STATE BOARD OF OPTOMETRY
2450 DEL PASO ROAD, SUITE 105, SACRAMENTO, CA 95834
P (916) 575-7170 F (916) 575-7292 www.optometry .ca.gov

Continuing Education Course Approval Checklist

Title: OCT Interpretation

Provider Name: Acuity Eye Specialists c/o Ms. April Weekly

☑Completed Application
Open to all Optometrists? ☑Yes ☐No
Maintain Record Agreement? ☑Yes ☐No

☑Correct Application Fee

☑Detailed Course Summary

☑Detailed Course Outline

☑PowerPoint and/or other Presentation Materials

☐Advertising (optional)

☑CV for EACH Course Instructor

☑License Verification for Each Course Instructor
Disciplinary History? ☐Yes ☑No

CALIFORNIA STATE BOARD OF OPTOMETRY

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CONTINUING EDUCATION COURSE APPROVAL APPLICATION

$50 Mandatory Fee

Pursuant to California Code of Regulations (CCR) § 1536, the Board will approve continuing education (CE) courses after receiving the applicable fee, the requested information below and it has been determined that the course meets criteria specified in CCR § 1536(g).

In addition to the information requested below, please attach a copy of the course schedule, a detailed course outline and presentation materials (e.g., PowerPoint presentation). Applications must be submitted 45 days prior to the course presentation date.

Please type or print clearly.

Course Title	**Course Presentation Date**
Oct Interpretation	05/15/2017

Course Provider Contact Information

Provider Name

April (First) Weekley (Last) C (Middle)

Provider Mailing Address

Street 94 Wild Horse Loop **City** Rancho Santa Margarita **State** CA **Zip** 92688

Provider Email Address AWeekley@Retina2020.com

Will the proposed course be open to all California licensed optometrists?	☒ YES ☐ NO
Do you agree to maintain and furnish to the Board and/or attending licensee such records of course content and attendance as the Board requires, for a period of at least three years from the date of course presentation?	☒ YES ☐ NO

Course Instructor Information

Please provide the information below and attach the curriculum vitae for each instructor or lecturer involved in the course. If there are more instructors in the course, please provide the requested information on a separate sheet of paper.

Instructor Name

Anthony (First) Culotta (Last) J (Middle)

License Number A97142	**License Type** CA Medical
Phone Number (626) 298-5116	**Email Address** ACulotta@retina2020.com

I declare under penalty of perjury under the laws of the State of California that all the information submitted on this form and on any accompanying attachments submitted is true and correct.

April Weekley
Signature of Course Provider

3/21/2017
Date

Form CE-01, Rev. 5/16

ACUITY
EYE SPECIALISTS

Acuity Eye Specials & Retina Institute

CE Dinner May 15th 2017

Agenda

Topic	Time	Speaker
OCT interpretation	6:30-7:30	Anthony Culotta(Retina)
Selected cases of Optic Disc Edema	7:30-8:30	Jessica Boeckmann

Requesting 2 hour CE approval

3/23/2017

OCT Interpretation Continuing Education

This presentation details the history of retinal OCT (optical coherence tomography) including the creation of the technology and the initial diagnostic applications. You create the presentation goes on to further detail the advances in the technology and the expansion of its diagnostic applications. Case studies are presented to help apply the technology to particular patient cases. The presentation will conclude with the future of OCT retina.

Anthony J. Culotta, M.D.

"OCT Interpretation of Retinal Diseases"

Anthony Culotta, MD

A. Discuss pathophysiology and treatment of retinal diseases
   1. Central serous retinopathy
   2. Wet macular degeneration
   3. Juxtafoveal retinal telangiectases
   4. Uveitic CME
   5. Other retinal diseases

B. Review OCT Technology and development
   1. Discuss differences between time domain and spectral domain OCT
   2. Discuss OCT Clinical applications
   3. Review OCT images of normal eyes and various retinal diseases to allow for you to educate your patients
   4. Interpret OCT finding to know when to refer patients for retinal consultation

C. Discuss classical versus atypical presentations of macular edema

D. Compare traditional versus new emerging treatments

E. Discuss related new research trials exploring innovative treatment

Review:

Discuss patient cases with OCT images in context of other imaging technology.

OCT Interpretation

Anthony Culotta, M.D.

RetinaInstitute

On call for you

Course Objectives

- Review OCT technology and development
- Discuss differences between time domain and spectral domain OCT
- Discuss OCT clinical applications
- Review OCT images of normal eyes and various retinal diseases to allow you to educate your patients
- Interpret OCT findings to know when to refer patients for Retinal consultation

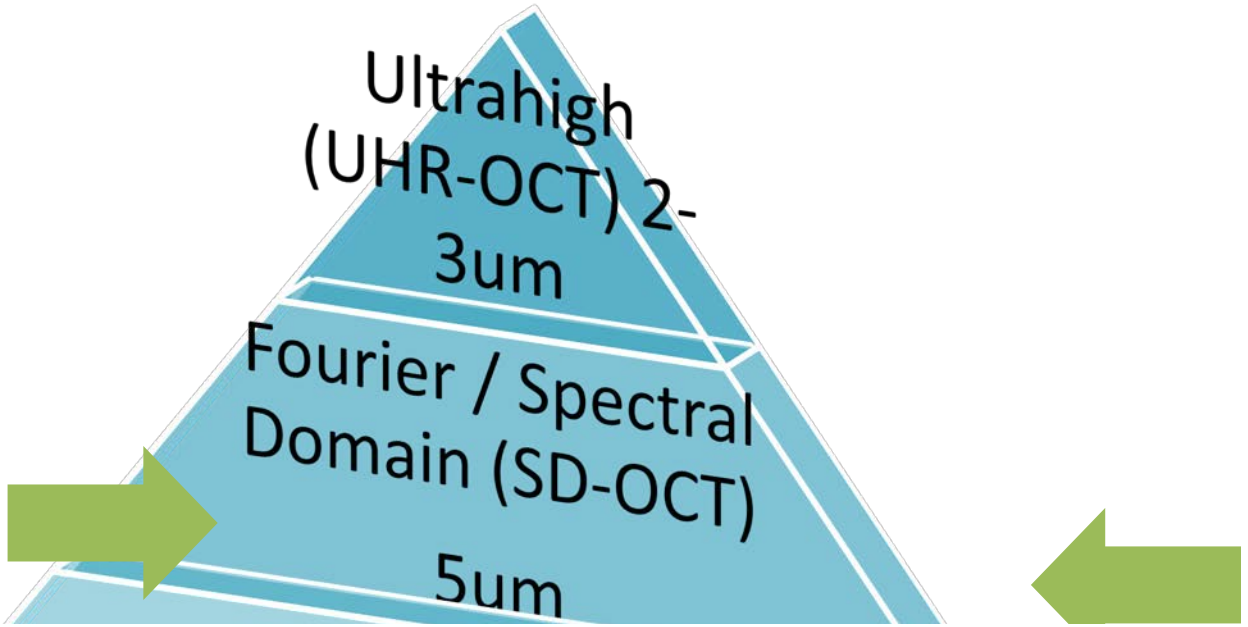
Introduction

- Optical Coherence Tomography (OCT)
  - Imaging technique first introduced in 1991
  - Collaborative development by MIT and New England Eye Center (Tufts)
  - Tomographic imaging analogous to MRI, CT, or ultrasound
  - High axial resolution = 10 microns
  - Allows for a “histologic” cross-section of the retina and enhanced visualization of other parts of the eye

Technology

- OCT is analogous to ultrasound B-Scan
  - Except optical rather than acoustic reflectivity is measured
- A much higher image resolution is thus obtained with OCT
- Michelson interferometry:
  - Light passes through the eye → different reflection are obtained from different layers

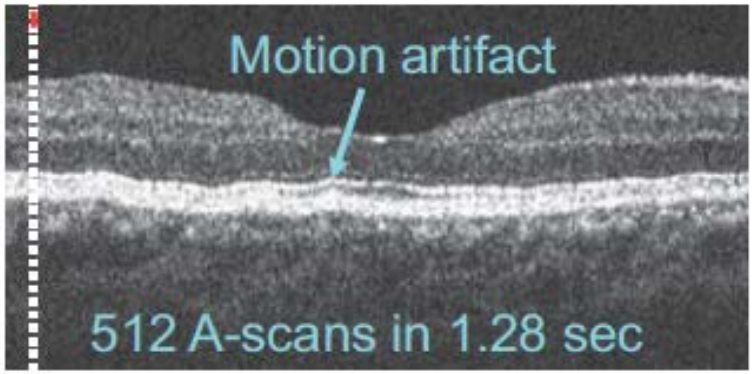
Resolutions of OCT Machines



Comparison

- SD-OCT
  - Simultaneous
  - 2048 pixels at a time
- TD-OCT
  - Sequential
  - 1 pixel at a time

1024 A-scans in 0.04 sec



Higher speed, higher definition and higher signal.

Common OCT Machines

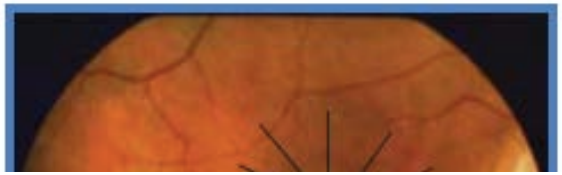
- TD-OCT
  - Stratus
- SD-OCT
  - Spectralis
  - Cirrus
  - Optovue RTVue, iVue

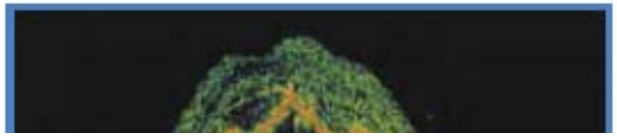
Time Domain OCT (Stratus)

- Became commercially available in 2002
- “State of the art” still in 2007

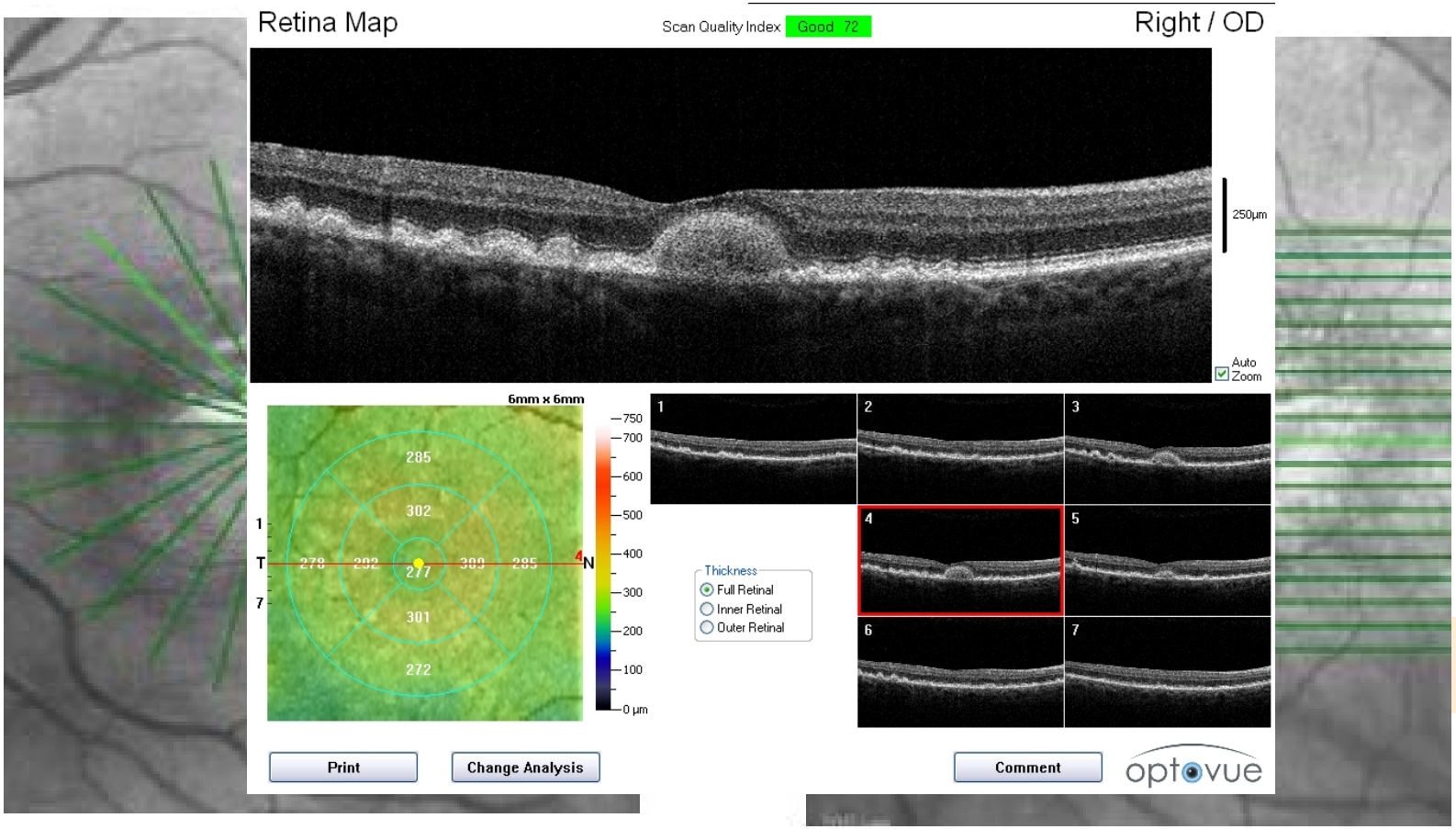
Stratus: Time-Domain

- Two forms of data output:
  - 6 linear scans through macula
  - Macular topography mapping

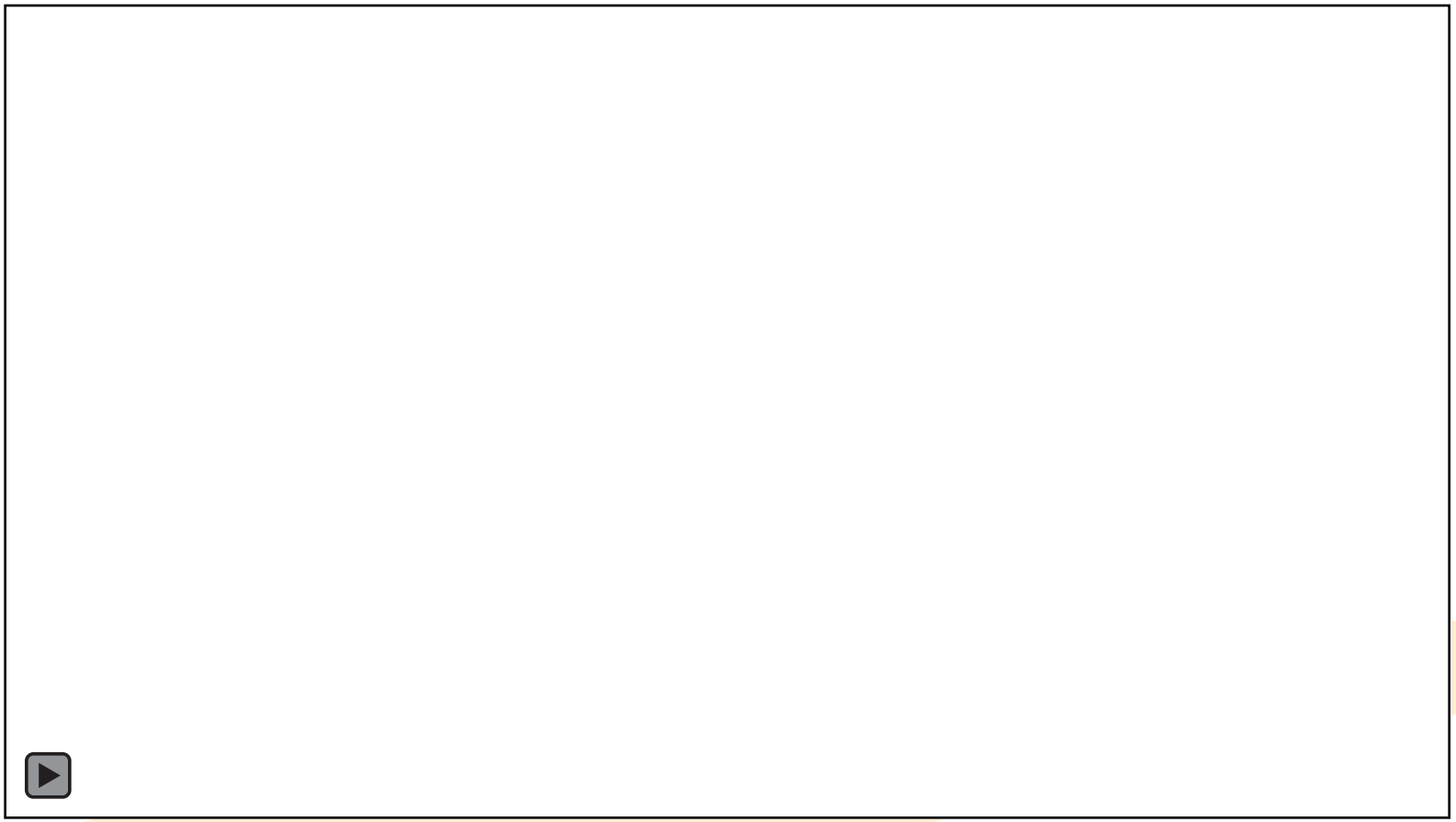




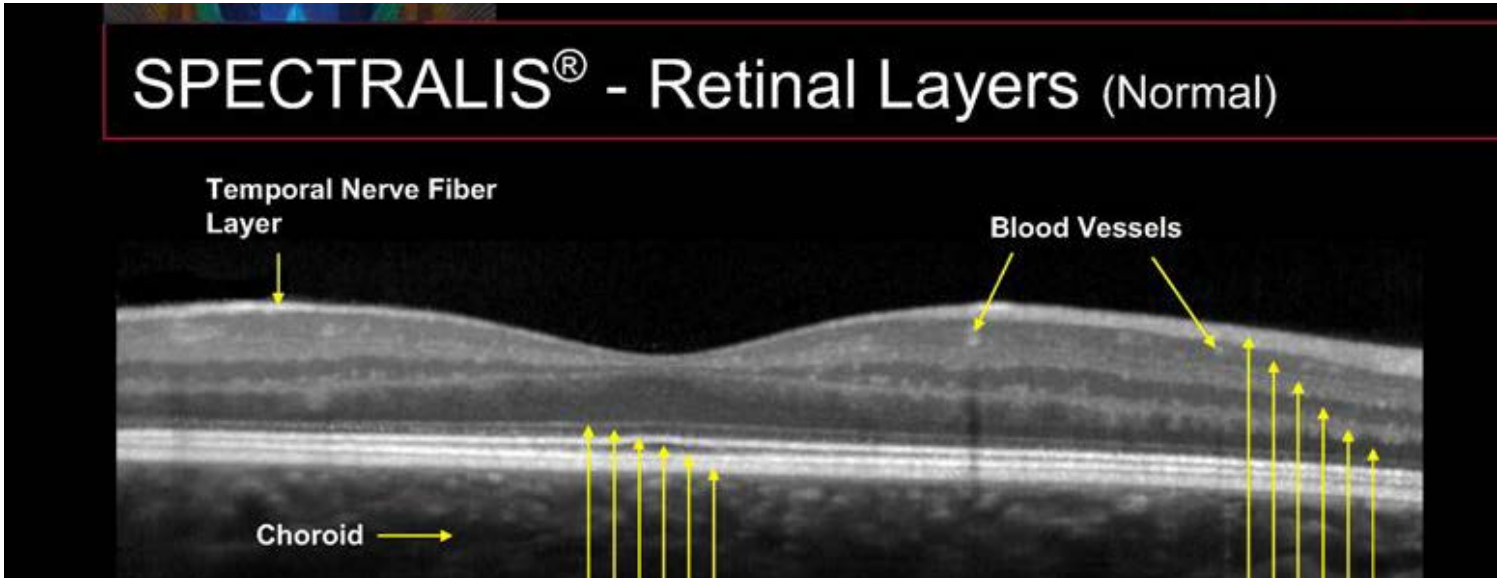
SD-OCT



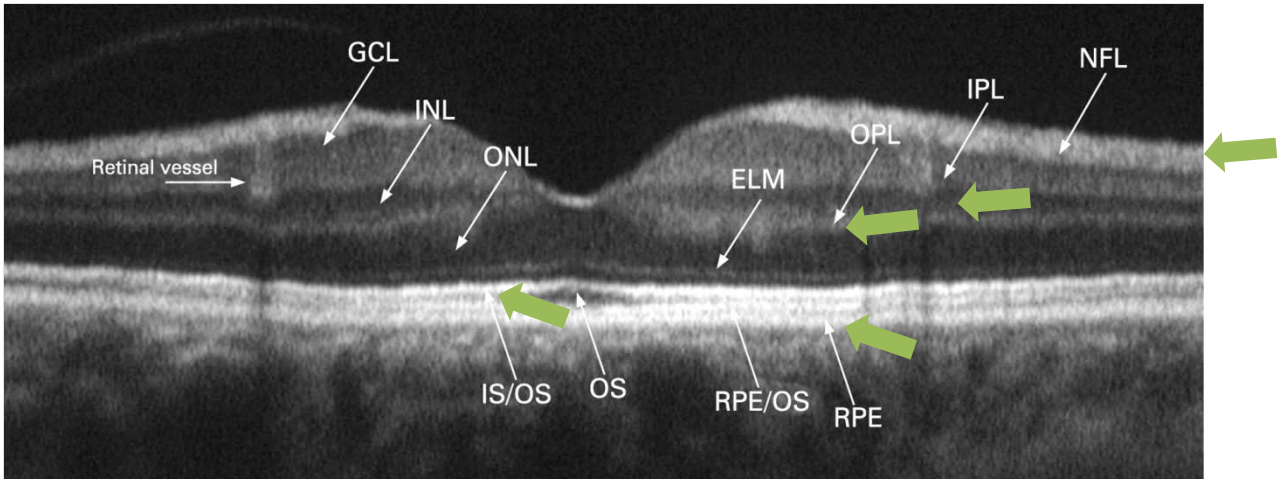
OCT Hands-On



SD-OCT

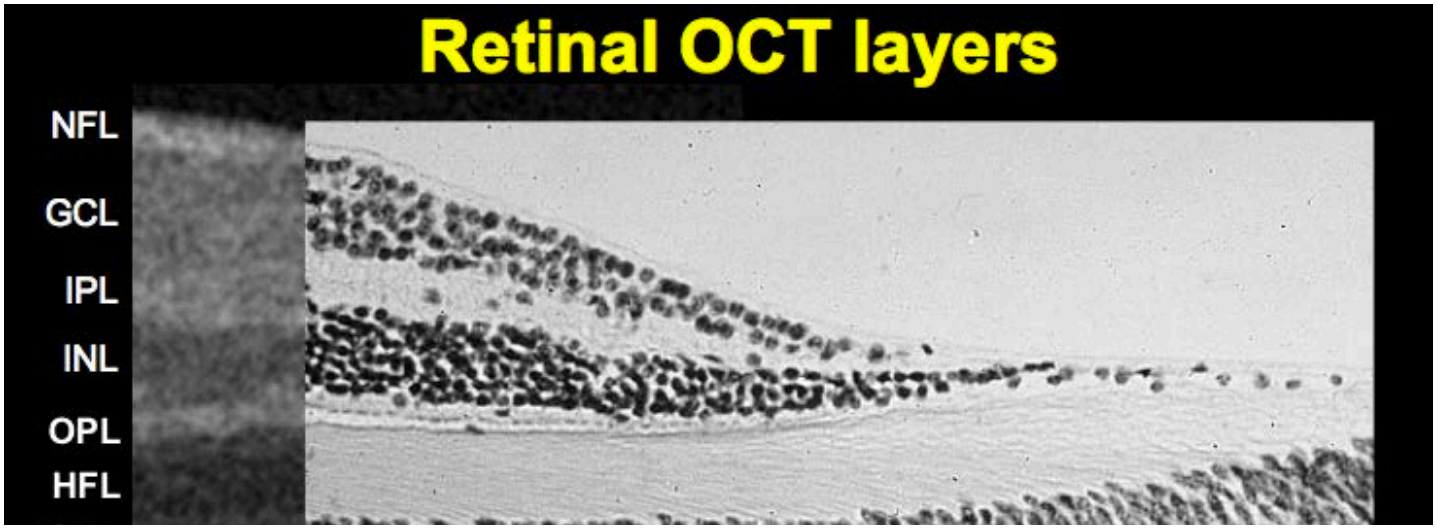

SPECTRALIS® - Retinal Layers (Normal)
Temporal Nerve Fiber Layer
Blood Vessels
Choroid

