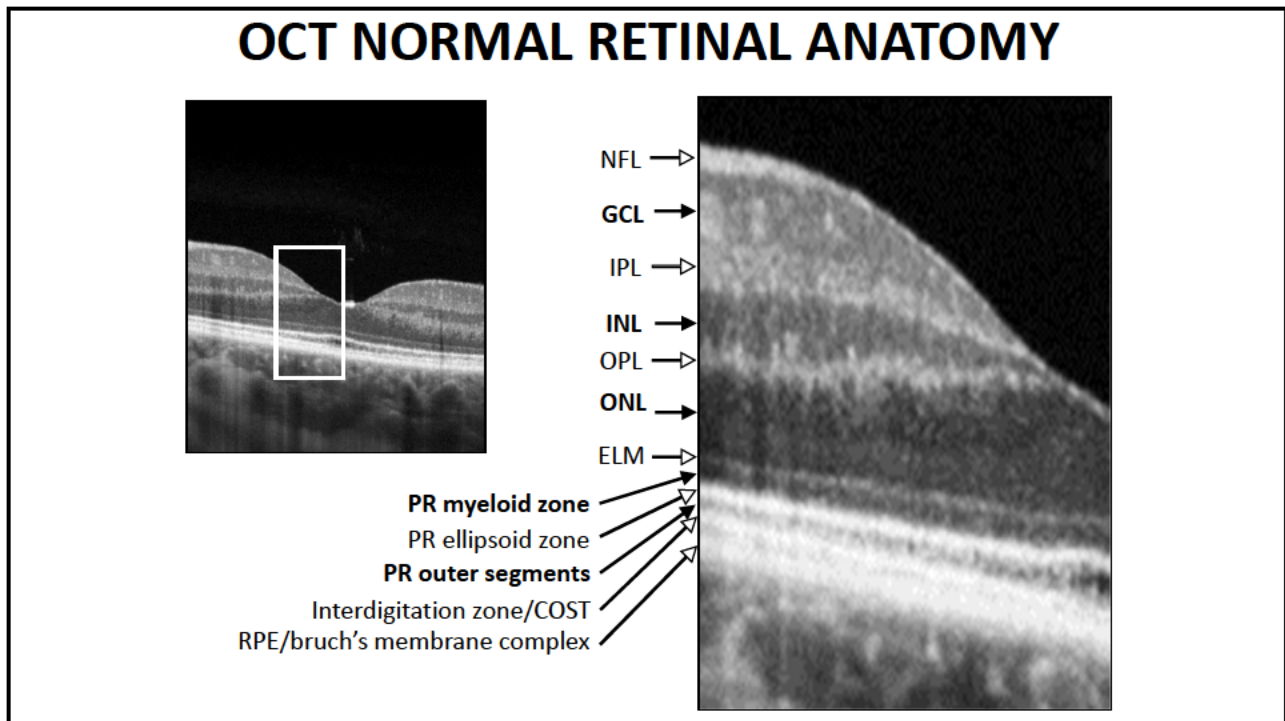
27



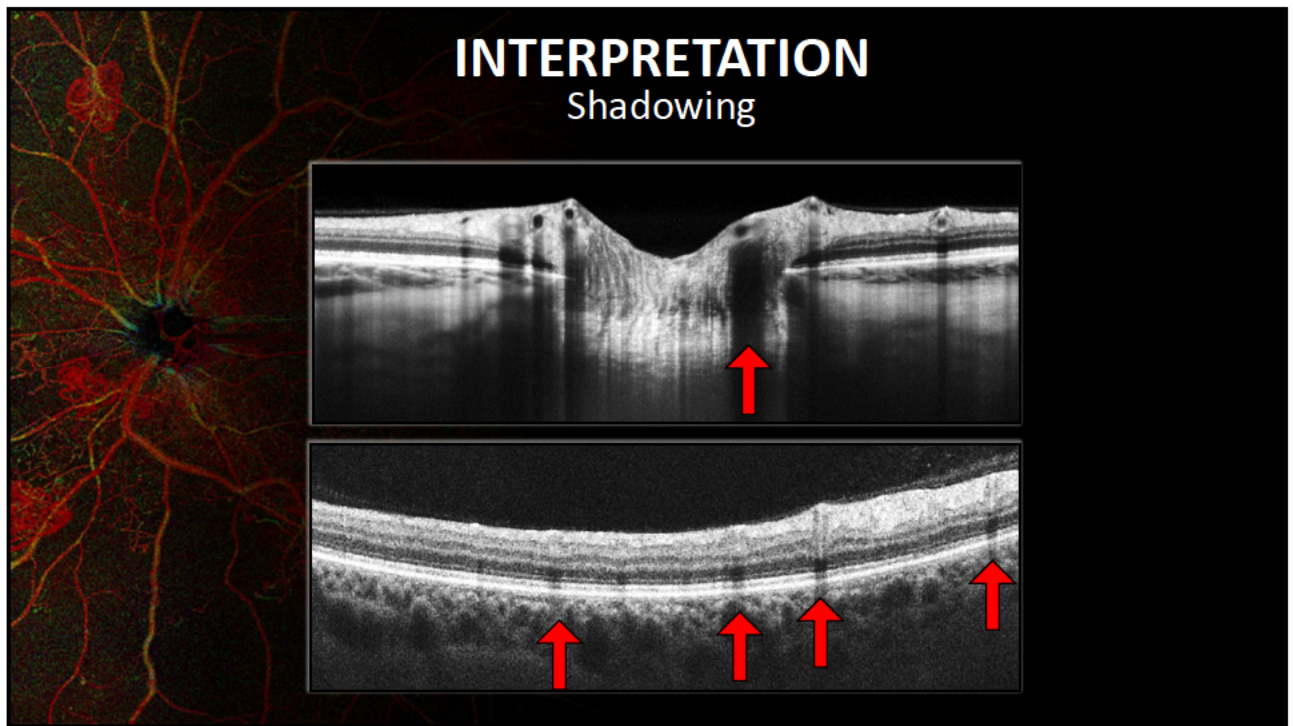
28



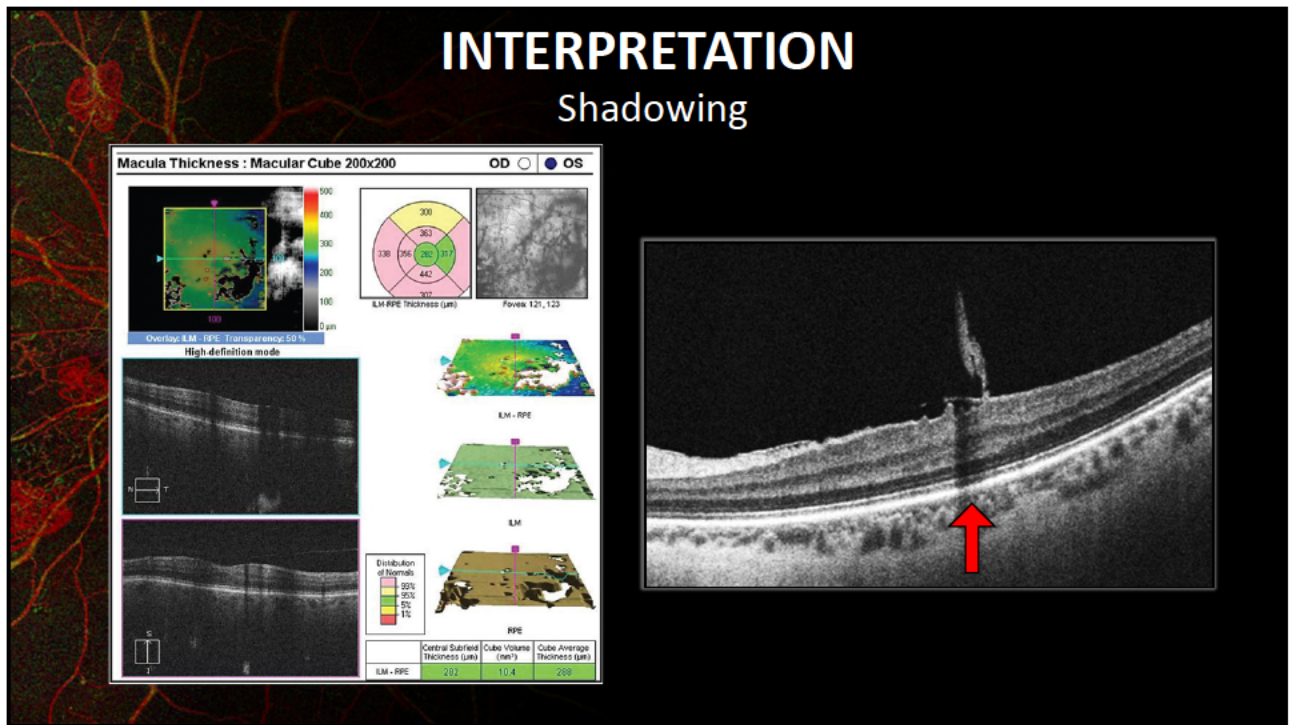
29



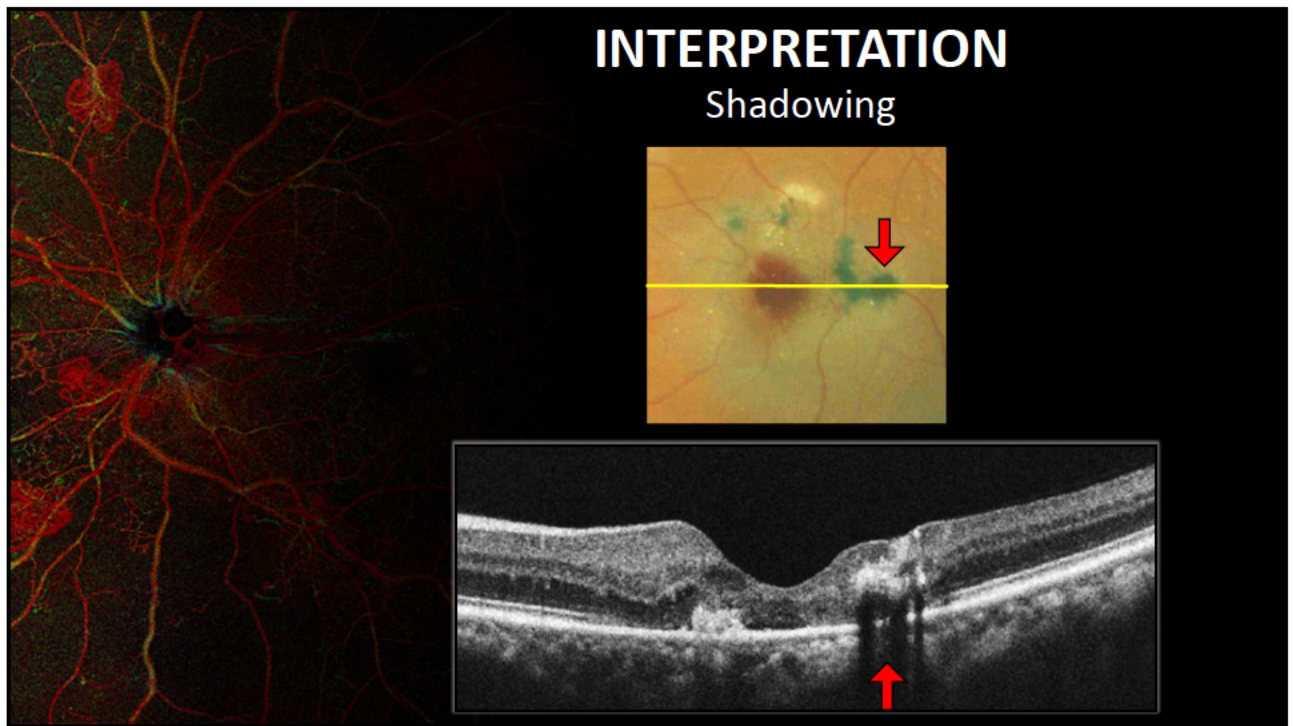
30



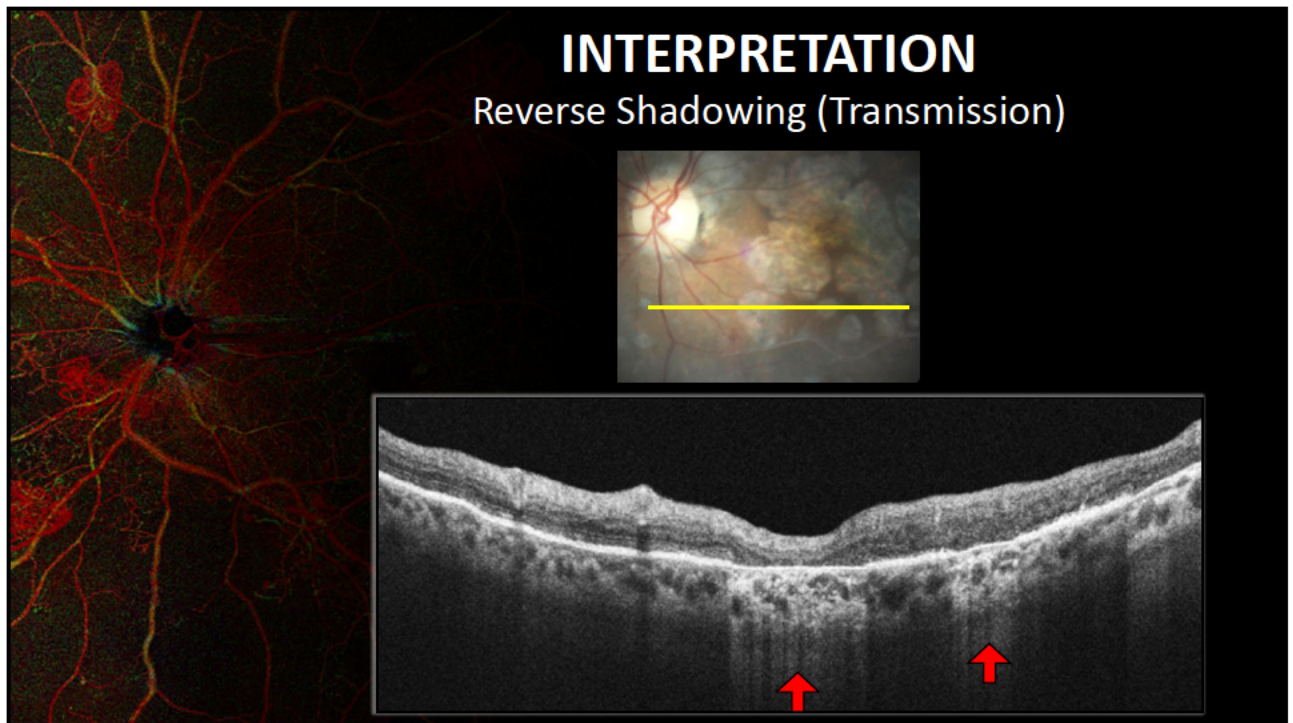
31



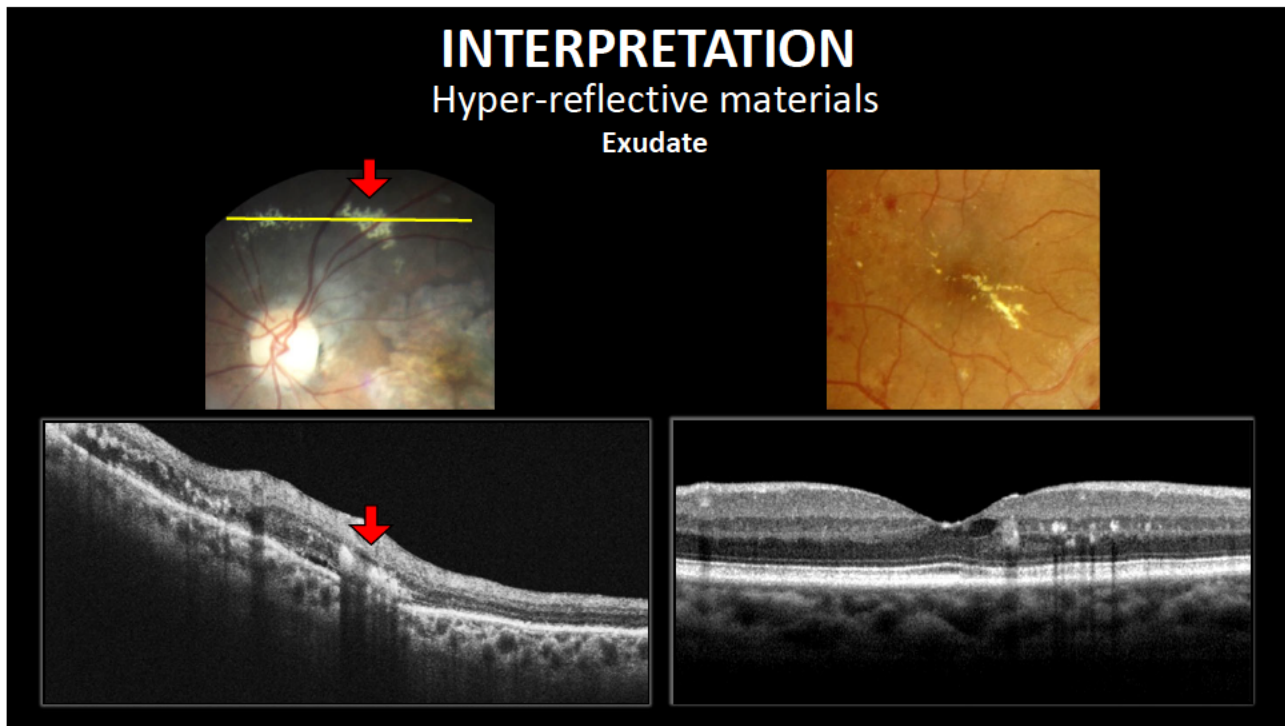
32



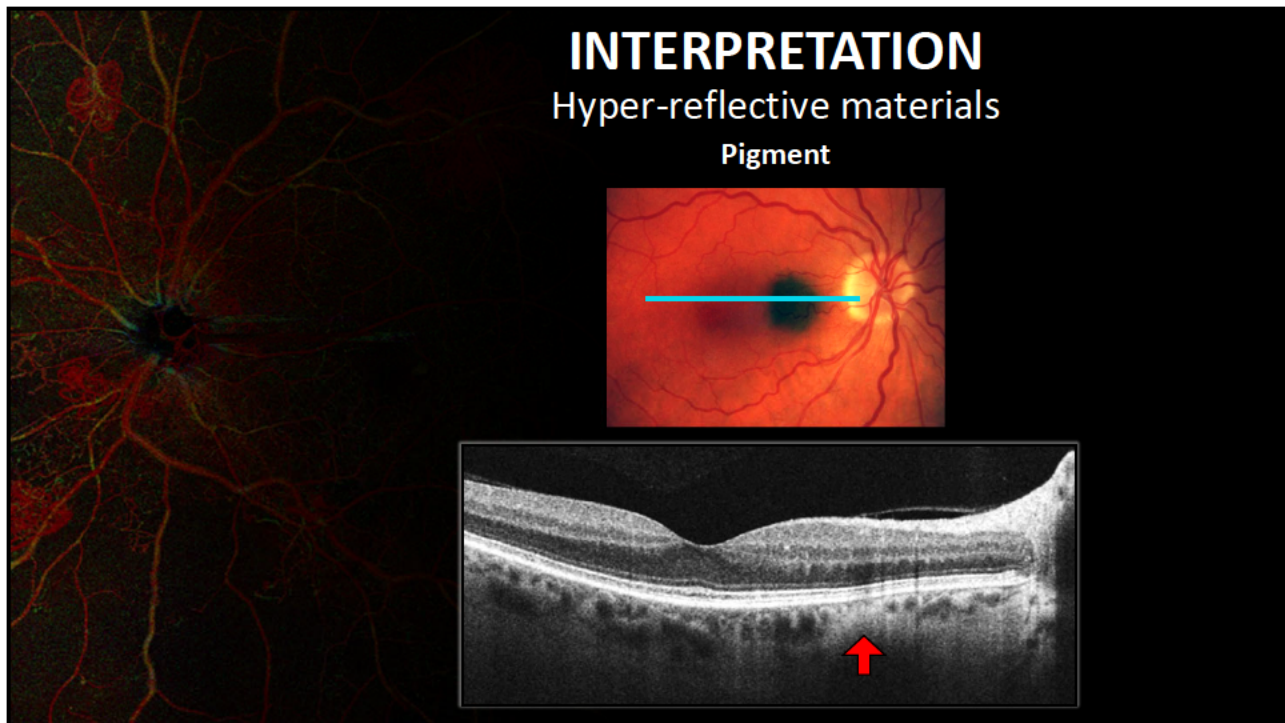
33



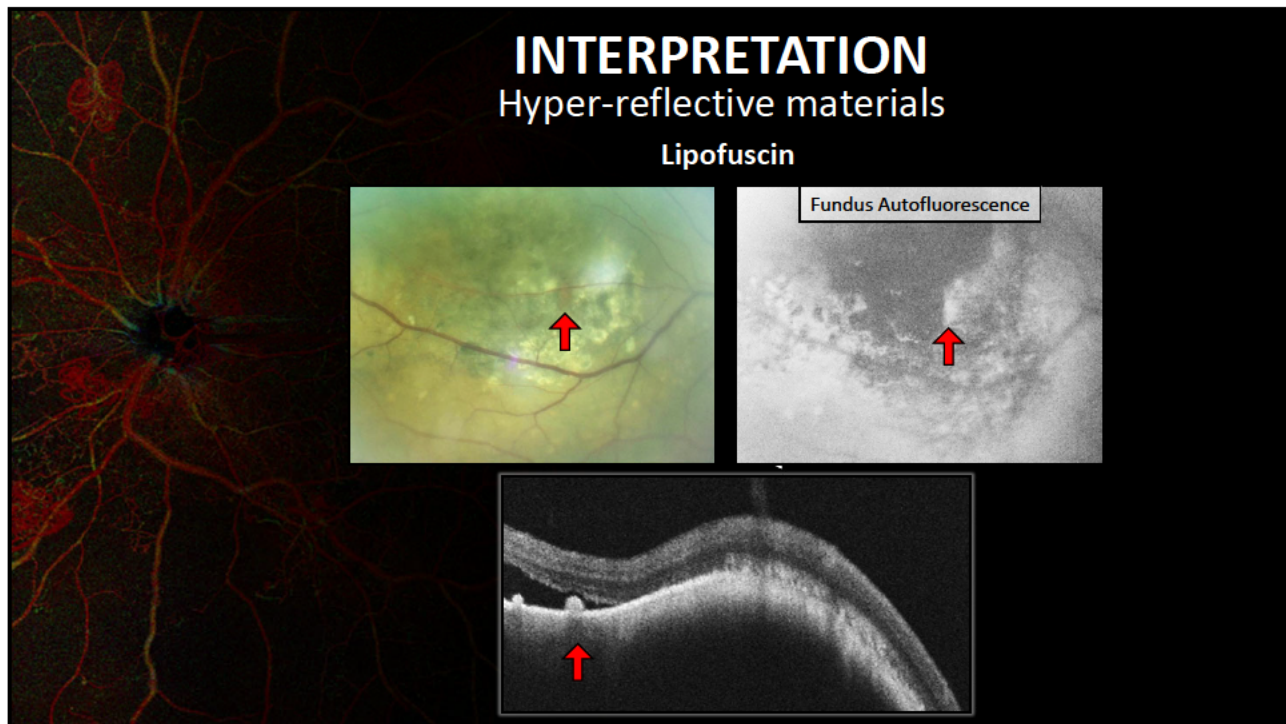
34



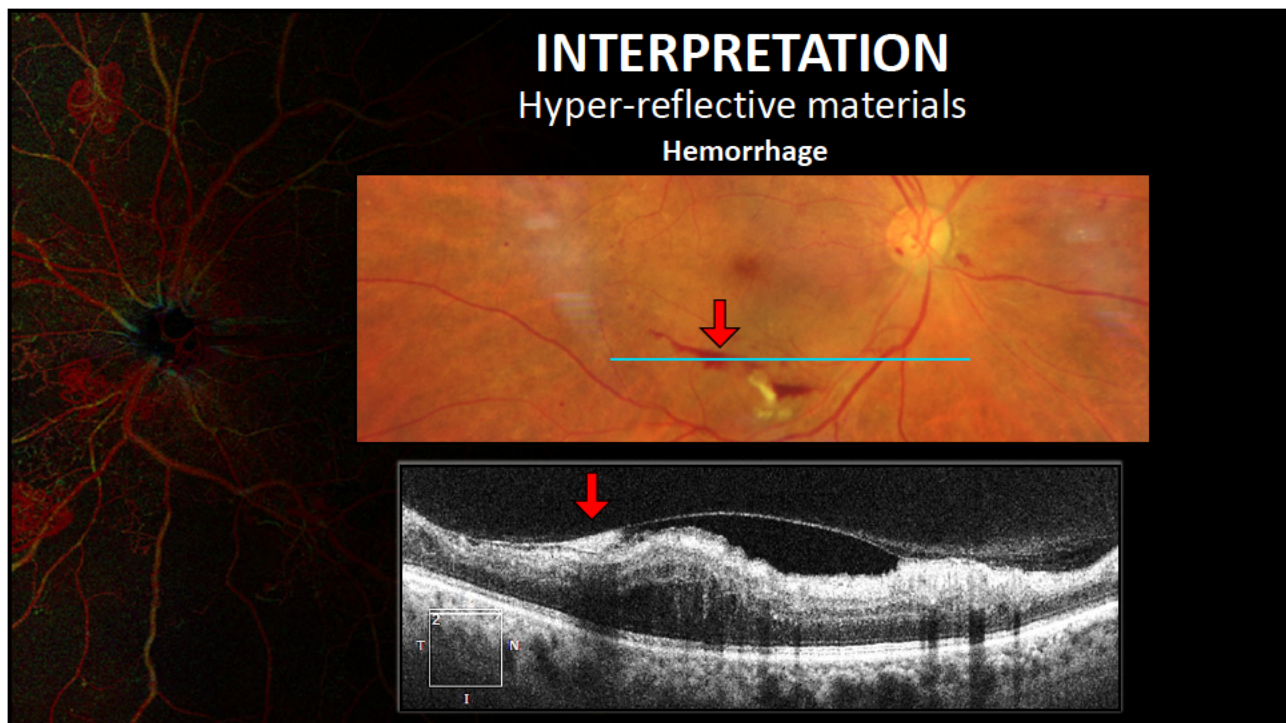
35



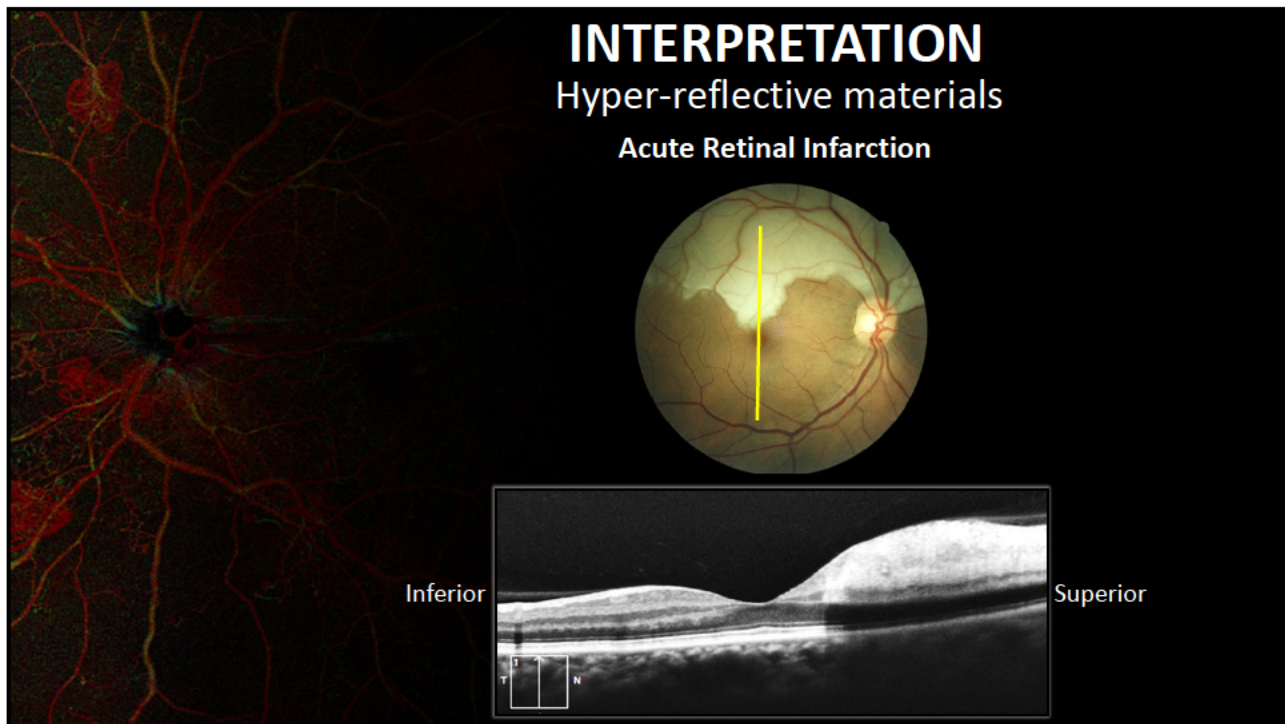
36



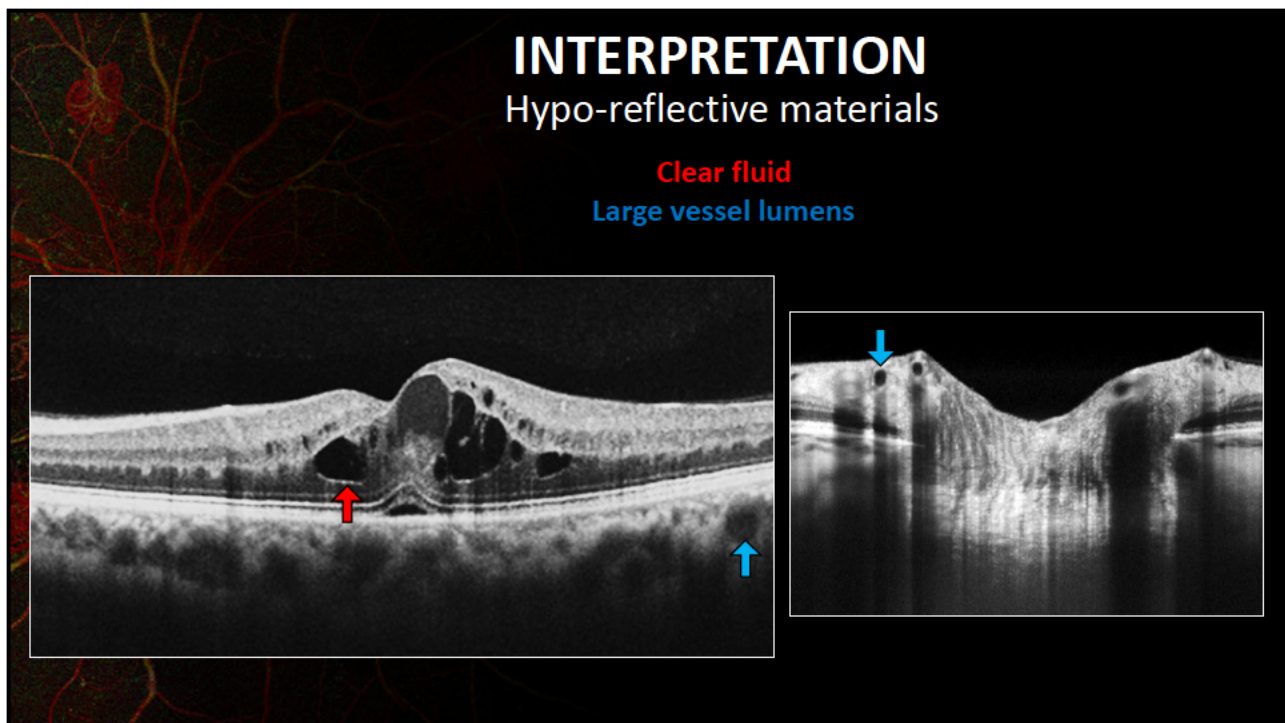
37



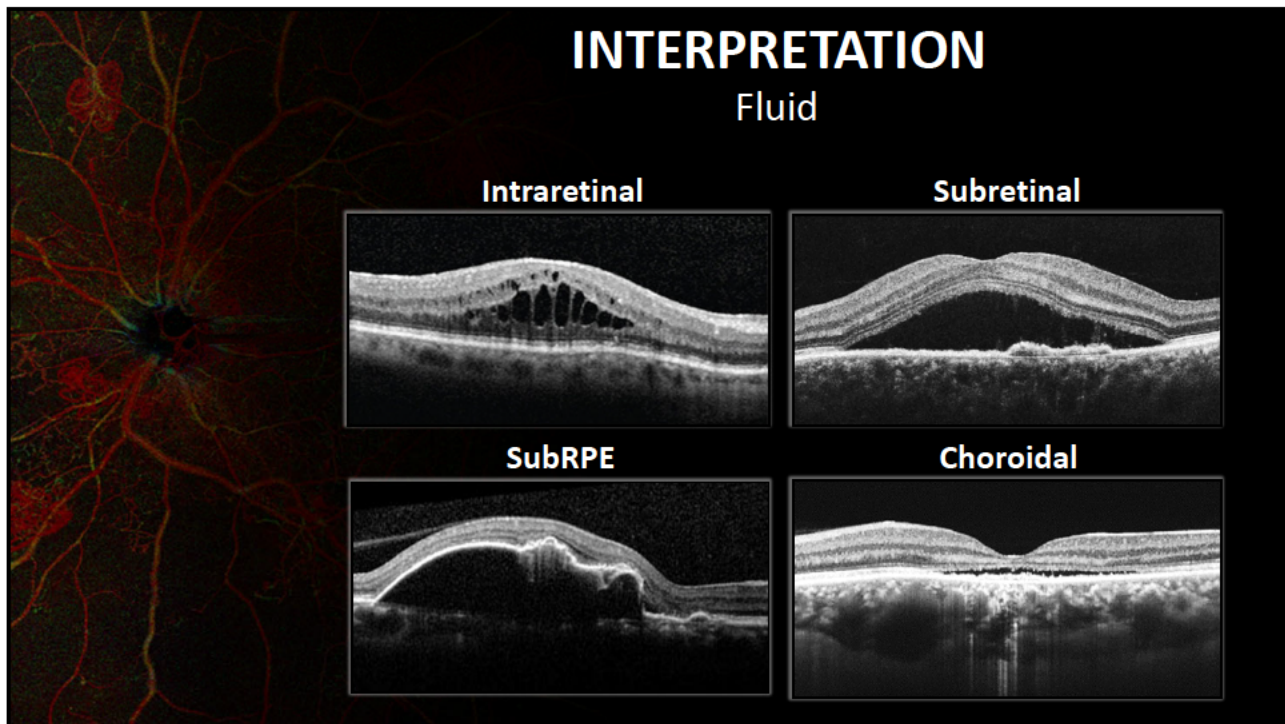
38



39



40



41

DIABETIC RETINOPATHY STAGING

American Academy of Ophthalmology Preferred Practice Pattern 2019 (p8)

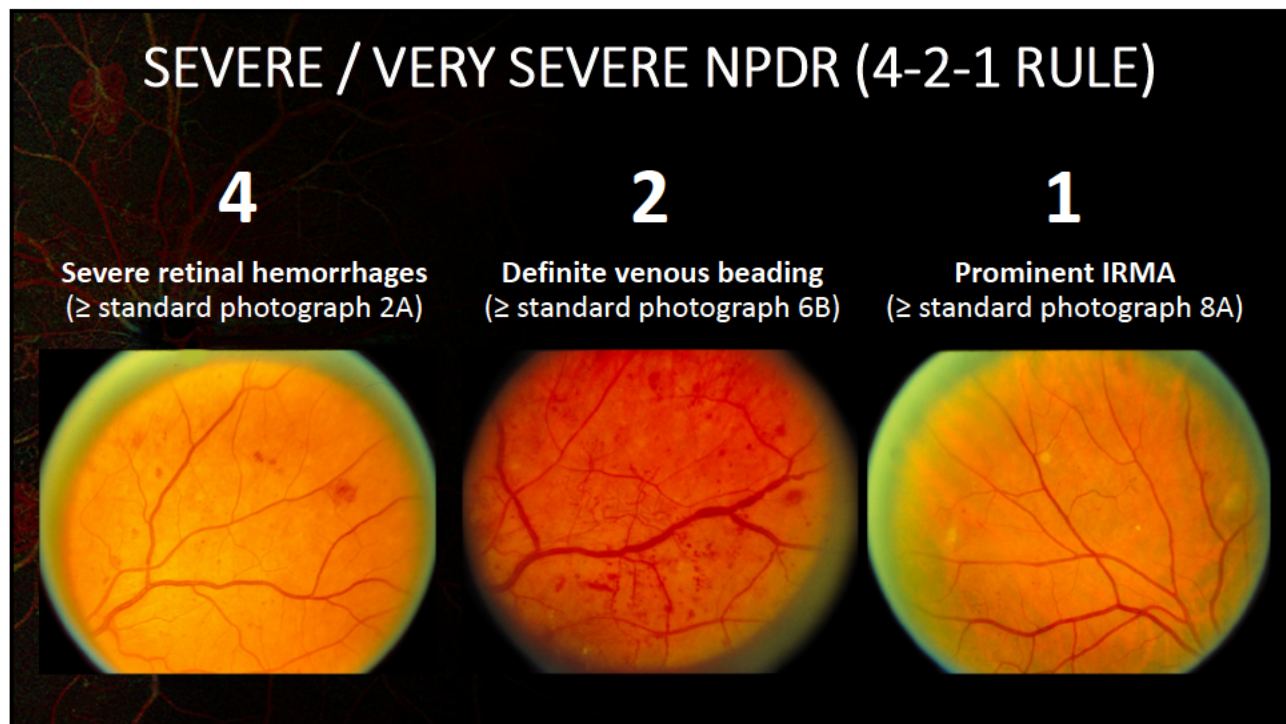
TABLE 1 DIABETIC RETINOPATHY DISEASE SEVERITY SCALE AND INTERNATIONAL CLINICAL DIABETIC RETINOPATHY DISEASE SEVERITY SCALE

Disease Severity Level	Findings Observable upon Dilated Ophthalmoscopy
No apparent retinopathy	No abnormalities
Mild NPDR (see Glossary)	Microaneurysms only
Moderate NPDR (see Glossary)	More than just microaneurysms but less than severe NPDR
Severe NPDR	<p>International Definition</p> <p>Any of the following and no signs of proliferative retinopathy:</p> <ul style="list-style-type: none"> • More than 20 Intraretinal hemorrhages in each of four quadrants • Definite venous beading in two or more quadrants • Prominent IRMA in one or more quadrants <p>• Any patient with two or more of the characteristics of severe NPDR is considered to have very severe NPDR.</p>
PDR	<p>One or both of the following:</p> <ul style="list-style-type: none"> • Neovascularization • Vitreous/preretinal hemorrhage

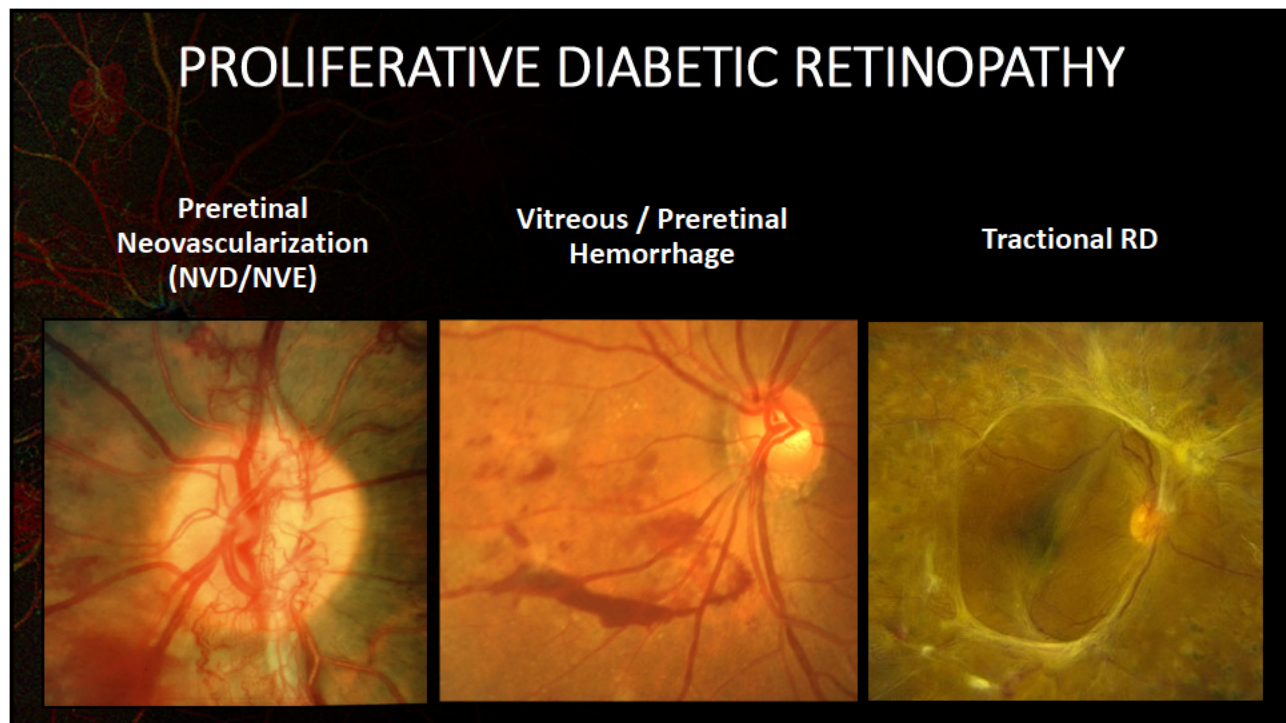
IRMA = intraretinal microvascular abnormalities; NPDR = nonproliferative diabetic retinopathy; PDR = proliferative diabetic retinopathy

***AOA CPG Mild NPDR** - marked by at least one retinal MA. Only hemorrhages & MAs are present and the severity is less than that depicted in ETDRS standard photograph 2A

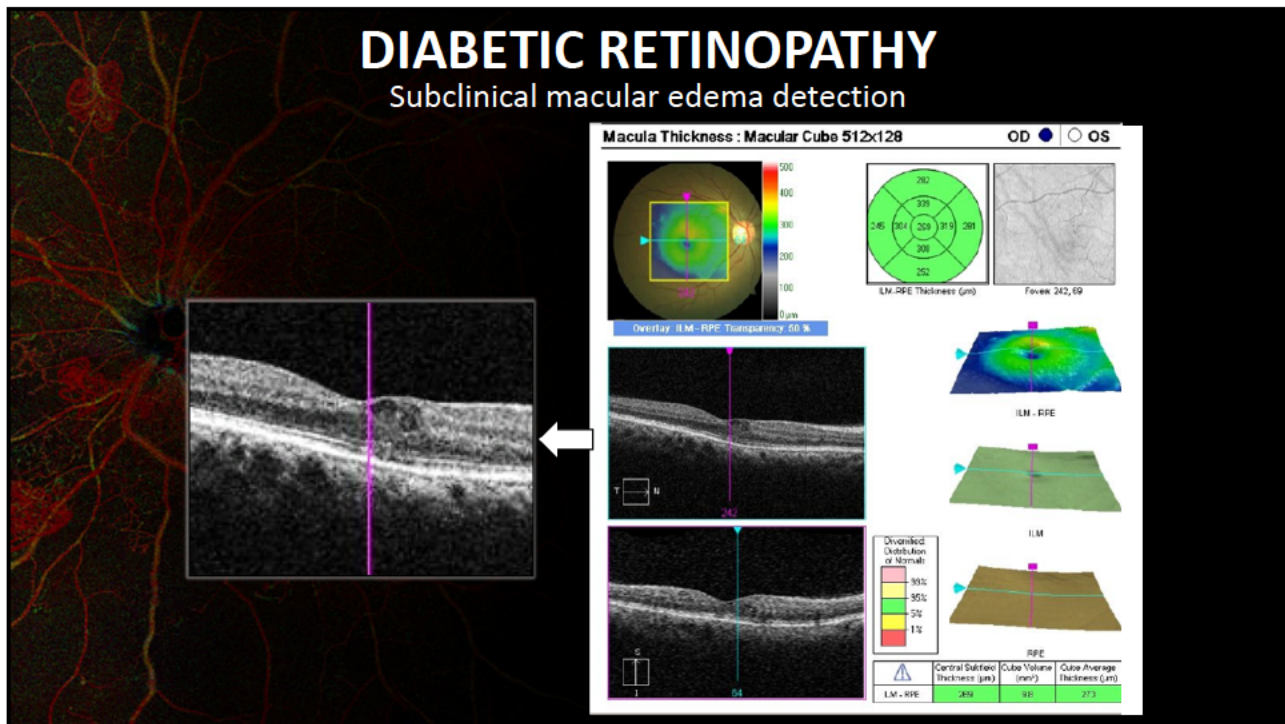
42



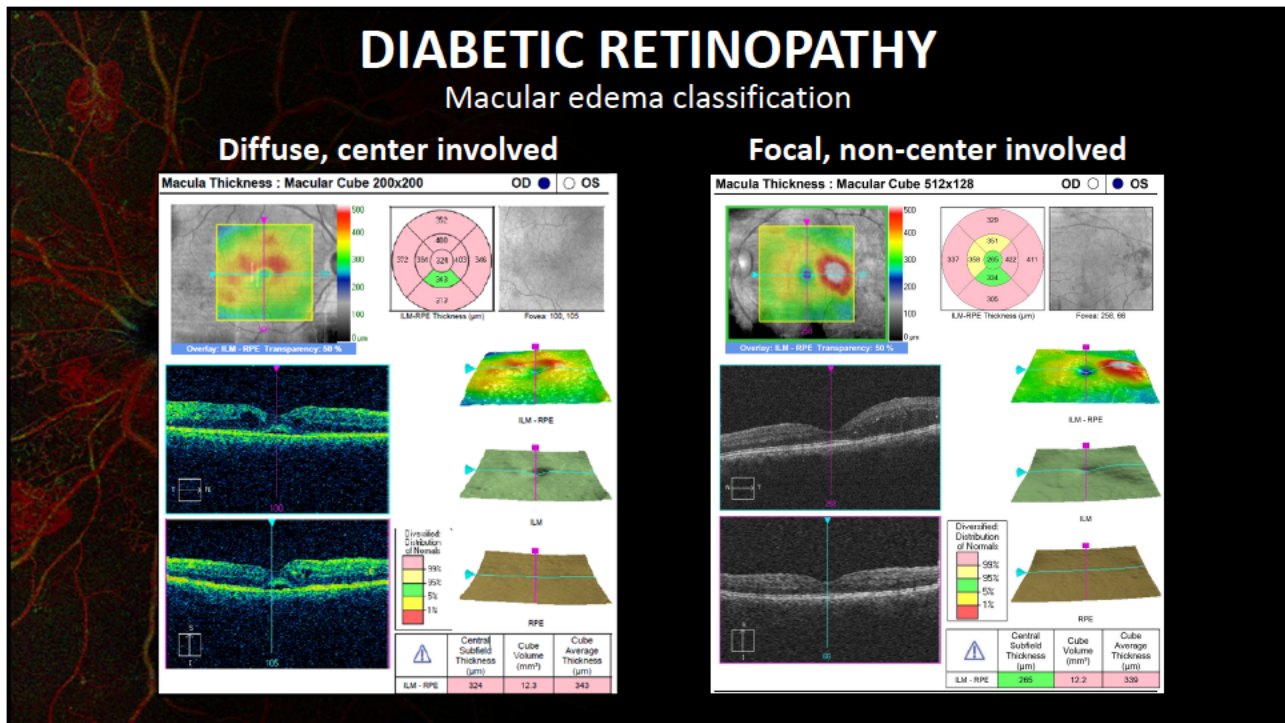
43



44



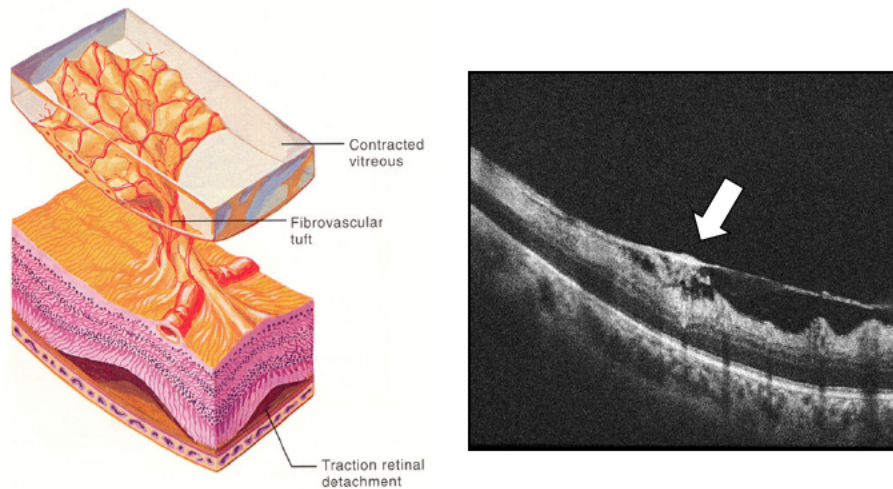
45



46

PROLIFERATIVE DIABETIC RETINOPATHY

Preretinal Neovascularization

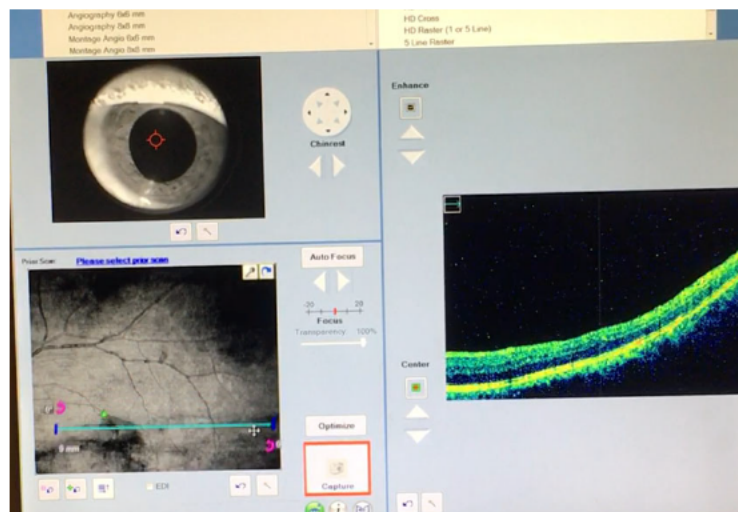


Most often characterized by new blood vessel growth located between the ILM and the posterior hyaloid

47

PROLIFERATIVE DIABETIC RETINOPATHY

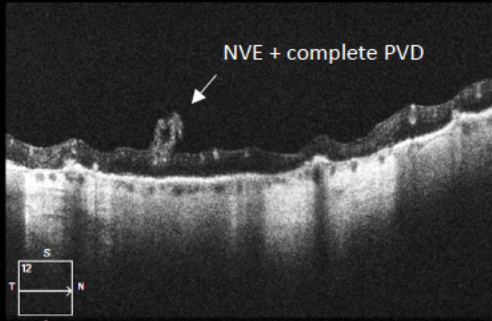
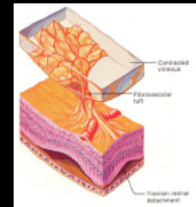
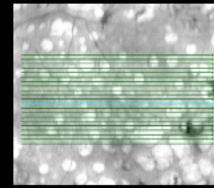
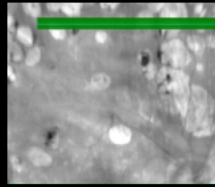
Preretinal Neovascularization



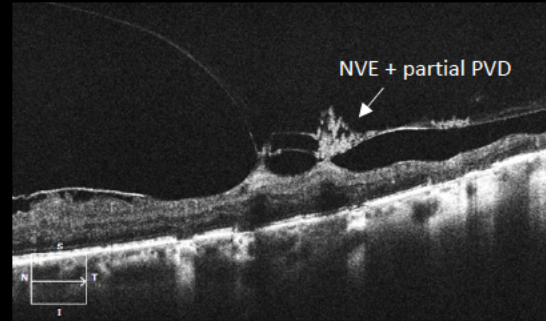
48

PROLIFERATIVE DIABETIC RETINOPATHY

PVD Status?



NVE + complete PVD

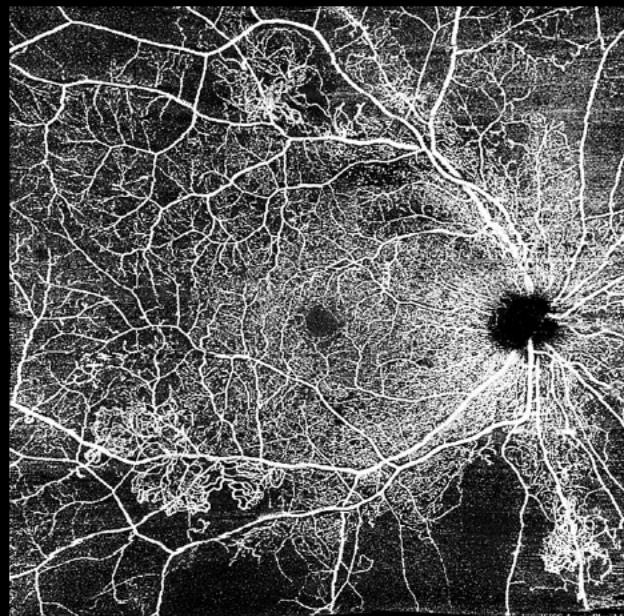


NVE + partial PVD

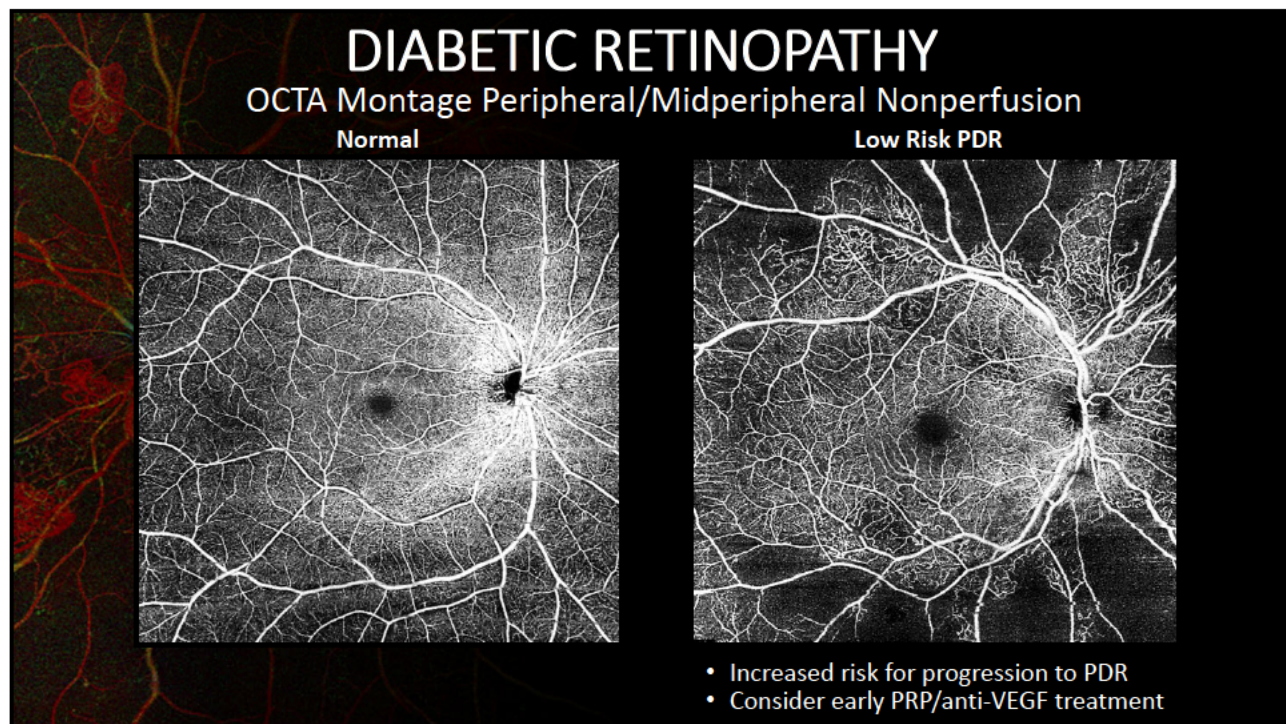
COMPLETE PVD IS PROTECTIVE!

49

Preretinal Neovascularization Border of perfusion/nonperfusion



50



53

TABLE 5 INITIAL MANAGEMENT RECOMMENDATIONS FOR PATIENTS WITH DIABETES

Severity of Retinopathy	Presence of Macular Edema	Follow-up (Months)	Panretinal Photocoagulation (Scatter) Laser	Focal and/or Grid Laser*	Intravitreal Anti-VEGF Therapy
Normal or minimal NPDR	No	12	No	No	No
Mild NPDR	No	12	No	No	No
	NCI-DME	3–6	No	Sometimes	No
	CI-DME [†]	1*	No	Rarely	Usually
Moderate NPDR	No	6–12 [‡]	No	No	No
	NCI-DME	3–6	No	Sometimes	Rarely
	CI-DME [†]	1*	No	Rarely	Usually
Severe NPDR	No	3–4	Sometimes	No	Sometimes
	NCI-DME	2–4	Sometimes	Sometimes	Sometimes
	CI-DME [†]	1*	Sometimes	Rarely	Usually
Non-high-risk PDR	No	3–4	Sometimes	No	Sometimes
	NCI-DME	2–4	Sometimes	Sometimes	Sometimes
	CI-DME [†]	1*	Sometimes	Sometimes	Usually
High-risk PDR	No	2–4	Recommended	No	Sometimes ^{§§,188}
	NCI-DME	2–4	Recommended	Sometimes	Sometimes
	CI-DME [†]	1*	Recommended	Sometimes	Usually

Anti-VEGF = anti-vascular endothelial growth factor; CI-DME = center-involved diabetic macular edema; NCI-DME = noncenter-involved diabetic macular edema; NPDR = nonproliferative diabetic retinopathy; PDR = proliferative diabetic retinopathy

American Academy of Ophthalmology – Preferred Practice Patterns 2019, p20

54

DIABETIC RETINOPATHY

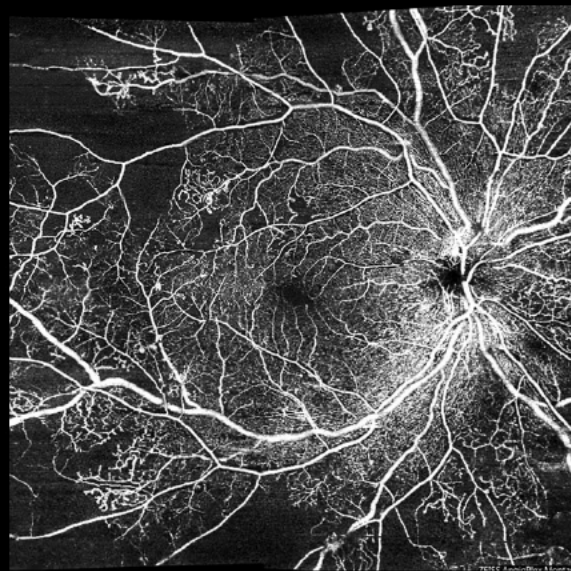
48yo HF

- Type 2 DM
- PDR S/P PRP and Avastin 1 yr ago OU
- Recent severe vision loss OS due to vitreous hemorrhage
- VA OD 20/25, OS HM

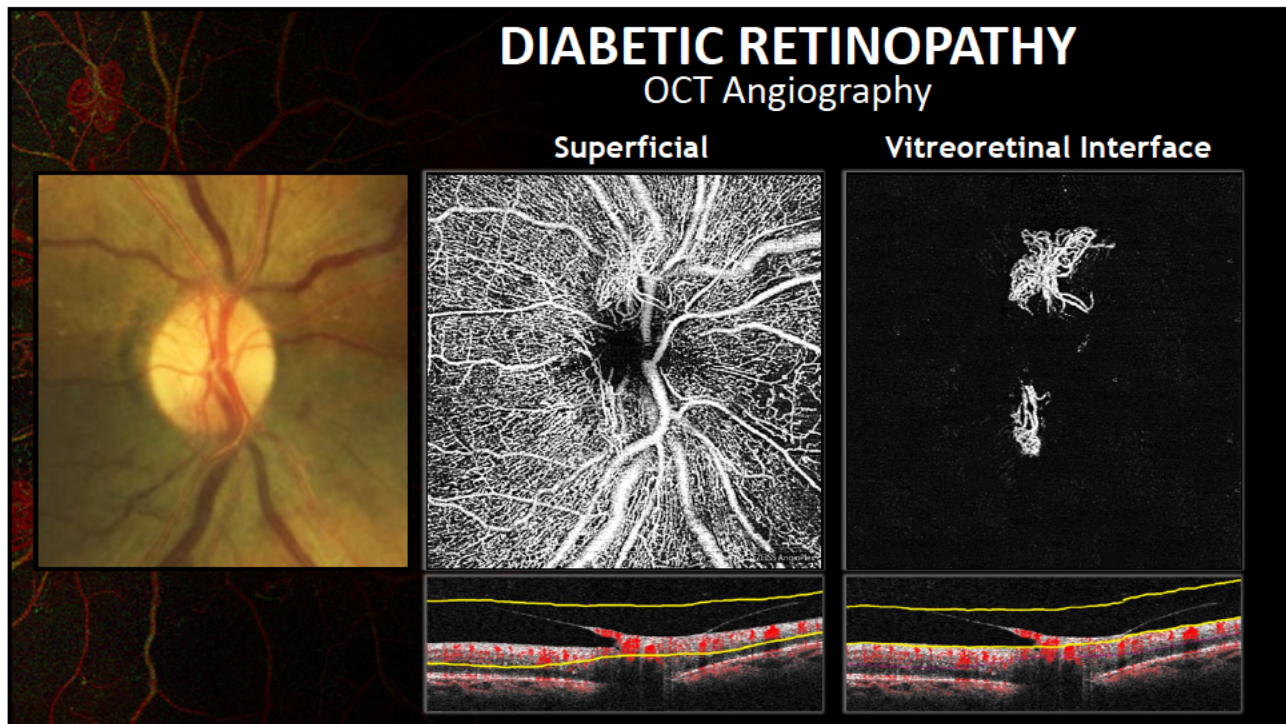


55

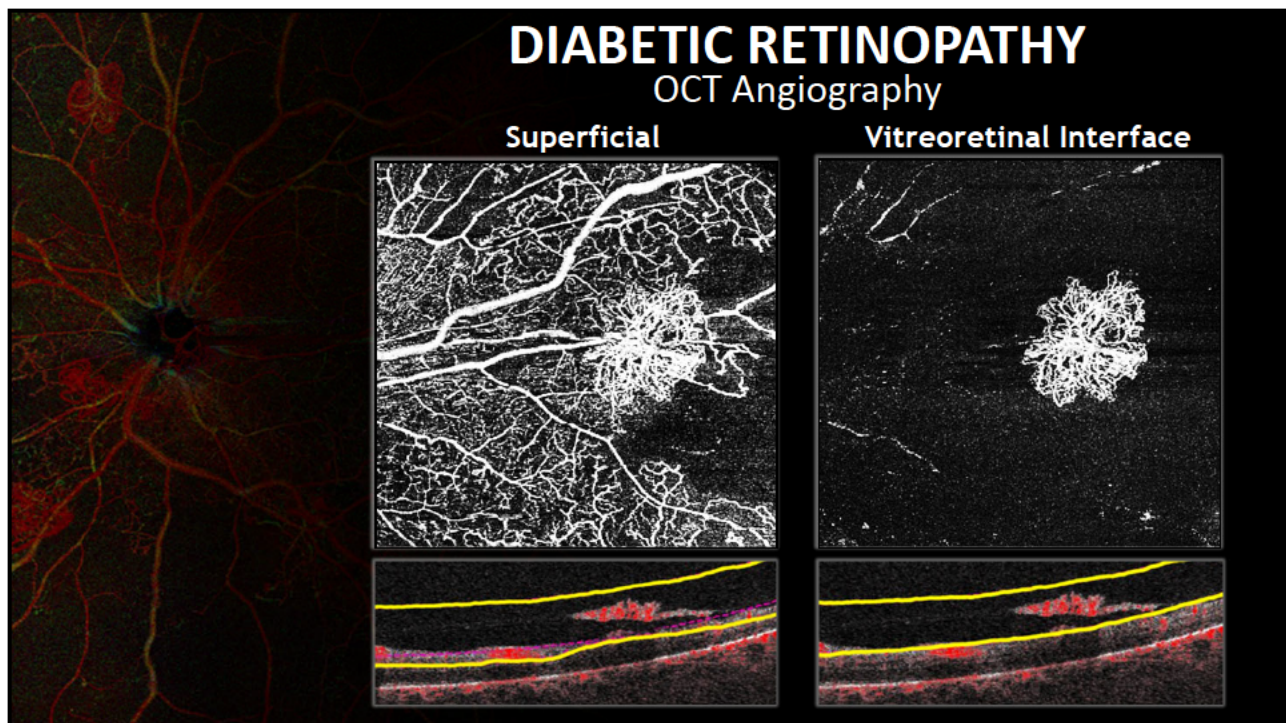
Massive Peripheral NP= Where's the neo?