Normal Retina OCT Structures



- NFL & GCL are bright
- Densely packed nuclear layers are dark
- Horizontal plexiform layers are bright
- Photoreceptors are hyporeflective
- IS/OS junction is bright
- RPE, inner choroid are hyper-reflective

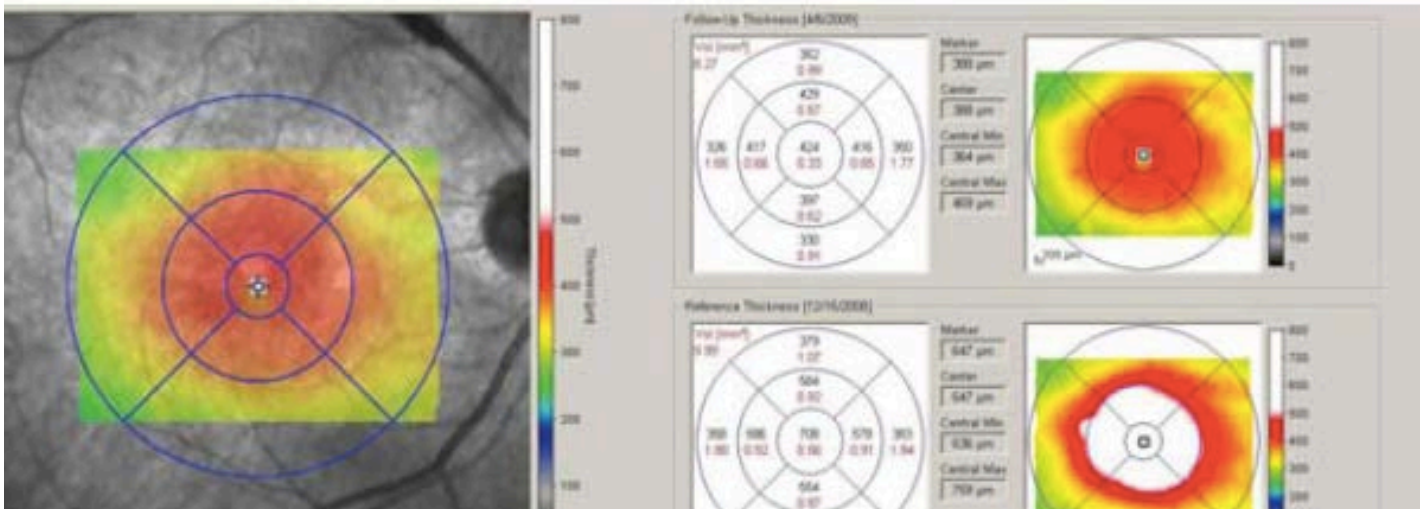
Histologic “Slice” of the Retina



Applications of SD-OCT

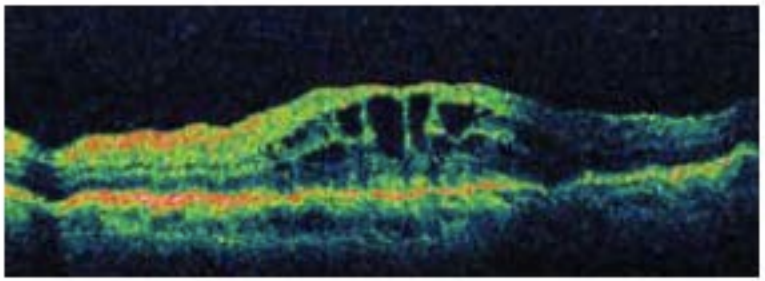
Poor fixation due to decreased vision	• Tracking & registration
Unexplained VA loss	• Explanation of symptoms based on cellular level • Detection of subtle findings
Response to therapy	• Analysis of change from baseline
Research	• Clinical trials outcome • Analysis of retinal layers

Reproducibility for Analysis of Change: CME

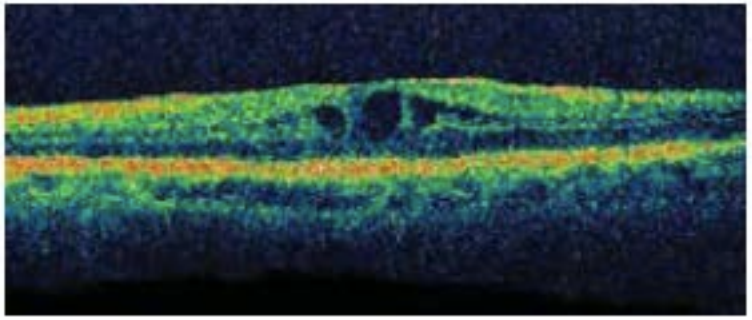


Qualitative Use of OCT

- Baseline

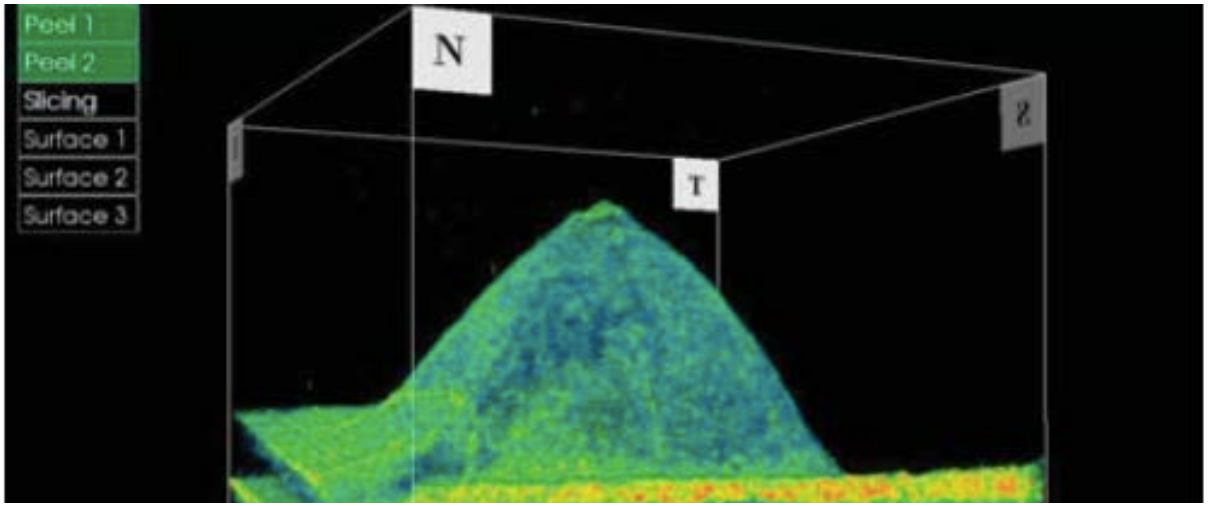


- One month post treatment

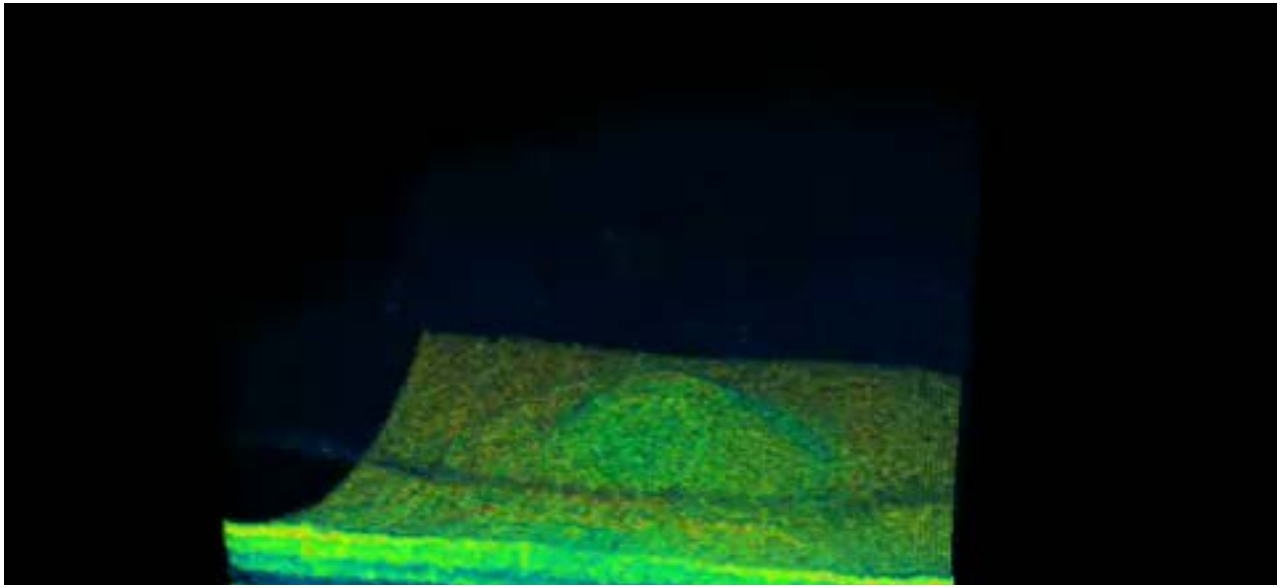


- Document change
- Aid in treatment decision making
- Educational tool for patients
- Enhances compliance

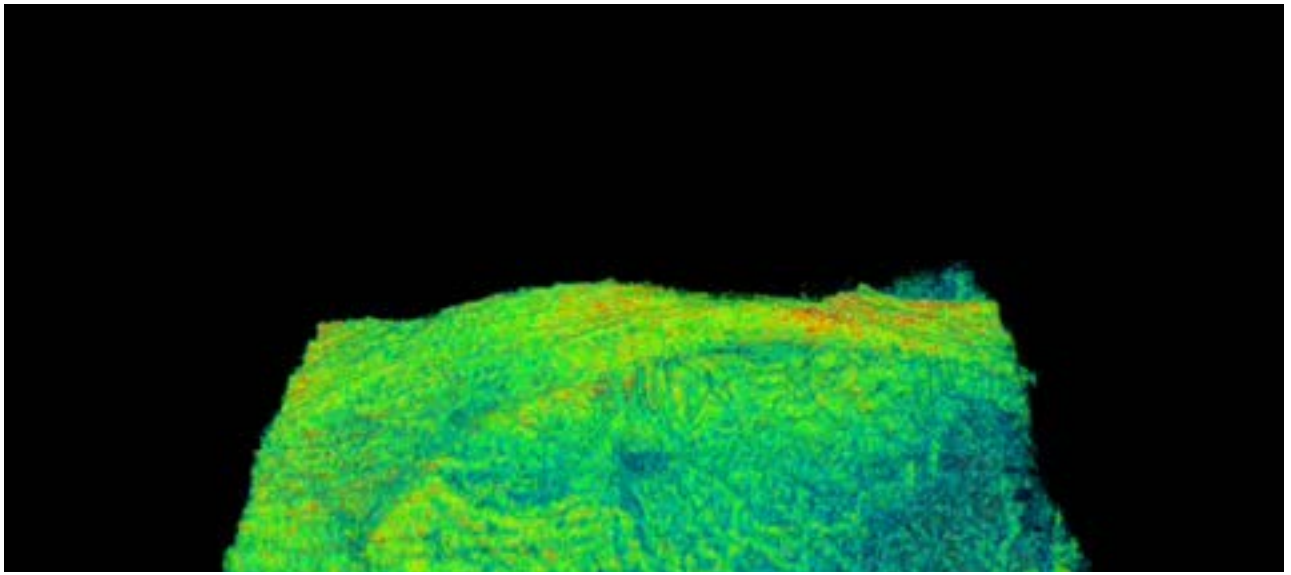
3D-Imaging Educational Tool



3D-Video: Macular Hole



3D-Video: ERM

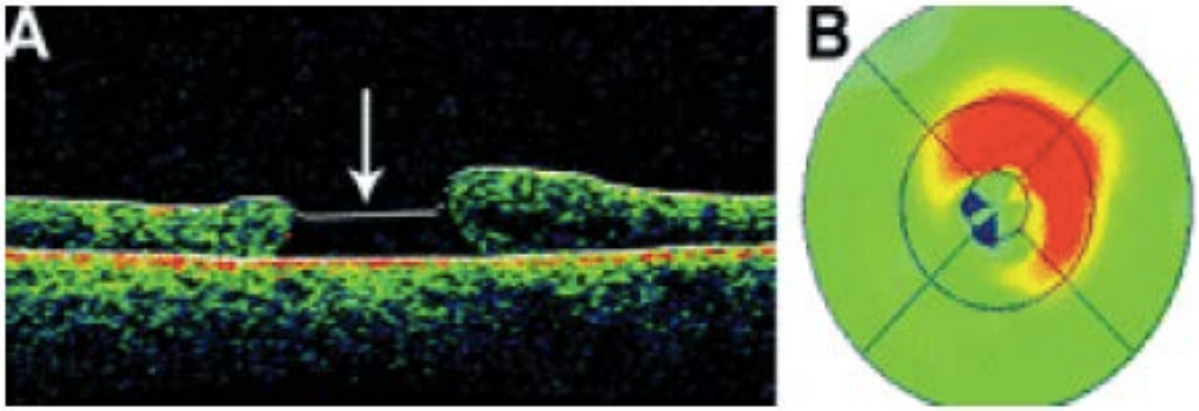


Potential Artifacts

- Be able to distinguish artifact vs. pathology

1. Boundary Line Errors
2. Decentration Errors
3. Motion Artifact
4. Low Signal Strength

Boundary Line Errors



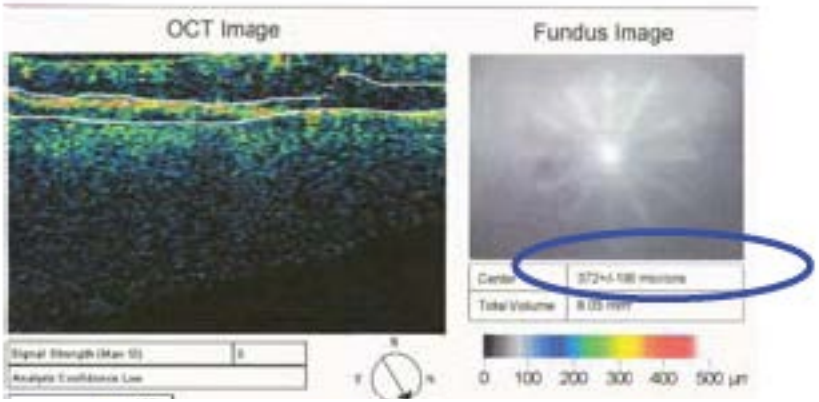
- Software interpolates the inner retinal surface across the discontinuity
- Thickness map does not demonstrate the full thickness hole

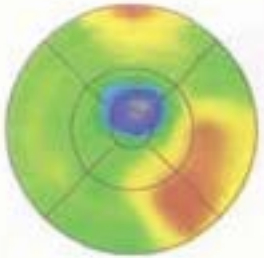
Decentration Error

Boundary line error

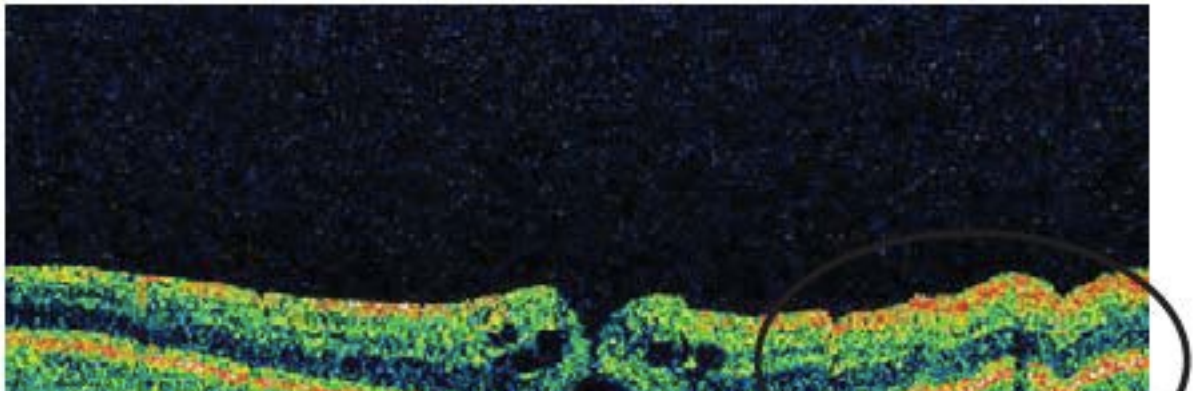
>10% standard deviation

Scan not centered on image window

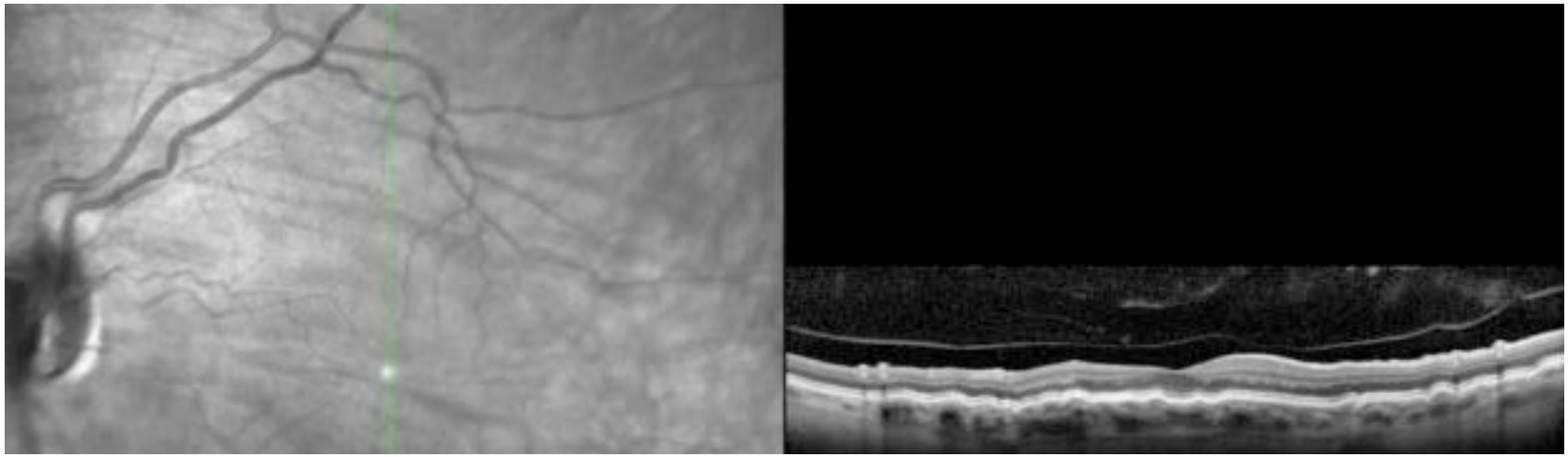




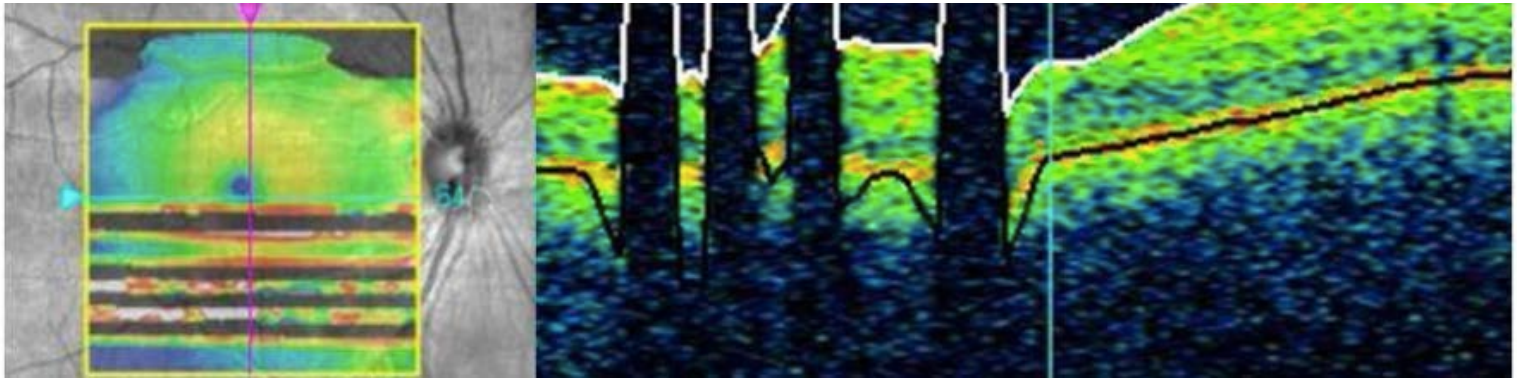
Motion Artifact



Hypotony Maculopathy



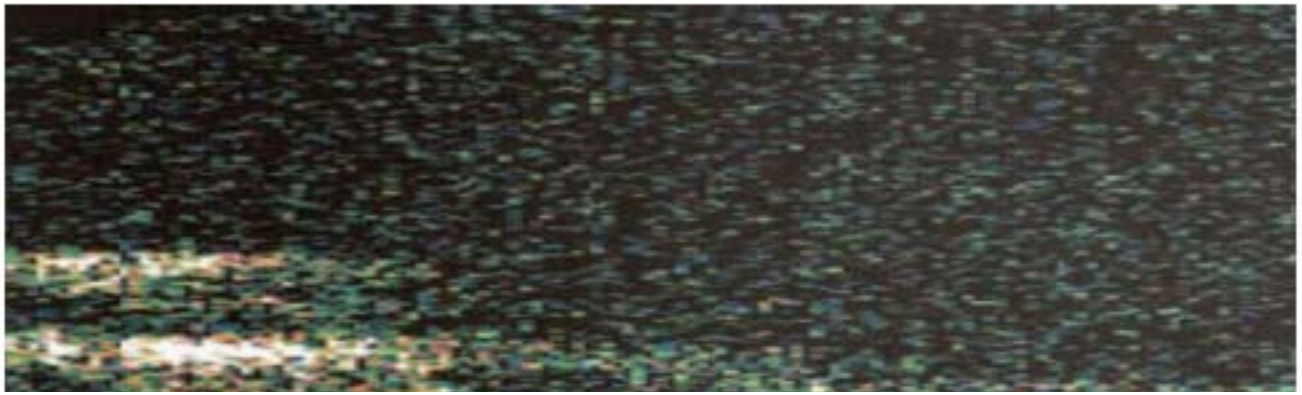
Blink Artifact



- Missing pieces of information between blinks
- Segmentation lines
- Inaccurate topographic mapping