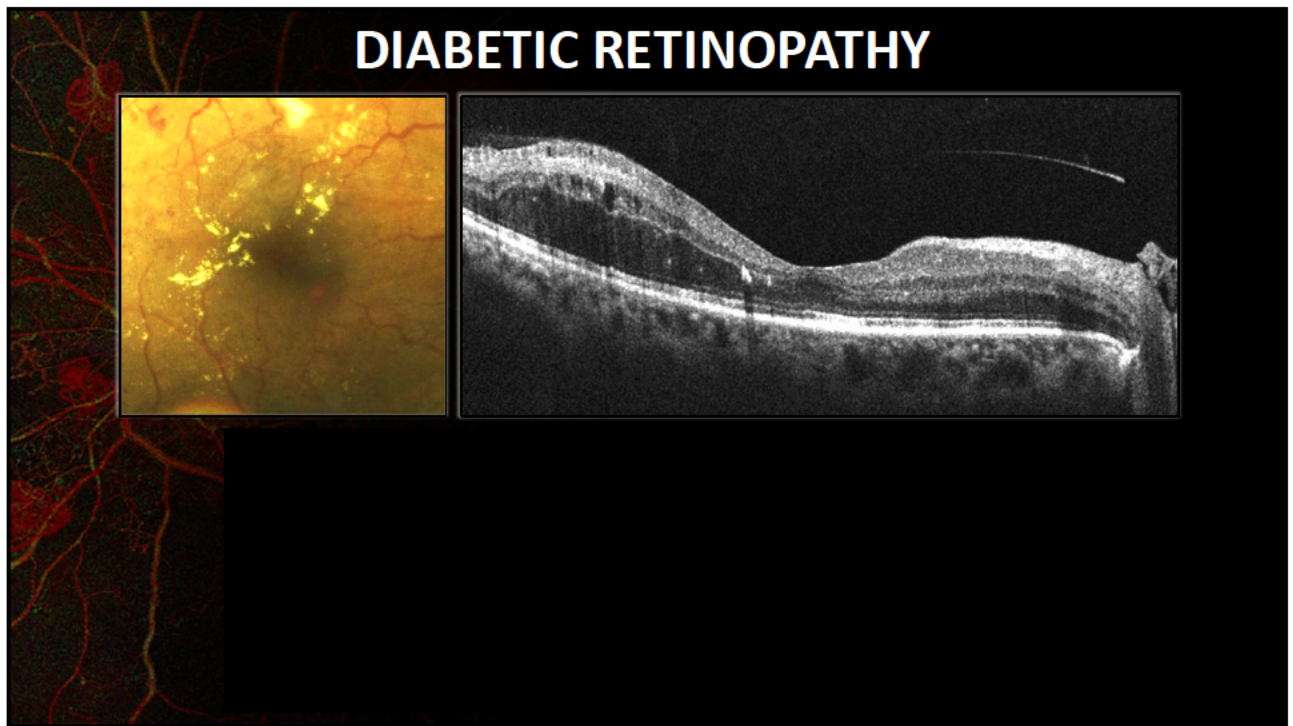
56



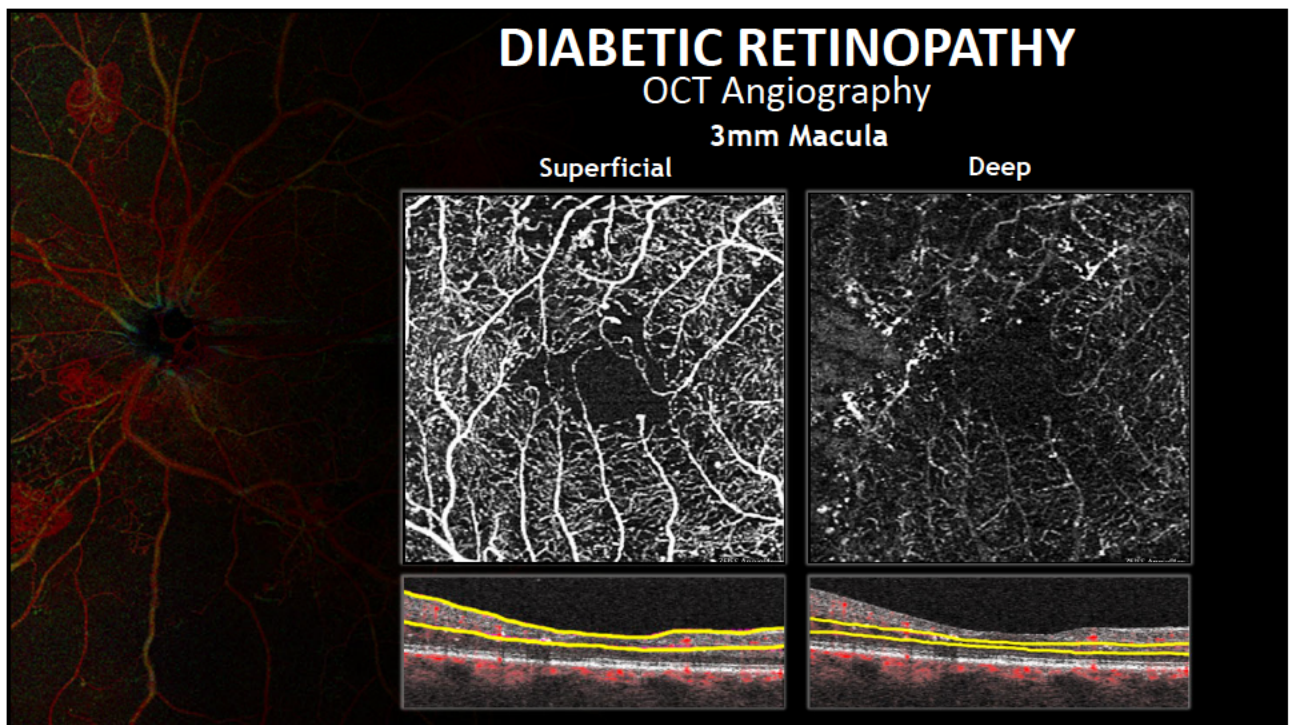
57



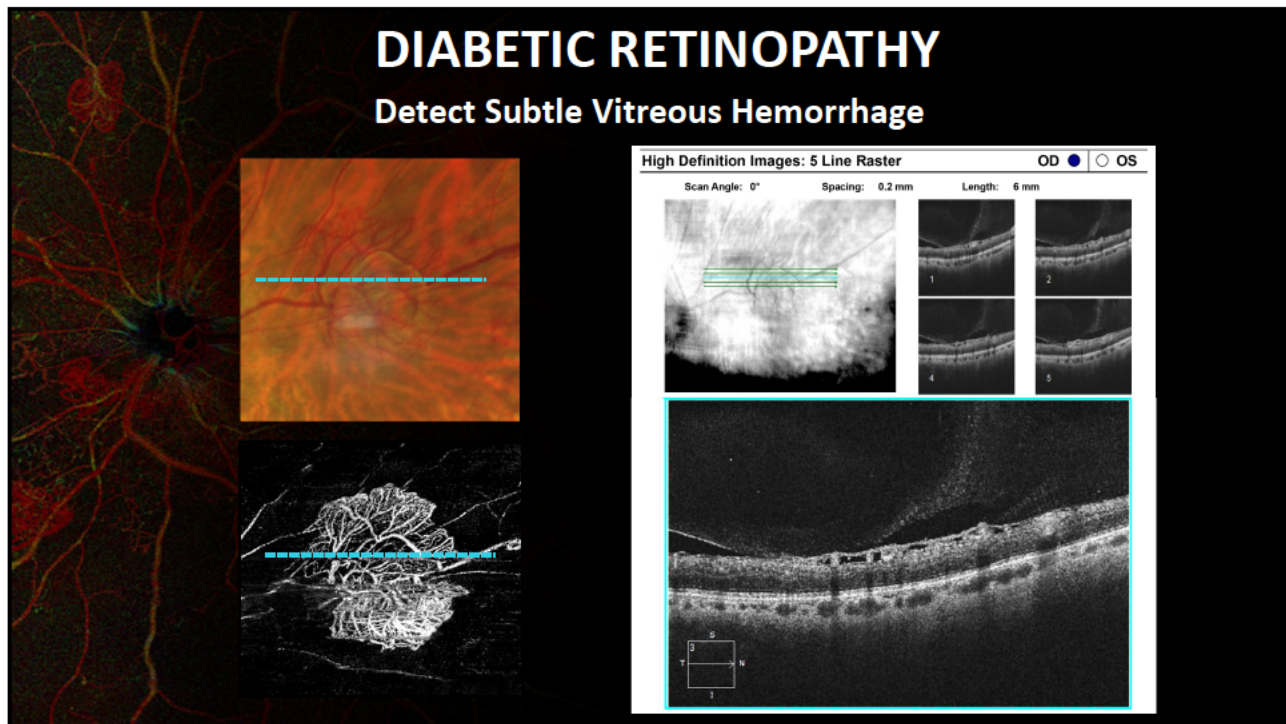
58



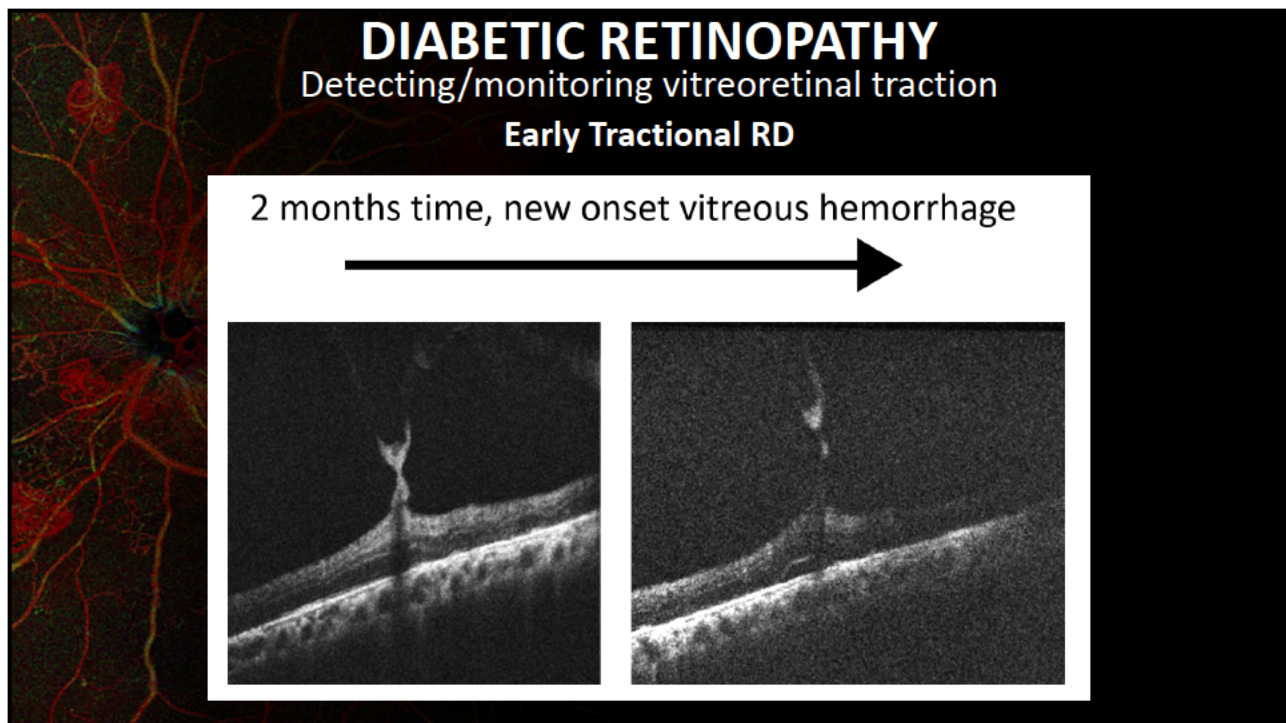
59



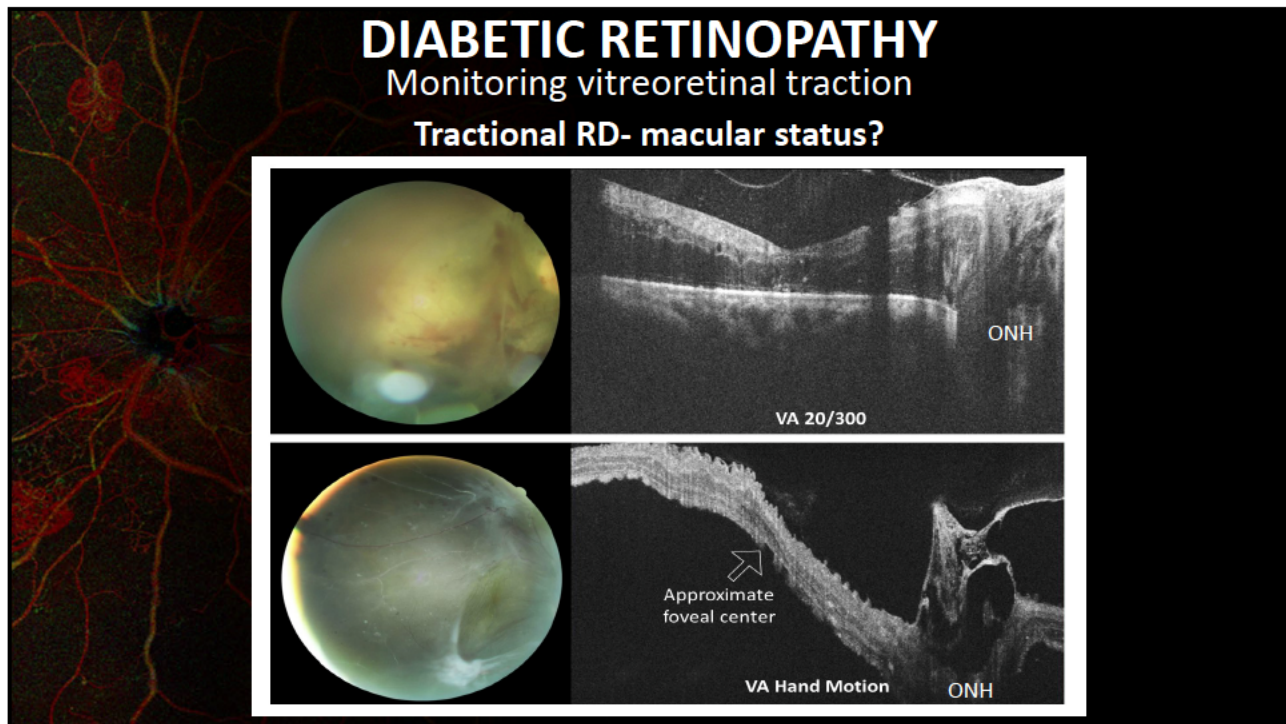
60



61



62



63

VENOUS OCCLUSION


- 2nd most common retinal vascular disease in the US after diabetic retinopathy
- Classified based on the site/area of the occlusion
- Arteriolosclerosis causes venous compression where the artery and vein share a common adventitial sheath
 - Secondary thrombosis formation

64

Hemi-Retinal Vein Occlusion

52yo HM

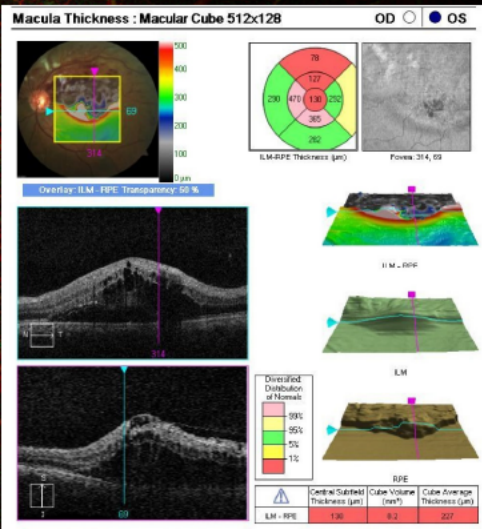
- Referred from outside clinic for vein occlusion OS
- Pt complains of blur x 5 days
- VA OS 20/200




65

Hemi-Retinal Vein Occlusion

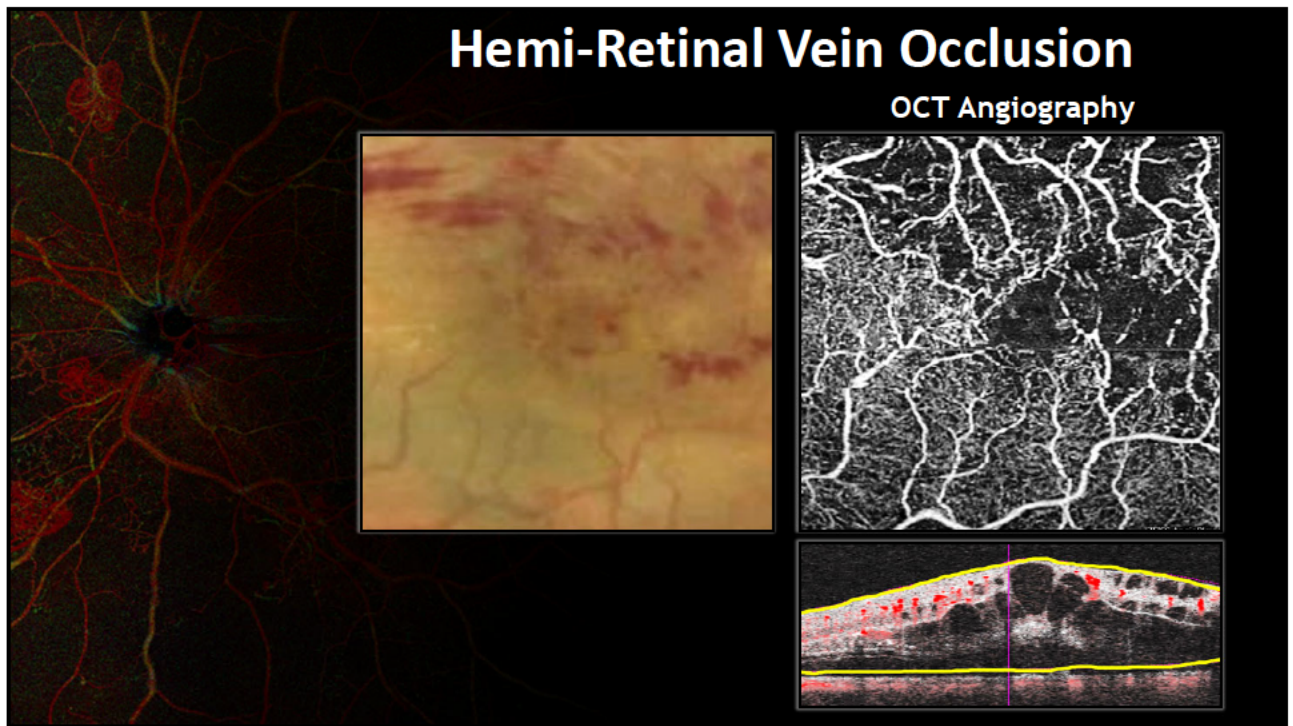
Macula Thickness : Macular Cube 512x128 OD ○ ● OS



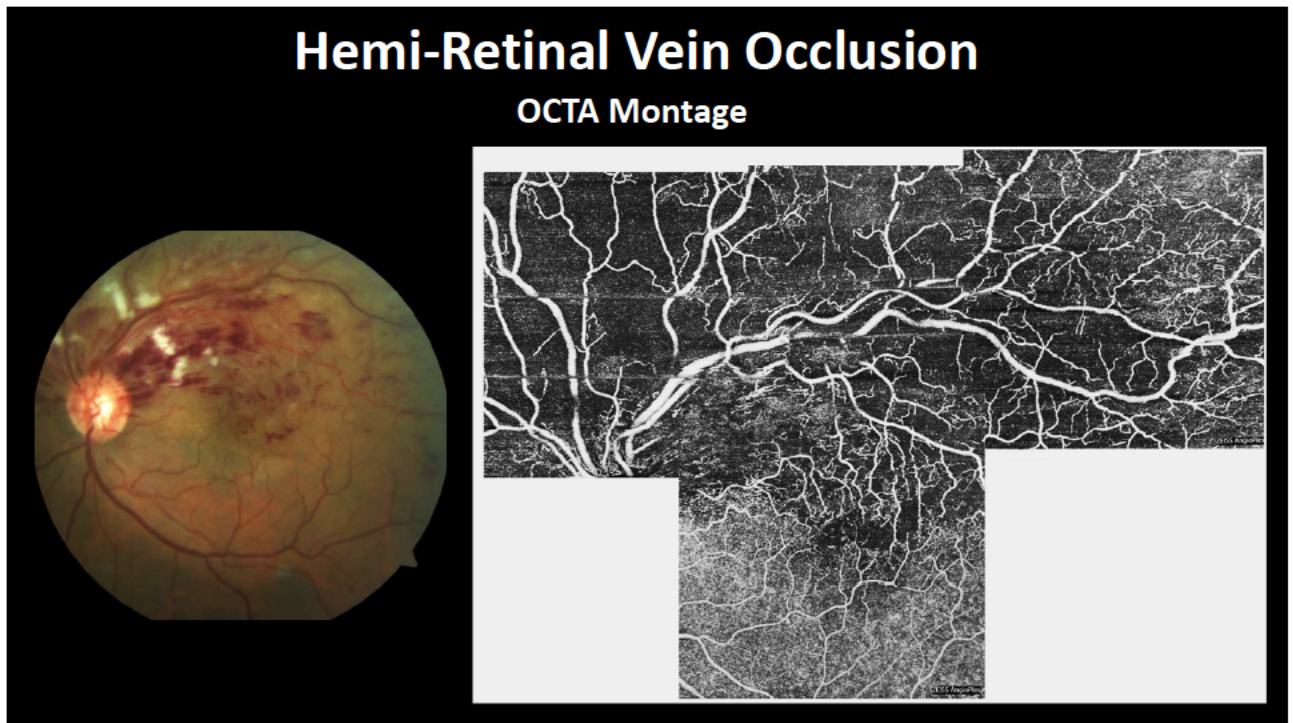
	Central Subfield Thickness (µm)	Cube Volume (mm³)	Cube Average Thickness (µm)
LM - RPE	136	6.2	227



66



67



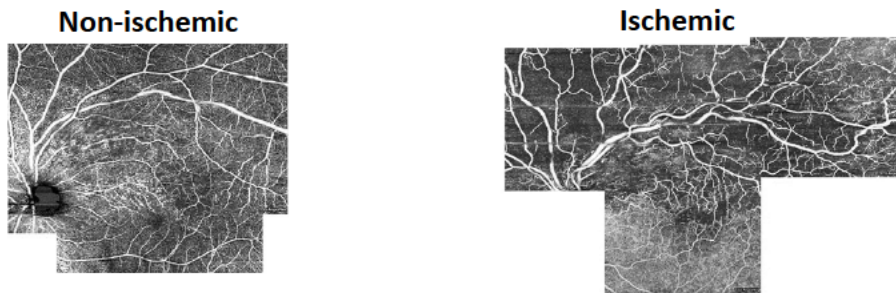
68

Branch Retinal Vein Occlusion

BVOS: Predictive Value of Retinal Nonperfusion

50/50/50 rule:

- Of large BRVOs (involving a quadrant or more) ~ 50% are ischemic (>5DD of NP via IVFA)
- About 40-50% of eyes with ischemic BRVO will develop NVD/NVE
- Of eyes with NVD/NVE, 50-60% develop preretinal or vitreous hemorrhage if left untreated



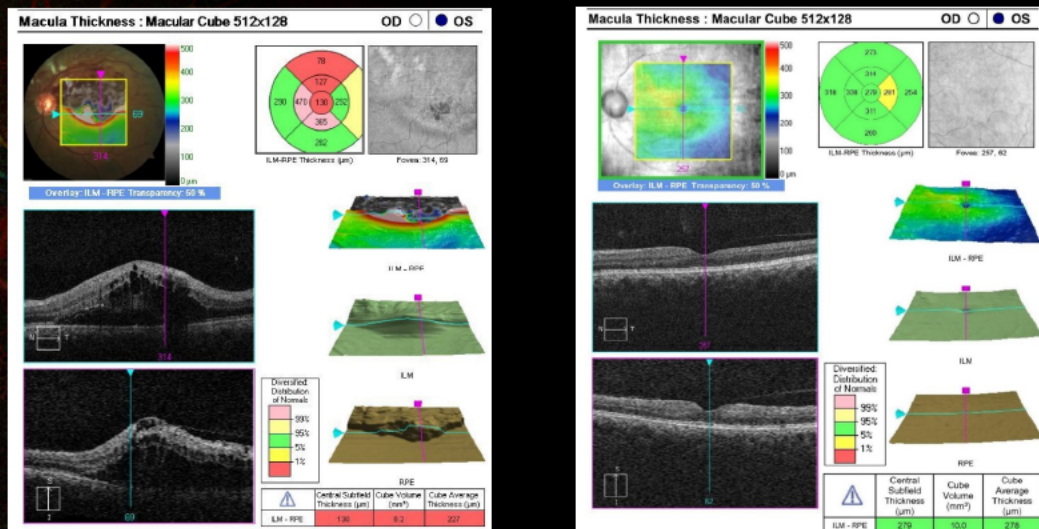
Branch Vein Occlusion Study Grp. Argon laser scatter photocoagulation for prevention of neovascularization and vitreous hemorrhage in BVO. A RCT. Arch Ophthalmol. 1986.

69

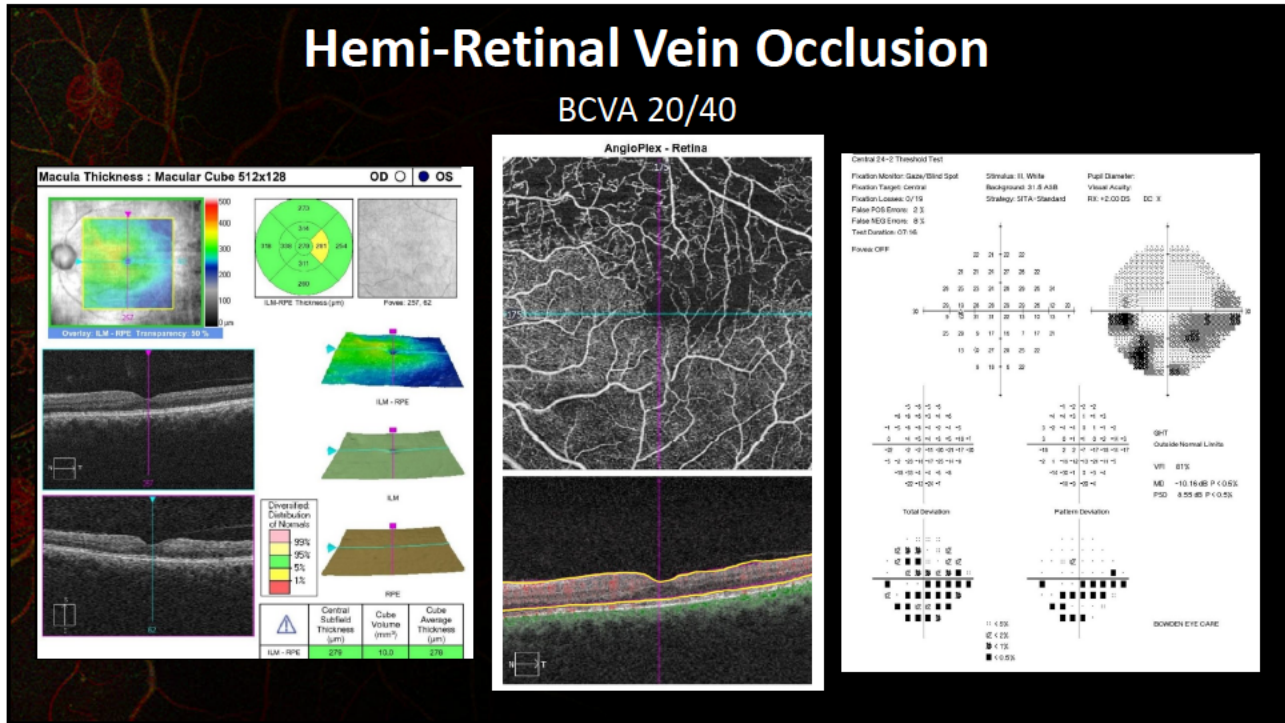
Hemi-Retinal Vein Occlusion

Baseline

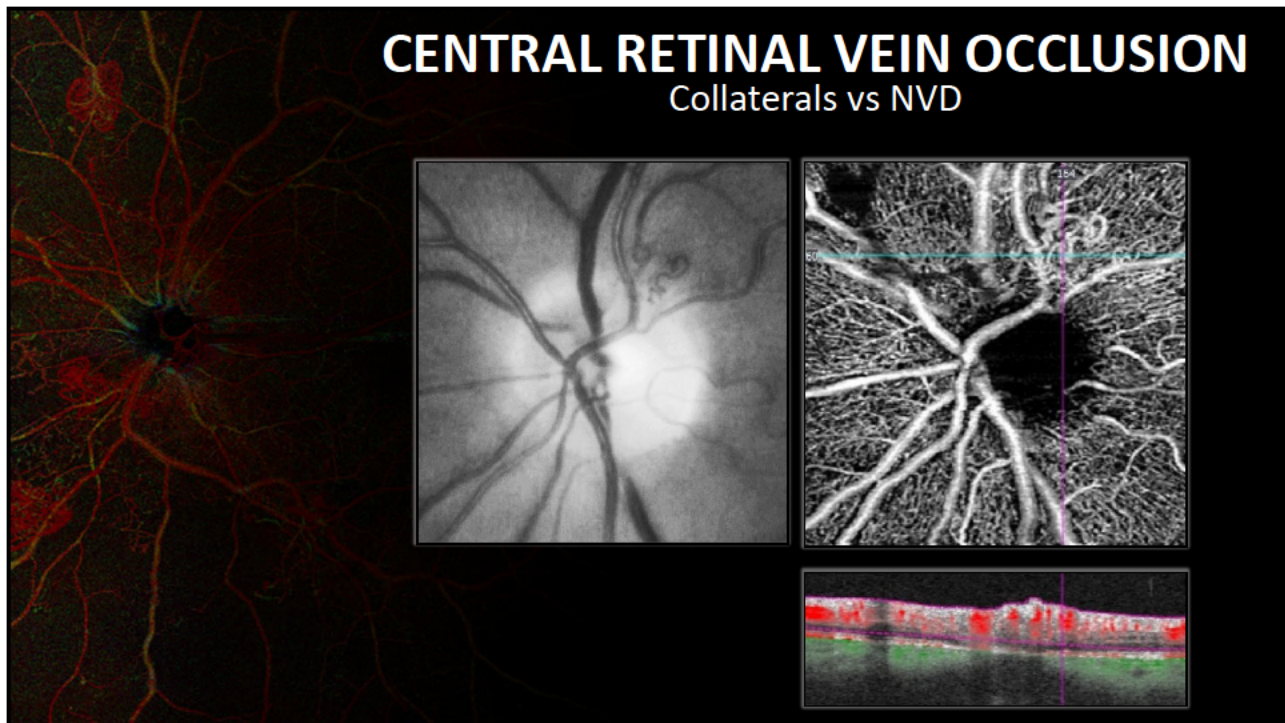
S/P 3 Avastin Injections (5 months)



70



71

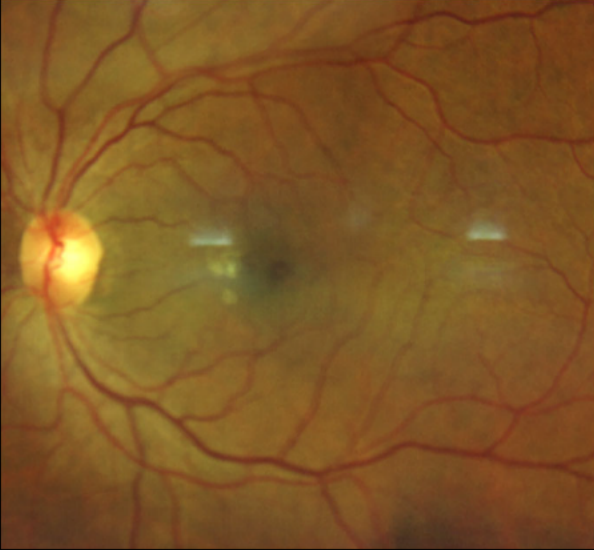


72

Macular Mystery

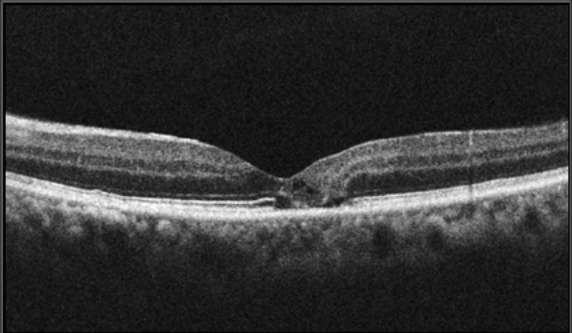
49yo HF


- Referred from outside OD for vision loss OU and poss macular holes
- Med Hx unremarkable
- Mother had decreased vision of unknown cause
- VA OD 20/60, OS 20/40