Low Signal Strength

- Dense Cataract



Techniques for Optimal OCT Scan

- Good dilation (although usually can get scans undilated)
- Optimal tear film
  - Have patient blink prior to scan
  - Artificial tears
- Image centered
- Proper depth of image
  - e.g. – Spectralis – center images within the blue brackets on the screen

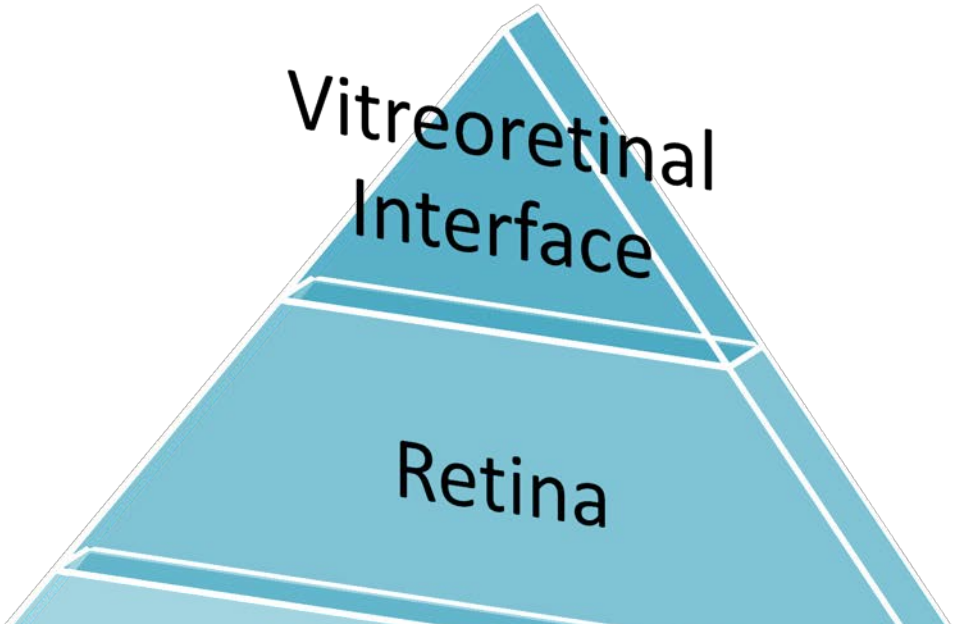
OCT Evaluation of Clinical Disorders

- CSCR
- VMT
- ERM
- Pseudoholes
- Macular Holes
- Macular Edema
- Retinal Detachment
- Retinoschisis
- Optic nerve head pit
- Optic nerve drusen
- ARMD
- Glaucoma
  - NFL
  - Angle evaluation – pupillary block, plateau iris
- Anterior segment
  - LASIK flaps
  - Posterior capsule

OCT Interpretation

- Review systematically, from inner → outer (from top of scan to bottom)
- Vitreoretinal surface (+/-PVD, VH, AH, VMT)
- Dark vs. Bright areas
- Identify artifacts
- Identify normal structures that are not pathological (e.g. retinal blood vessels)

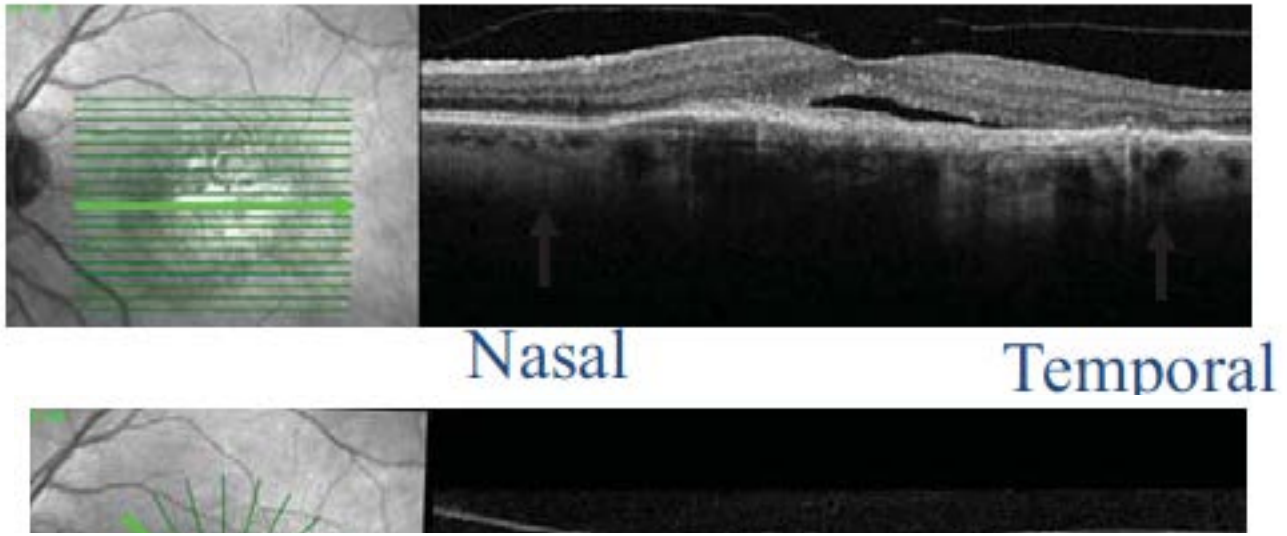
Review OCT in “Layers”



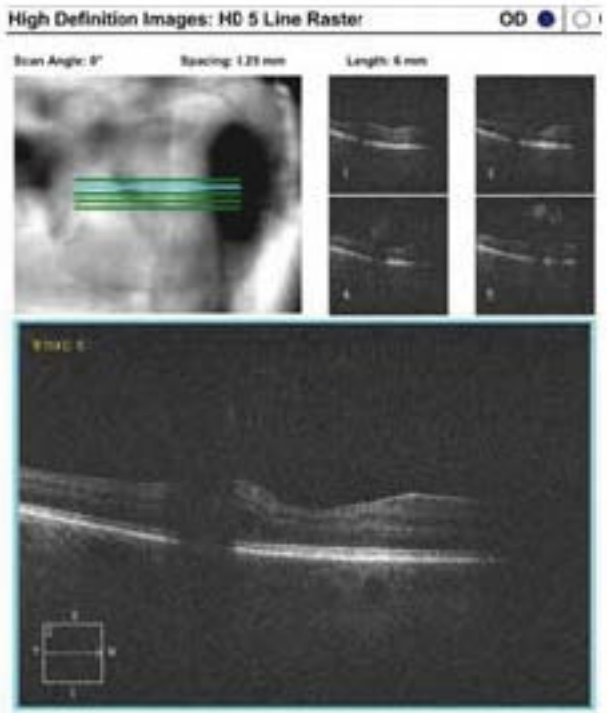
OCT Interpretation

- **Hypo-Reflective**
  - Cellular nuclei: GCL, INL, ONL
  - Shadowing beneath vessels
  - Fluid
  - Cystic spaces
  - Loss of tissue
- **Hyper-Reflective**
  - Interface changes: NFL, IPL, OPL, ELM
  - IS/OS junction
  - RPE
  - Lipids

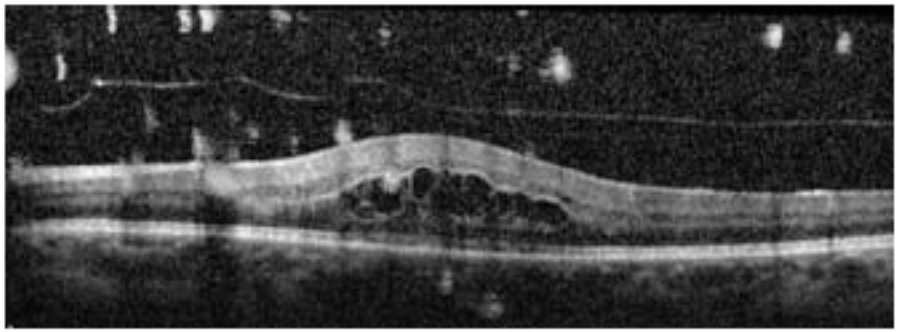
Orientation



Vitreous Opacities

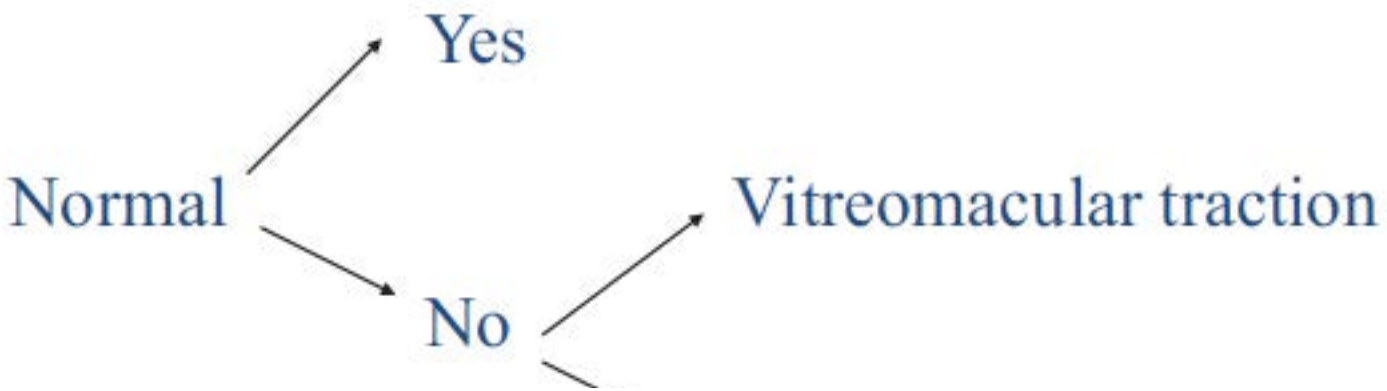


Large Vitreous Floater

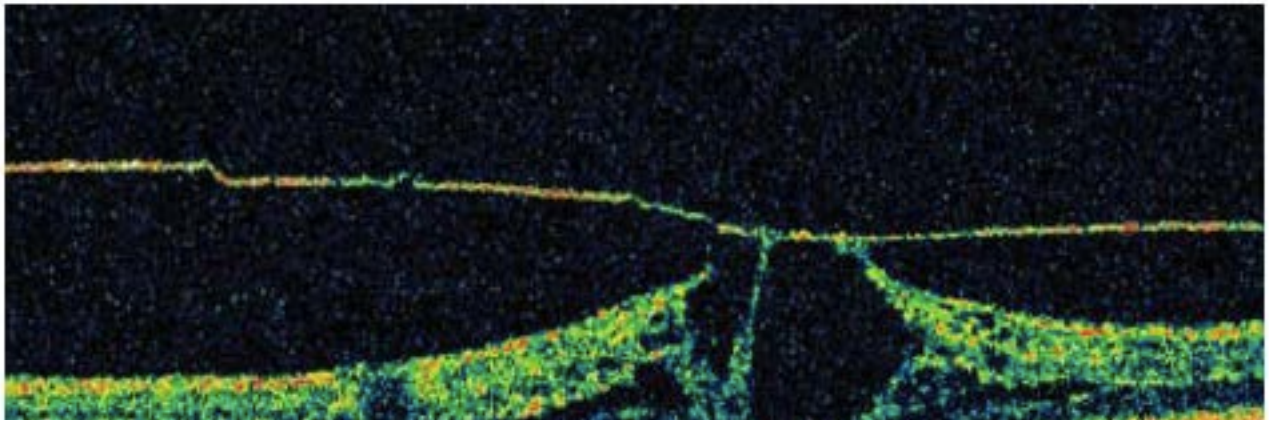


Asteroid Hyalosis

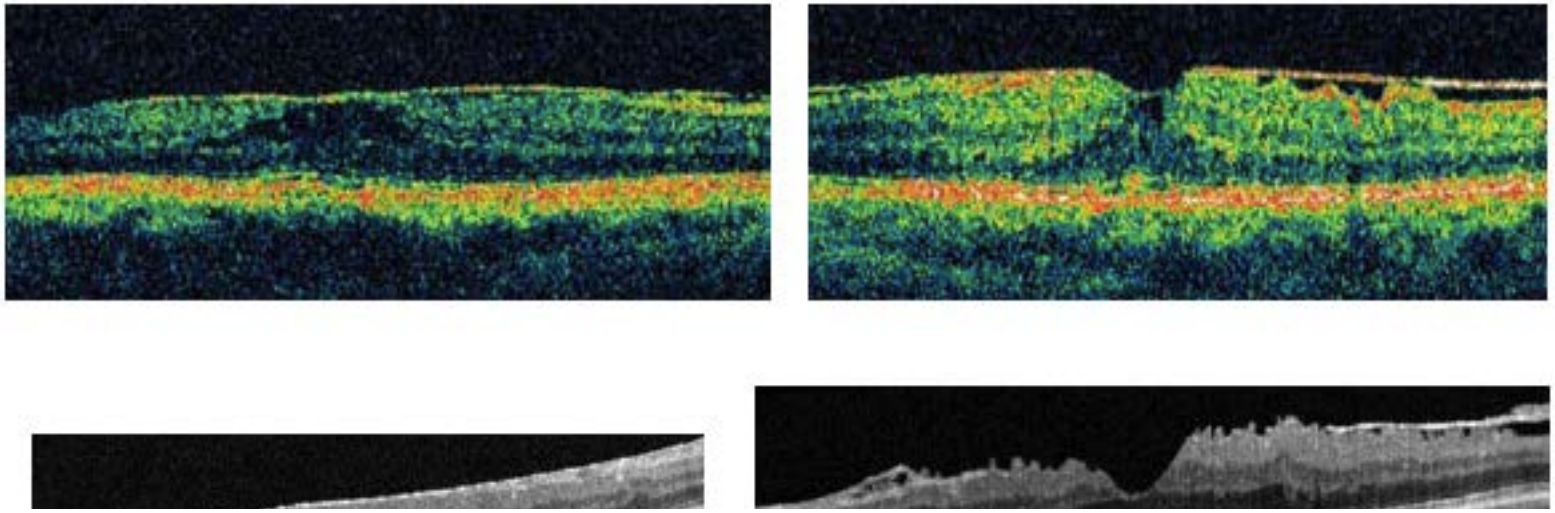
Vitreoretinal Interface



Vitreomacular Traction (VMT)



Epiretinal Membrane (ERM)

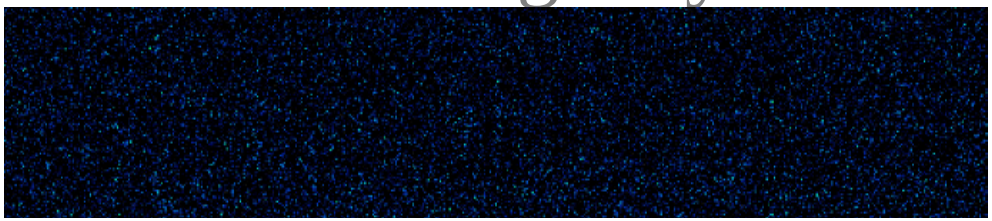


Retina

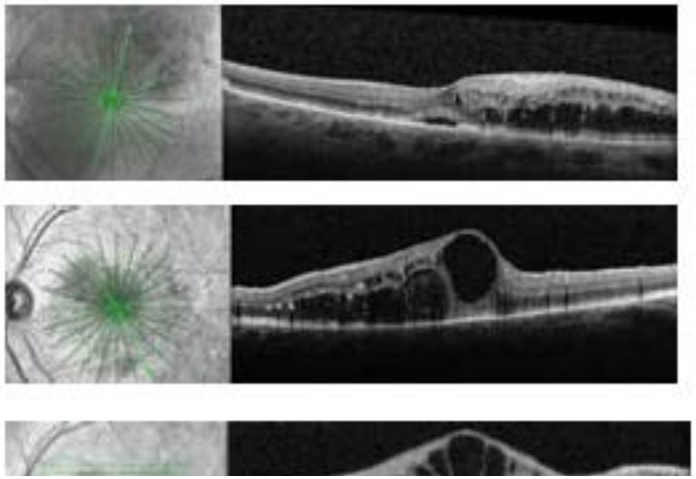
- Retinal Artery Occlusion
- Macroaneurysms
- Intraretinal Exudates
- Intraretinal Hemorrhages
- CME
- SRF
- Macular Hole / Lamellar / Pseudoholes
- JFT
- Plaquenil Toxicity
- Retinal Detachments

CRAO

- 32 y/o man with h/o sickle cell anemia
- c/o sudden vision loss of the right eye. His BCVA of the right eye is CF.



Retinal Edema



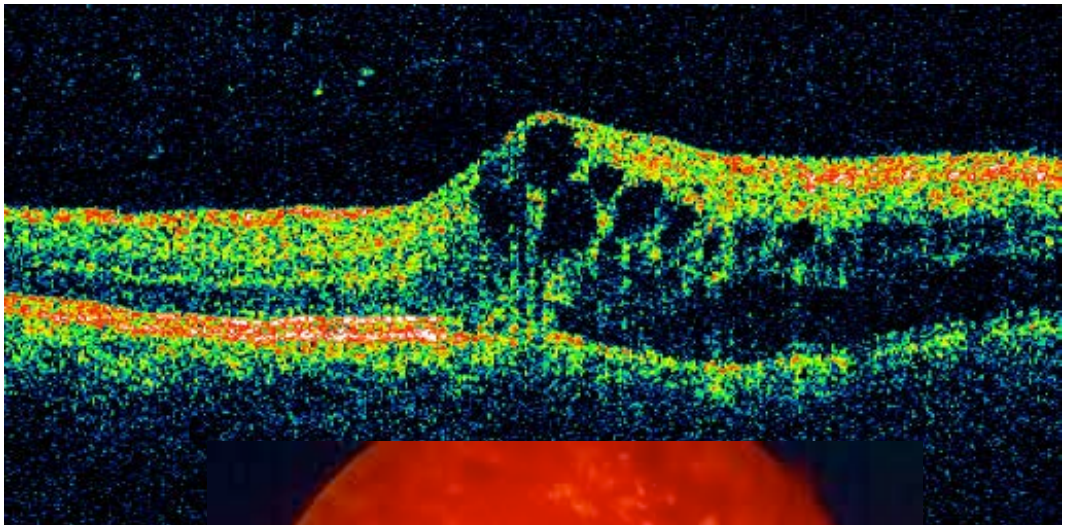
BRVO

- Retina is thickened
- Cystoid spaces

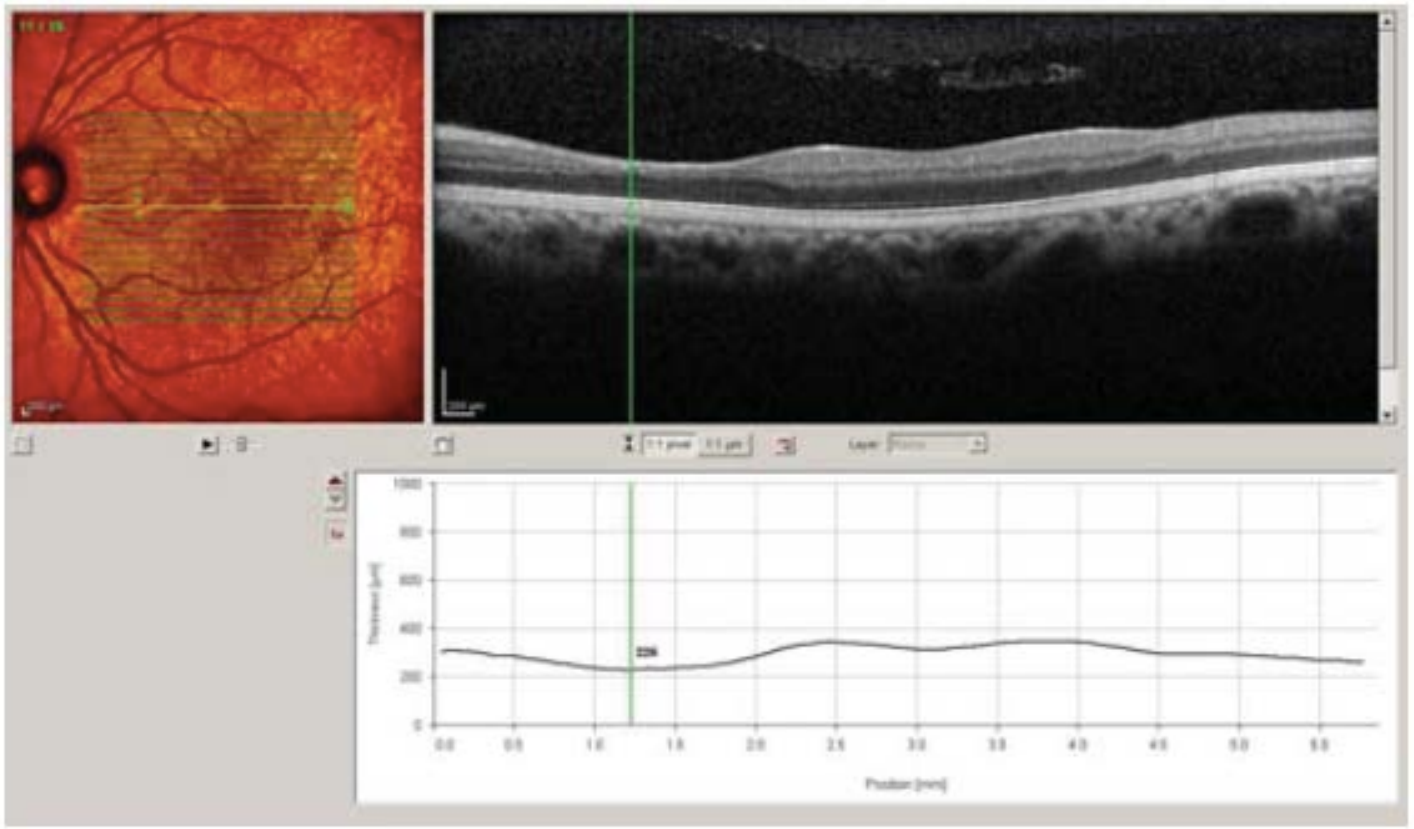
DME

- May be associated with subretinal fluid

BRVO

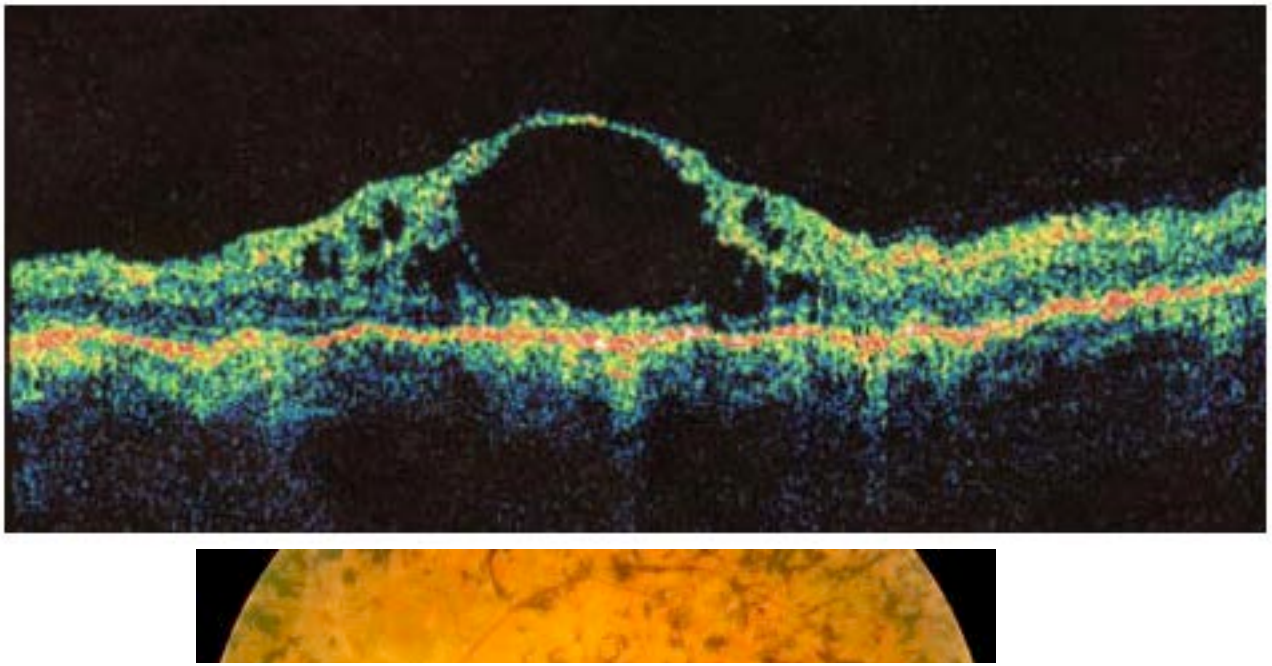


Unexplained Vision Loss
Pt c/o scotoma

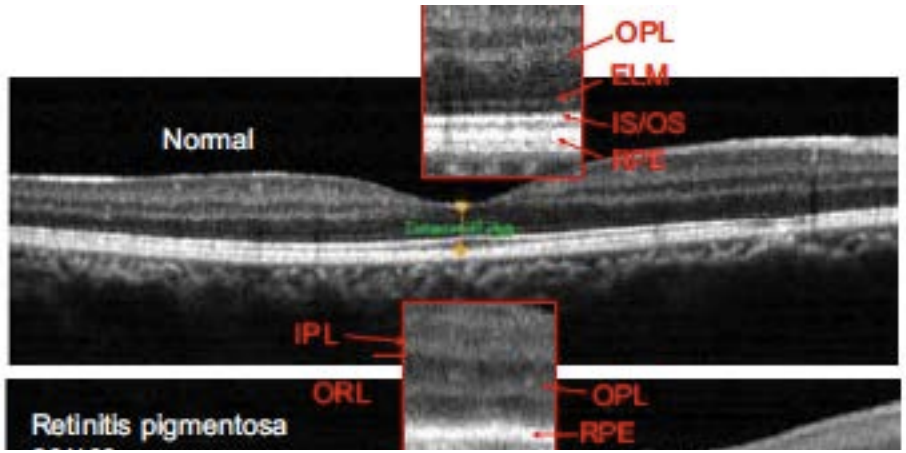


Focal retinal atrophy from BRVO

Retinitis Pigmentosa with CME



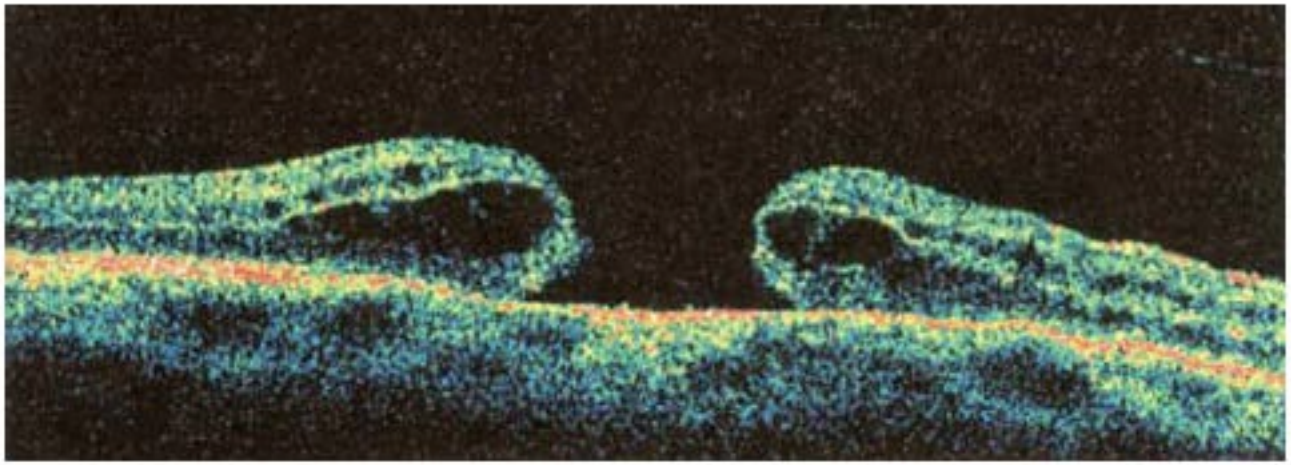
Retinitis Pigmentosa



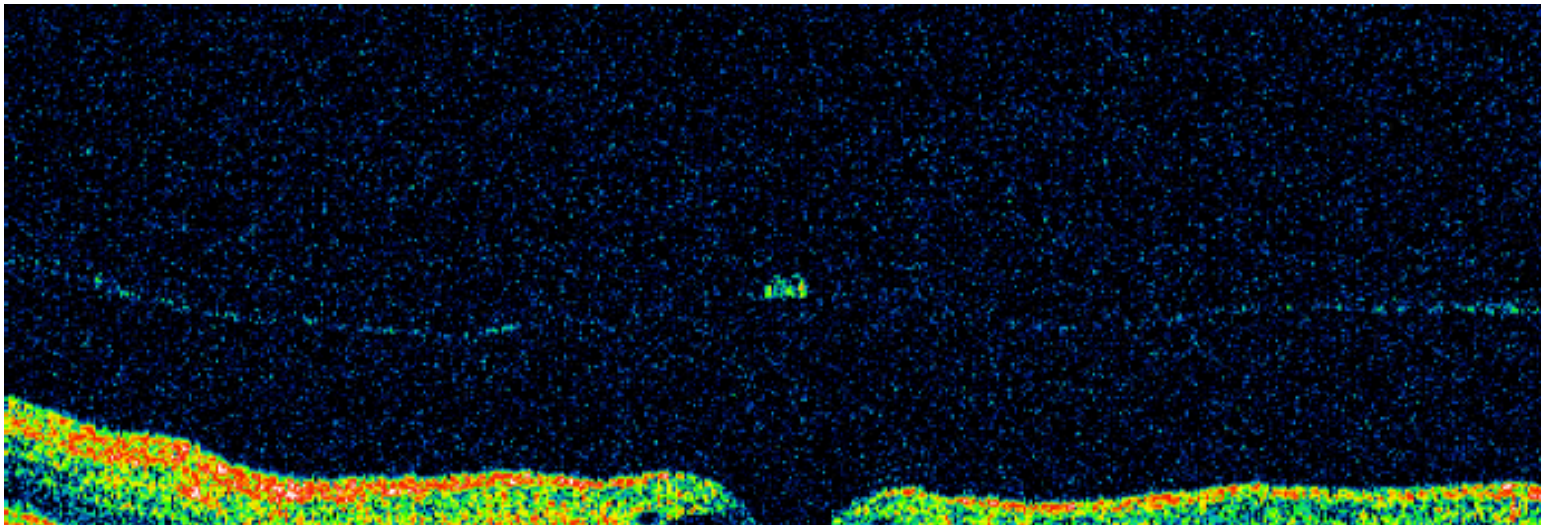
Normal Eye

Thinning of the outer retina with

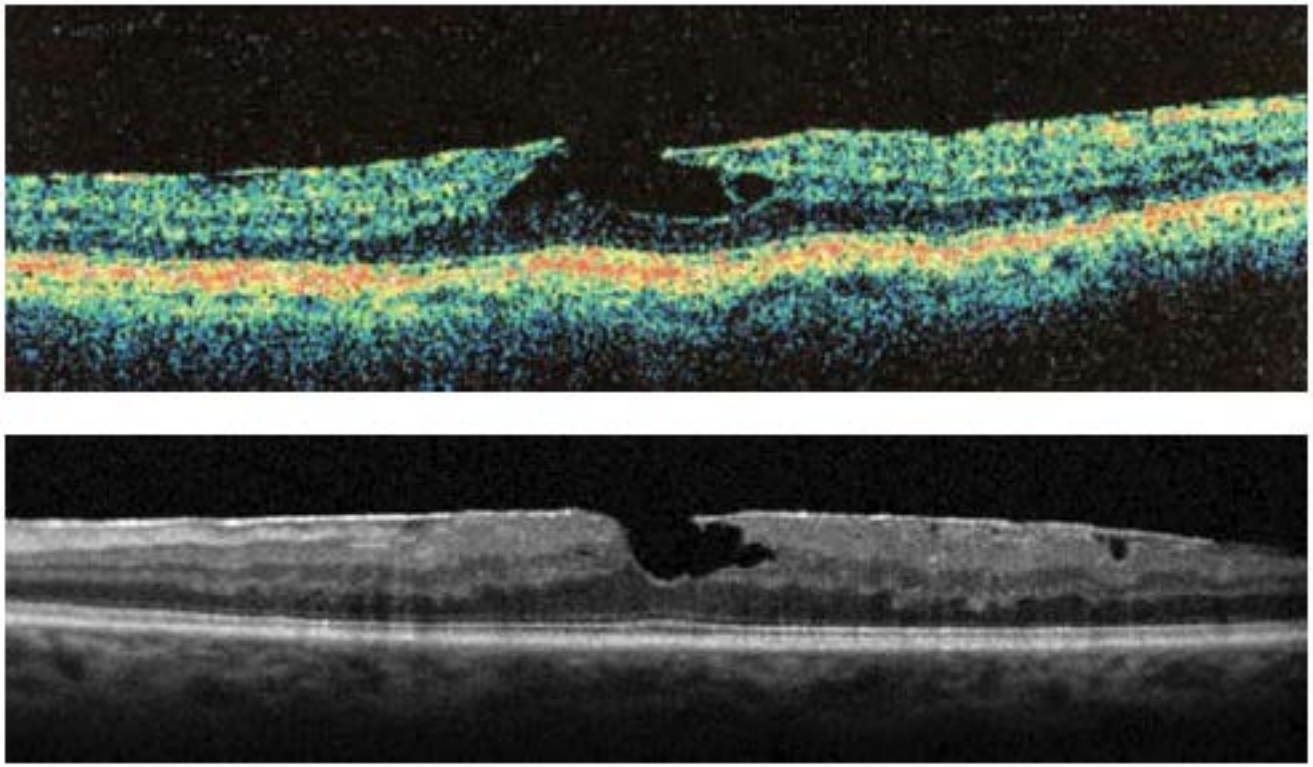
Macular Hole



Macular Hole

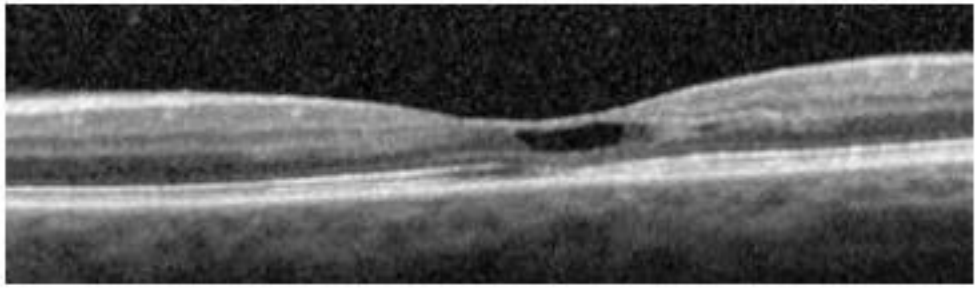


Lamellar Hole



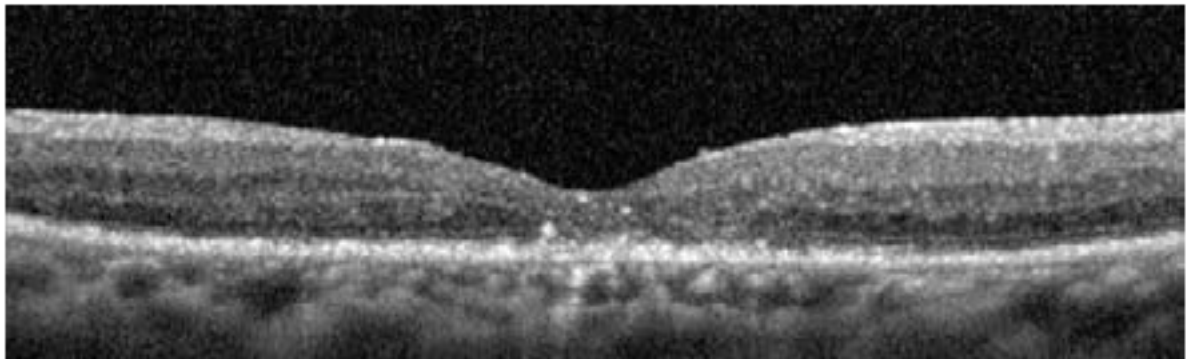
What is likely to be the patient's visual acuity?

Juxtafoveal Telangiectasia

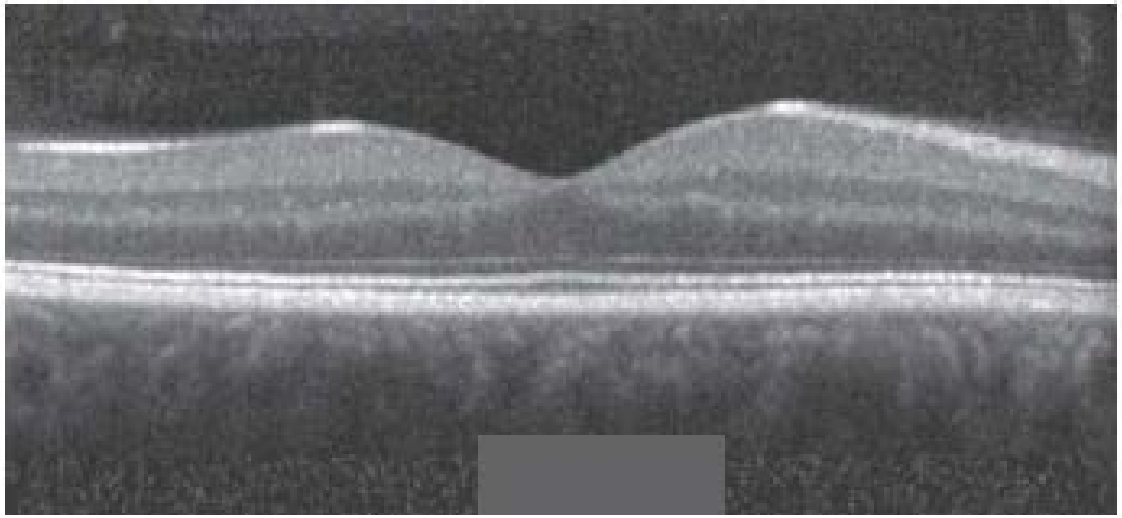


- Intraretinal "cavities"
- ILM drape
- Retina is not

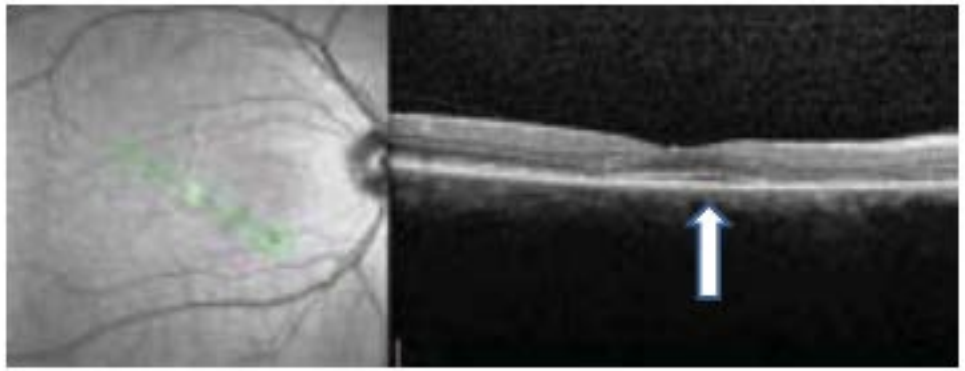
Reattachment after Chronic RD



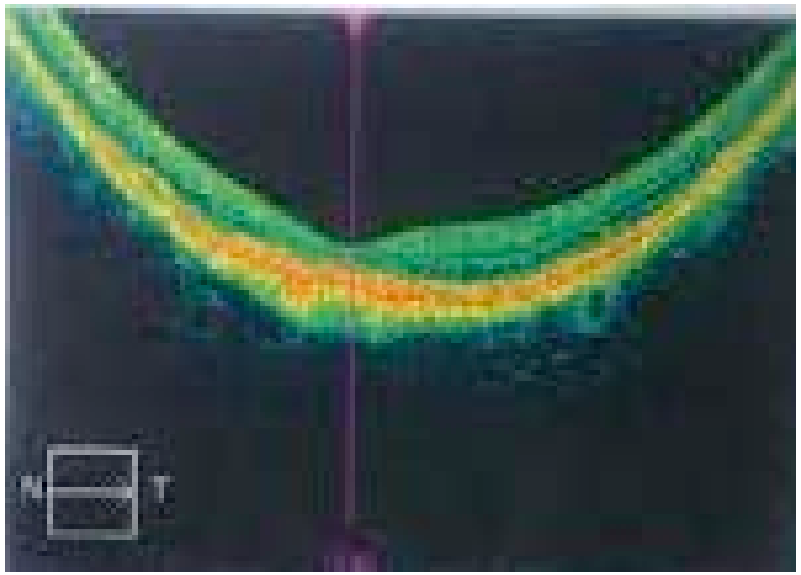
Plaquenil Toxicity

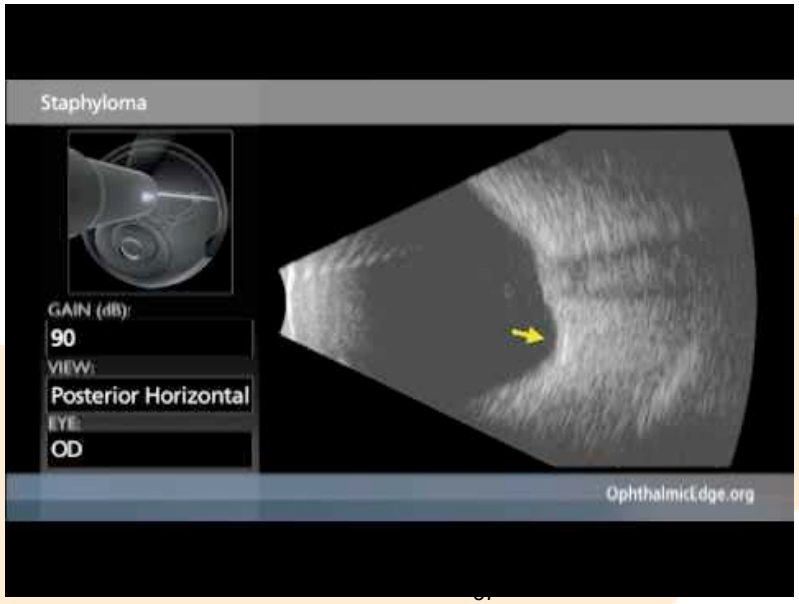


Plaquenil Toxicity



High Myope (-15D) → Posterior Staphyloma

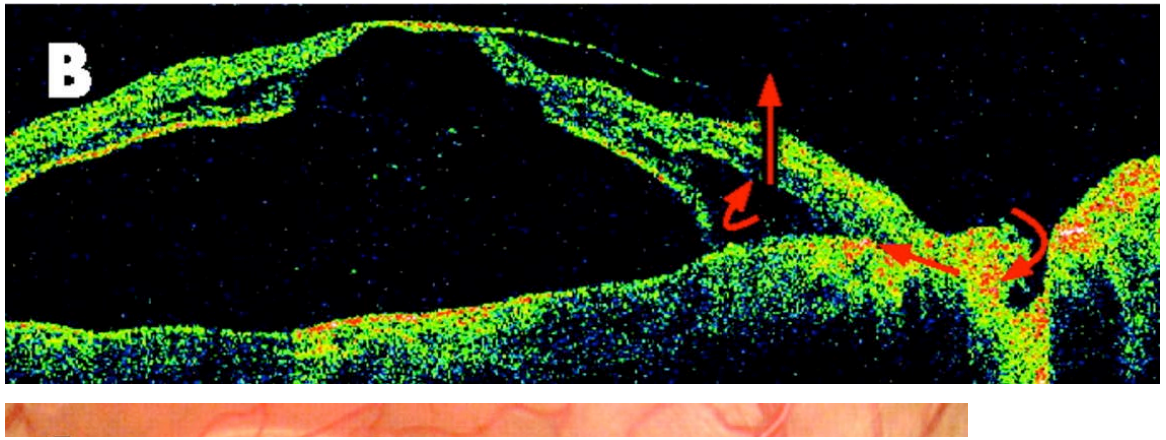




RetinaInstitute
On call for you

Optic Nerve Pit with Serous Retinal Detachment

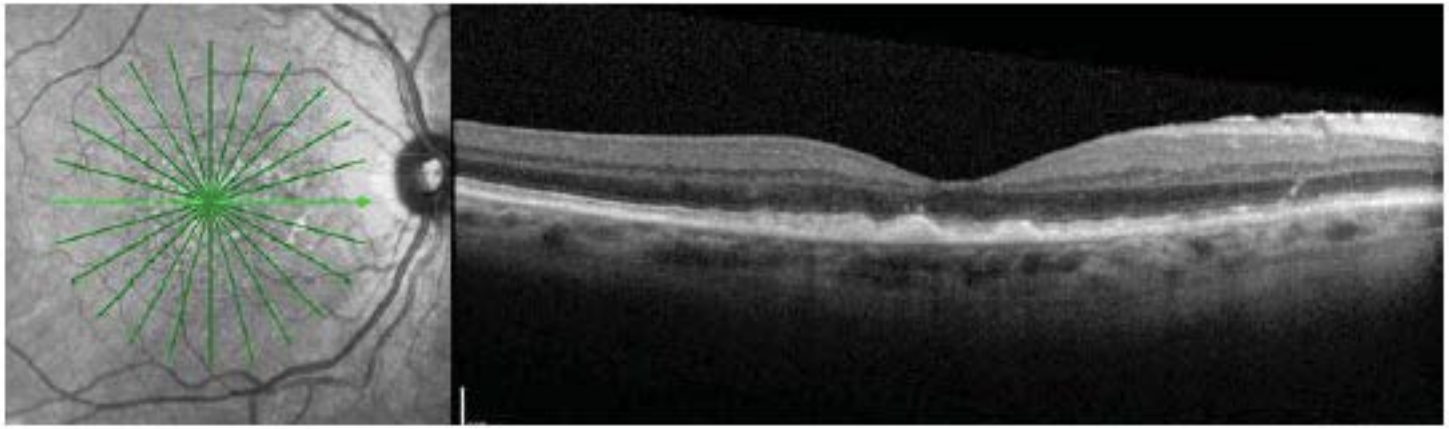
8 year old boy with this congenital finding:



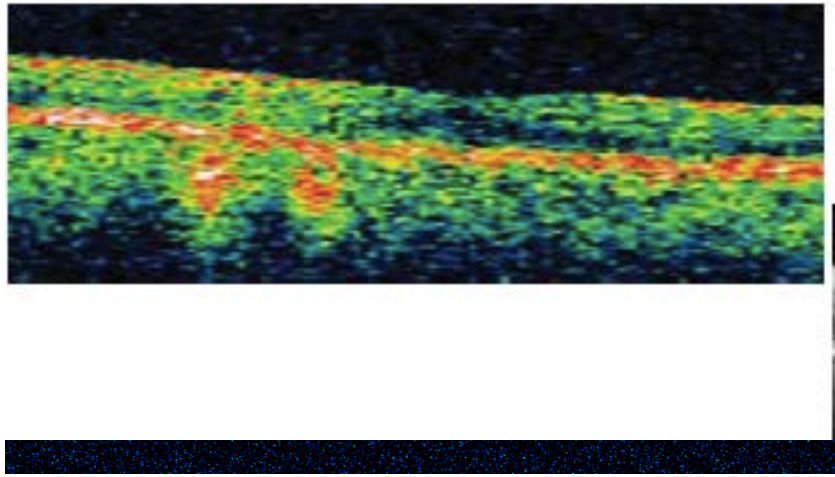
RPE/Subretinal Space/Choroid

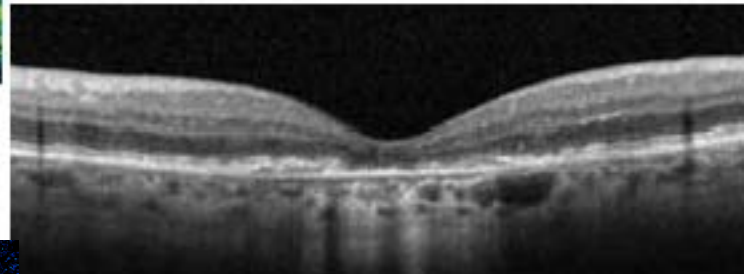
- ARMD
  - Drusen
  - Geographic Atrophy
  - Choroidal Neovascular Membrane (CNVM)
  - Subretinal Fluid
- Best's Disease/Vitelliform Dystrophy
- Central Serous Chorioretinopathy
  - Neurosensory detachment