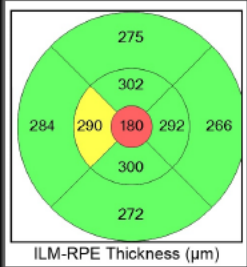


73

Macular Mystery

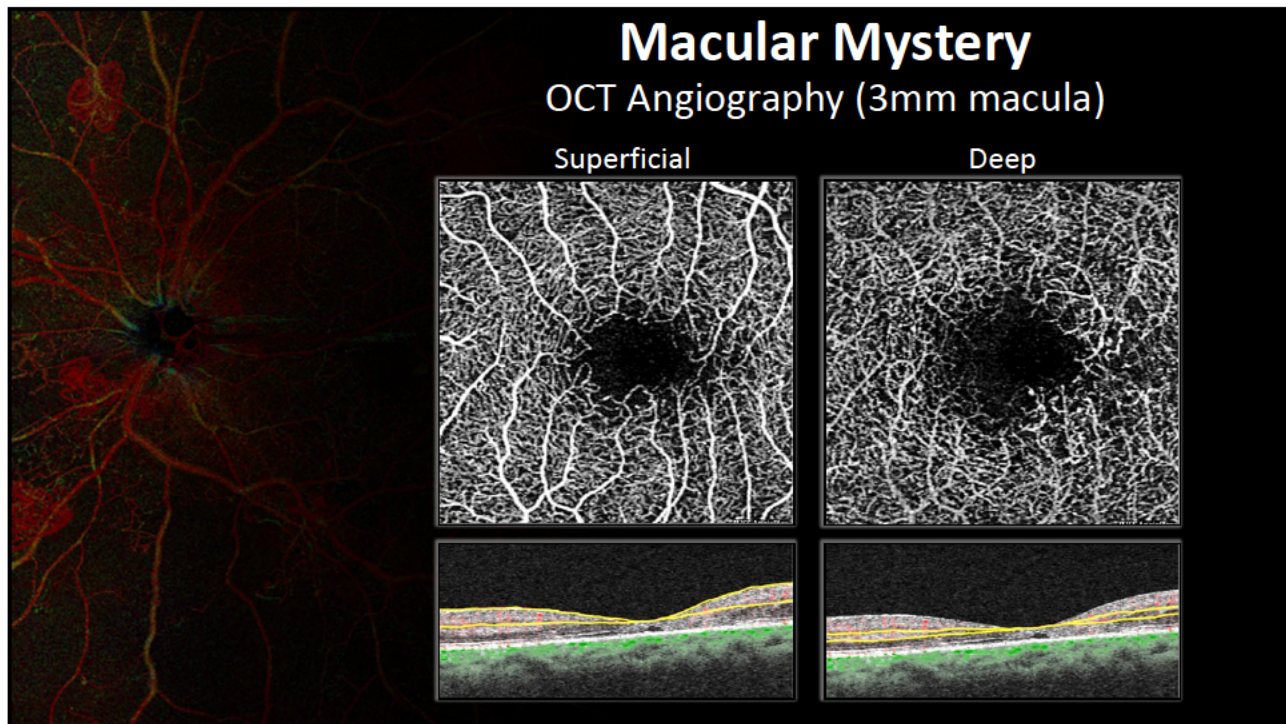




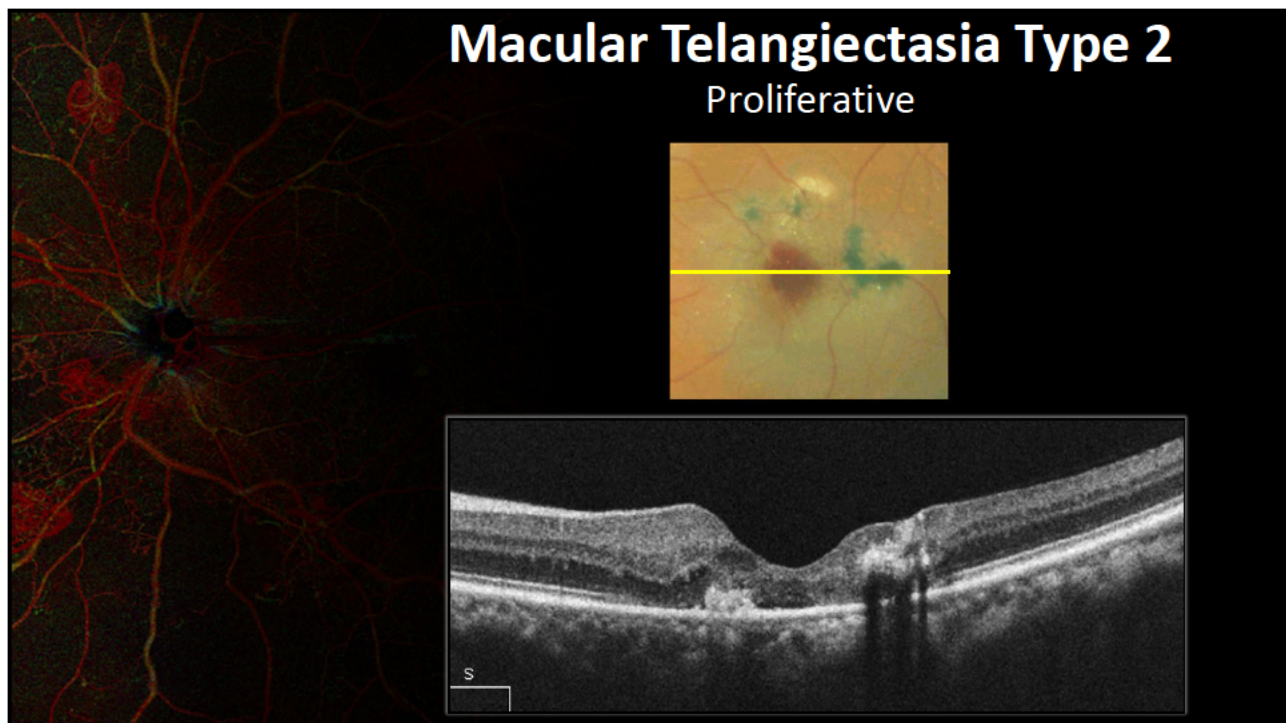


ILM-RPE Thickness (µm)

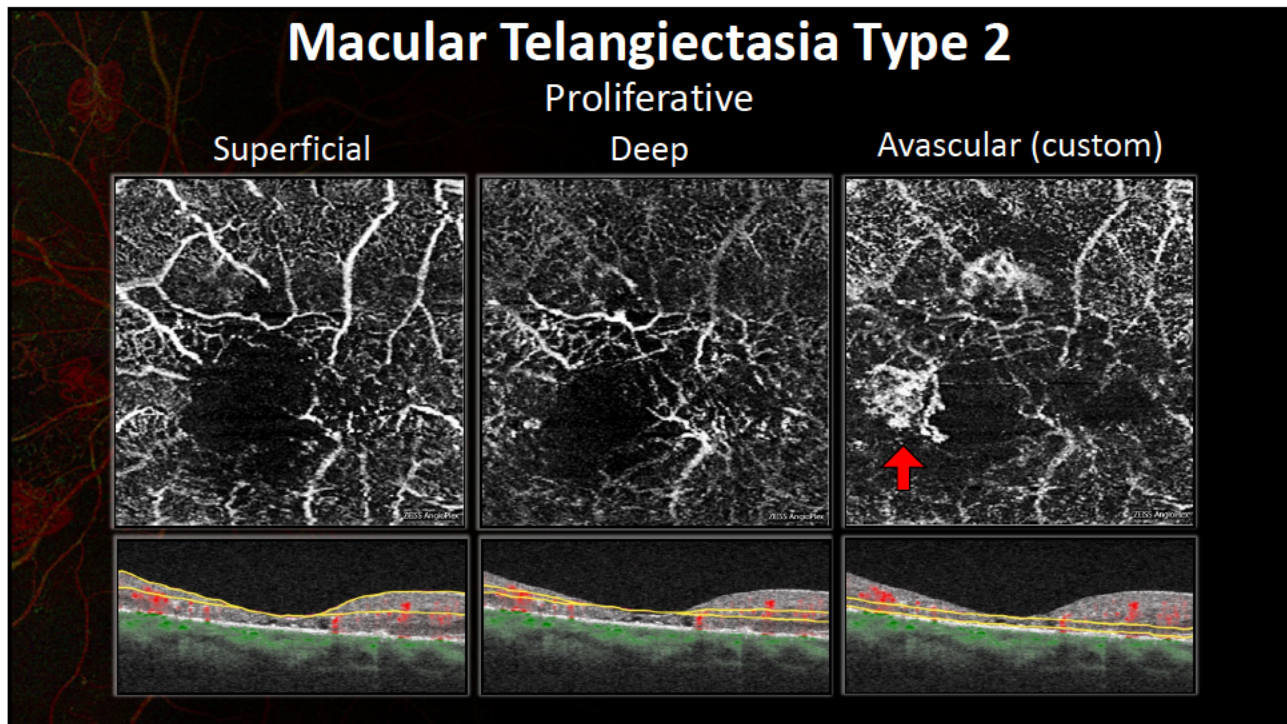
74



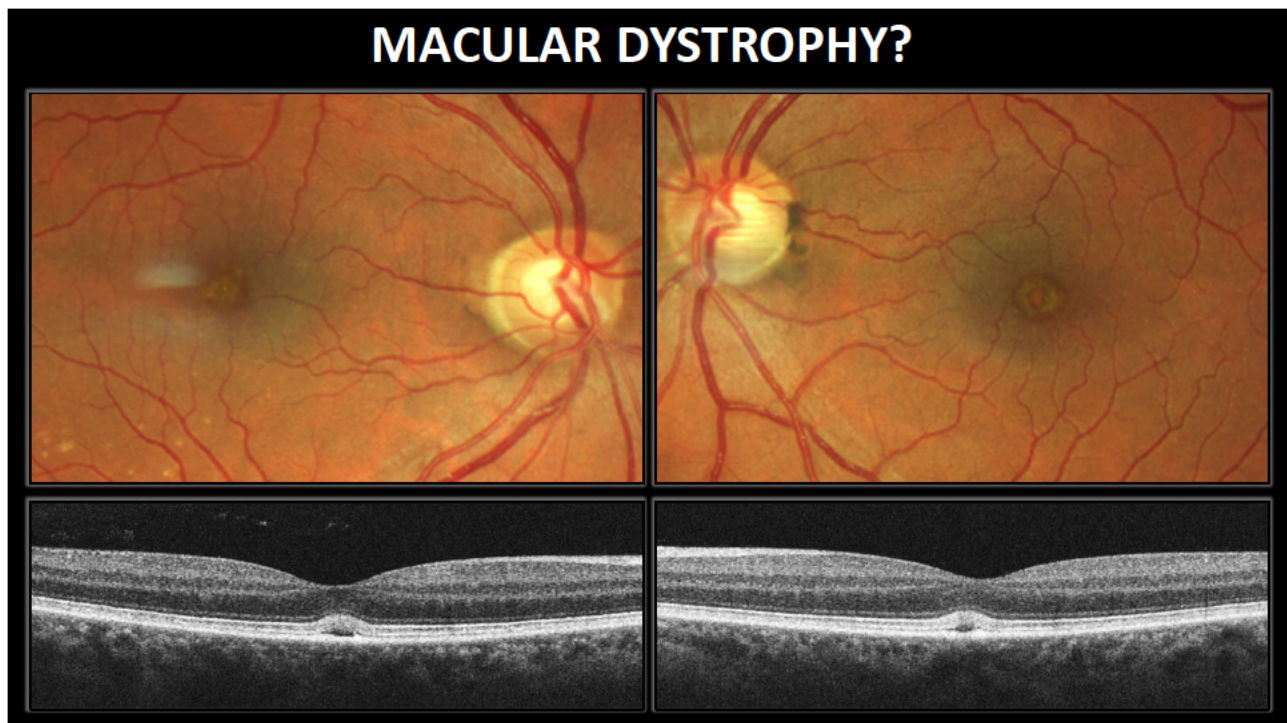
75



76



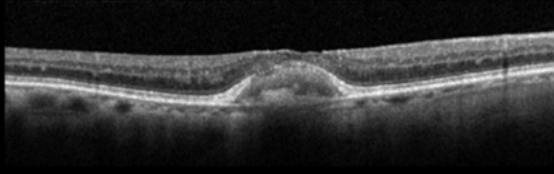
77



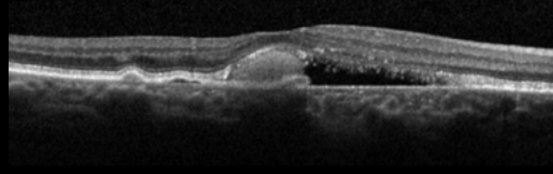
78

OCT Stages of Adult-Onset Foveomacular Vitelliform Dystrophy (AOFVD)

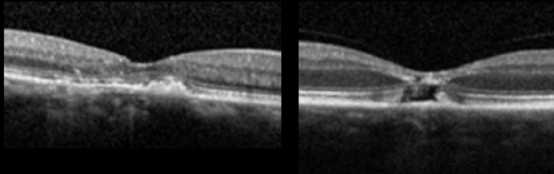
Vitelliform Stage



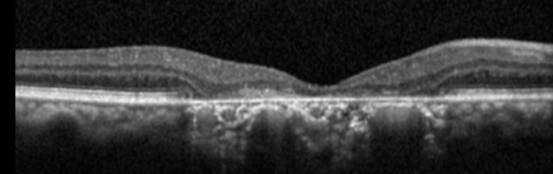
Pseudohypopyon Stage



Vitelliruptive Stage



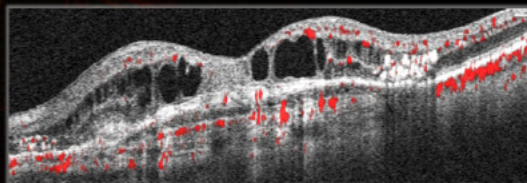
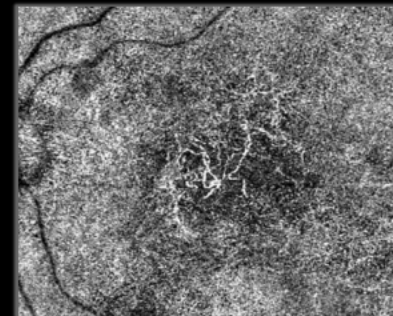
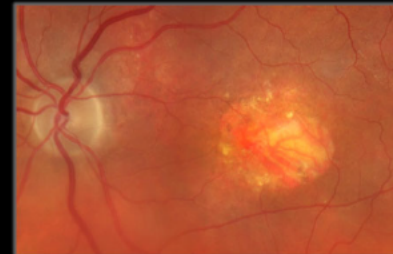
Atrophic Stage



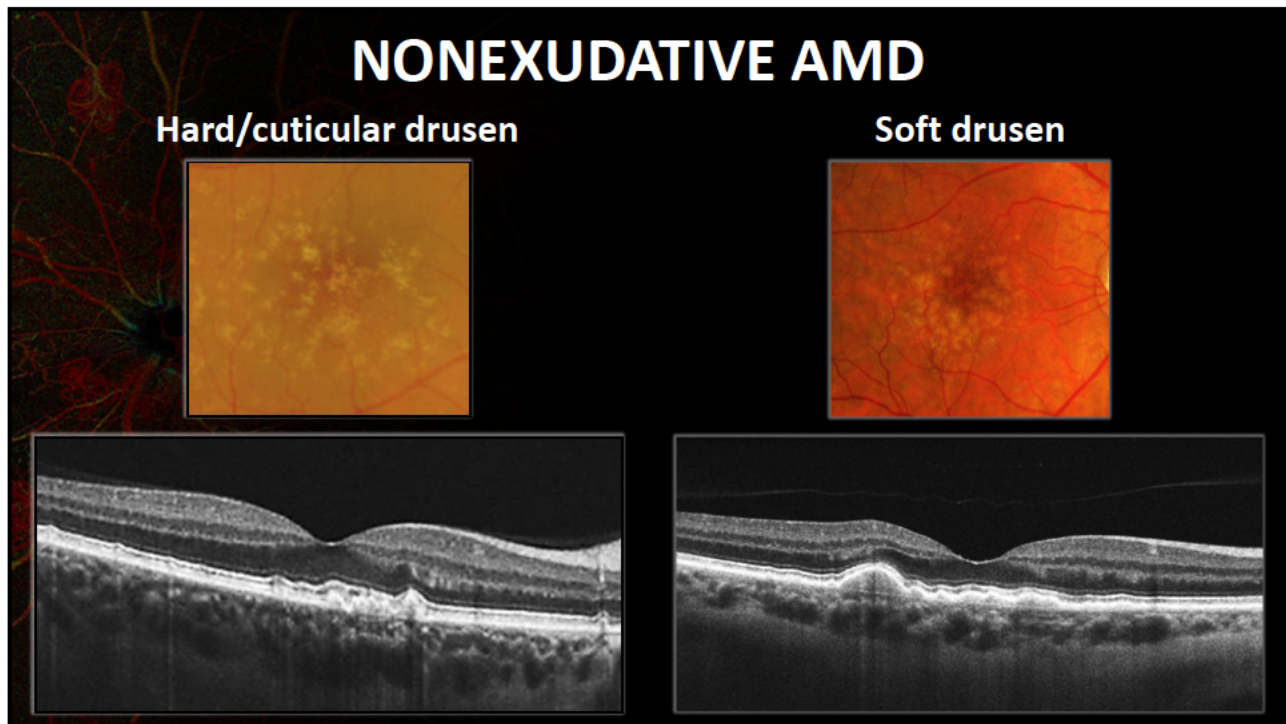
79

AGE-RELATED MACULAR DEGENERATION

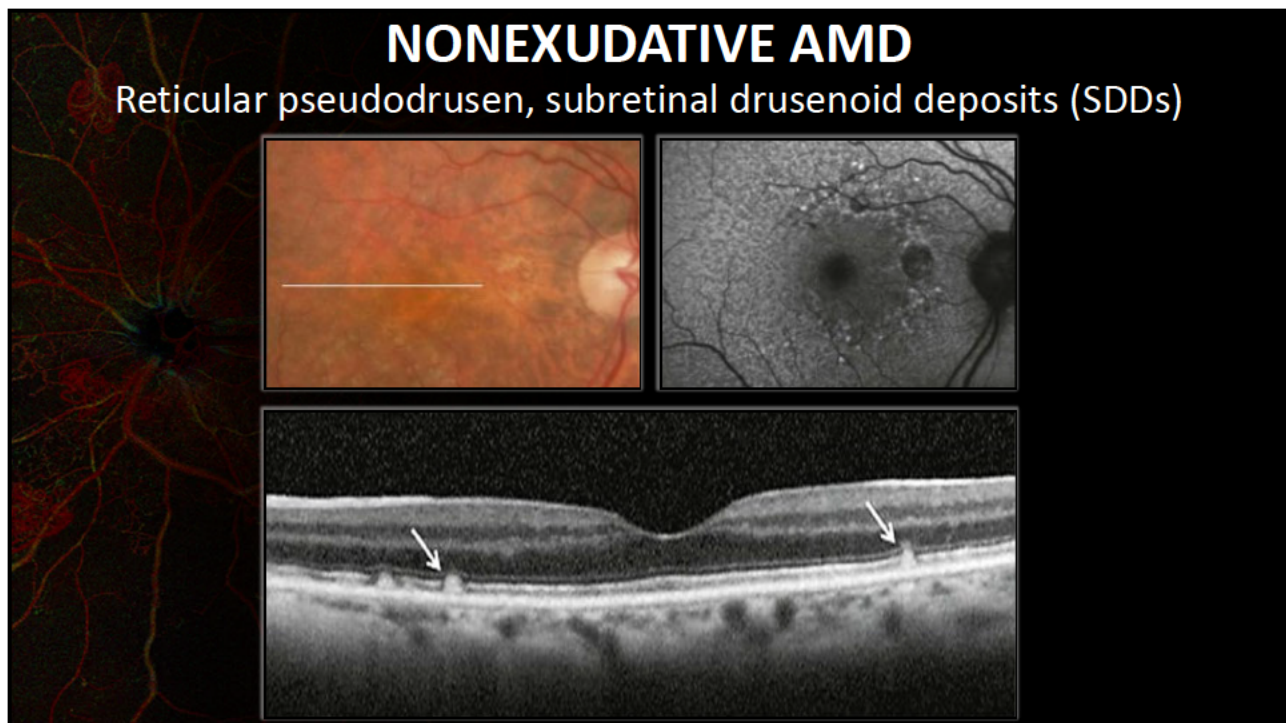
- Leading cause of blindness in the developed world in persons >50yo
- Characterized by drusen, RPE abnormalities, GA, CNV
- 80% nonexudative/20% exudative
 - Neo accounts for 90% of severe central VA loss from AMD
- OCT is useful in detecting new or recurrent neovascular disease activity and guiding therapy
 - Early detection and prompt treatment of neo improves the visual outcome



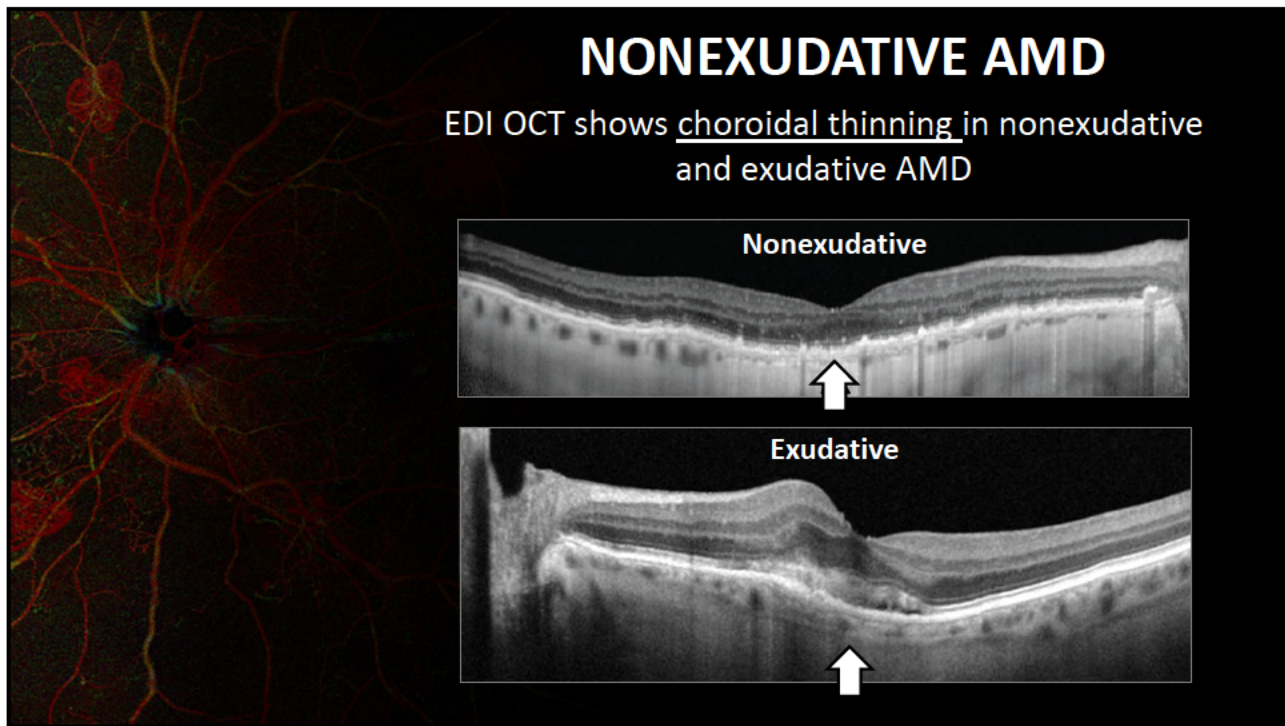
80



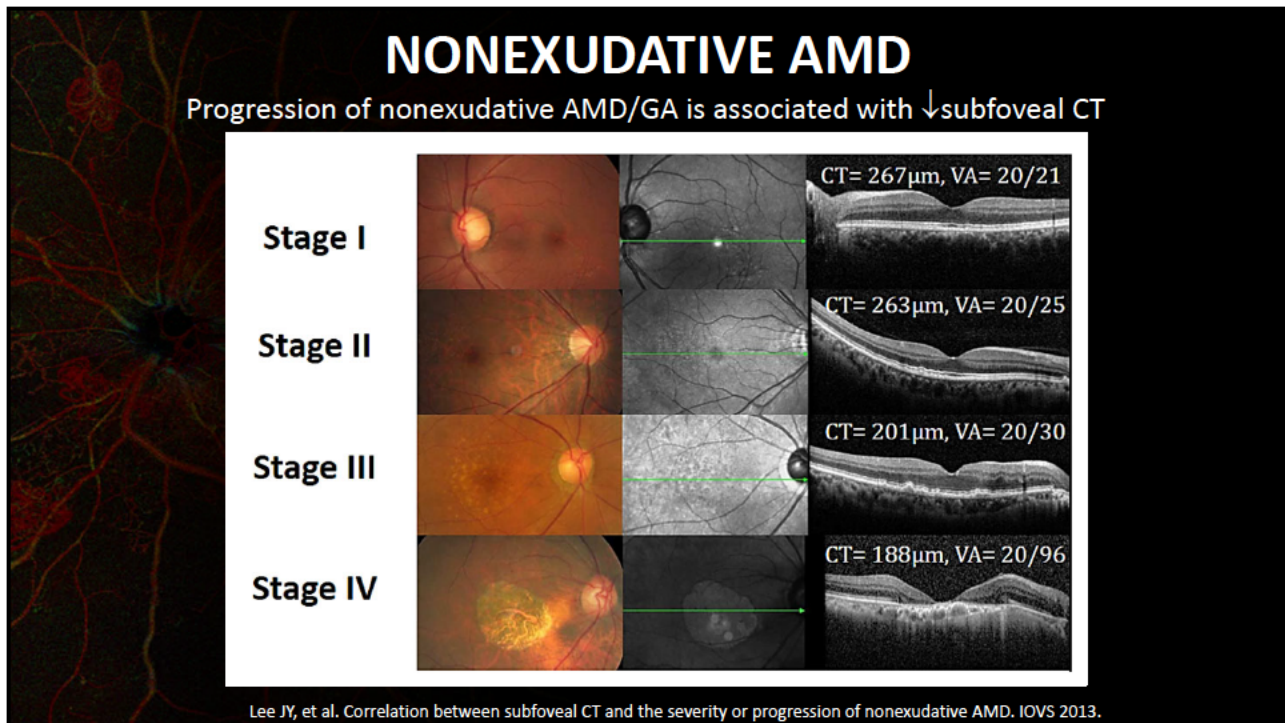
81



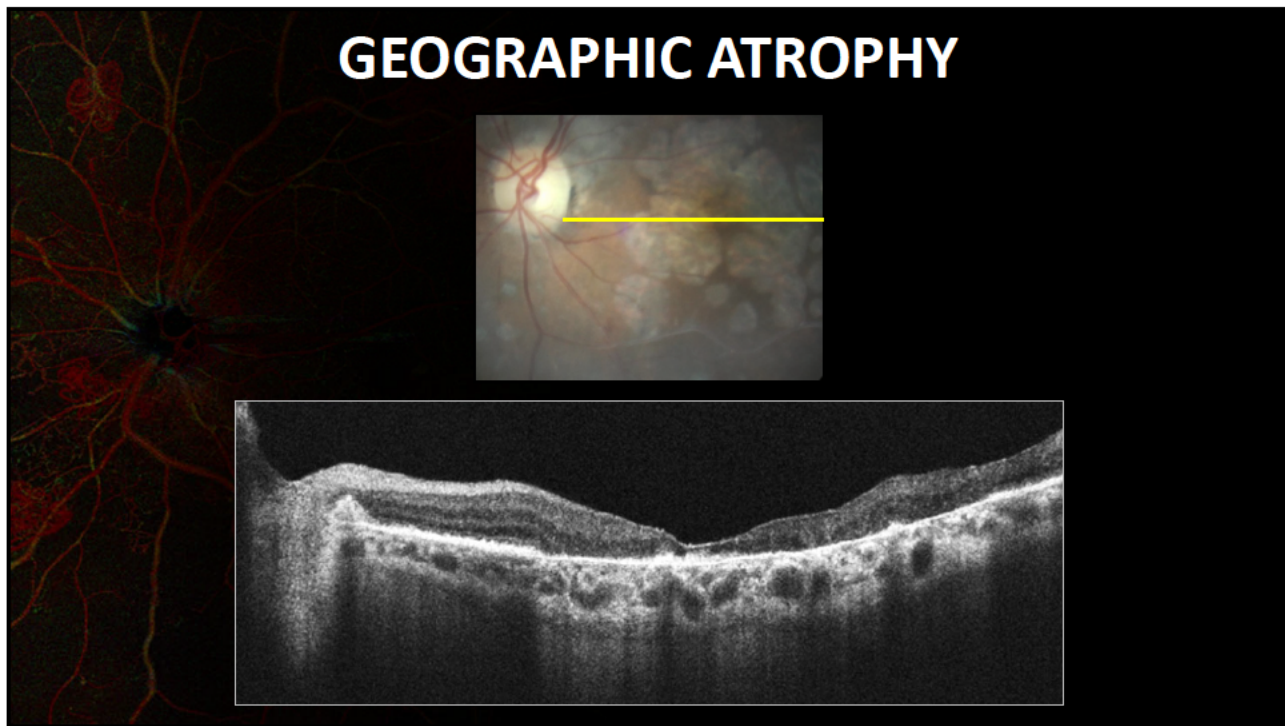
82



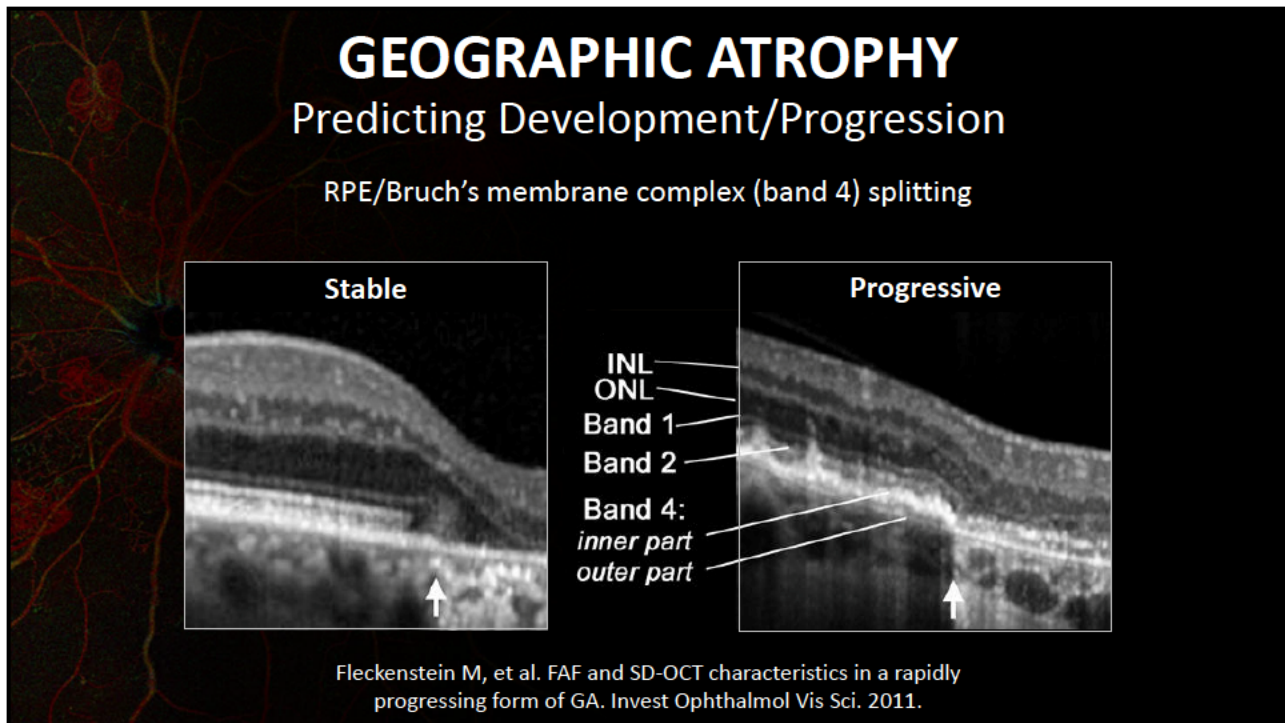
83



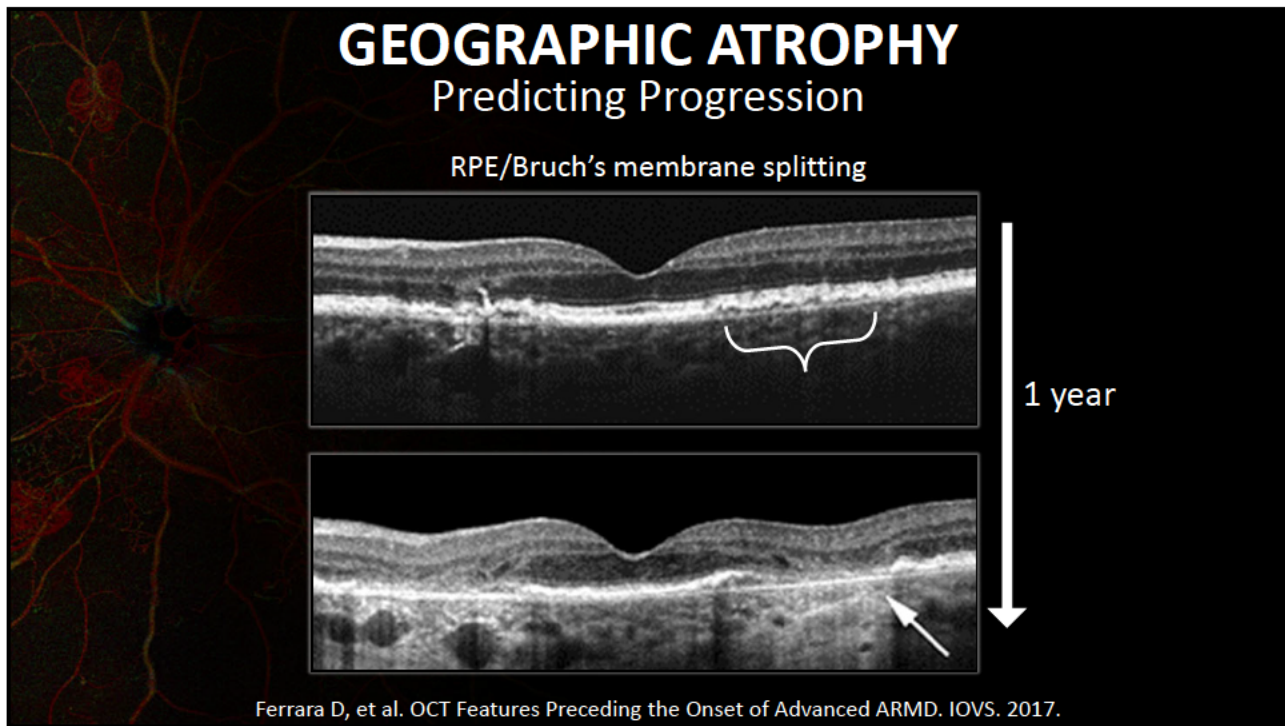
84



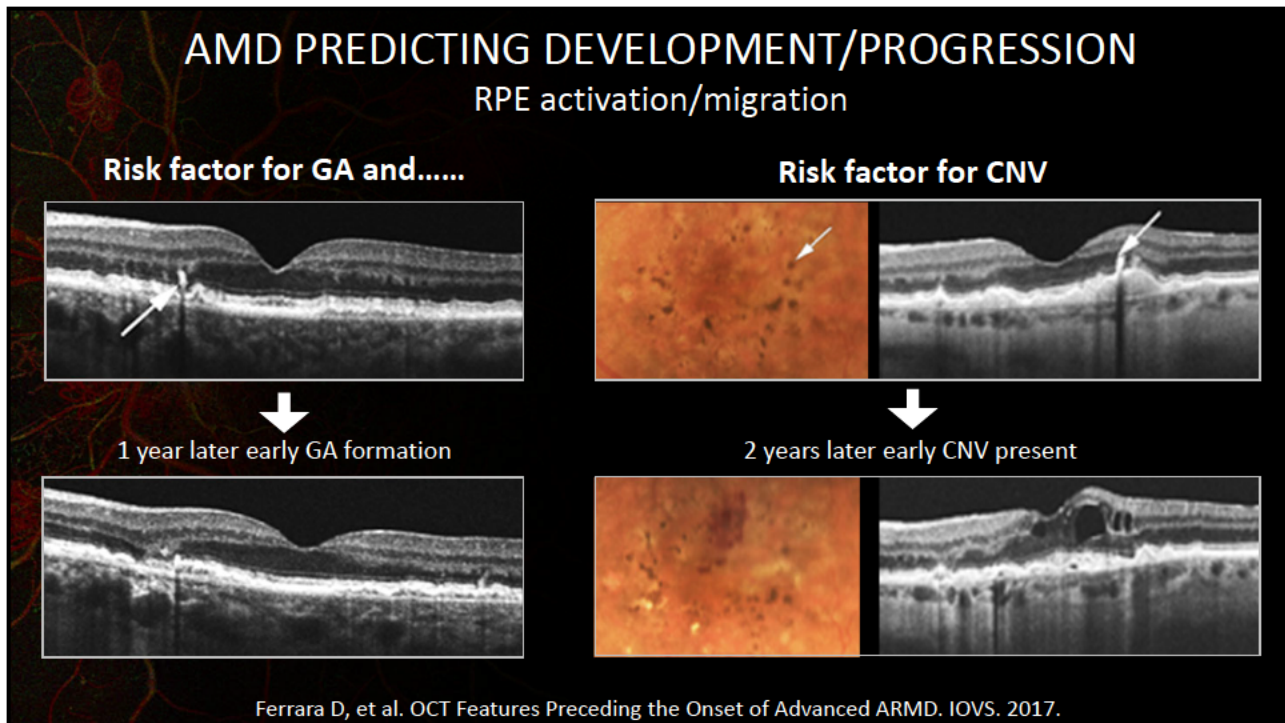
85



86



87

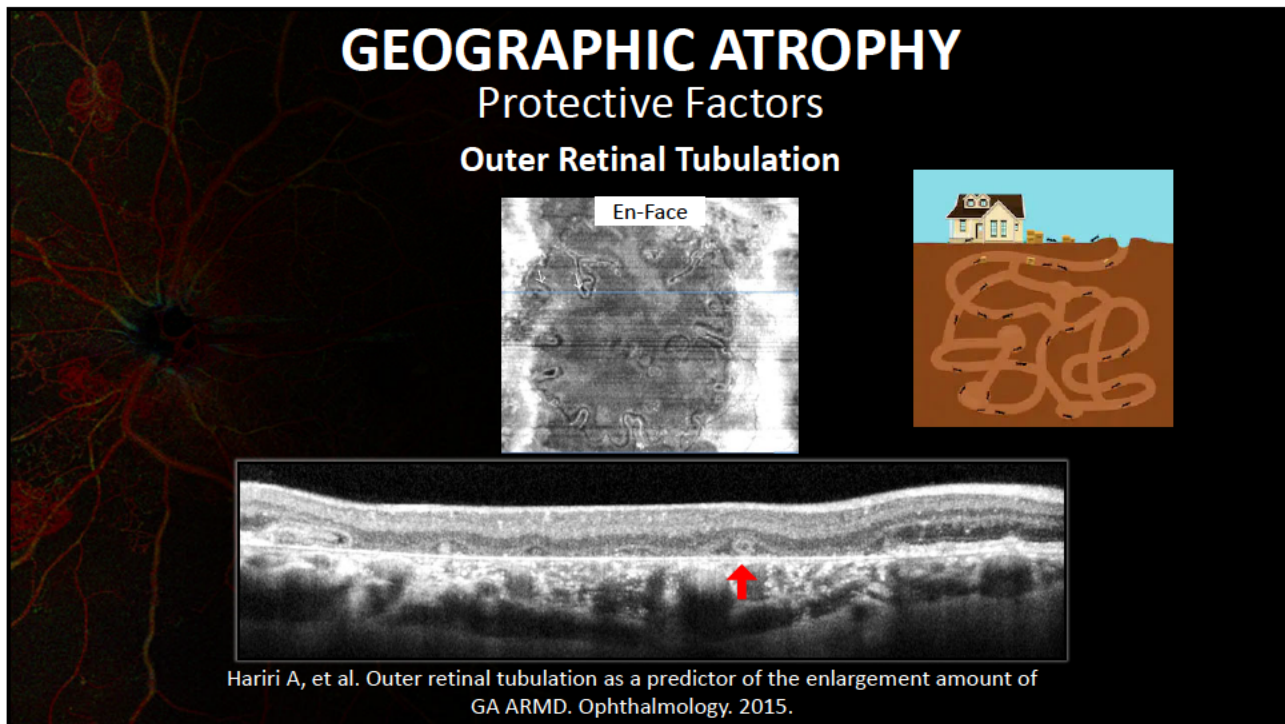


88

GEOGRAPHIC ATROPHY

Protective Factors

Outer Retinal Tubulation



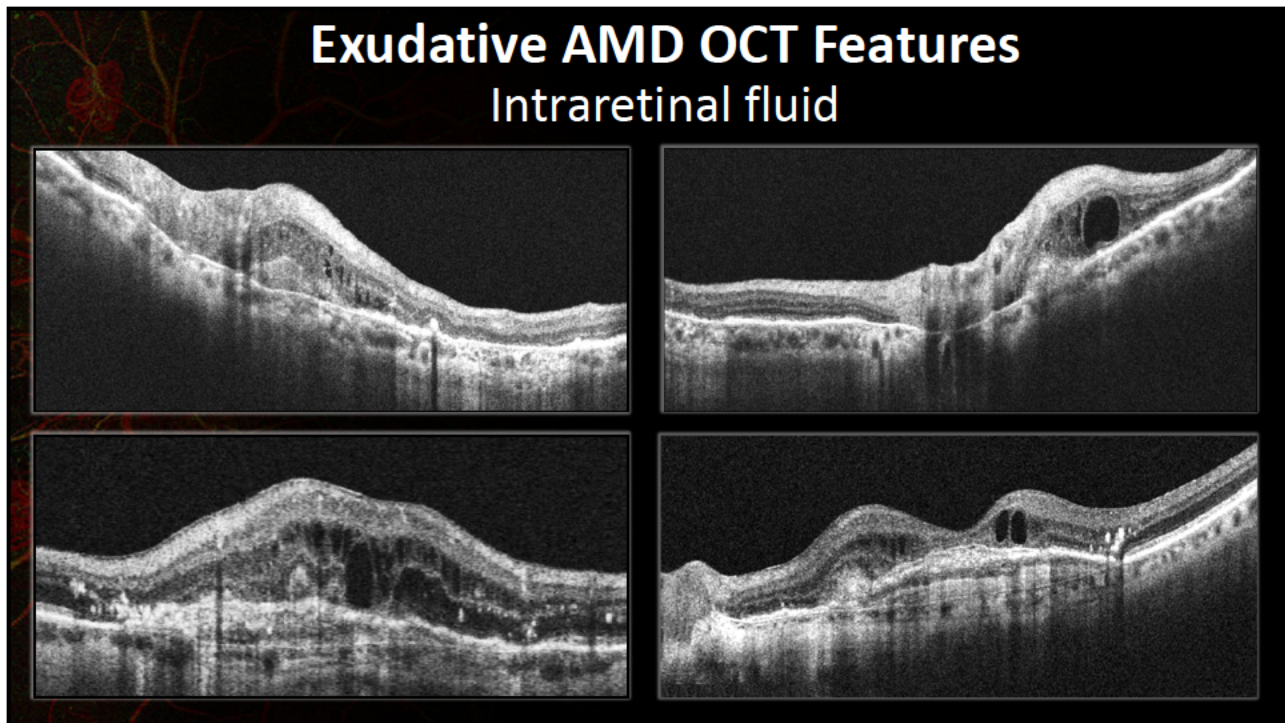
The composite image illustrates the concept of outer retinal tubulation in geographic atrophy. On the left, a fundus photograph shows the retinal vascular network. The top center features an en-face OCT scan labeled 'En-Face' with a blue line indicating the cross-section shown below. To the right, a schematic diagram shows a house on a hill with orange, winding lines representing tubulation in the subretinal space. The bottom center shows a cross-sectional OCT scan with a red arrow pointing to a specific area of tubulation.

Hariri A, et al. Outer retinal tubulation as a predictor of the enlargement amount of GA ARMD. Ophthalmology. 2015.

89

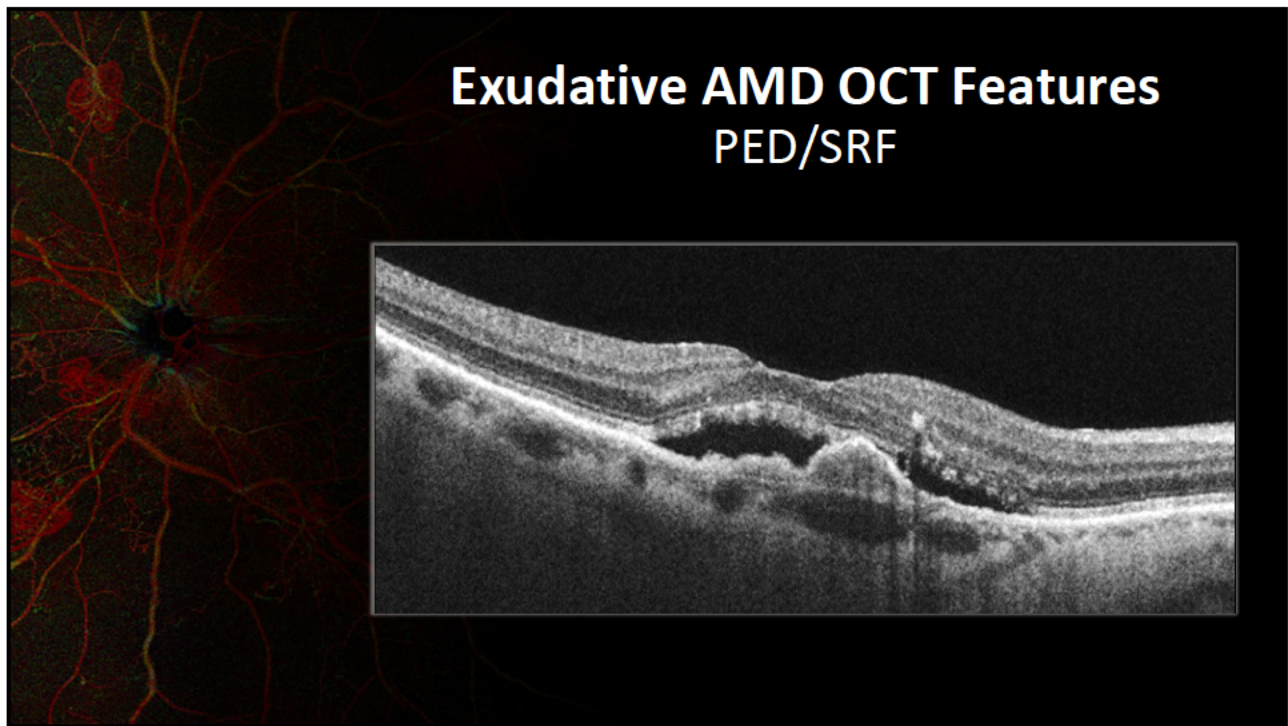
Exudative AMD OCT Features

Intraretinal fluid

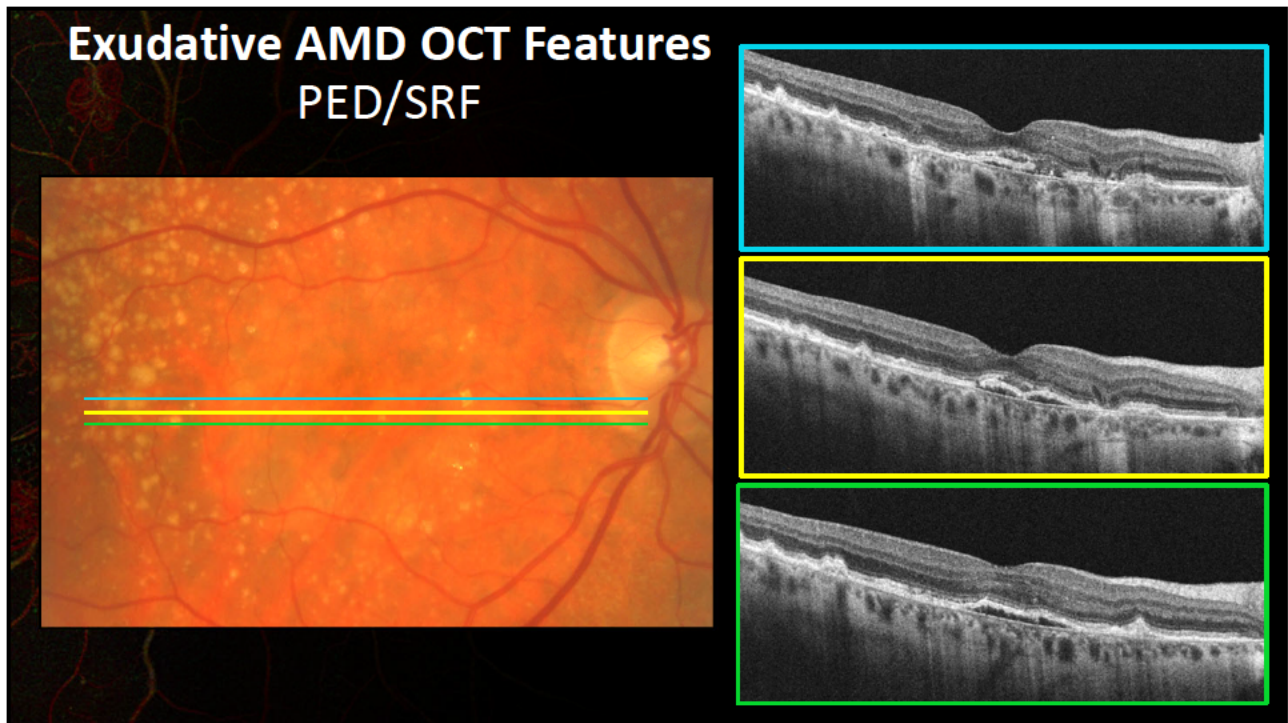


Four OCT scans are arranged in a 2x2 grid, illustrating different features of intraretinal fluid in exudative AMD. The top-left scan shows a large, dome-shaped elevation of the retina with a large, dark, hyporeflective space representing a large intraretinal cyst. The top-right scan shows a similar elevation with a smaller, more localized area of fluid. The bottom-left scan shows a smaller, more rounded elevation with a large, dark, hyporeflective space. The bottom-right scan shows a similar elevation with a smaller, more localized area of fluid.

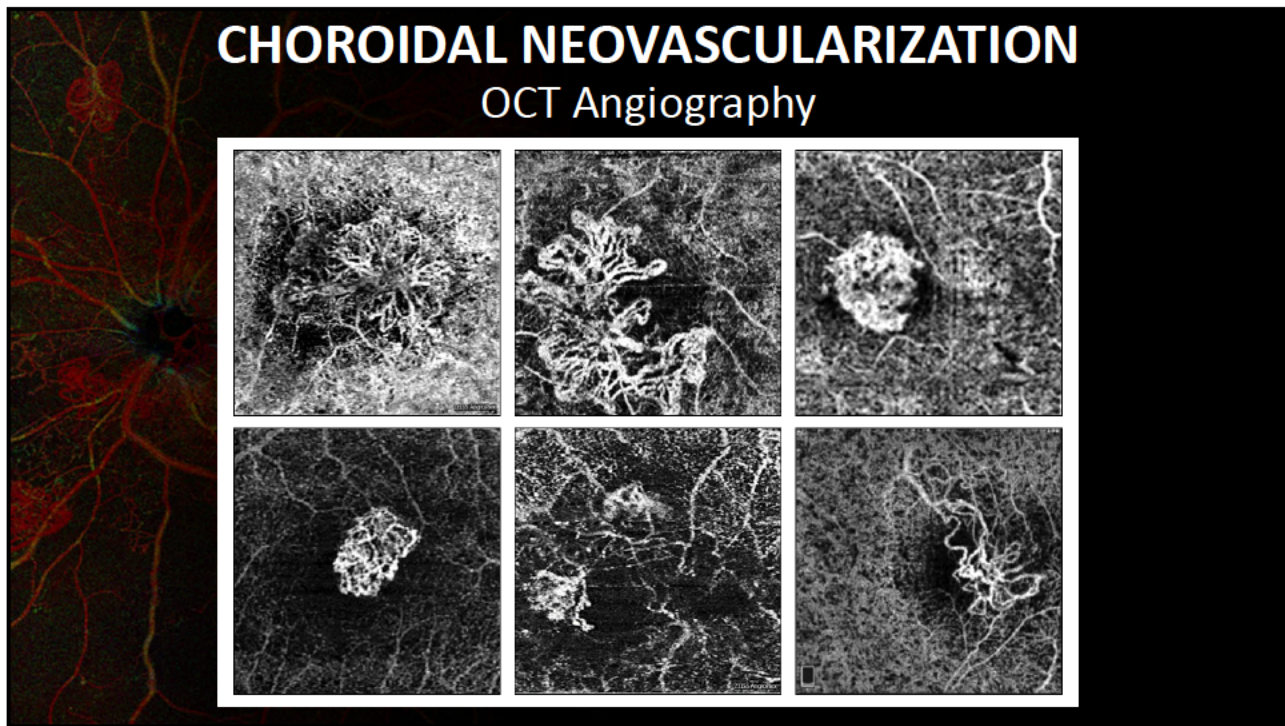
90



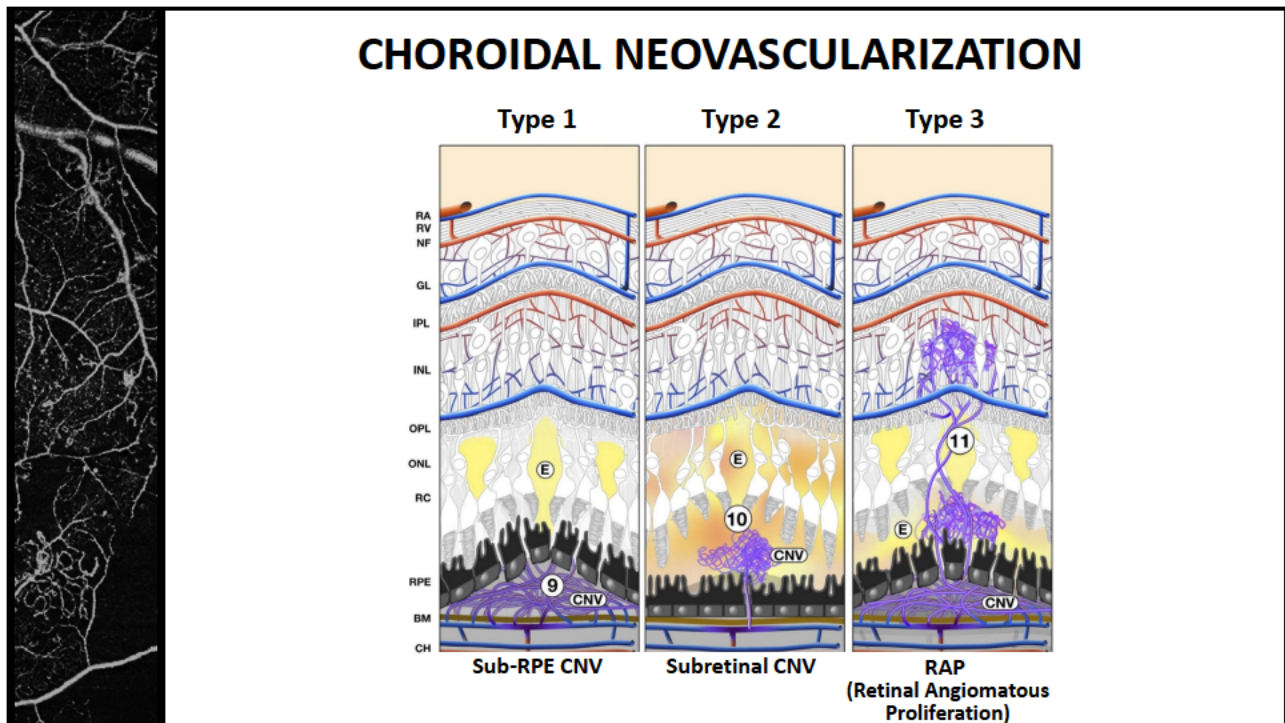
91



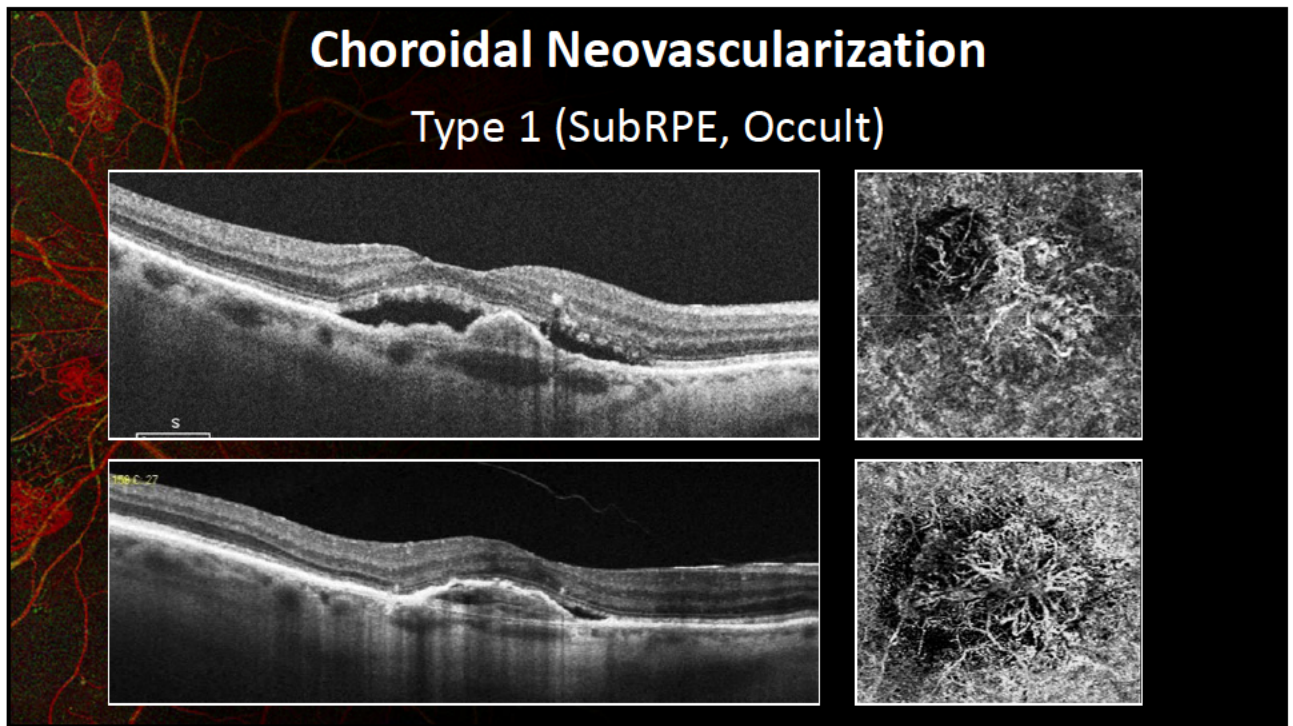
92



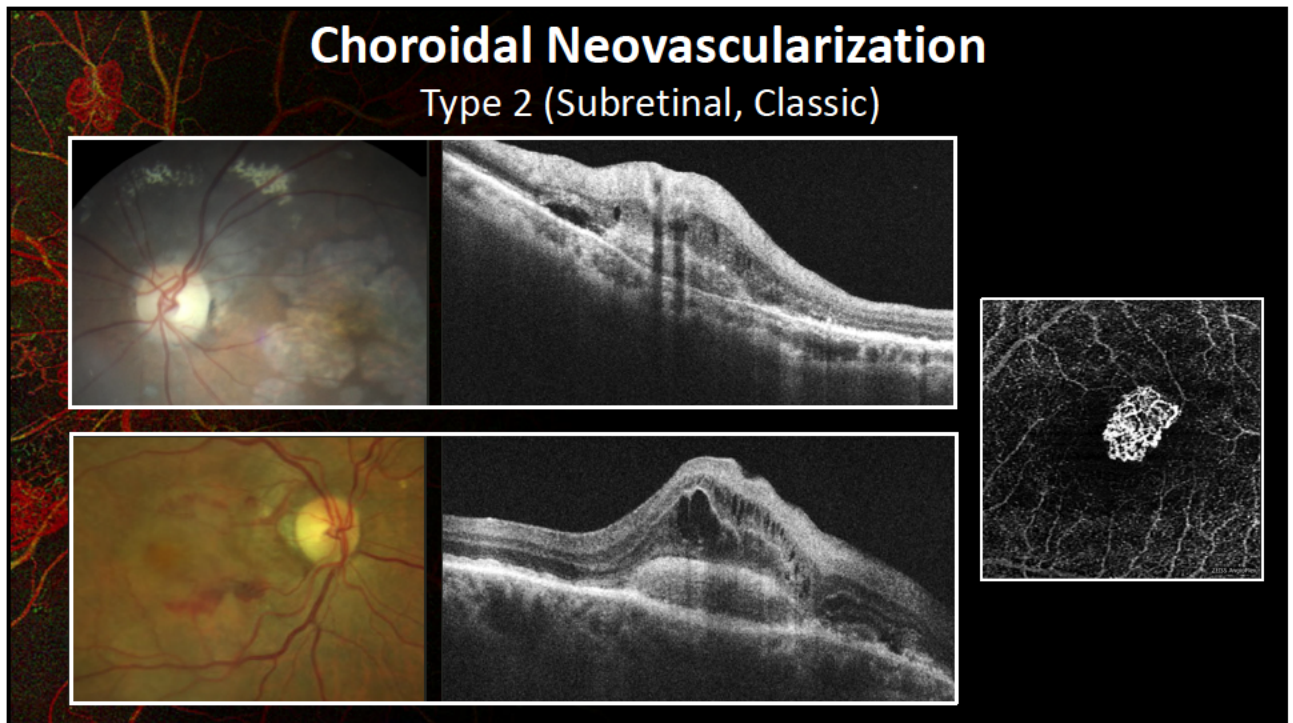
93



94



95



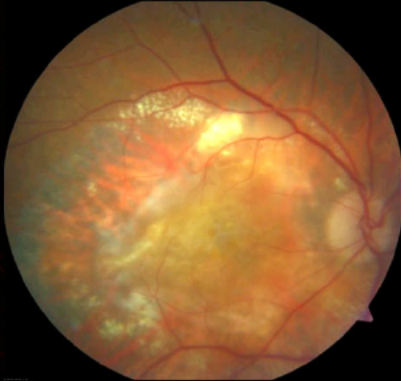
96

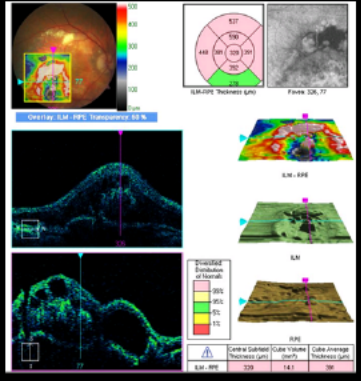
CASE IN POINT!

87yo Hispanic female

- History of exudative AMD OD S/P 12 Lucentis injections-wants a second opinion of whether or not she should continue injections OD
- Med HX remarkable for DM type 2
- VAs OD HM, OS 20/40

Right Eye



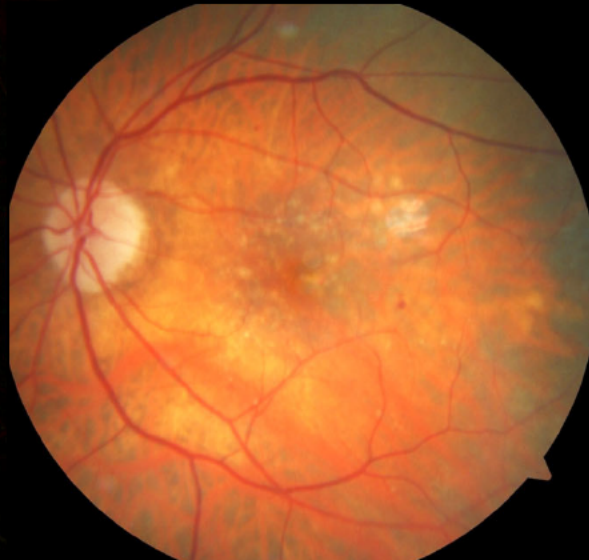


97

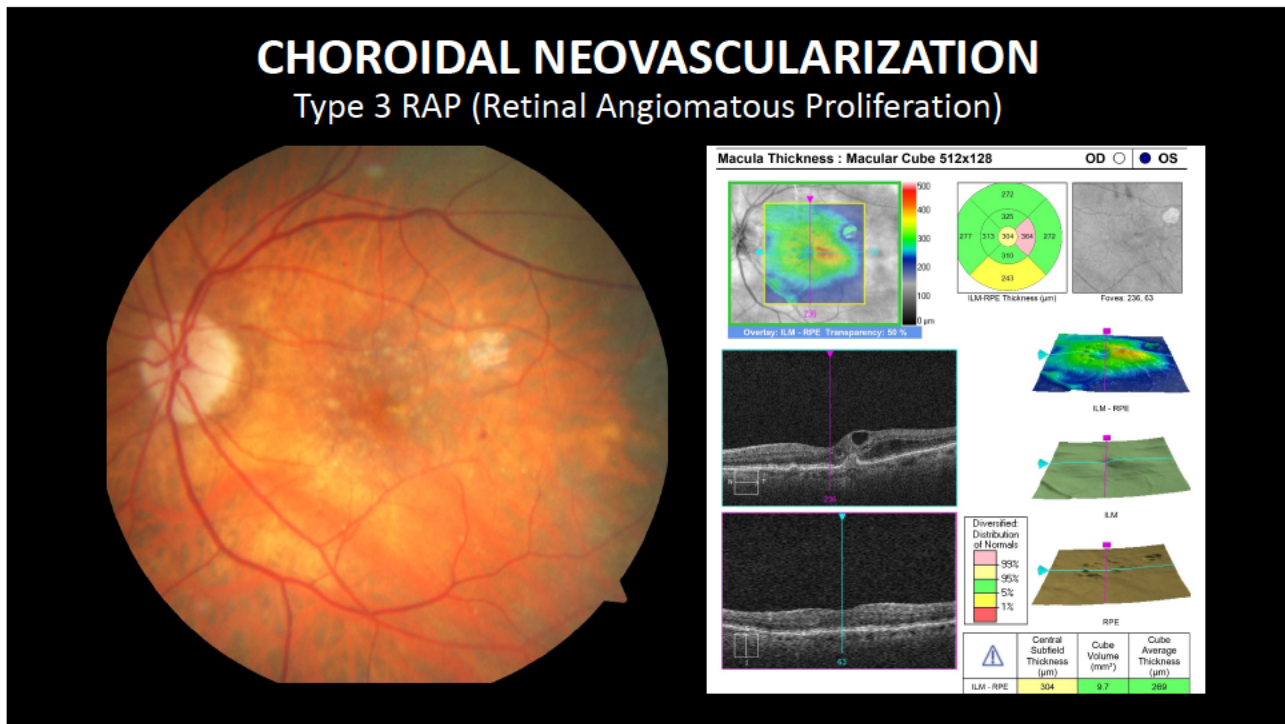
CASE IN POINT!

POLL QUESTION!!