Drusen

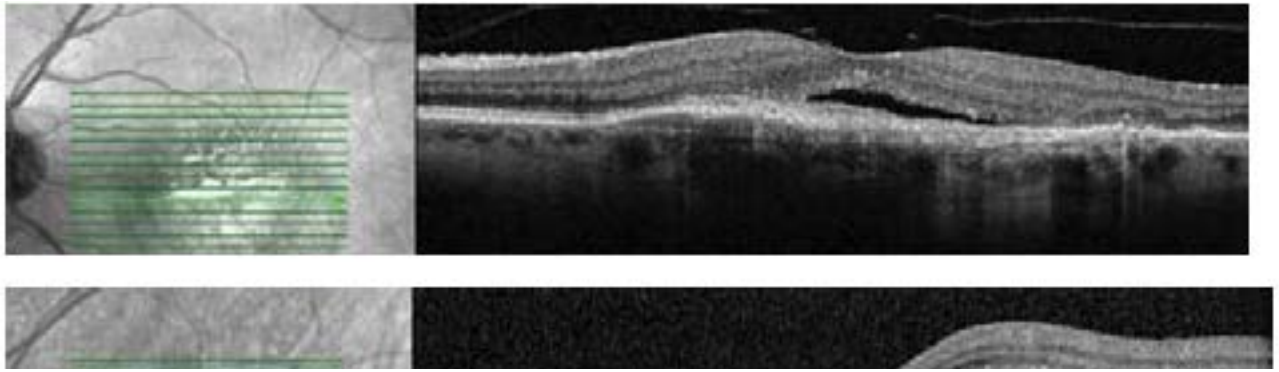


Geographic Atrophy

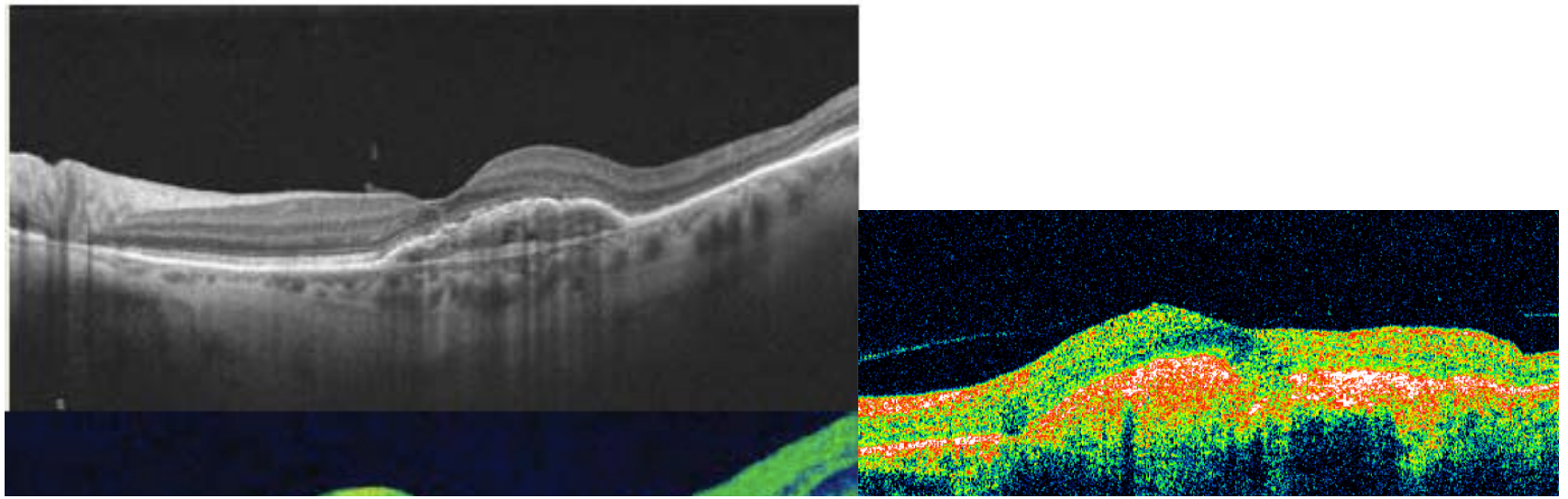




Exudative AMD

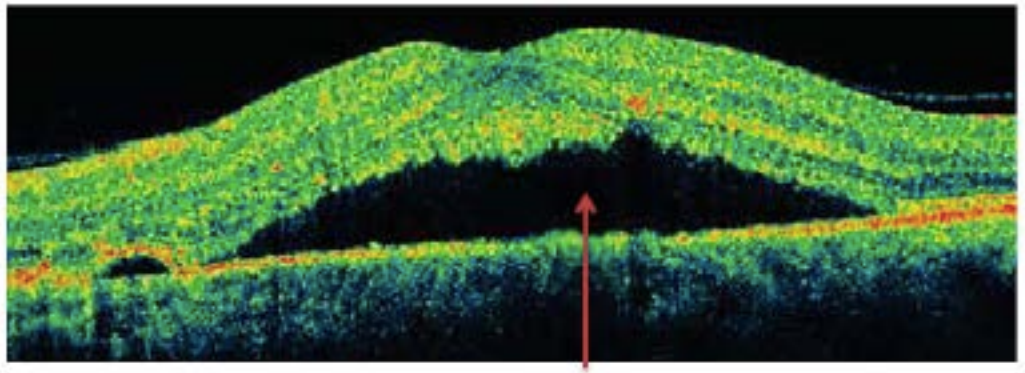


Exudative AMD – Disciform Scar



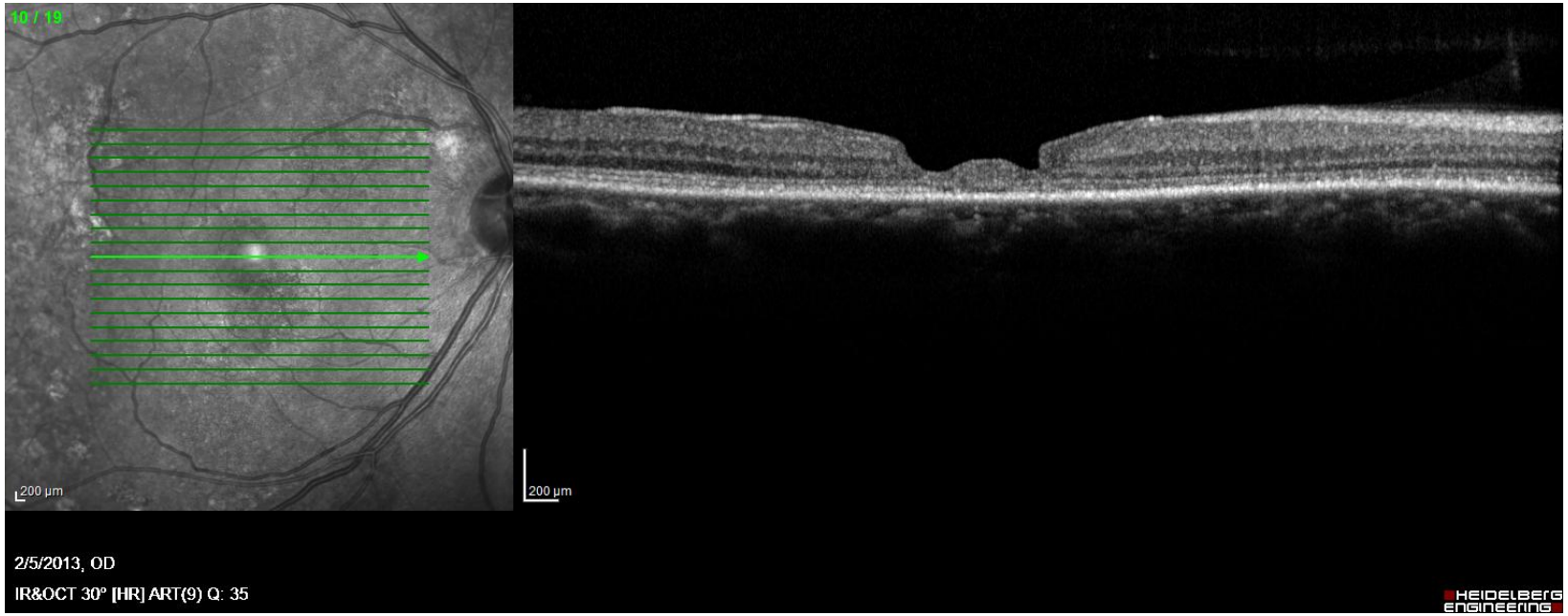
CNV from Myopic Degeneration

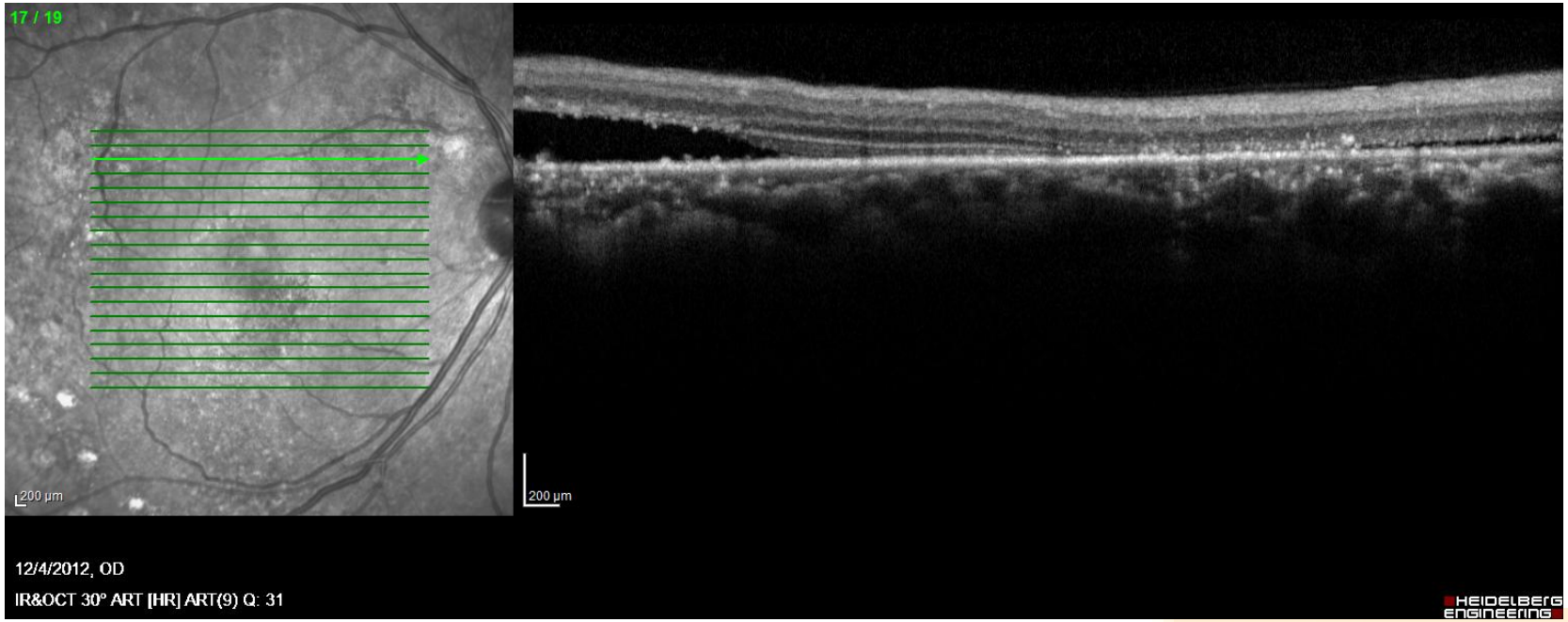
Central Serous Chorioretinopathy

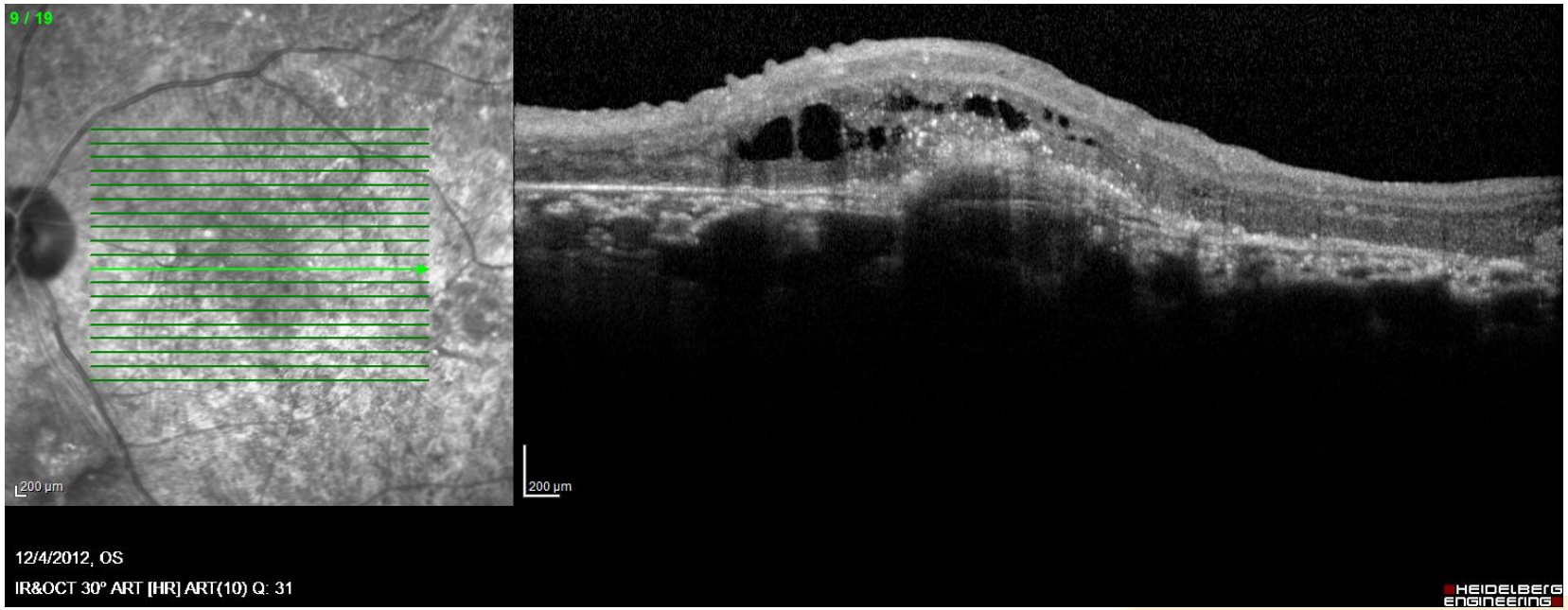


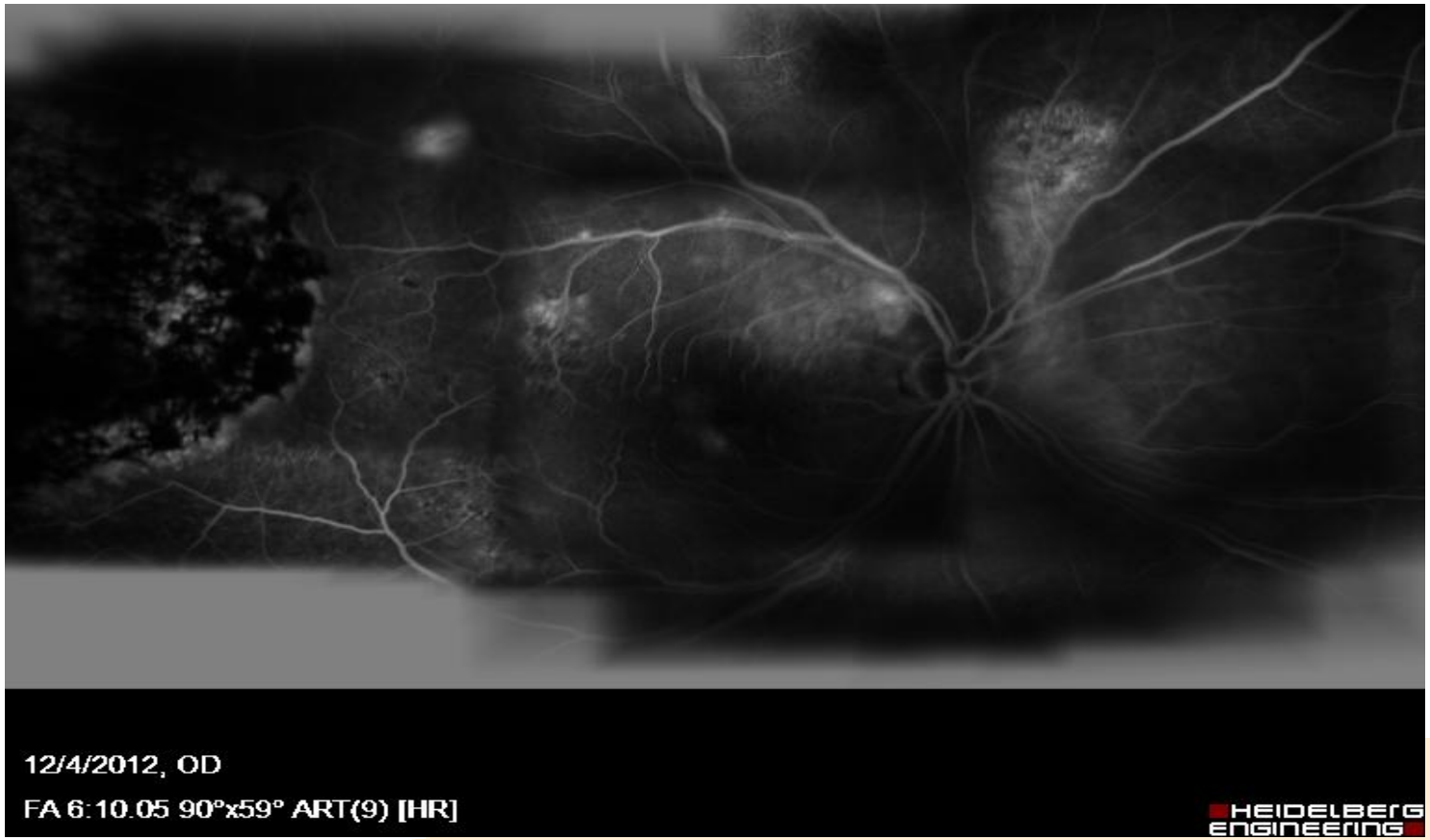
NSD/SRF

Case 1 50 yo hisp male with chronic va loss ou









Multifocal CSR

Typically younger persons and often males

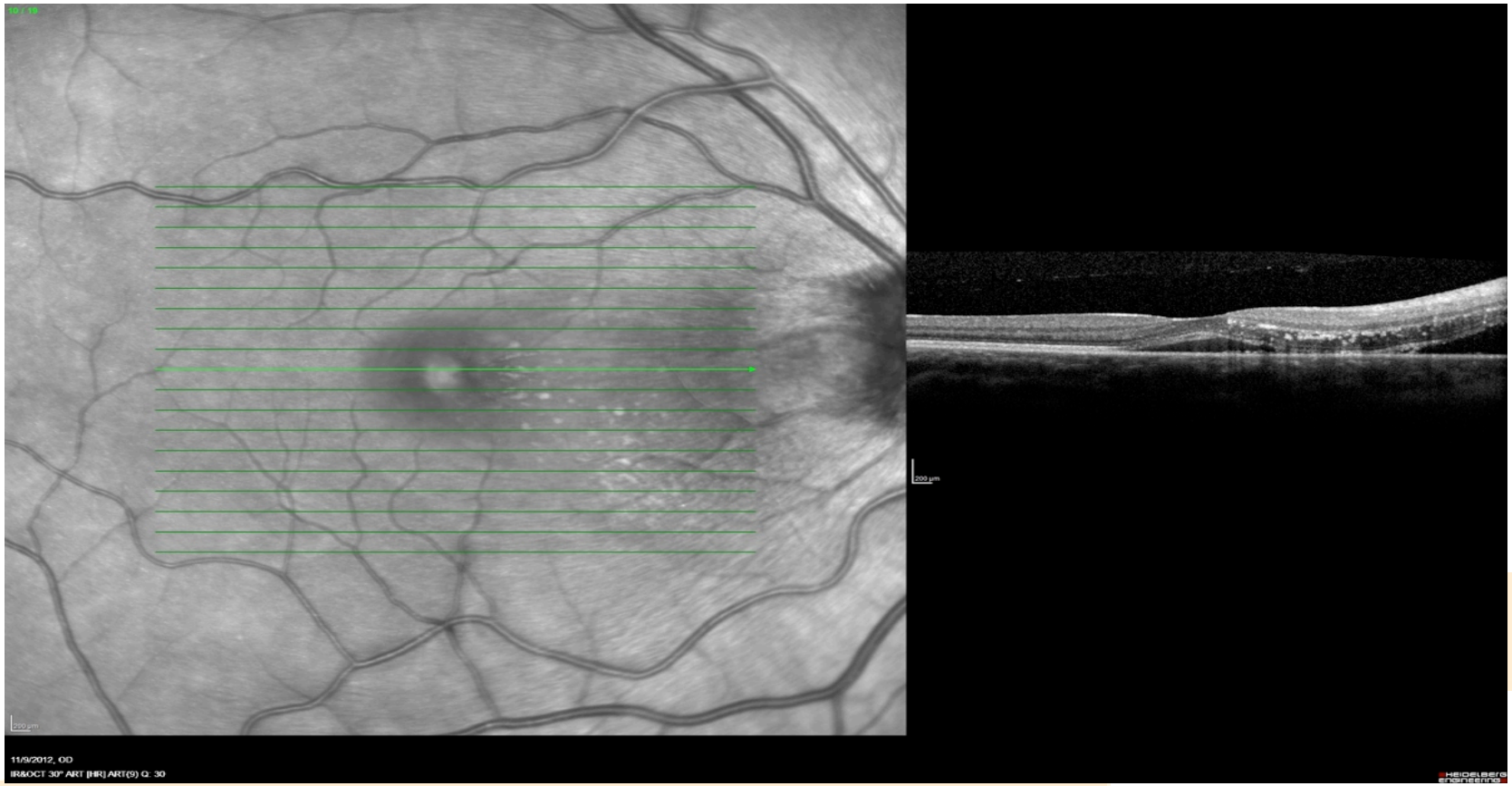
Multiple leakage points and bilaterally for this gentleman

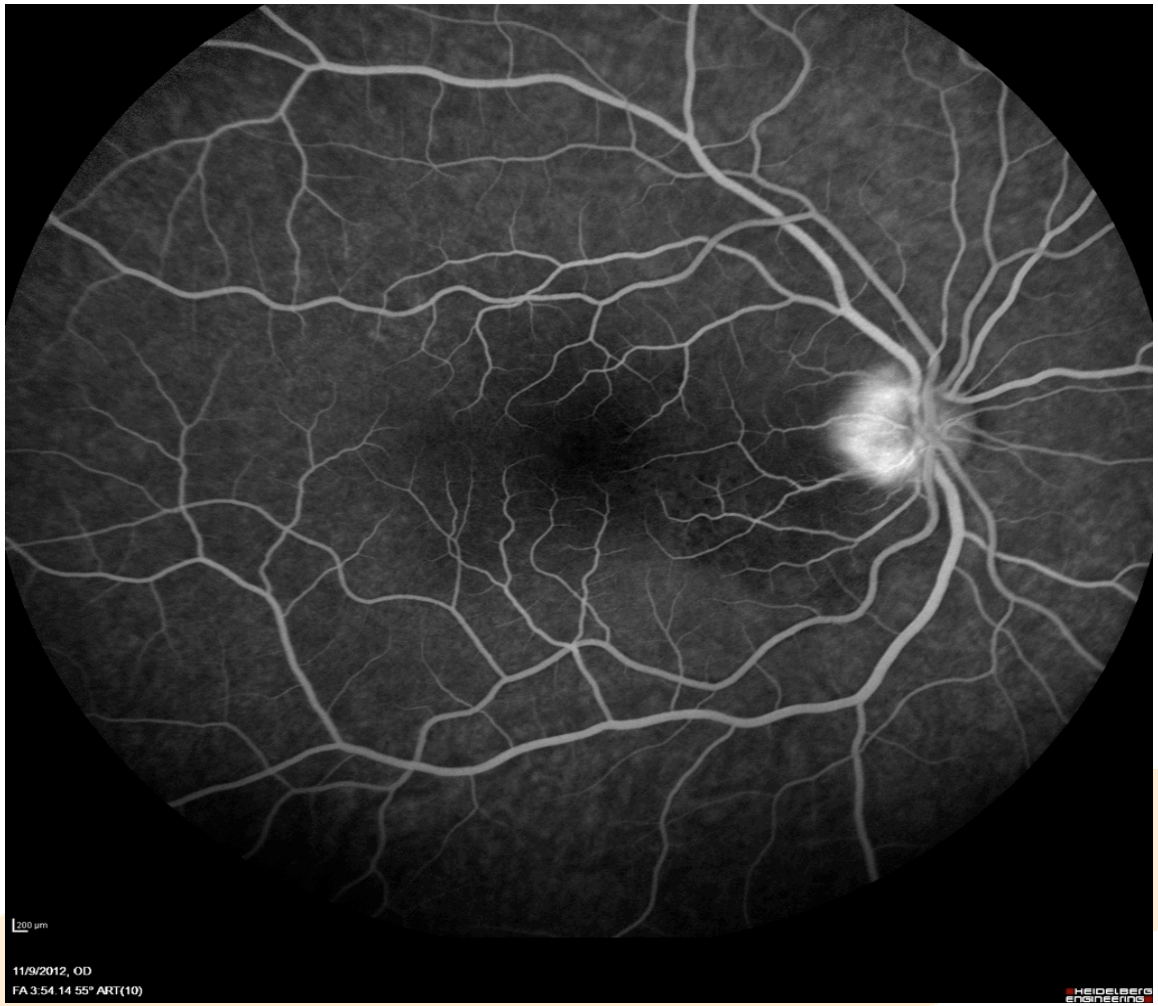
Collection of subretinal fluid results in permanent vision over time

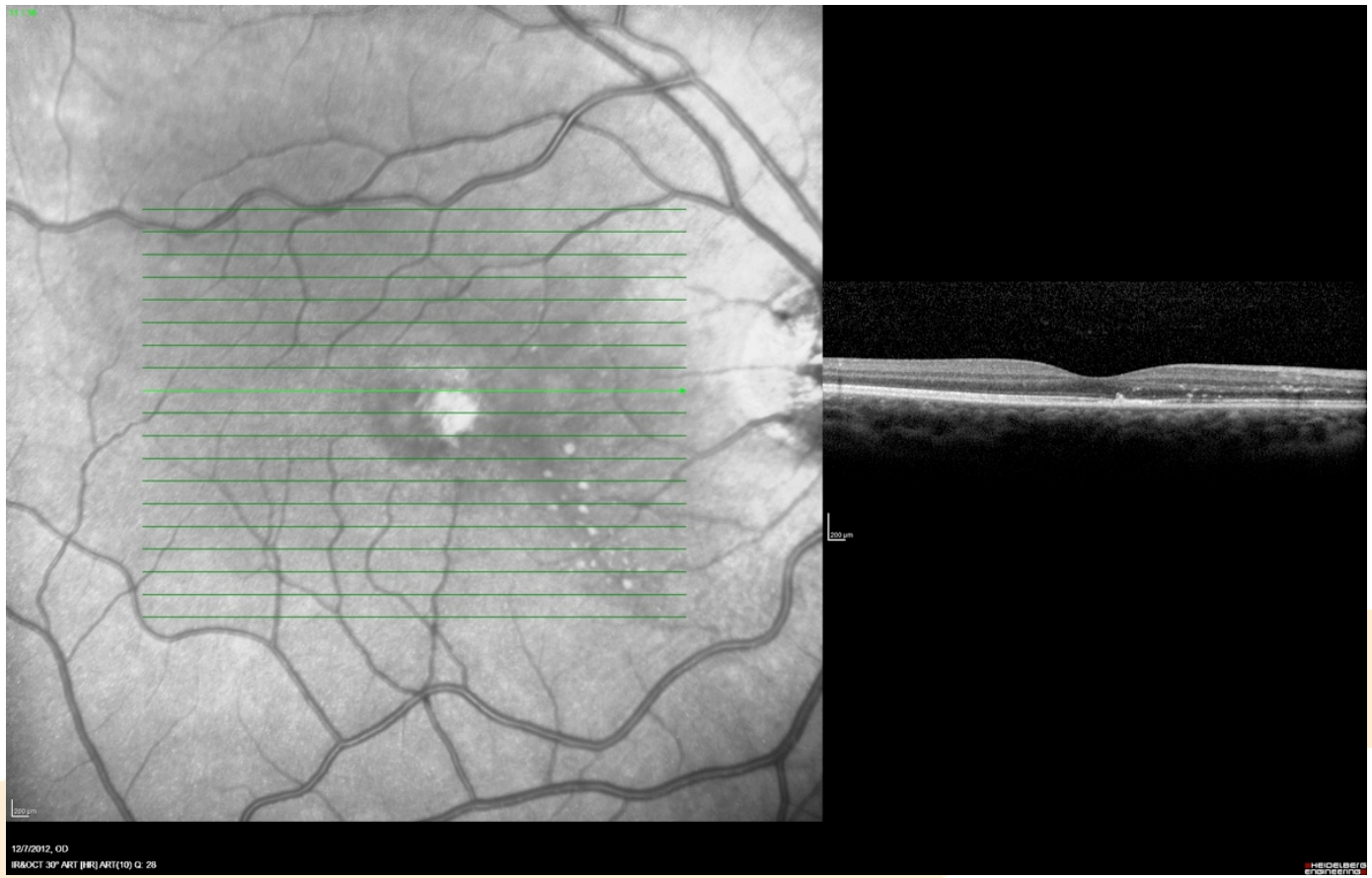
Need to be asked about steroid use

Possible new treatments including rifampin in addition to focal laser

Case#2 - 20 yo white female with acute vision loss od







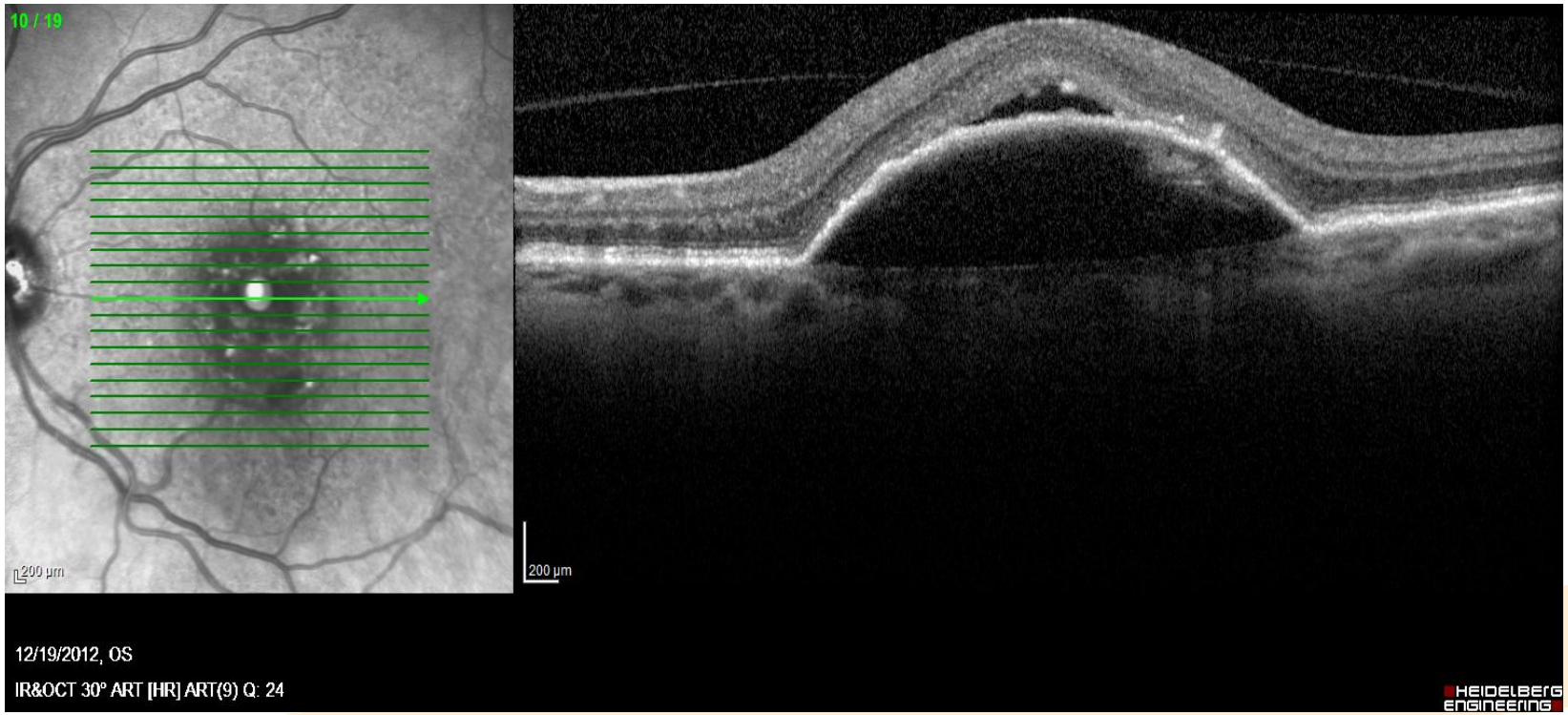
Juxtapapillary choroidal neovascularization (CNV)

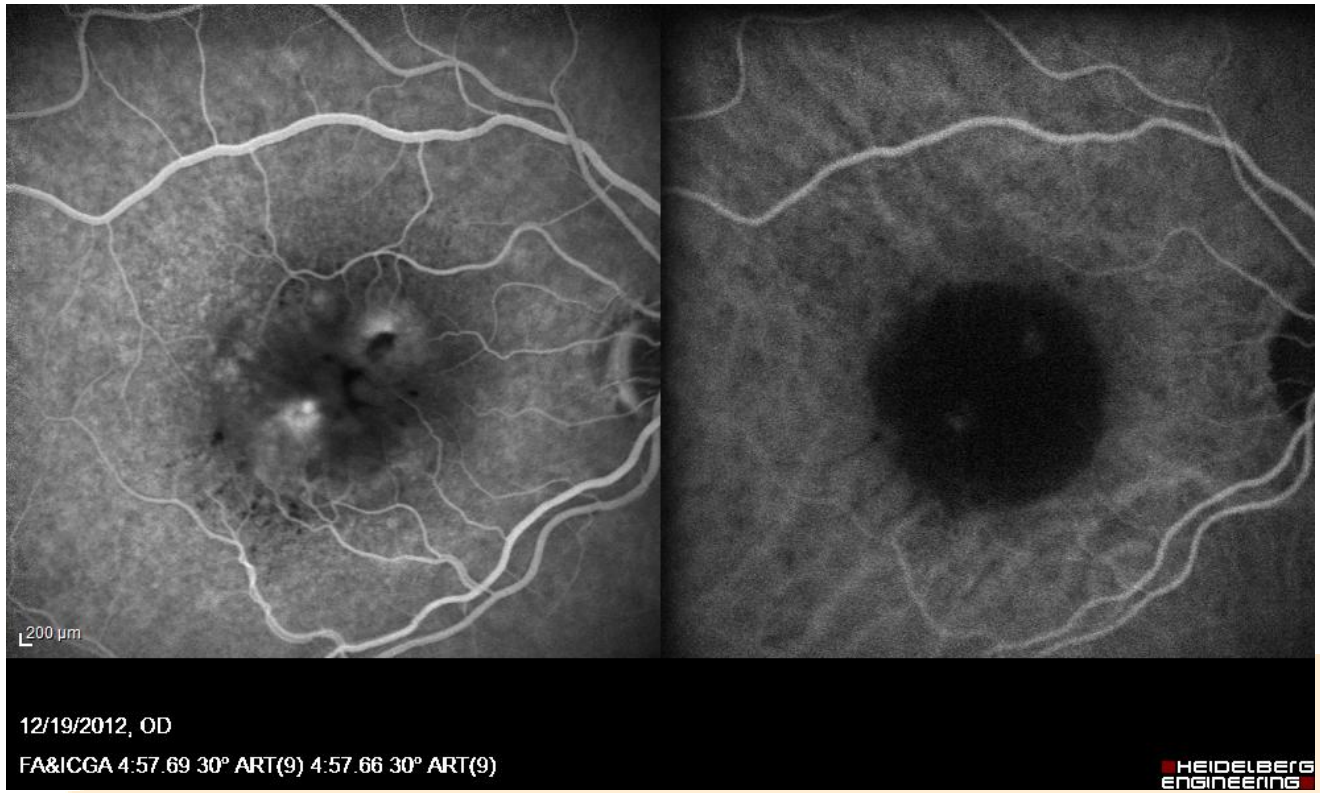
Typically younger persons

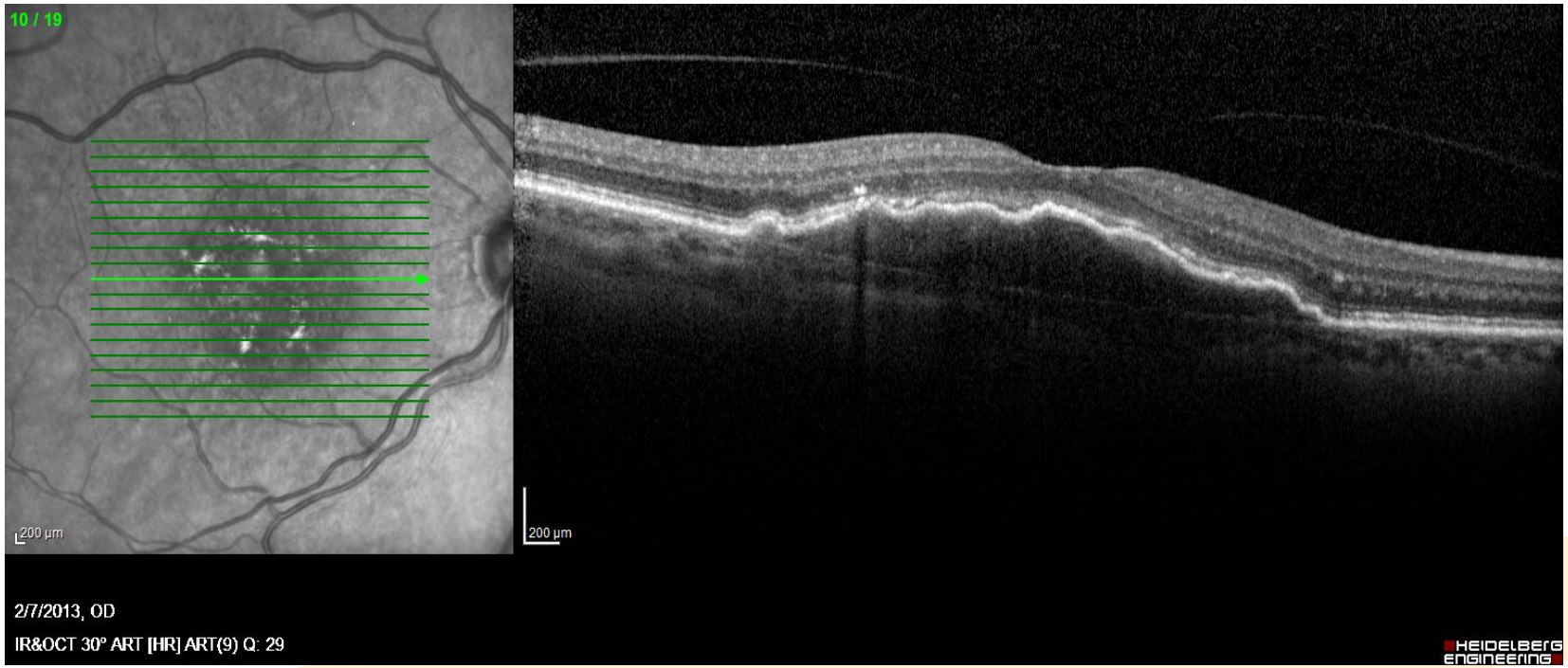
Subretinal fluid causes vision loss

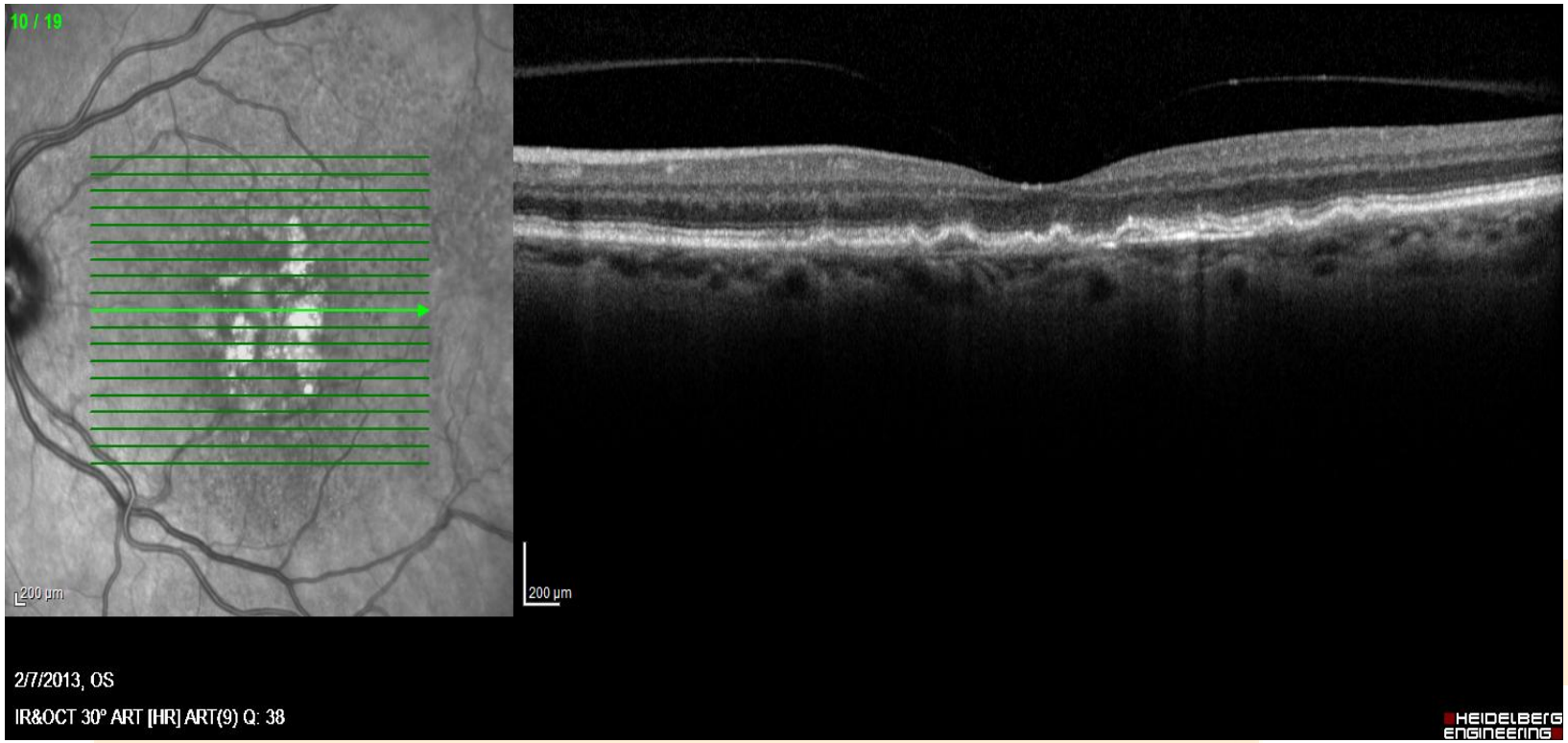
Responds very well to anti-VEGF treatment