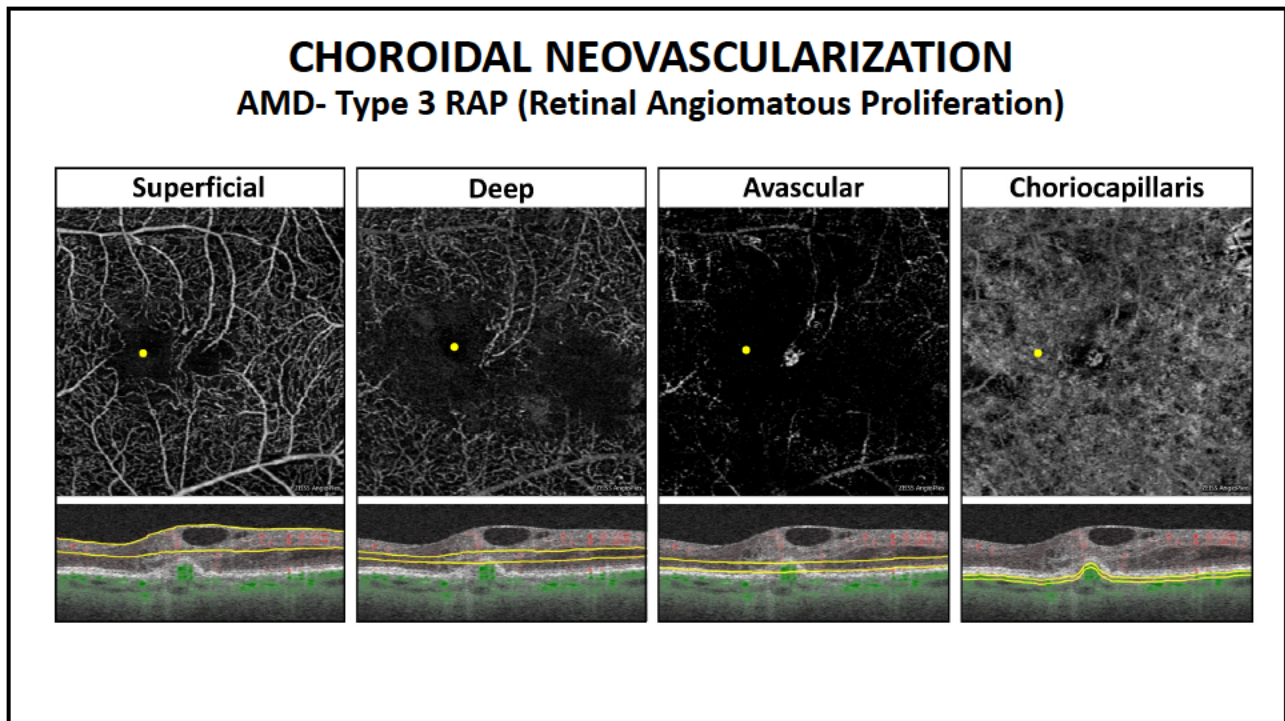
Based on the fundus photo alone, what is your diagnosis OS thus far?



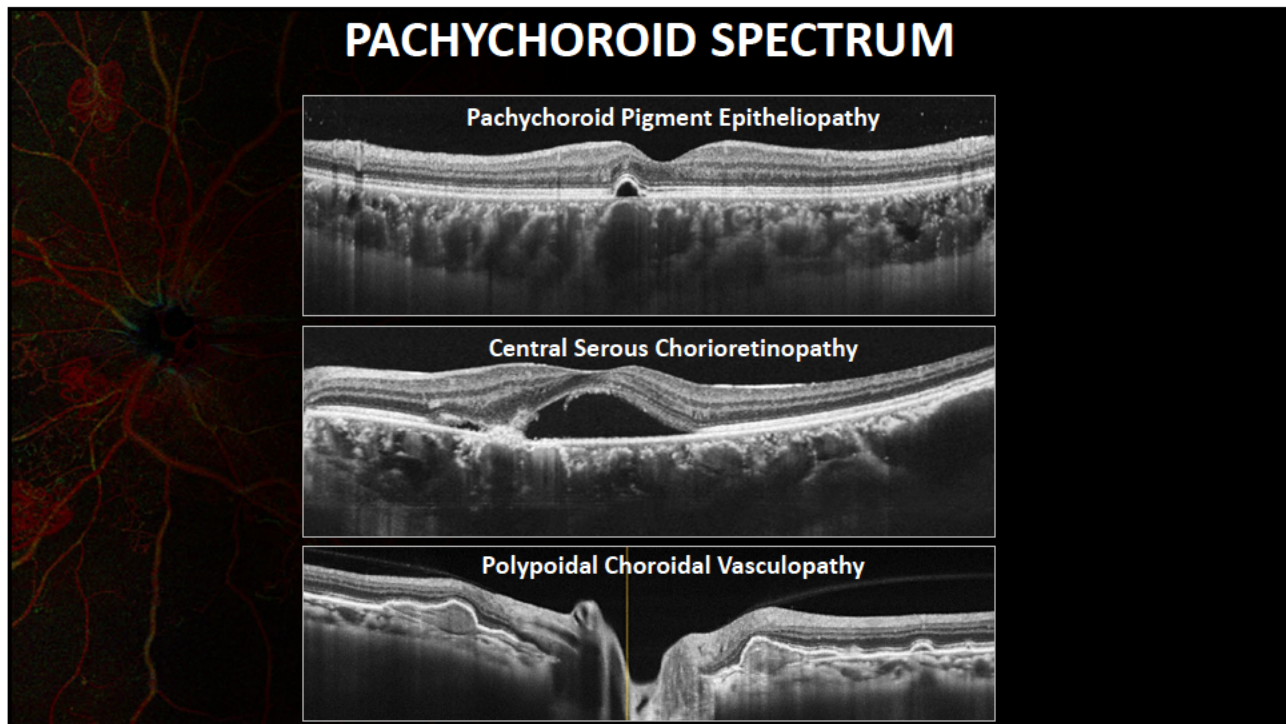
98



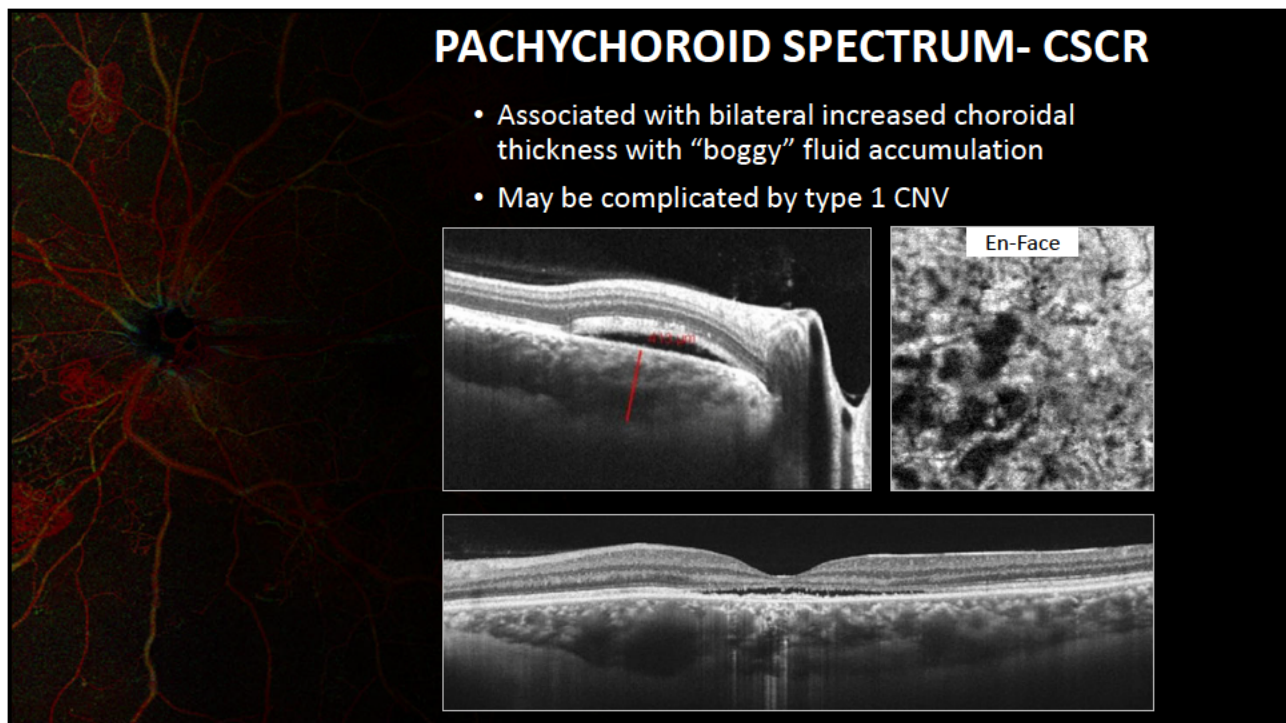
99



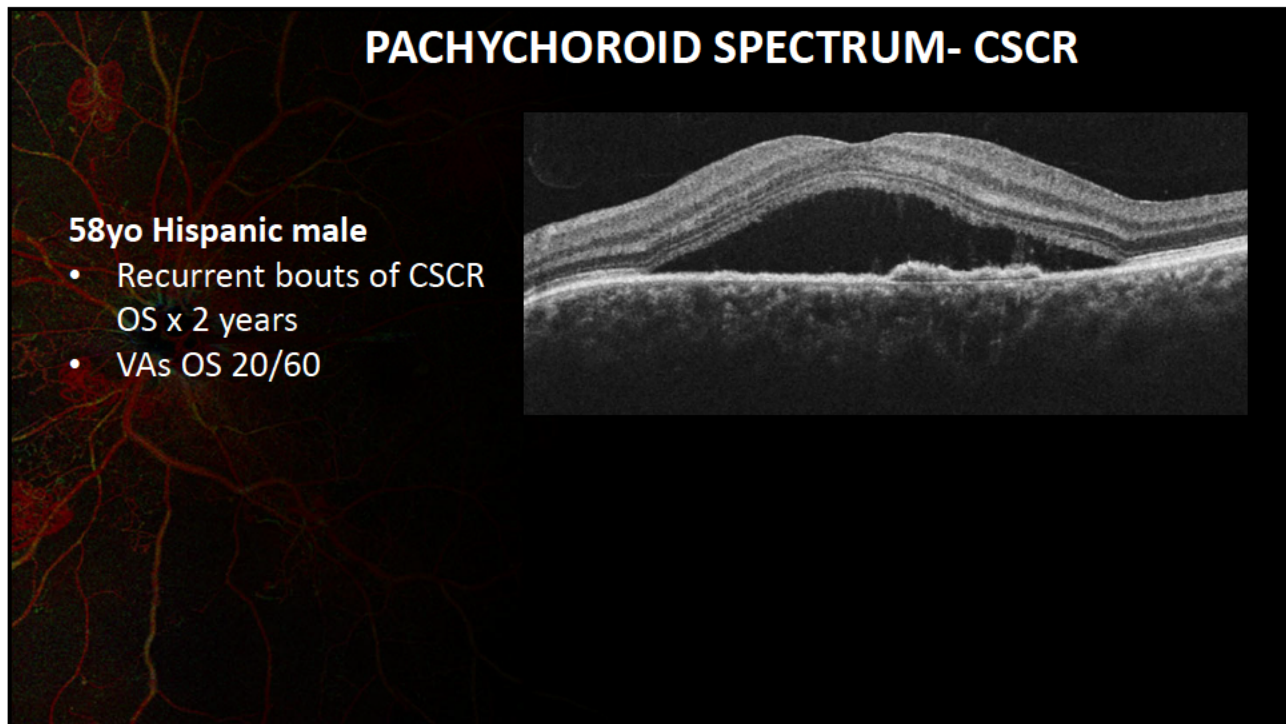
100



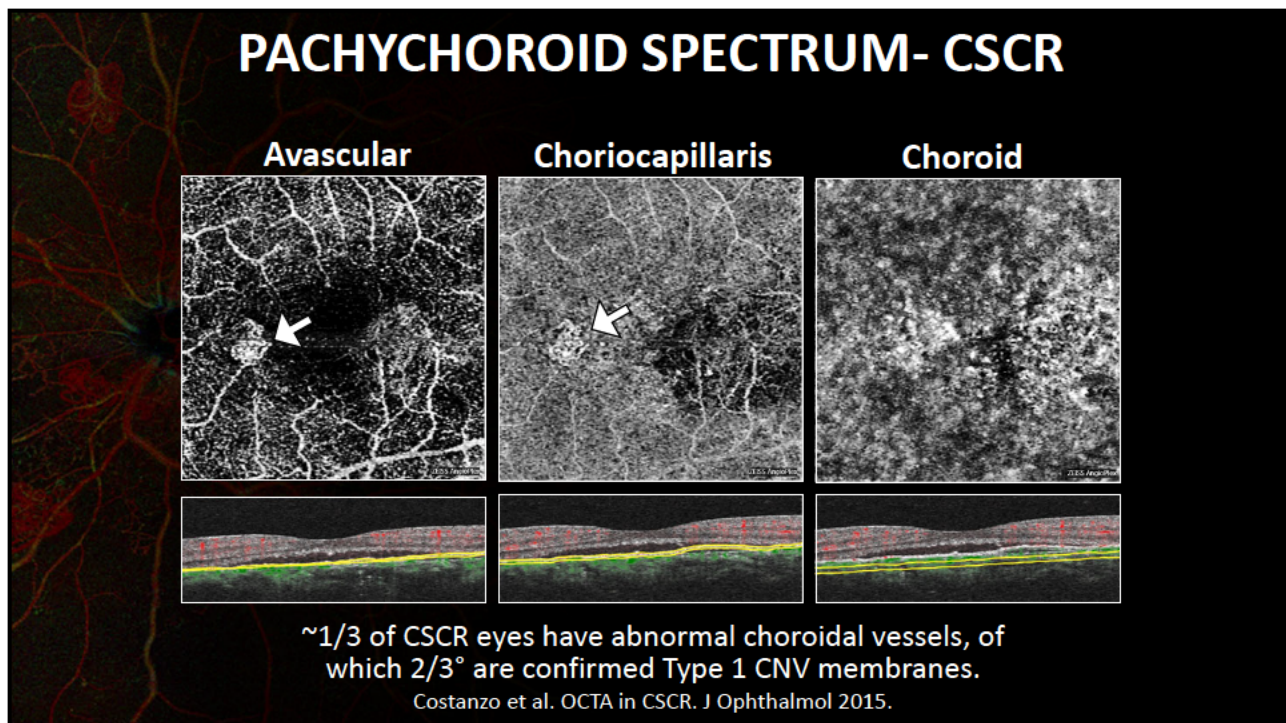
101



102



103



104

CHOROIDAL TUMORS

Differentiating small choroidal melanoma from choroidal nevus

To Find Small Ocular Melanoma

T- Thickness (>2mm US = ~ 890um OCT)

F- Fluid

S- Symptoms

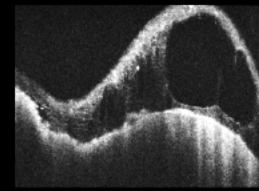
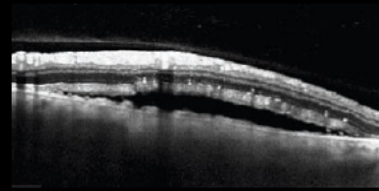
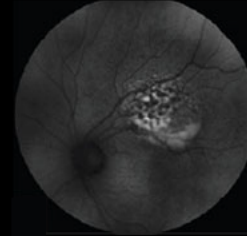
O- Orange pigment

M- Margin near optic disc

Risk for growth within the next 5 years:

- 0 risk factors = 3%
- 1 factor = 38%
- 2 or more factors = > 50%

<http://www.ocularmelanomacalculator.com/>



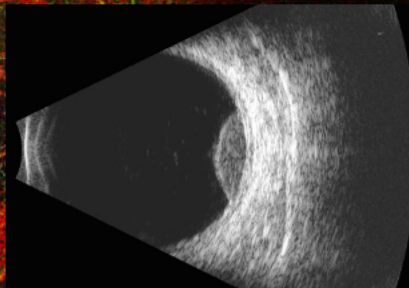
Shields CL, et al. Clinical features of small choroidal melanoma. Curr Opin Ophthalmol. 2002 Jun;13(3):135-41.

105

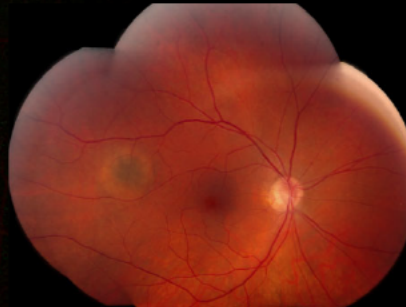
CHOROIDAL TUMORS

TFSOM- UHHD

Ultrasonic Hollowness (UH)



Halo ABSENT (H)



Drusen ABSENT (D)



106

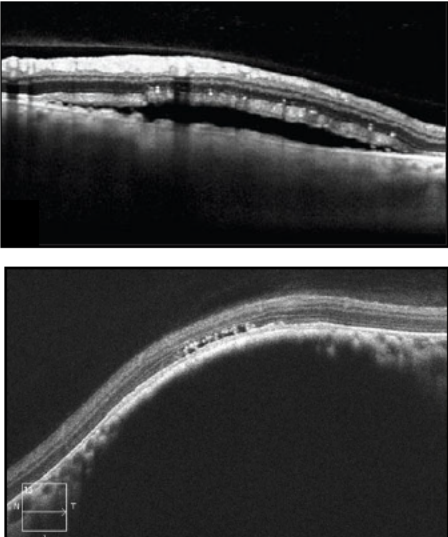
CHOROIDAL TUMORS

EDI-OCT Features of Small Choroidal Melanoma Compared with Choroidal Nevus

	Melanoma	Nevus	P value
Mean tumor thickness (EDI-OCT)	1025µm	685µm	NA
Subretinal lipofuscin	95%	45%	NA
Subretinal fluid	92%	16%	NA
Shaggy photoreceptors	49%	0%	<.001
PR abnormality	73%	43%	0.005
IS/OS junction loss	65%	6%	0.02
Intraretinal edema	16%	0%	0.003
ELM loss	43%	2%	0.008
IPL abnormality	8%	0%	0.04
GCL abnormality	8%	0%	0.04

* Small choroidal melanoma tumor thickness was overestimated by 55% on ultrasonography compared with EDI-OCT

Shields CL, et al. Enhanced depth imaging OCT of small choroidal melanoma: comparison with choroidal nevus. Arch Ophthalmol. 2012 Jul;130(7):850-6.



107

CHOROIDAL TUMORS

Differentiating small choroidal melanoma from choroidal nevus 2019 UPDATE

To Find Small Ocular Melanoma Doing IMaging (TFSOM-DIM)

T- Thickness (>2mm US = ~ 890um OCT)
 F- Fluid, SRF
 S- Symptomatic VL (VA ≤20/50)
 O- Orange pigment (FAF)
 M- Melanoma acoustic hollowness
 DIM- DIaMeter >5mm

Risk for growth within the next 5 years:

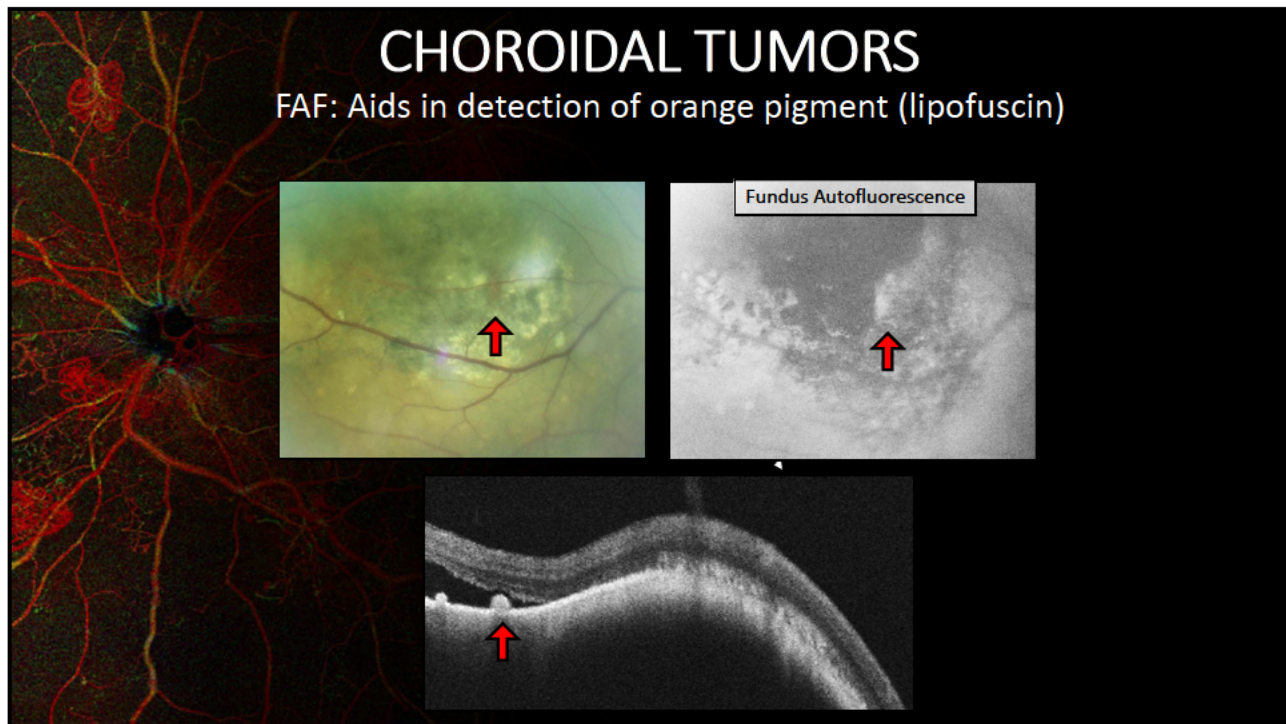
- 0 risk factors = 1.1%
- 1 factor = 11%
- 2 factors = 22%
- 3 factors = 34%
- 4 factors = 51%

Variable	Letter	Mnemonic	Testing	Hazard ratio (mean) multivariate analysis	P value
Thickness tumor >2mm	T	To	US	3.80	<0.0001
Fluid subretinal	F	Find	OCT	3.56	<0.0001 0.0003
Symptoms visual acuity ≤20/50	S	Small	Snellen VA	2.28	0.0050
Orange pigment	O	Ocular	AF	3.07	0.0004
Melanoma acoustic hollowness	M	Melanoma	US	2.10	0.0020
Diameter tumor >5mm	DIM	Doing IMaging	Photography	1.84	0.0275

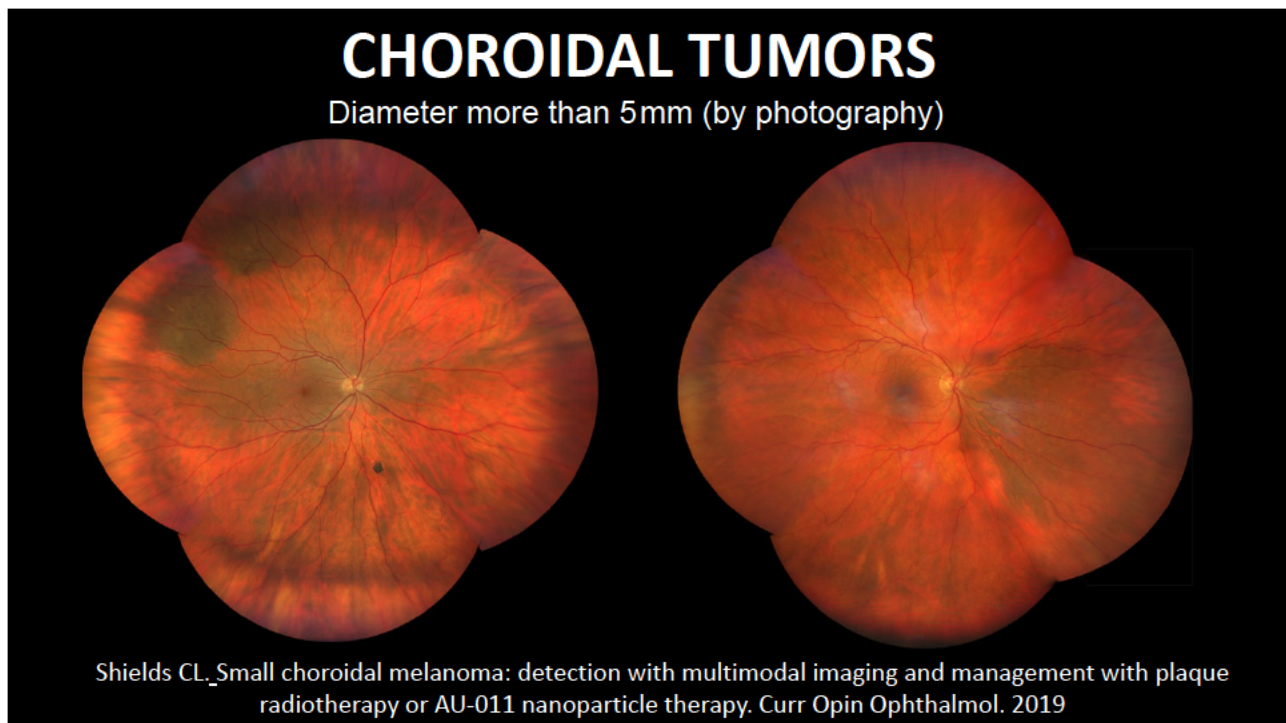
AF, autofluorescence; OCT, optical coherence tomography; US, ultrasonography; VA, visual acuity. Adapted from [13**].

Shields CL. Small choroidal melanoma: detection with multimodal imaging and management with plaque radiotherapy or AU-011 nanoparticle therapy. Curr Opin Ophthalmol. 2019

108



109



110

Nevus or Melanoma?

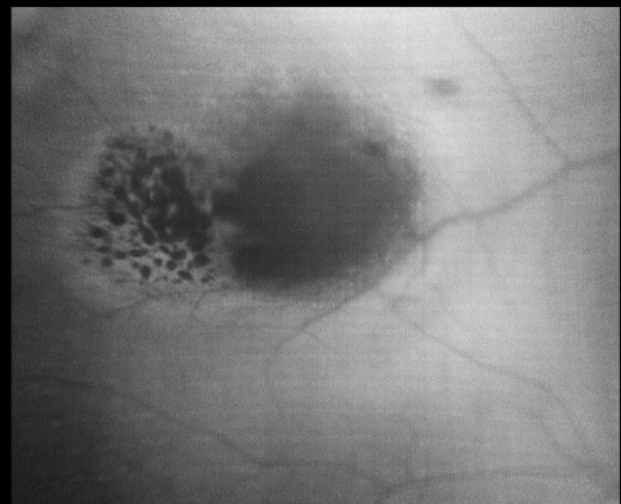
72yo American Indian female

- CC: Doctor directed visit, 6mo cataract and HR FU, complains of occasional pain OD
- Oc Hx: Choroidal tumor OD
- BCVA
 - OD 20/60
 - OS 20/30
- SLE:
 - 1+ AC rxn OD
 - NS 2 OD, NS 1 OS



111

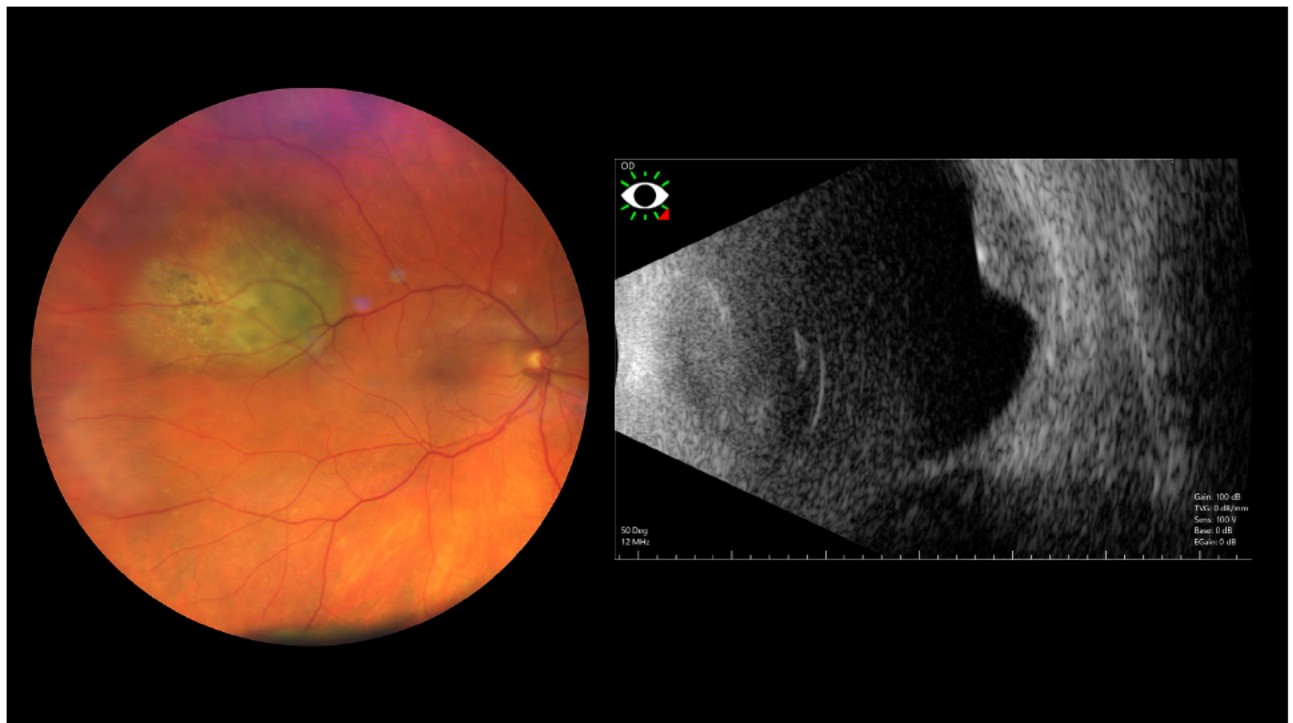
Fundus Autofluorescence



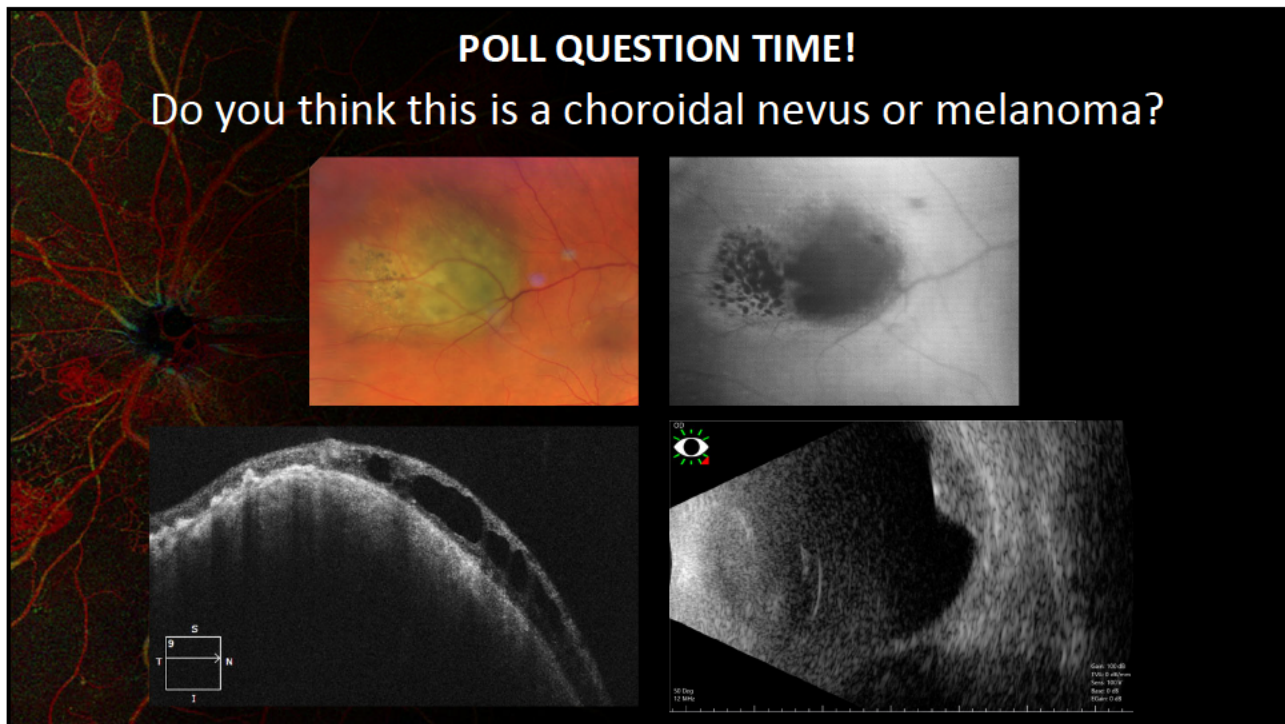
112



113



114



115

CHOROIDAL MELANOMA

Decision Dx-Uveal Melanoma: Gene Expression Profiling

Physician

or

CLIA laboratory

RNA → cDNA → qPCR

12 discriminating genes
3 control genes

Tumor GEP

↓ SVM algorithm

Training set

Class 1A:
Low-risk

Class 1B:
Intermediate-risk

Class 2:
High-risk

*Discriminant score < 0.5 on the hyperplane and 1 represents core of training set data

Inter-assay concordance

Intra-assay concordance

Inter-laboratory concordance

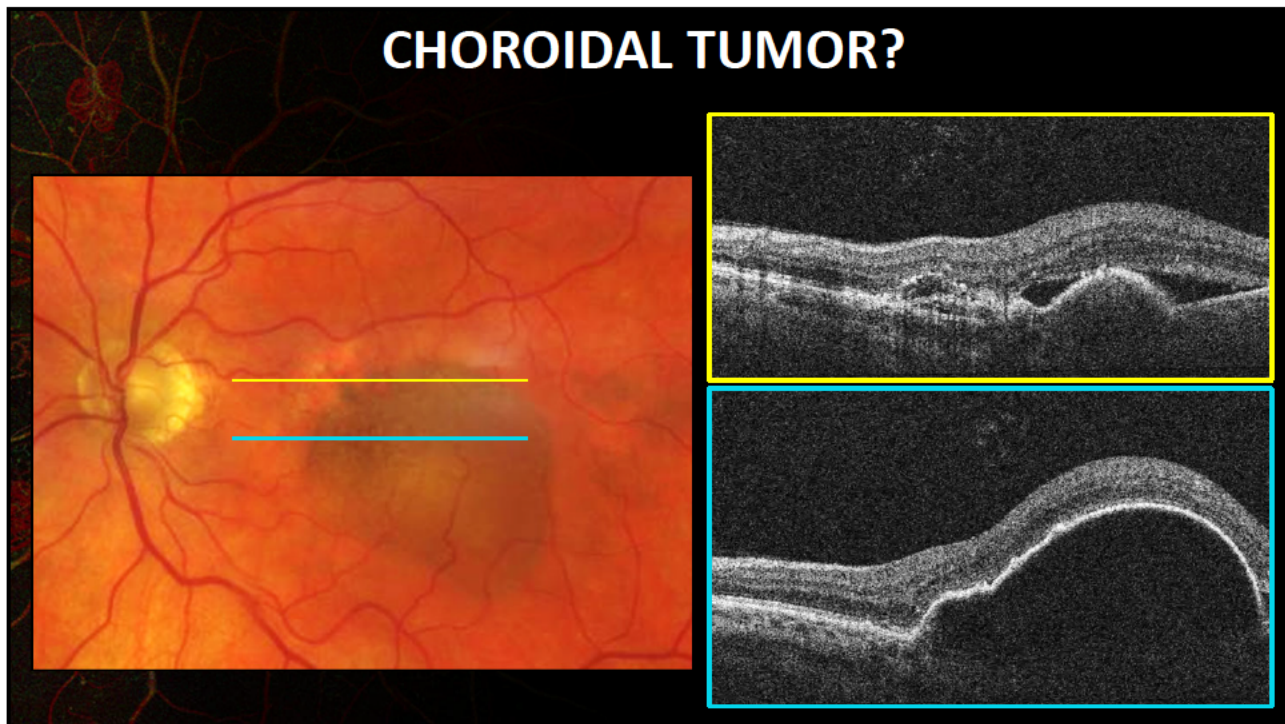
Technical success

Inter-operator/instrument concordance

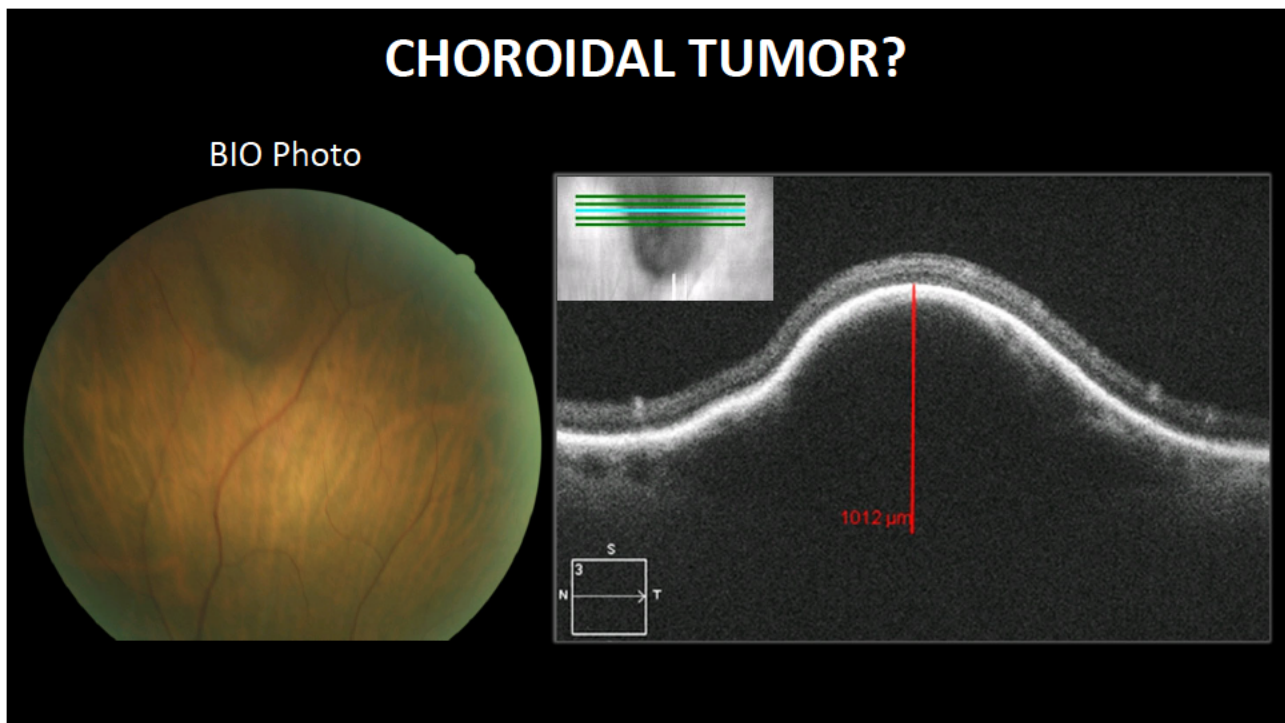
Molecular pathology correlations

- DecisionDx-UM test results are reported as follows:
 - Class 1A – very low risk (2%) of metastasis within 5 years⁴
 - Class 1B – moderate risk (21%) of metastasis within 5 years⁴
 - Class 2 – high risk (72%) of metastasis within 5 years⁴

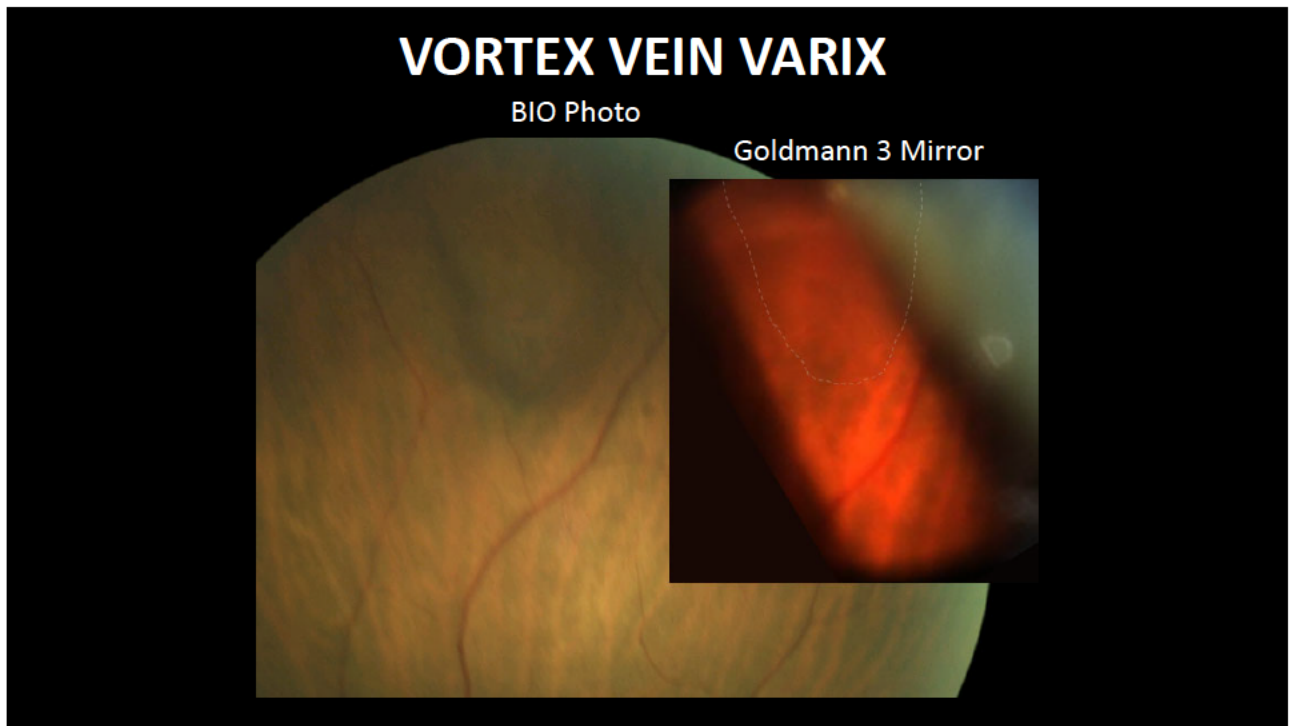
116



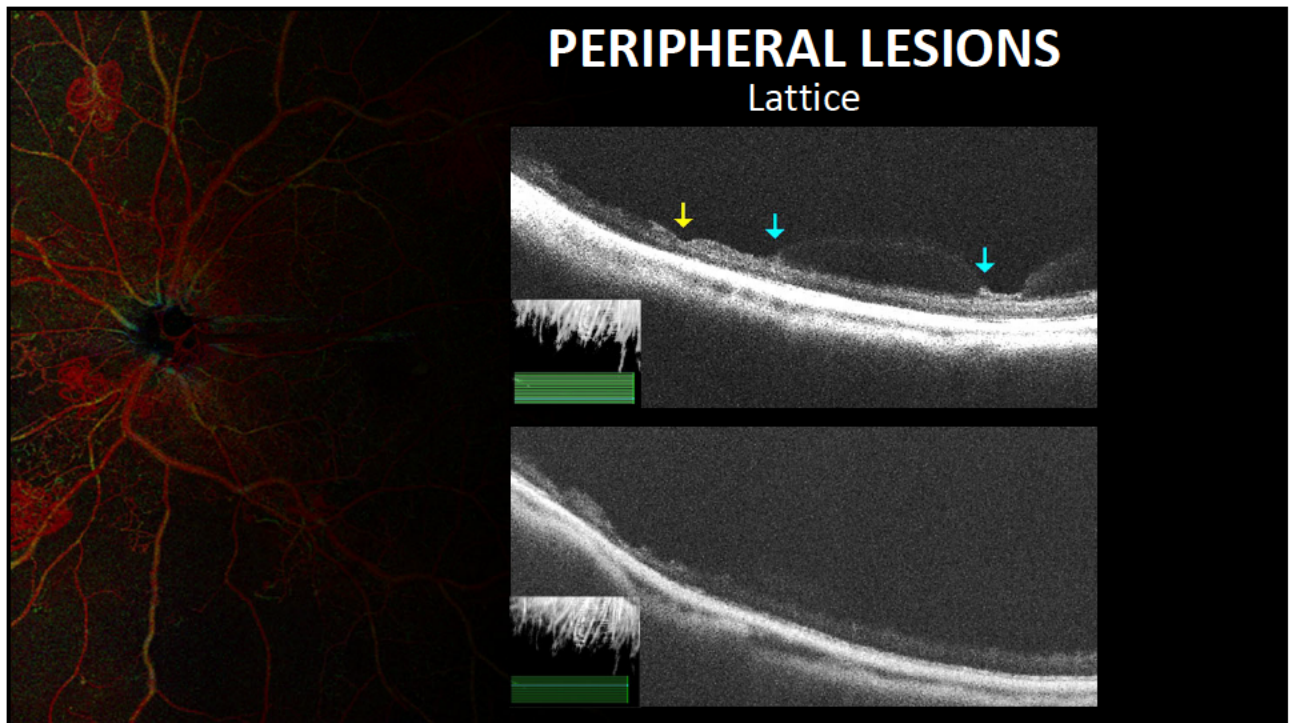
117



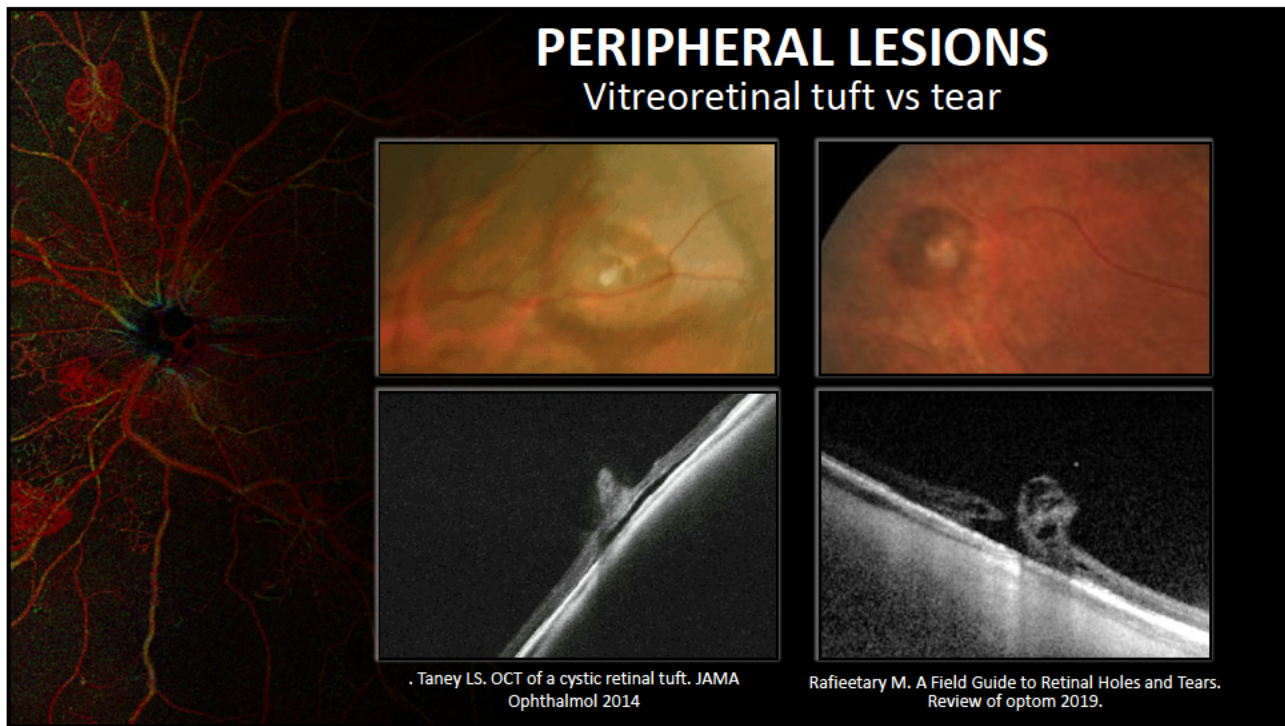
118



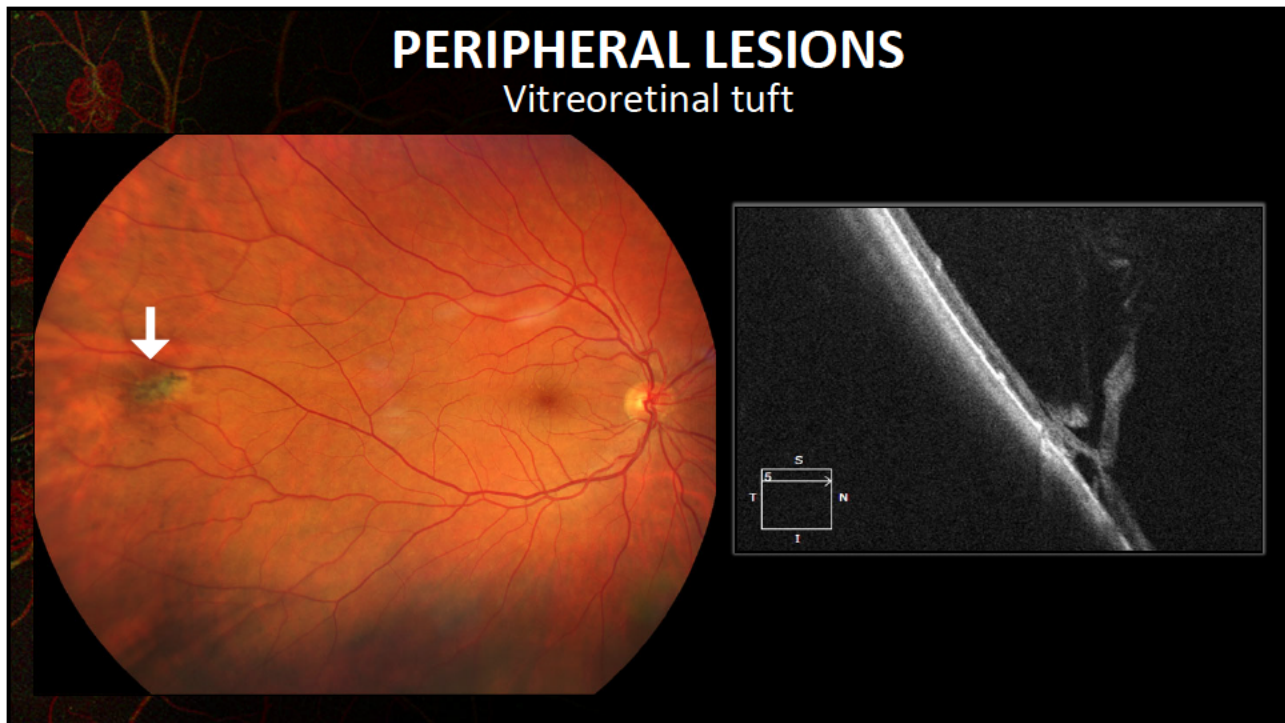
119



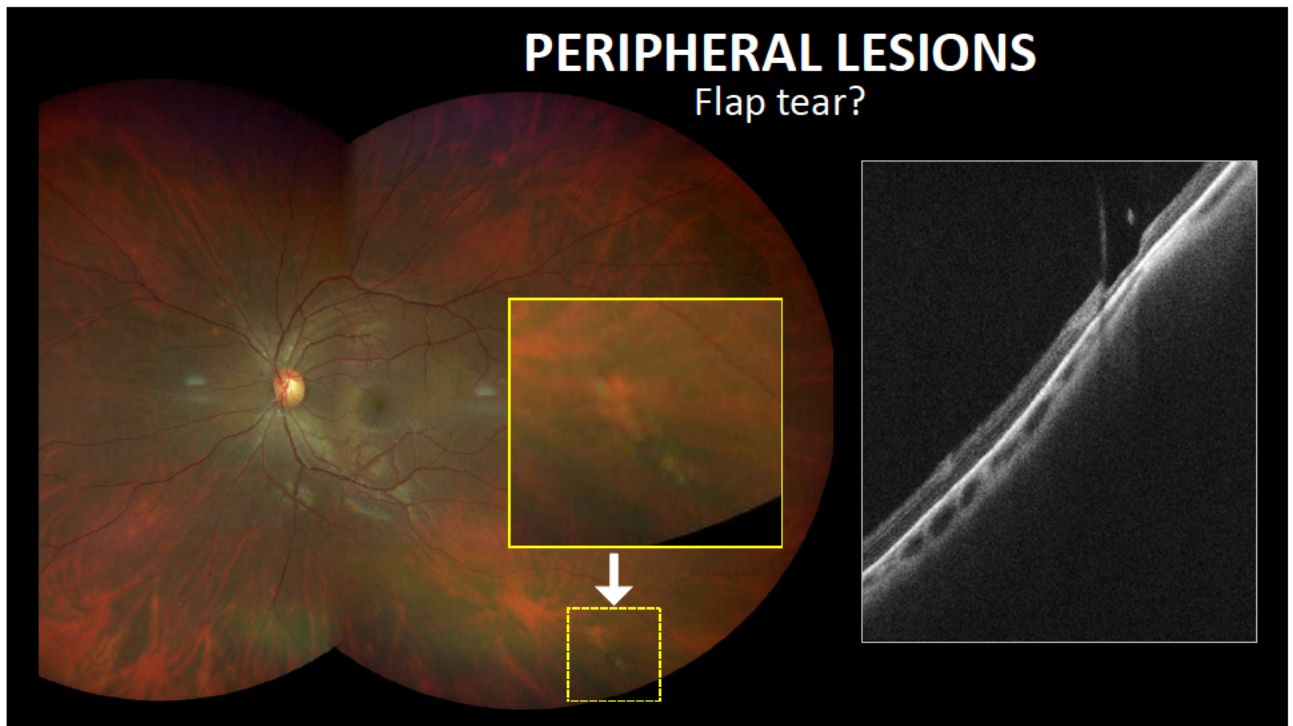
120



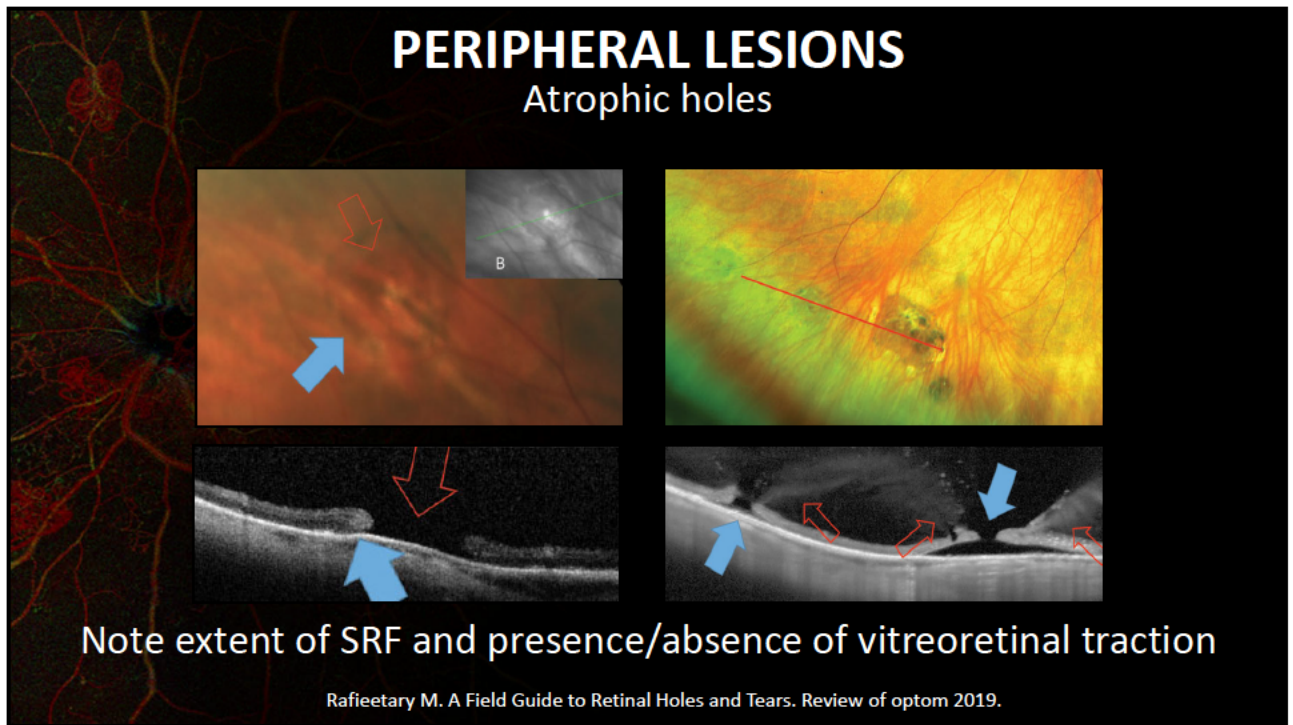
121



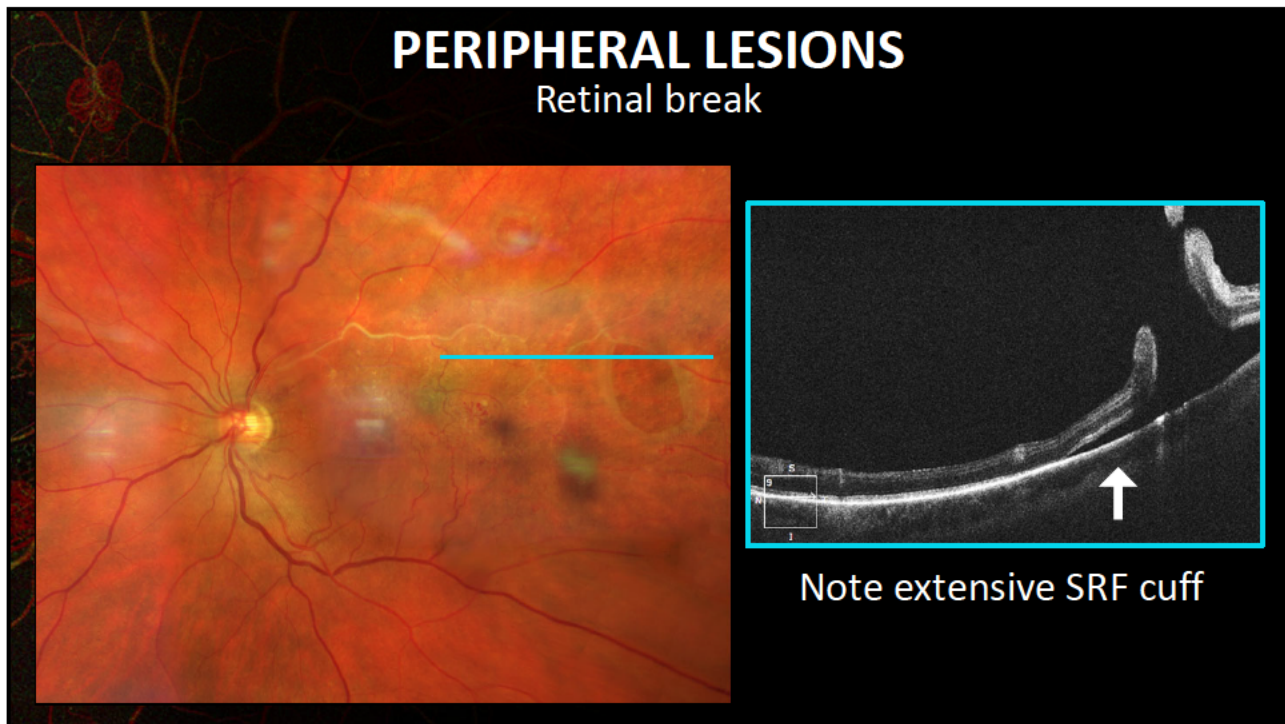
122



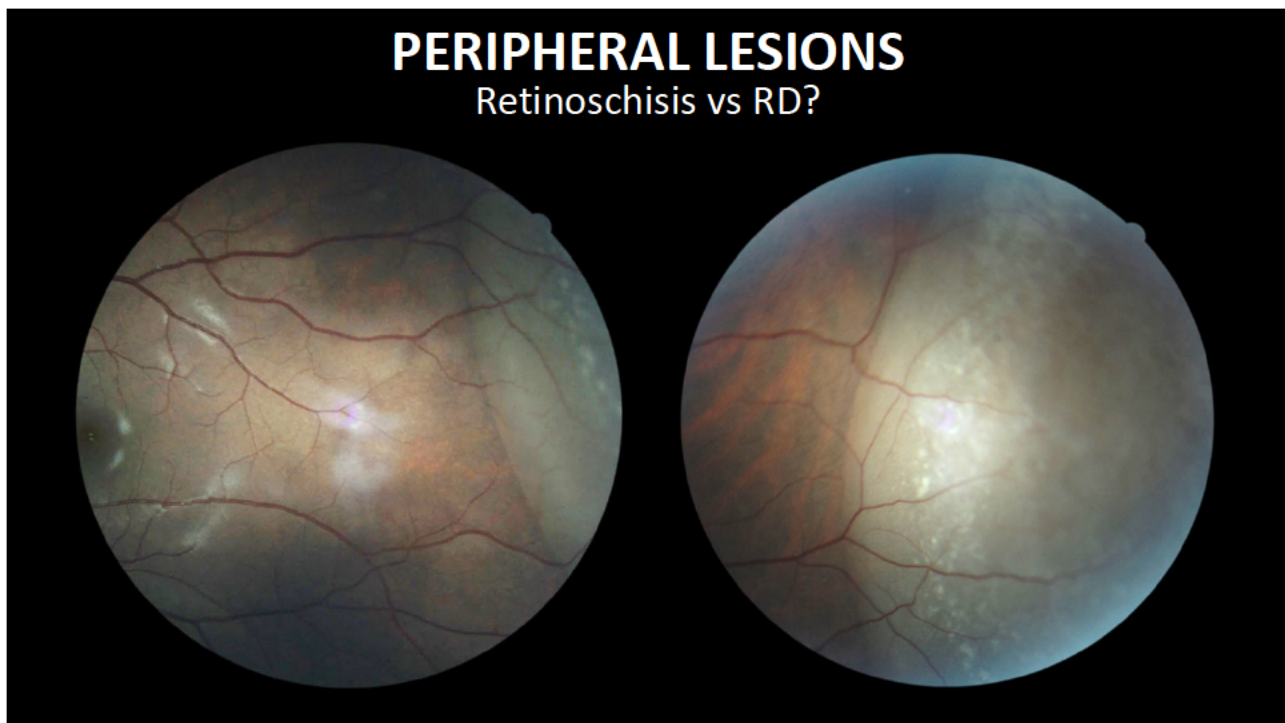
123



124

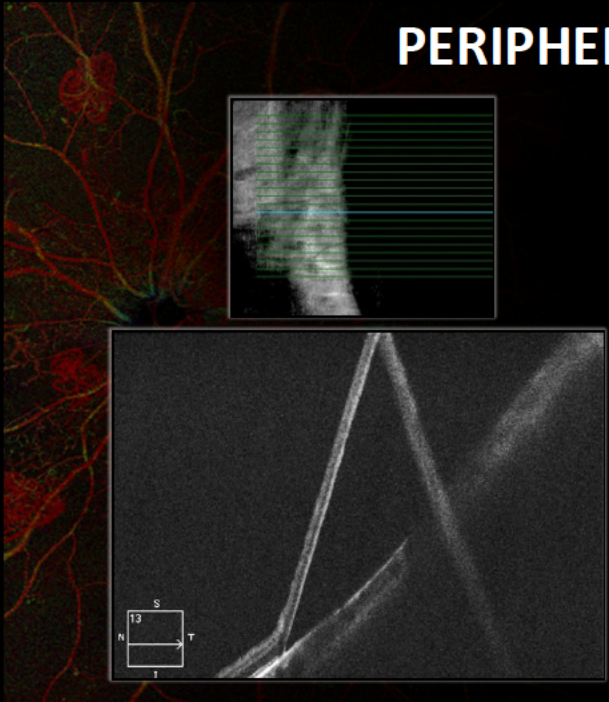


125



126

PERIPHERAL LESIONS



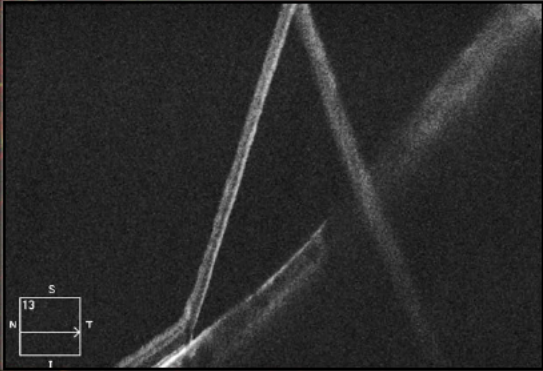
POLL QUESTION TIME!
Based on the OCT image here, do you think this is a retinoschisis or retinal detachment?

127

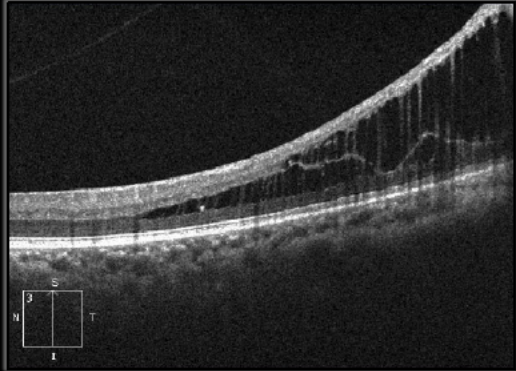
PERIPHERAL LESIONS

Retinoschisis vs RD?