Case #3 – 60 yo white female with chronic vision loss ou









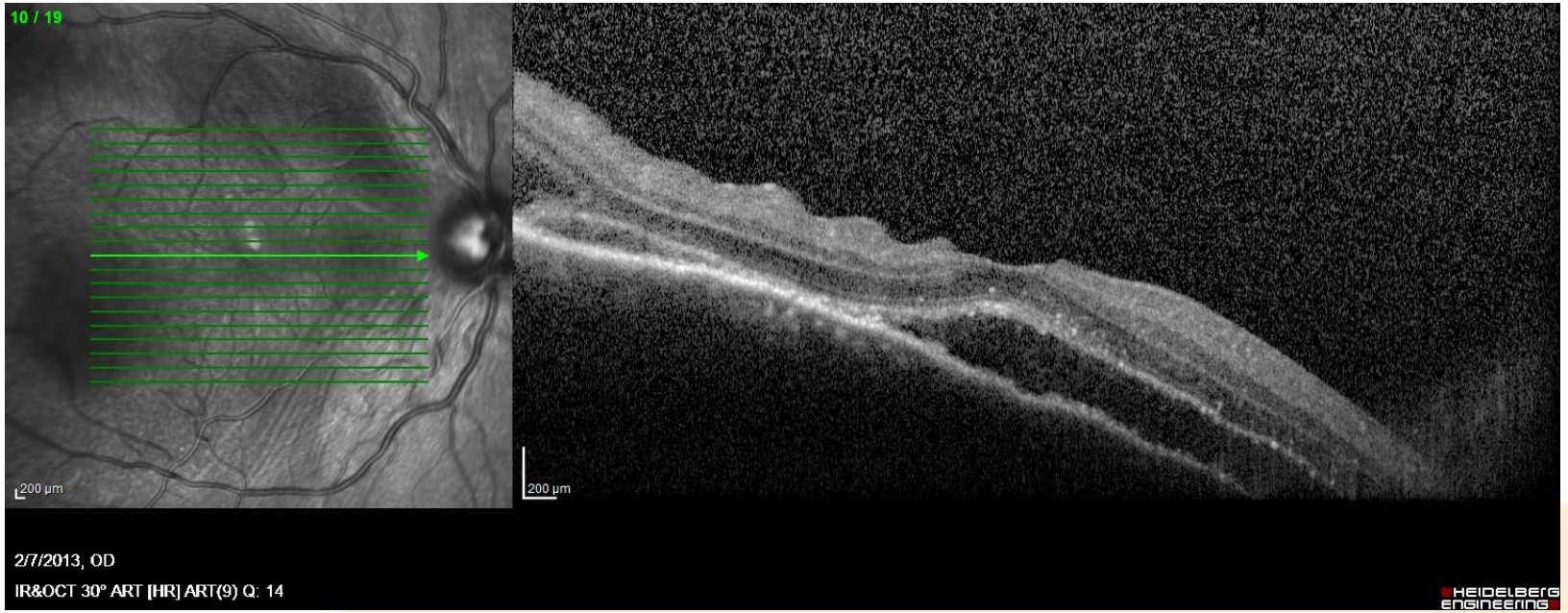
Wet AMD

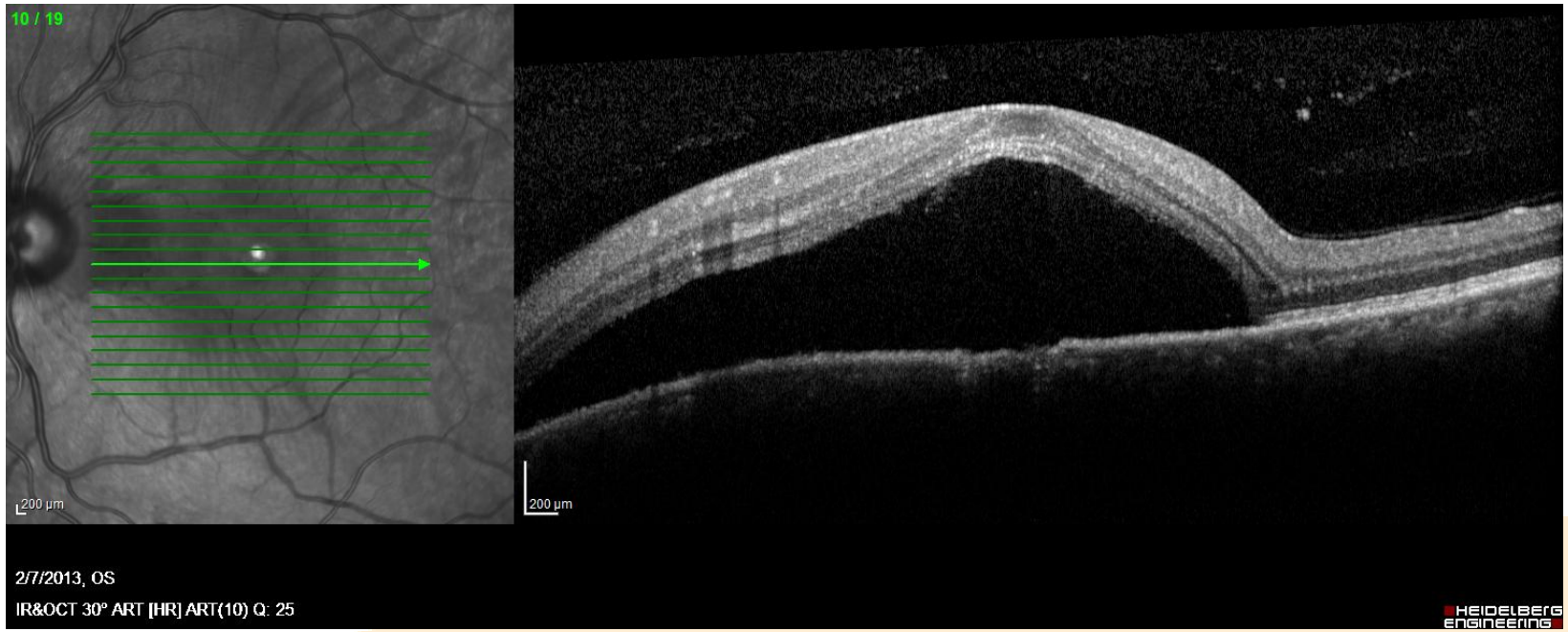
PEDs can be serous or fibrovascular

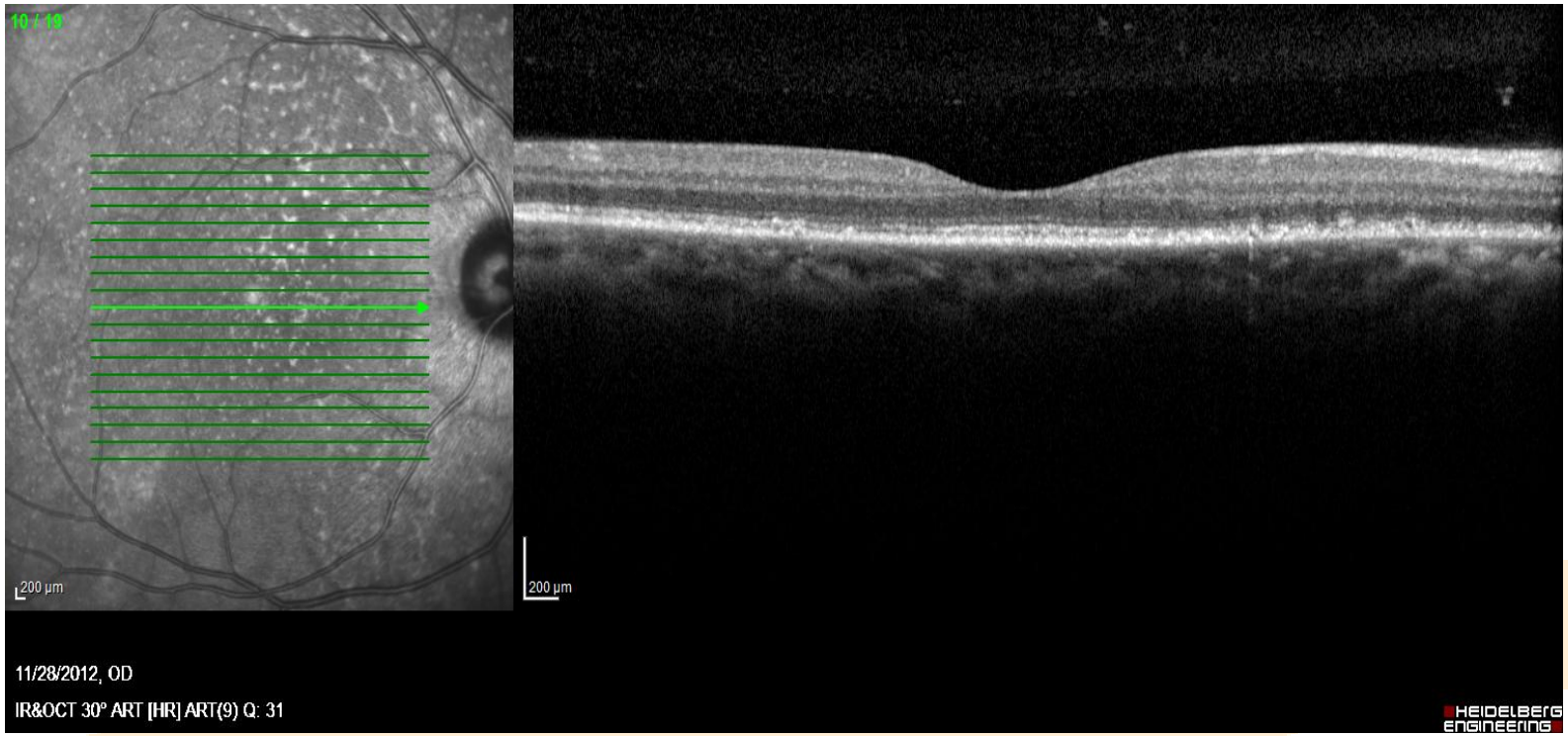
Responds well to anti-VEGF treatment

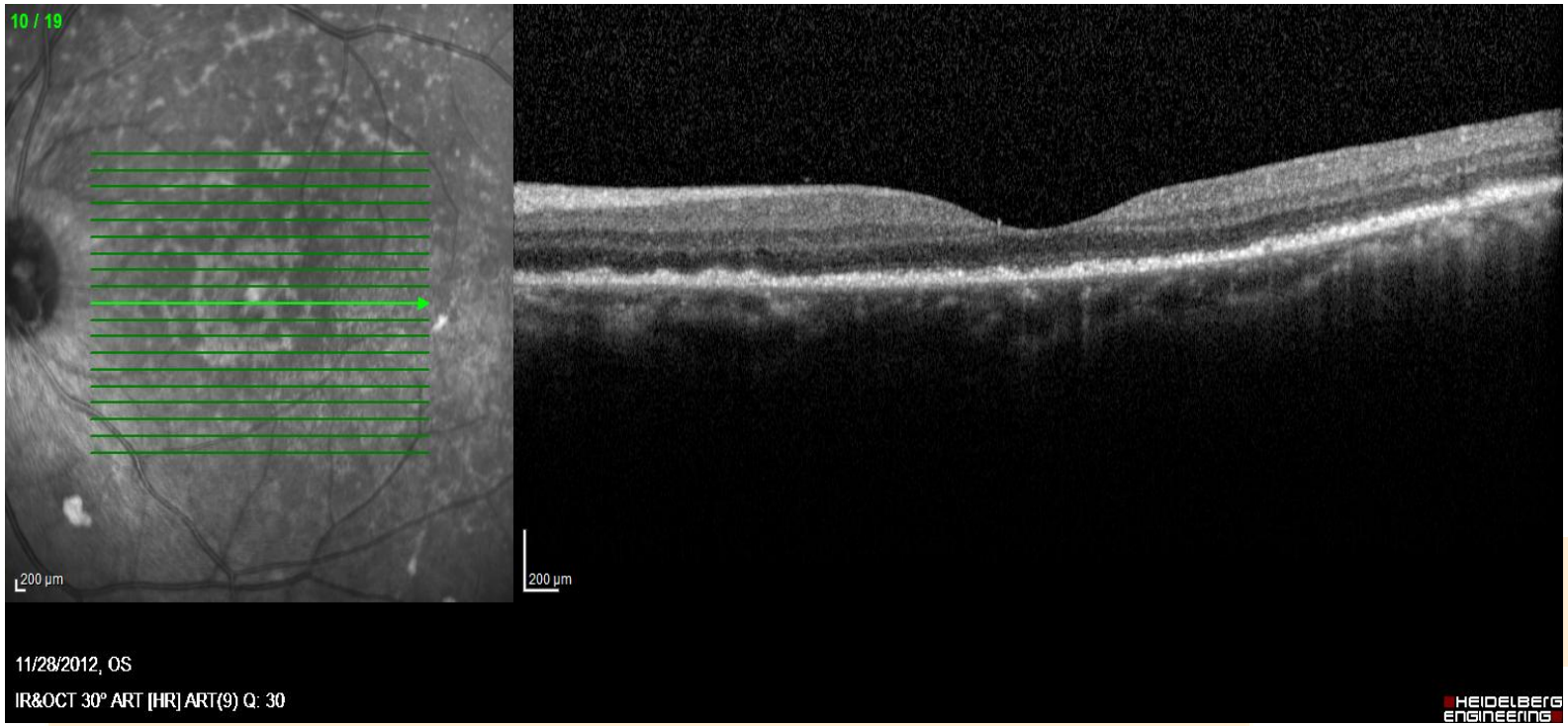
Low reported risk of RPE rip with treatment

Case #4 – 30 yo hisp female with acute va loss ou









VKH (Haradas syndrome)

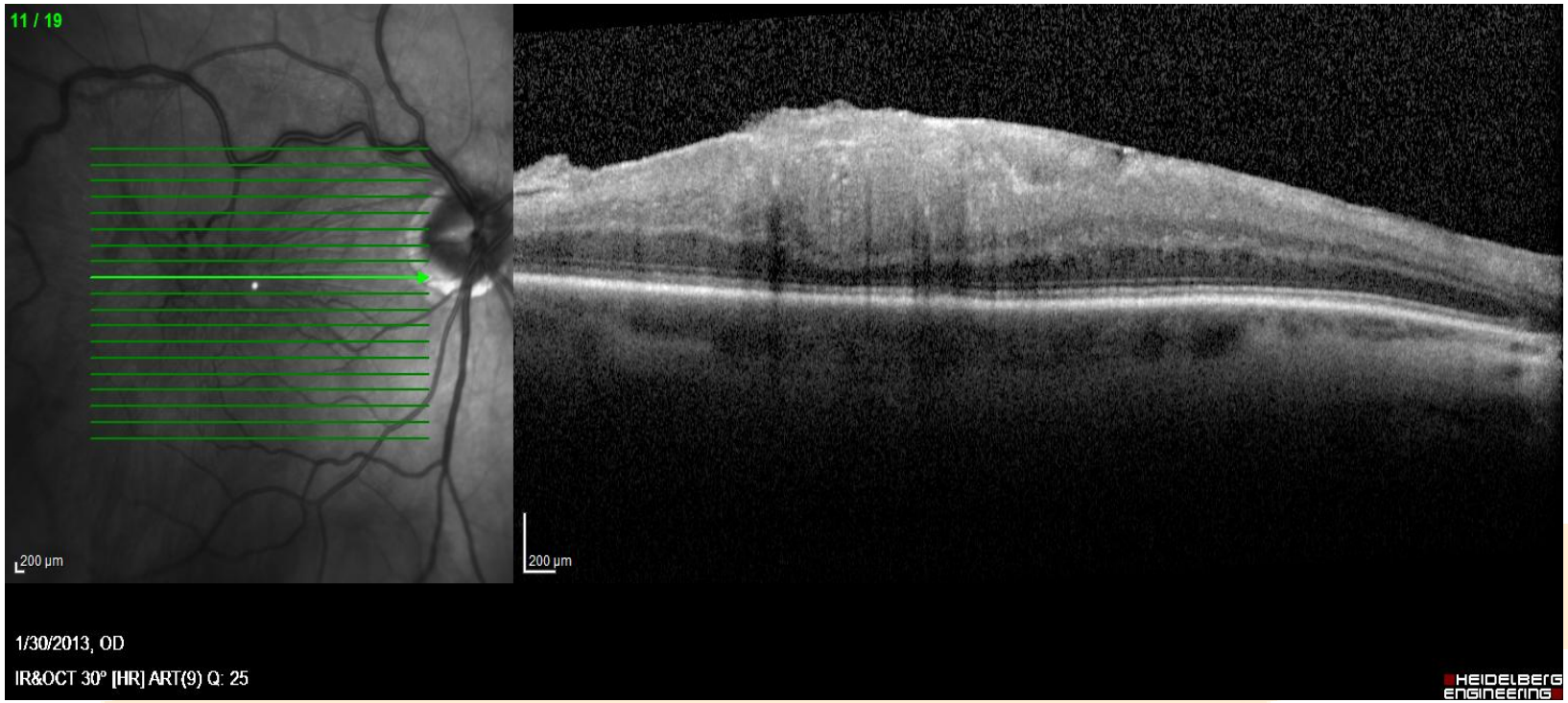
Subretinal fluid results from choroidal inflammation

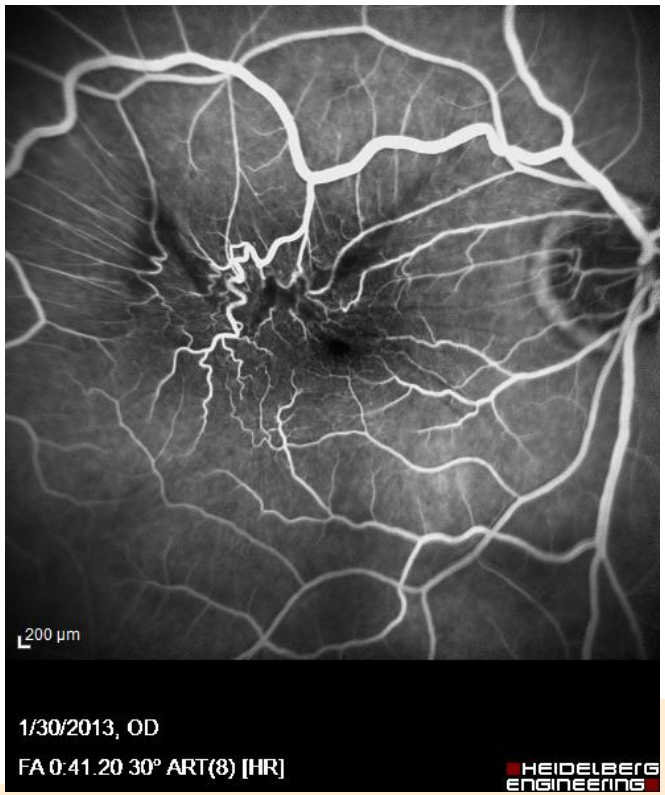
Serous retinal detachments from severe subretinal fluid

Needs long term steroid and anti-inflammatory treatment

Suprachoroidal delivery of steroids has been successful for cases involving eyes only