Retinal detachment



Retinoschisis



128

VITREOUS

OCT to document symptomatic vitreous floaters

Macula Thickness : Macular Cube 512x128 OD OS

	Central Subfield Thickness (µm)	Cube Volume (mm ³)	Cube Average Thickness (µm)
LM-RPE	163	0.2	256

Macula Thickness : Macular Cube 200x200 OD OS

	Central Subfield Thickness (µm)	Cube Volume (mm ³)	Cube Average Thickness (µm)
LM-RPE	202	1.04	280

Ophthalmic Surg Lasers Imaging Retina. 2013;44:415-418

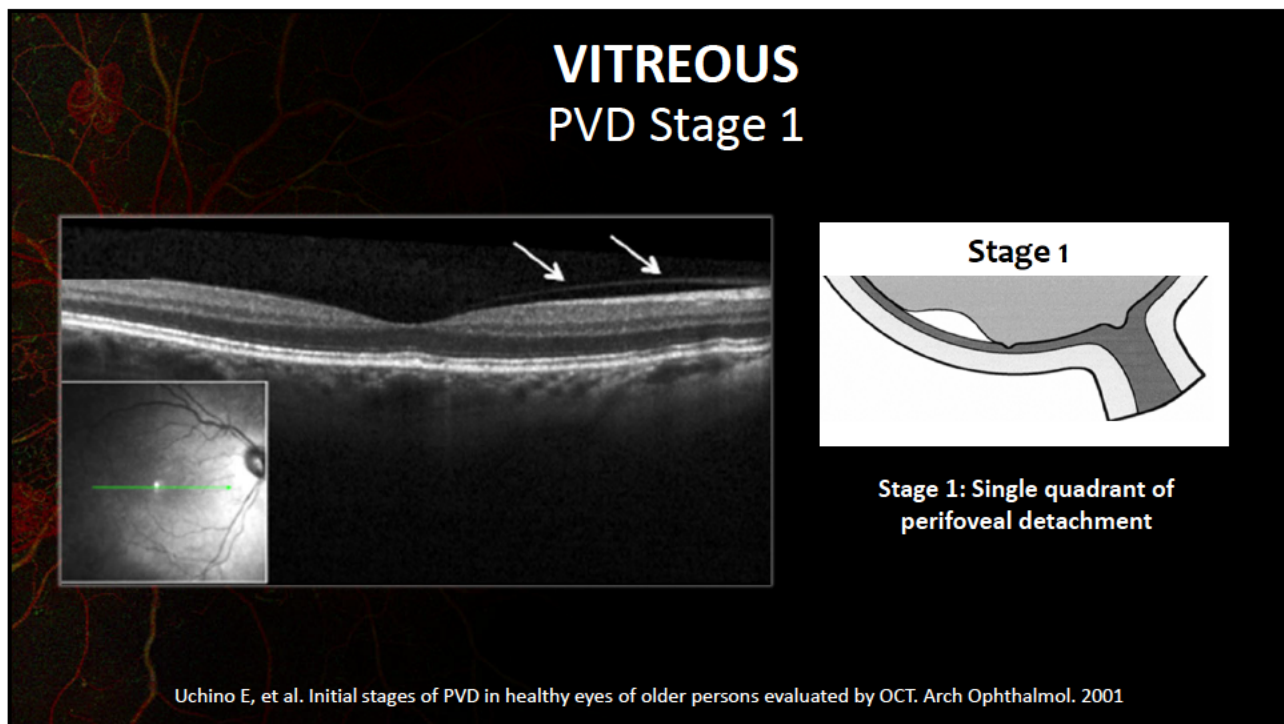
129

VITREOUS

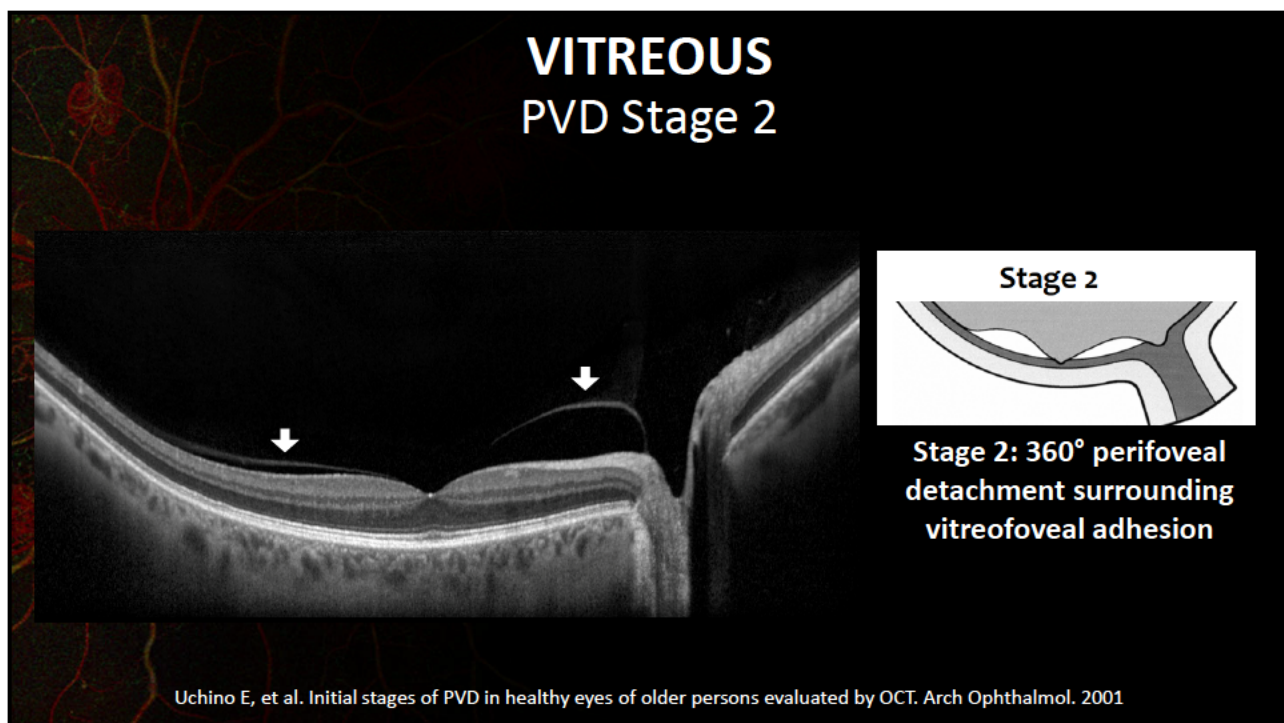
“Falling Ash” Sign = Posterior Shaffer’s Sign

Ophthalmology. 2015;122: 1946–1947.

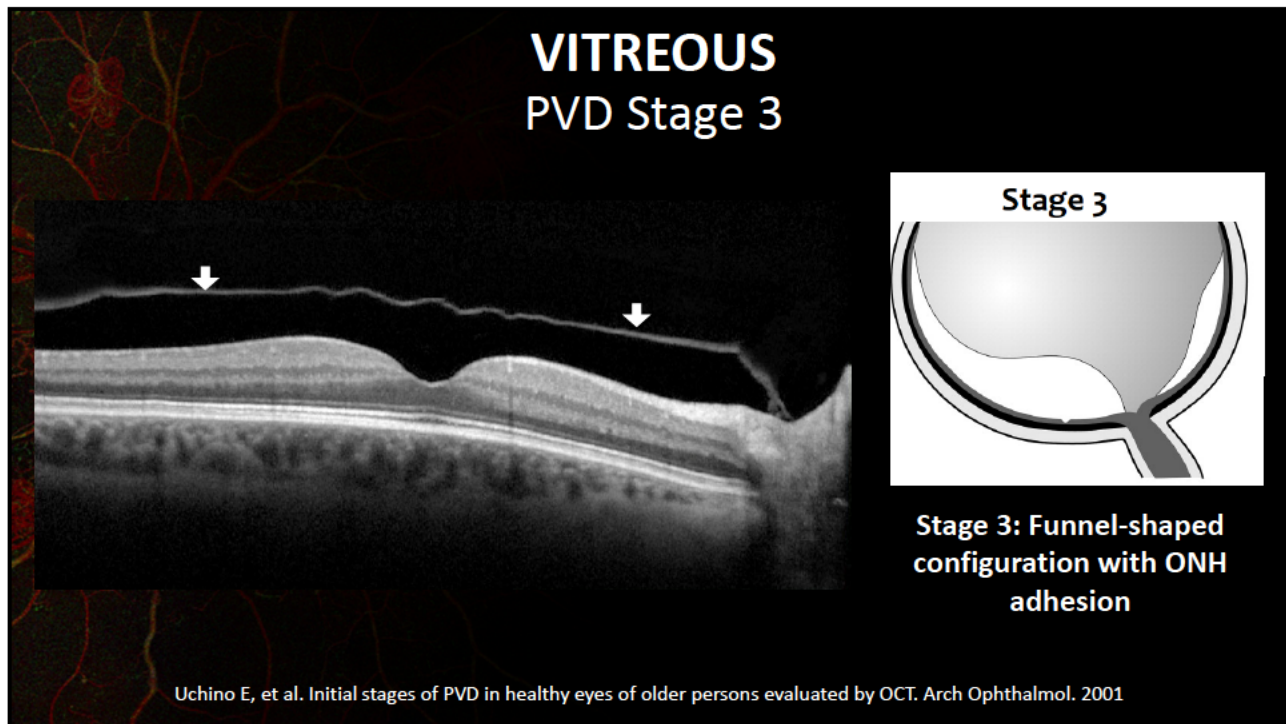
130



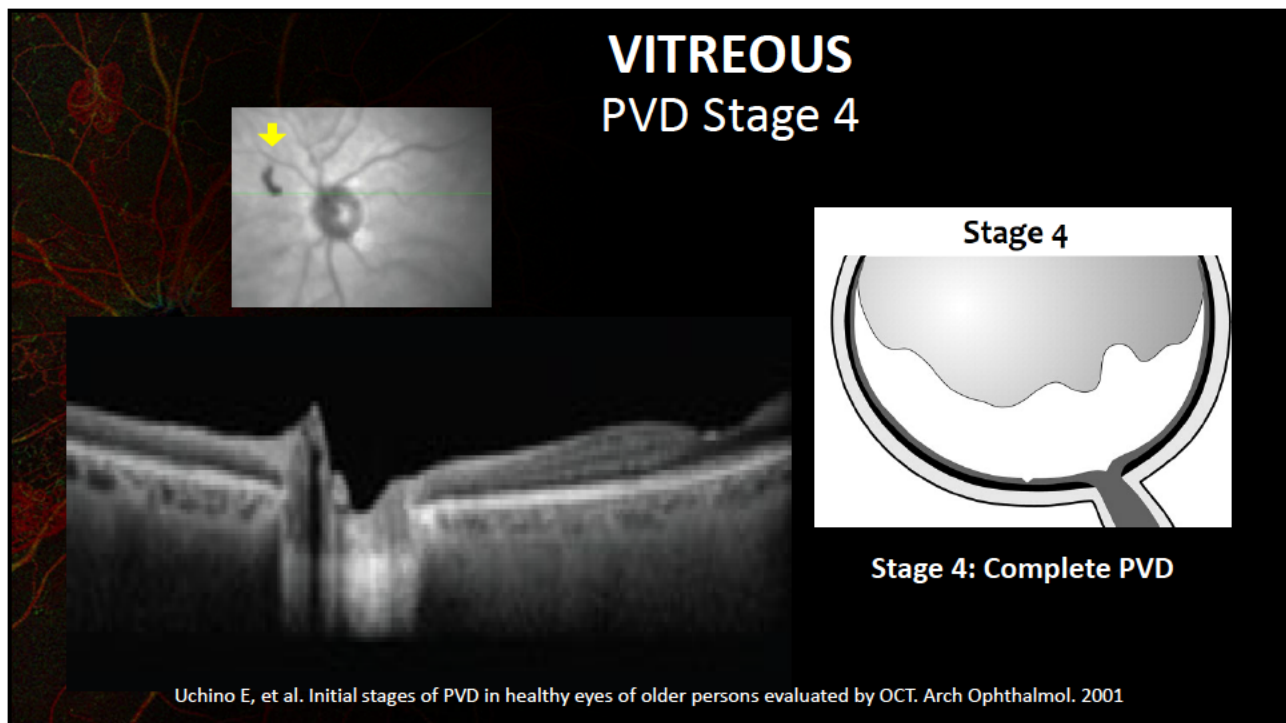
131



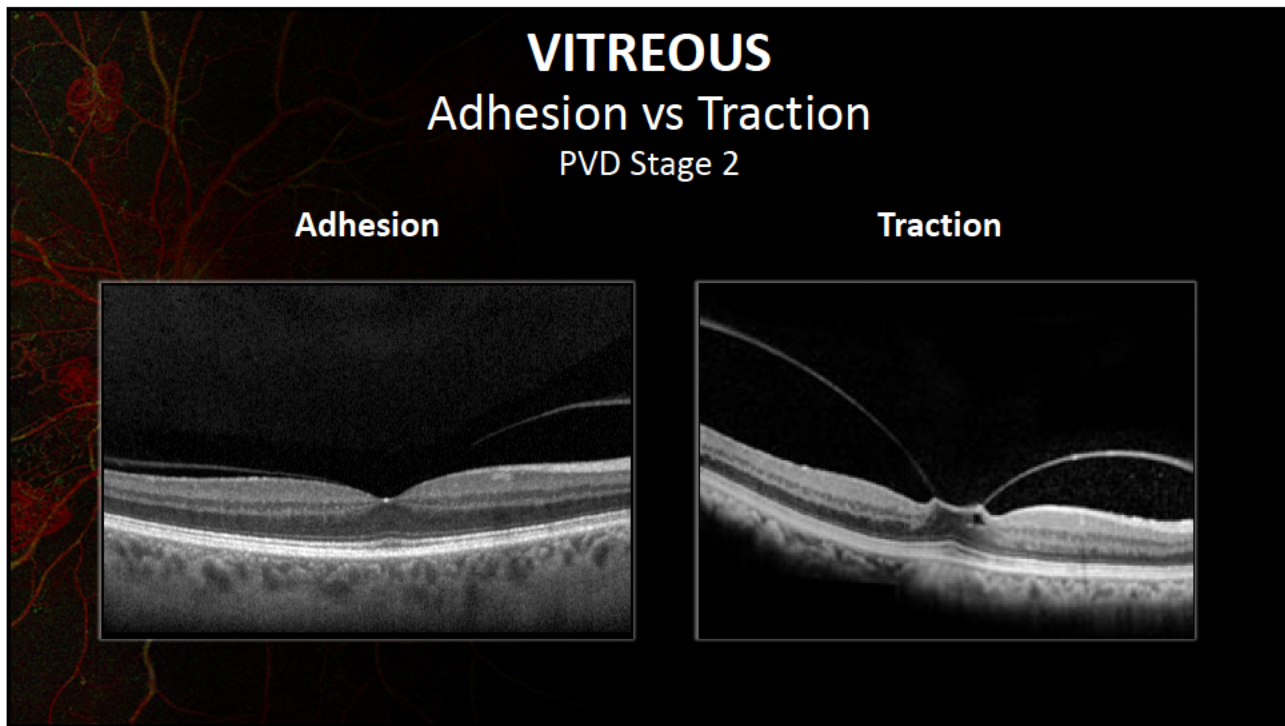
132



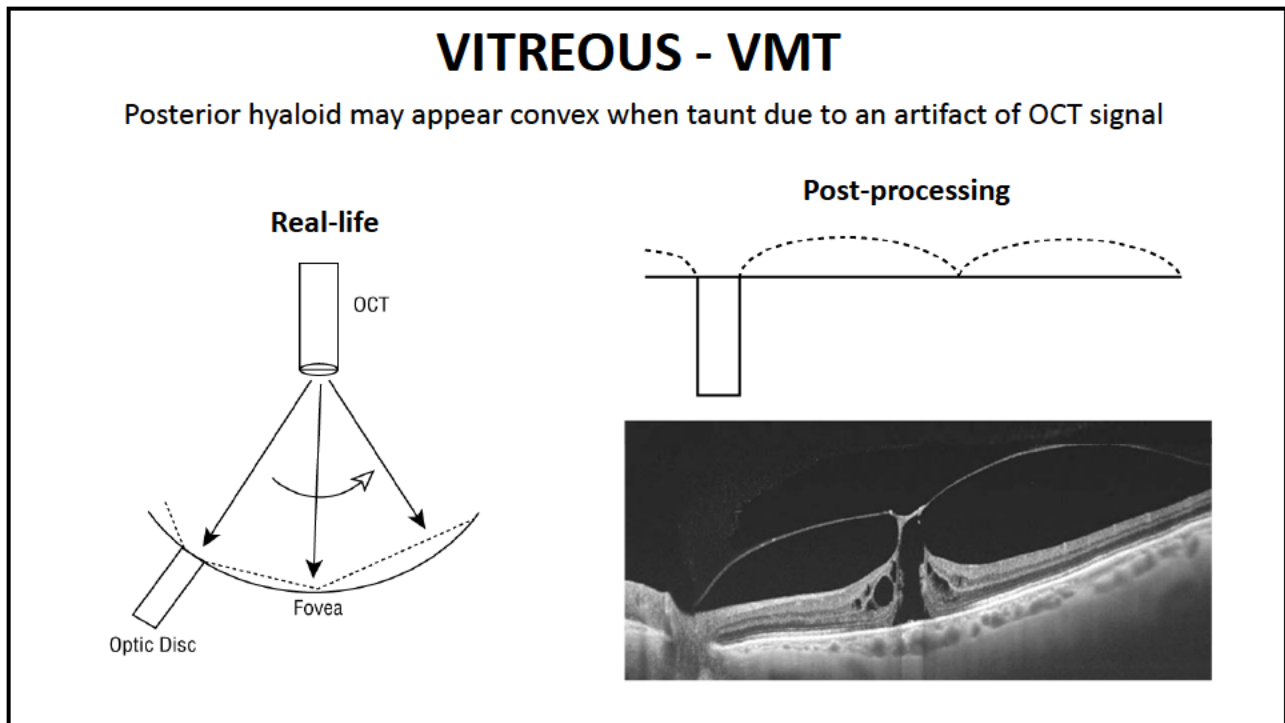
133



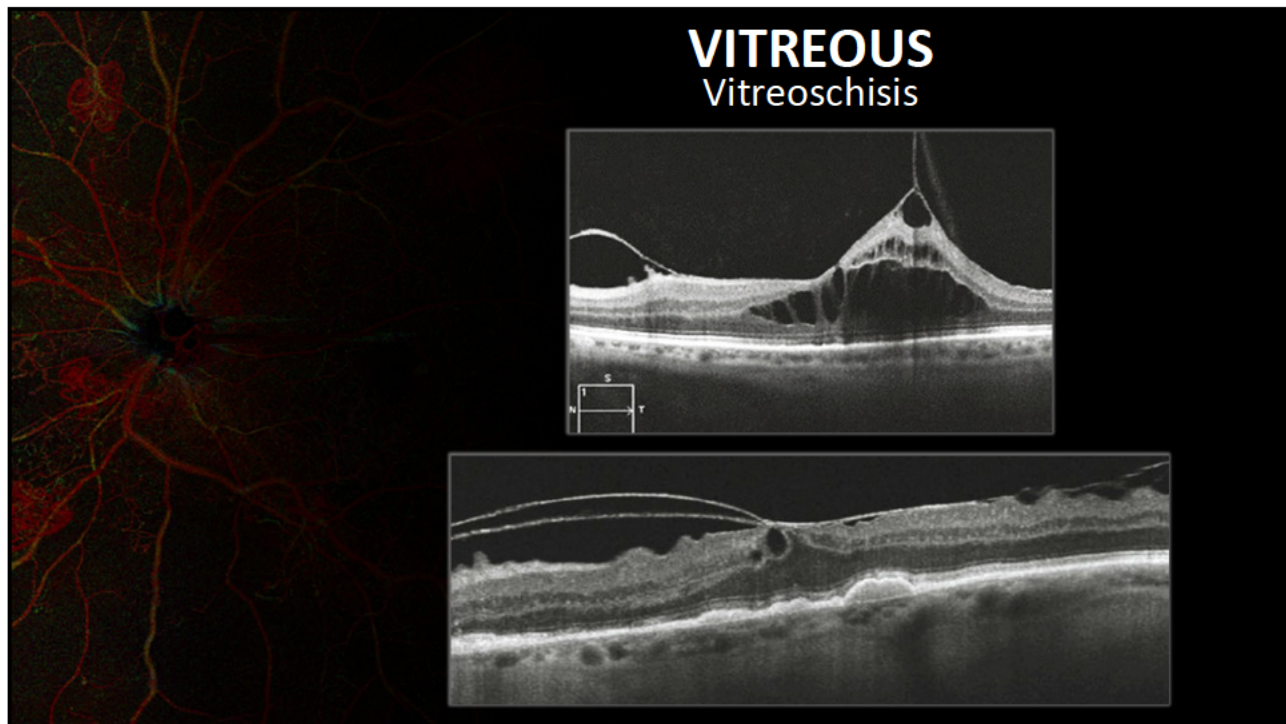
134



135



136

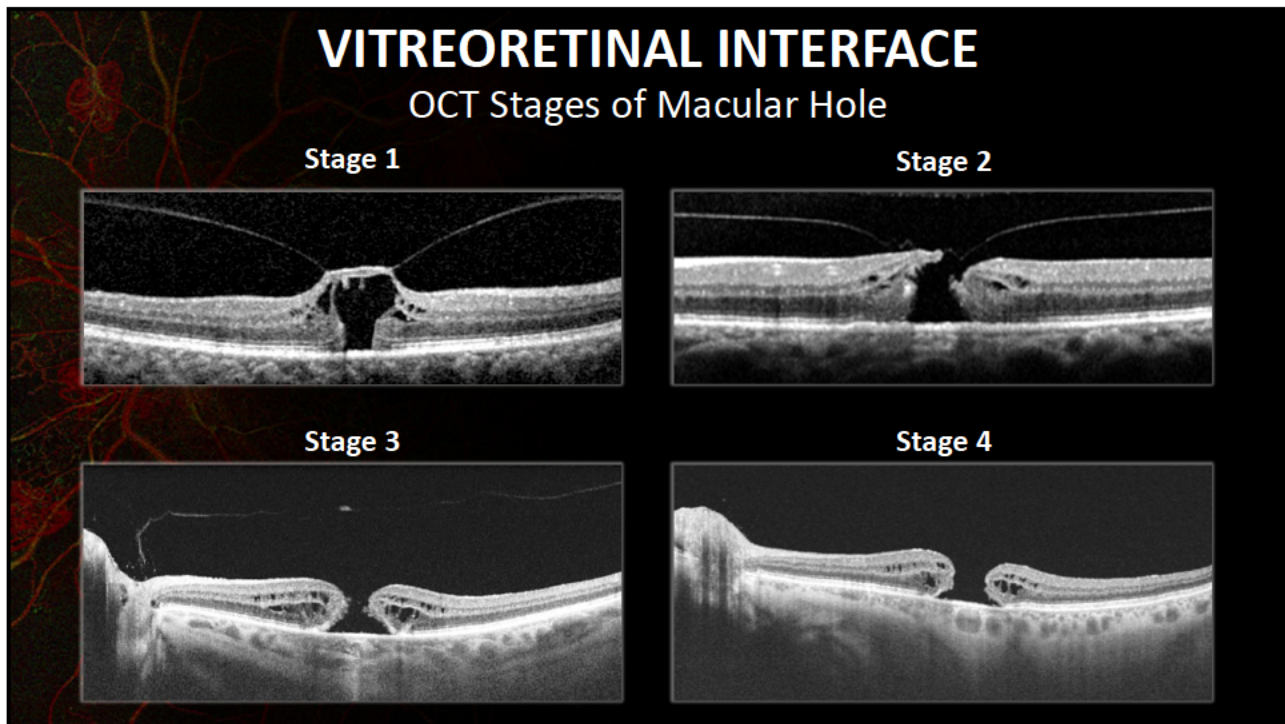


137

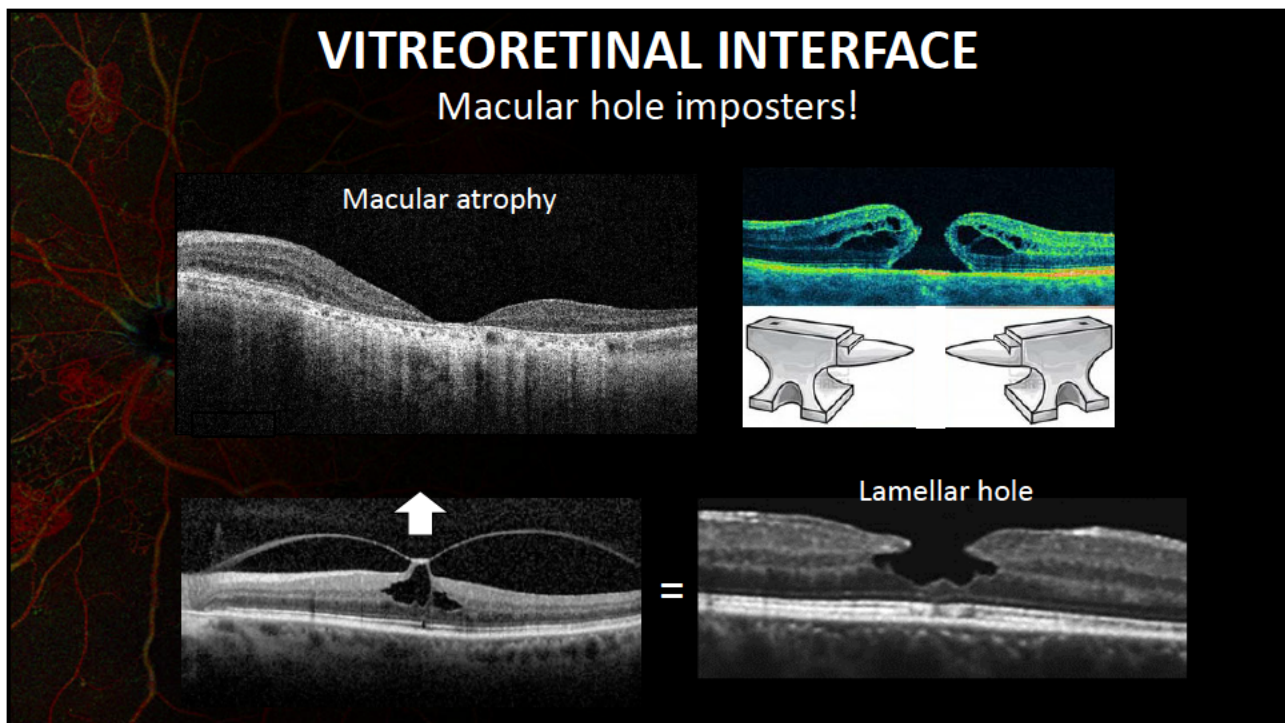
VITREOUS
Macular complications of anomalous PVD

- **Large adhesion zones** ($\geq 1,500\mu\text{m}$)
 - Vitreomacular traction syndrome
 - Tractional diabetic macular edema
 - Myopic traction maculopathy
 - Neovascular AMD
- **Small adhesion zones** ($\leq 500\mu\text{m}$):
 - Idiopathic macular hole
 - Lamellar macular hole
 - Tractional cystoid foveal edema
- ERM is associated with various vitreomacular adhesion sites of differing sizes

138



139


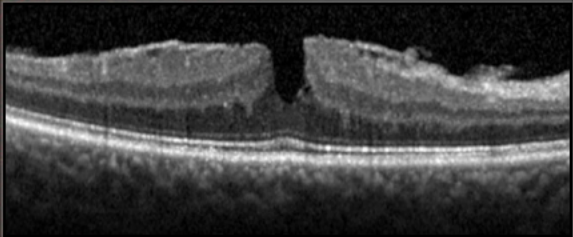
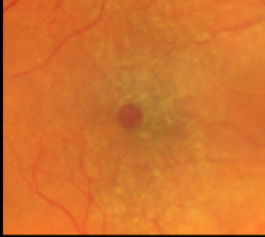




140

VITREORETINAL INTERFACE

Macular hole imposters!

Pseudomacular Hole

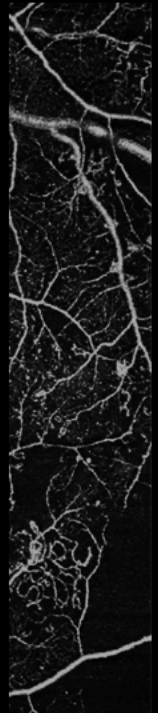


Large Foveal Cyst

141

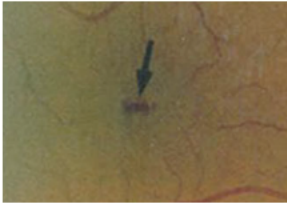

VITREORETINAL INTERFACE

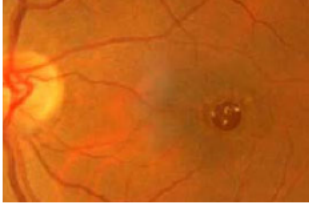
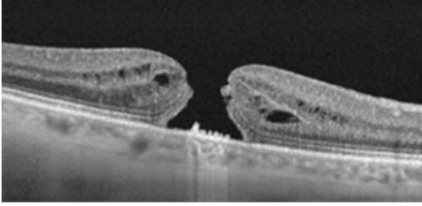
Macular hole imposters!



Differentiation from true MH

- Visual acuity?
- Edges raised or flat?
- Surrounding cuff of SRF?
- Perfectly round or irregular in shape?
- Yellow deposits in the base?
- Pseudo-operculum?
- Watzke-Allen sign?
- OCT makes the definitive DX

142

VITREORETINAL INTERFACE

Macular hole management- AAO PPP 2019

TABLE 2 MANAGEMENT FOR MACULAR HOLE

Stage	Management	Follow-up
1-A and 1-B	Observation ³⁴	<ul style="list-style-type: none"> Follow up at 2- to 4-month intervals in the absence of new visual symptoms Recommend prompt return if new visual symptoms develop Encourage monocular vision testing with Amsler grid
2	Pneumatic Vitreolysis ^{45,55}	<ul style="list-style-type: none"> Performed usually within 1 to 2 weeks of diagnosis Follow up at 1-2 days, then 1 week or sooner if new visual symptoms Frequency and timing of subsequent visits varies depending on the outcome of surgery and the patient's clinical course
2	Vitreoretinal surgery ^{39 *}	<ul style="list-style-type: none"> Performed usually within 1 month of diagnosis to minimize risk of progression of macular hole and vision loss Routine postoperative follow-up at 1-2 days, then 1-2 weeks during which time strict face down positioning is advised Frequency and timing of subsequent postoperative visits varies depending on the outcome of surgery and the patient's clinical course
2	Vitreopharmacolysis ¹	<ul style="list-style-type: none"> Performed usually within 1 to 2 weeks of diagnosis Follow-up at 1 week and 4 weeks, or with new symptoms (i.e., retinal detachment symptoms)
3 or 4	Vitreoretinal surgery ^{39,43} PPV + ILM peel + gas tamponade Few case reports of topical NSAIDs/steroids causing closure???	<ul style="list-style-type: none"> Performed usually within 1 month of diagnosis Postoperative follow-up at 1-2 days, then 1-2 weeks during which time strict face down positioning if advised Frequency and timing of subsequent visits varies depending on the outcome of surgery and the patient's clinical course

* Several small case series have shown promising results with this technique for smaller holes

Pharmacologic vitreolysis



Pneumatic vitreolysis

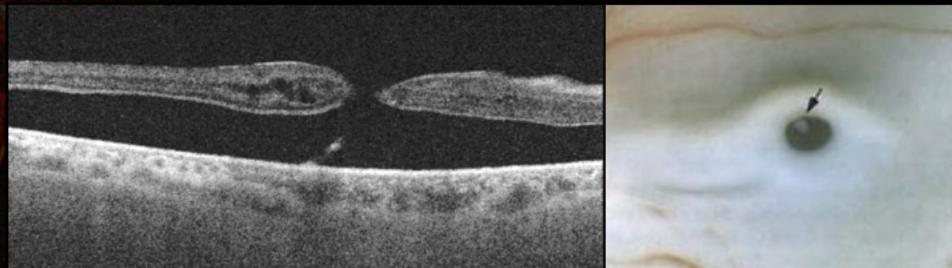


143

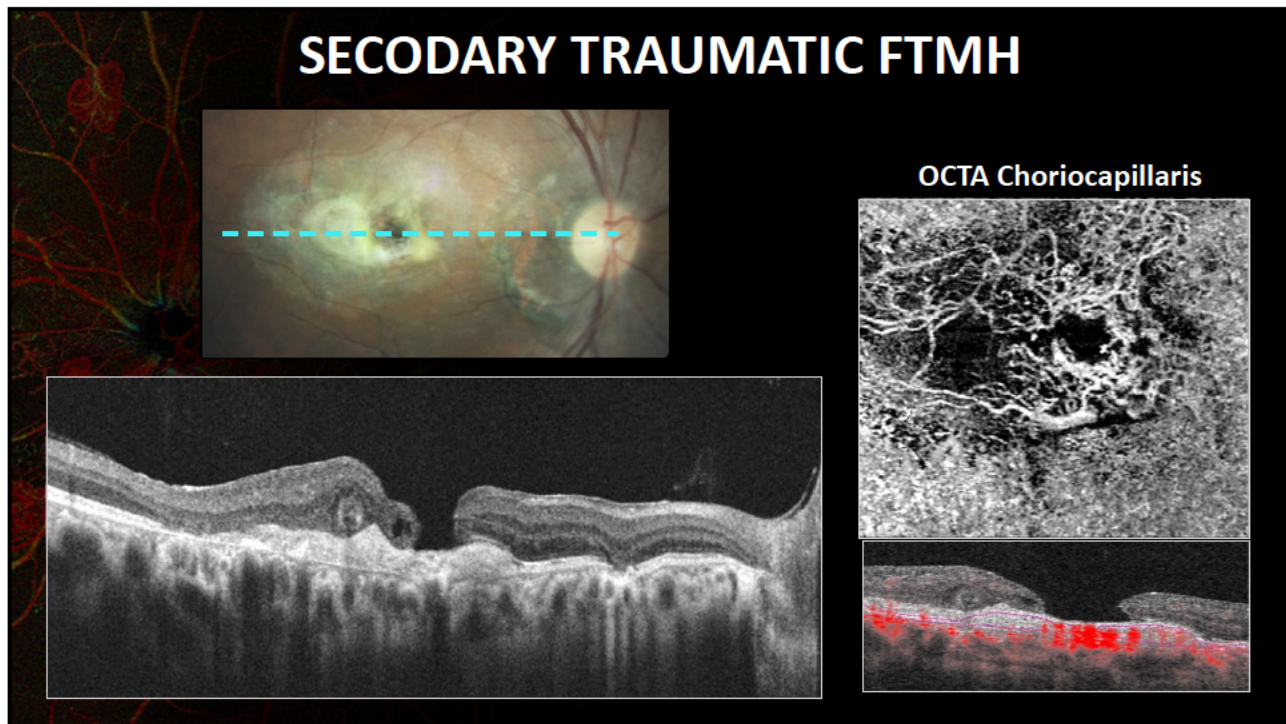
VITREORETINAL INTERFACE

Macular hole

Edu all FTMH pts on S & S of RD (rare)



144




145

THE "TAKE HOME" MESSAGE

- EDI- Improved visualization of choroid/sclera/RPE
- More accurate disease staging (DR, AMD, PVD, MH)
- Gage risk of progression in GA
- Identify high risk features of choroidal tumors
- Earlier detection of preretinal and choroidal neo
- Guide retreatment

146



Thank You!!