Case#5 – 55 yo white male with chronic va loss od





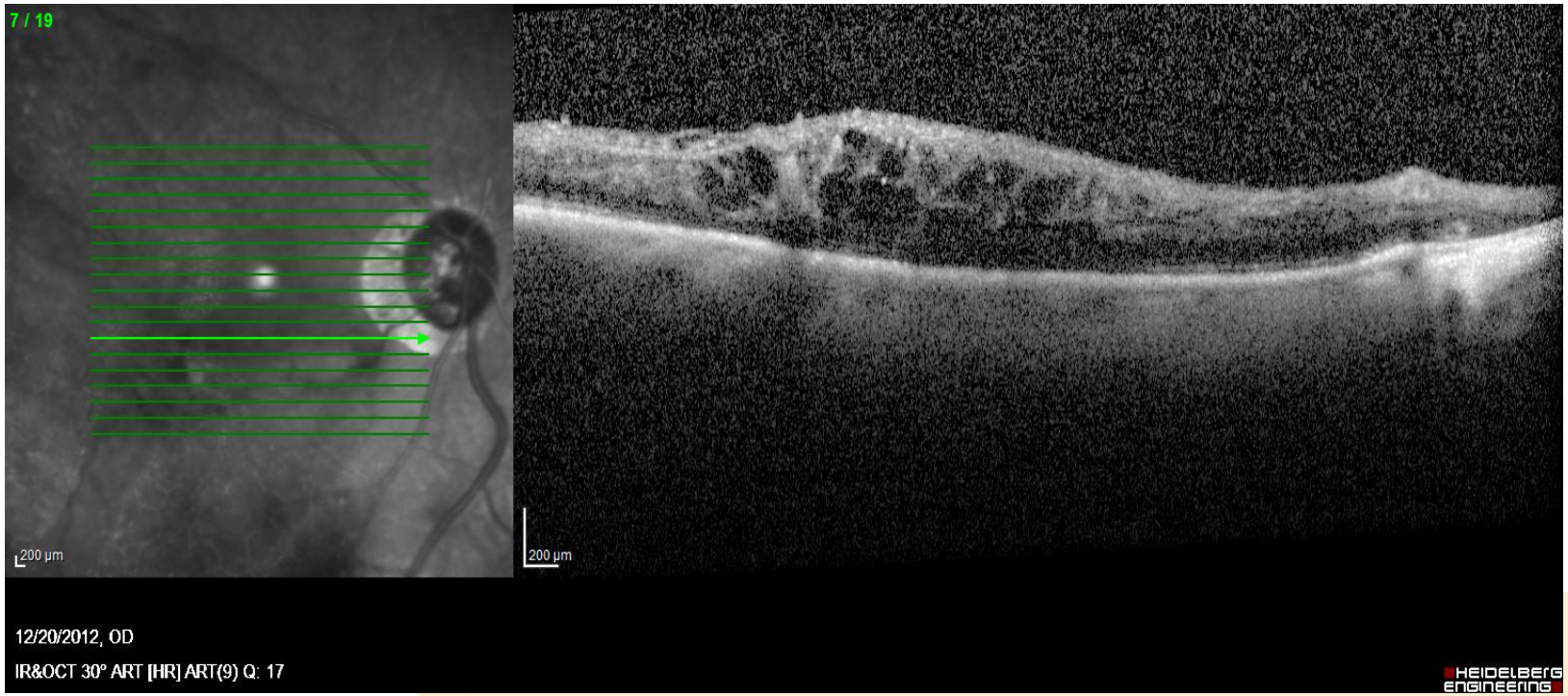
Macular Pucker

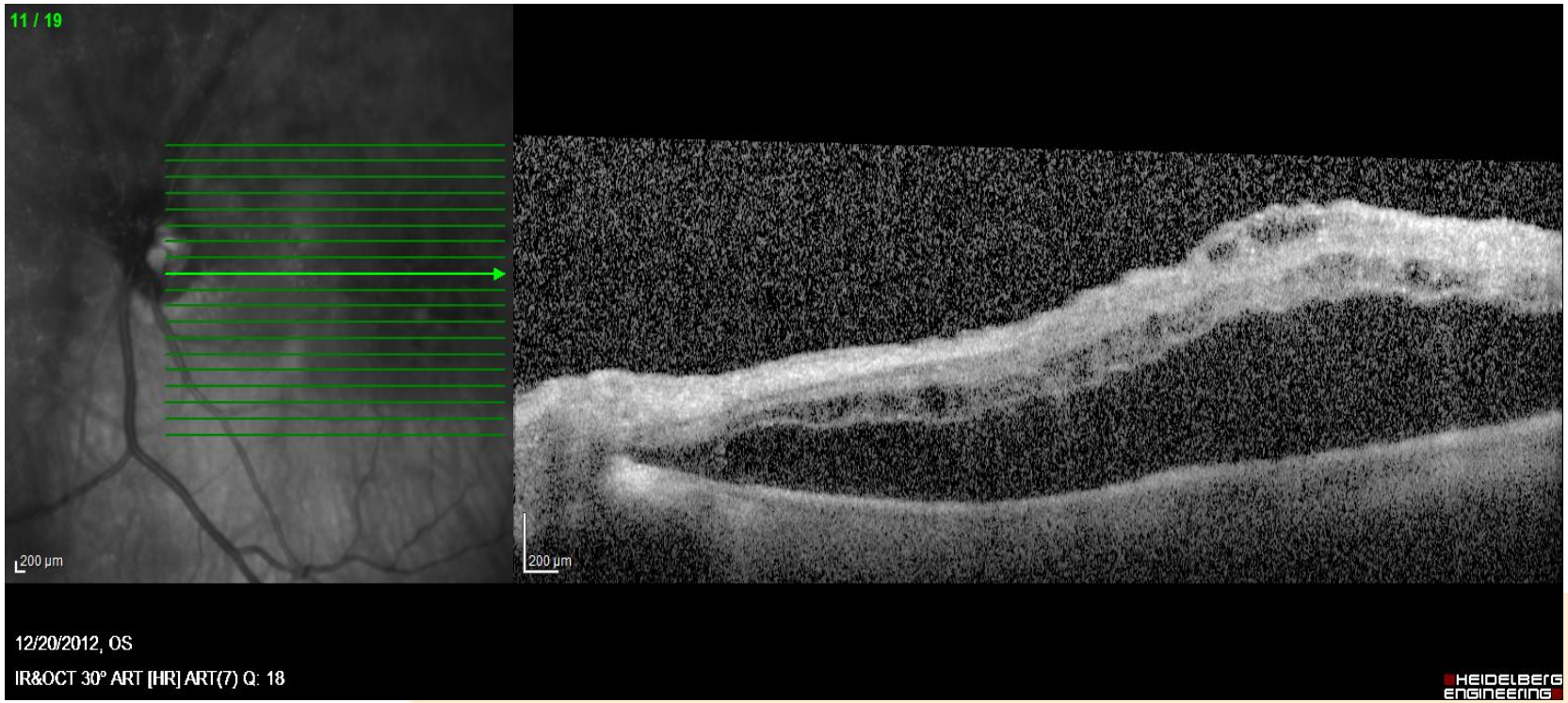
Usually this glial proliferation? results when PVD present

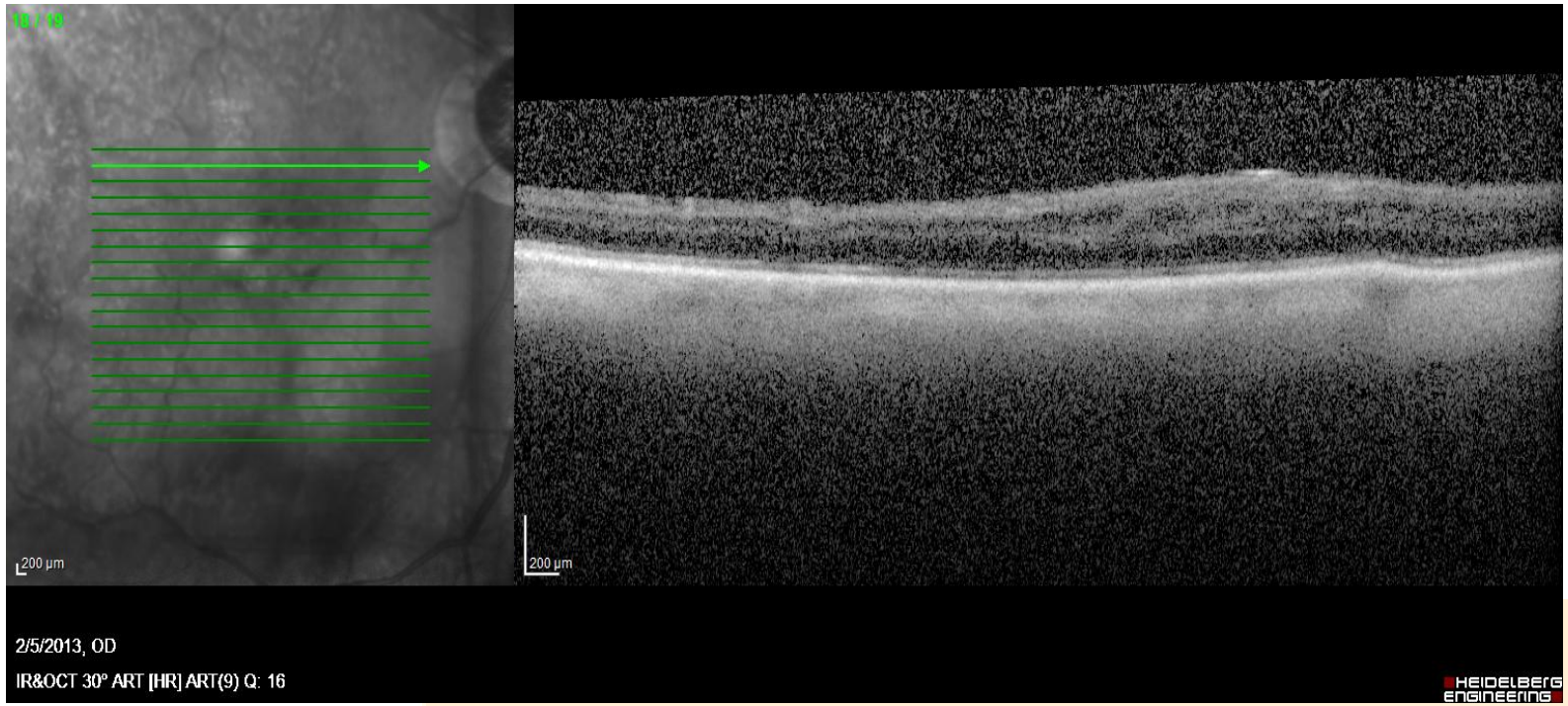
Very prominent pucker can result from PVR (proliferative vitreoretinopathy) from retinal tear/detachment

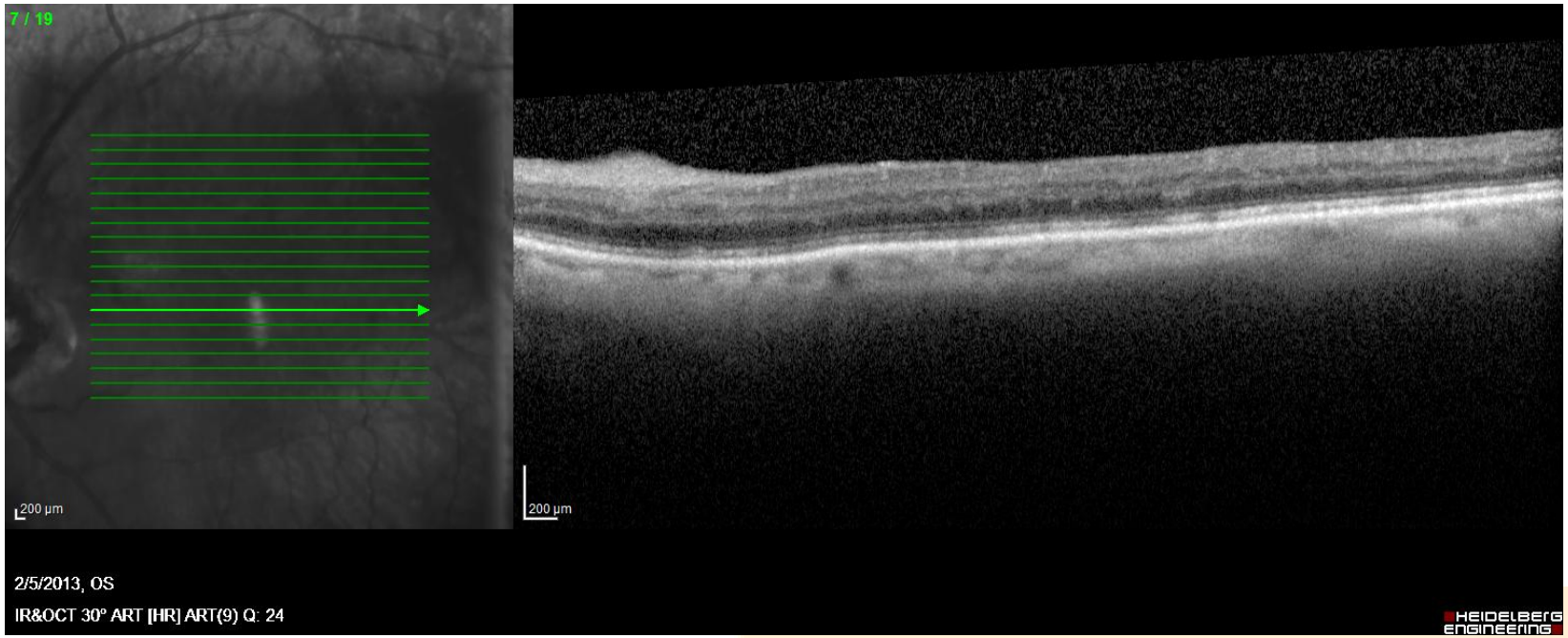
Surgical treatment only

Case #6 – 90 yo chinese female with chronic vision loss ou









Retinal Vein Occlusions

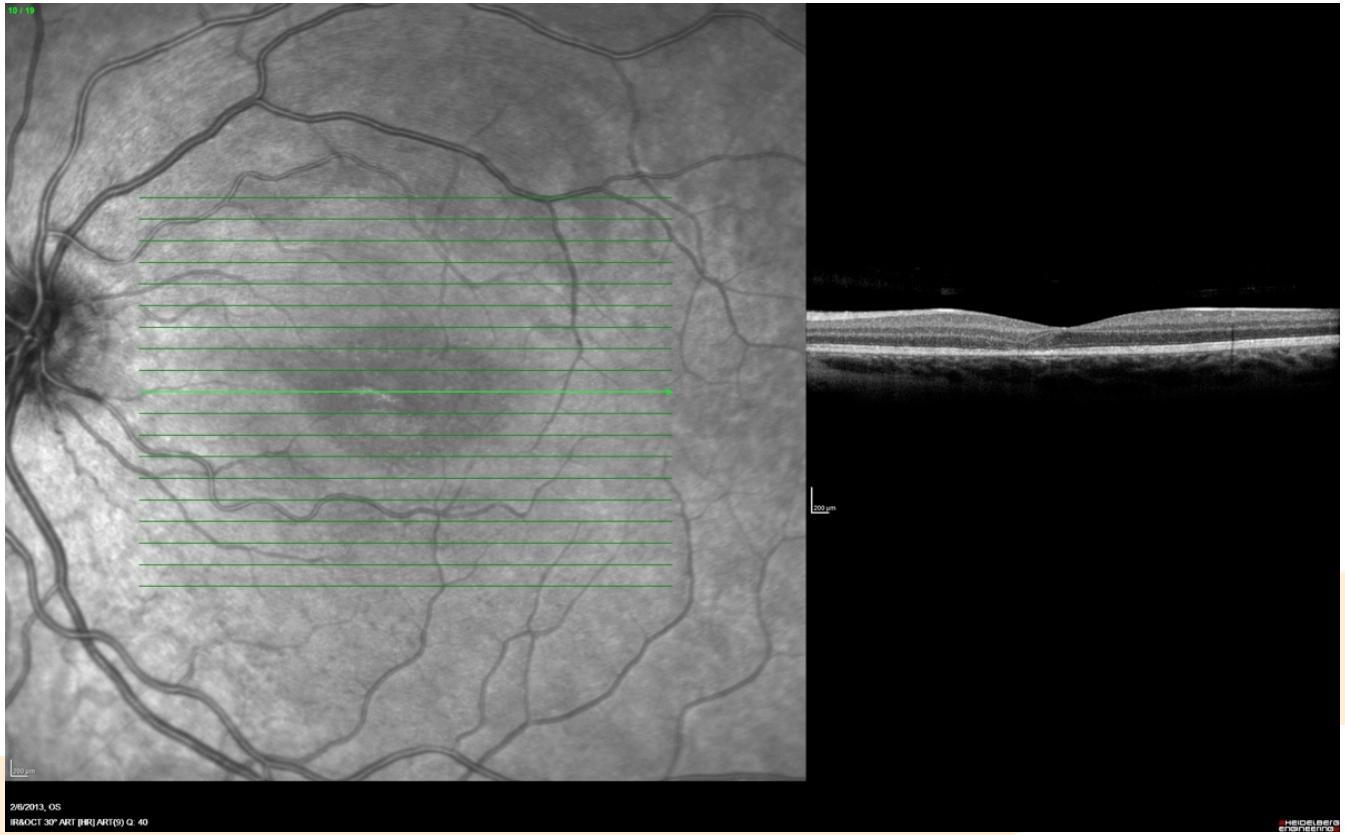
Risk factors are hypertension and glaucoma

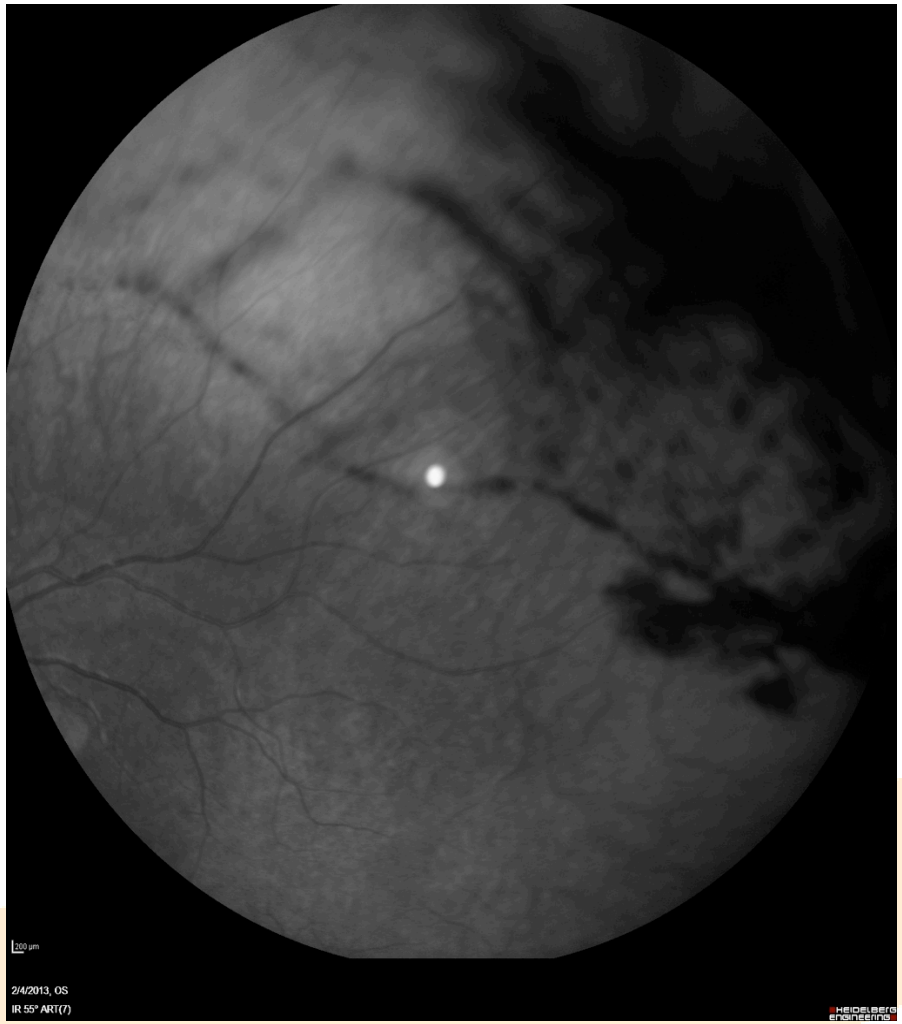
Types include BRVO, HRVO, and CRVO

Respond well to anti-VEGF treatment and laser

Atrophy of retina in macula limits visual potential

Case #7 – 15 yo white male with acute va loss after soccer ball hit OS





Commotio Retinae

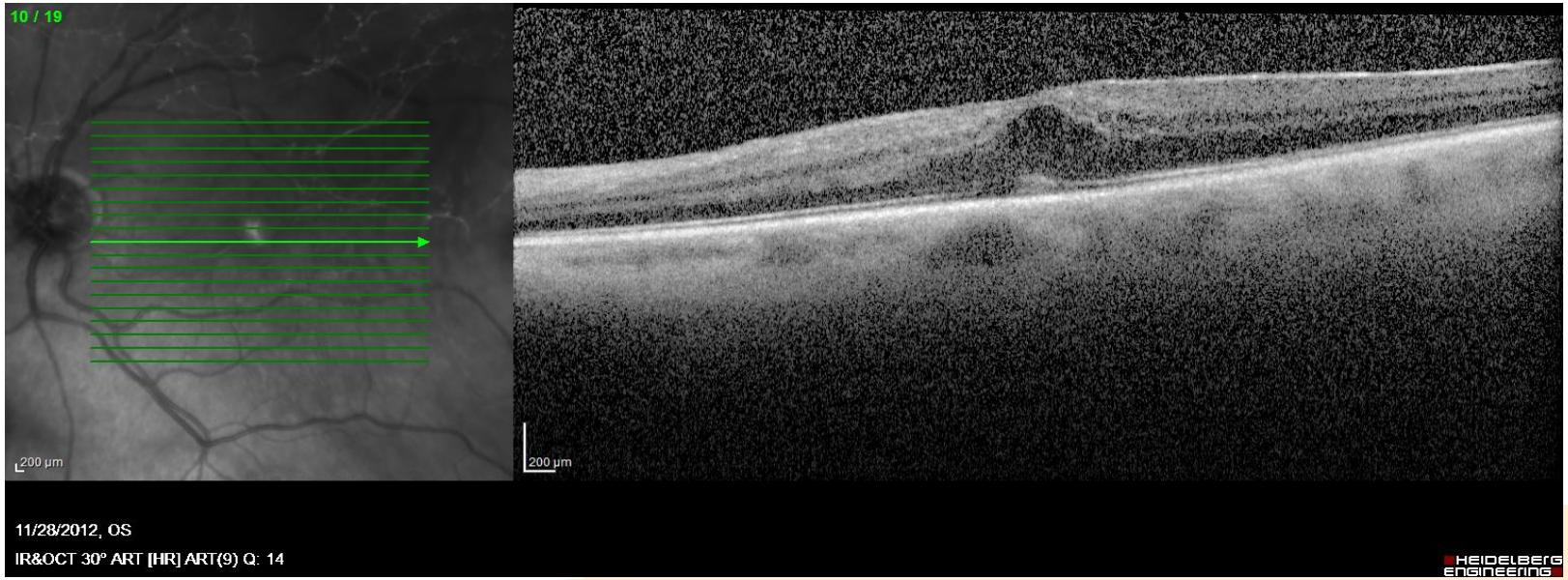
Results from sound waves created by blunt trauma

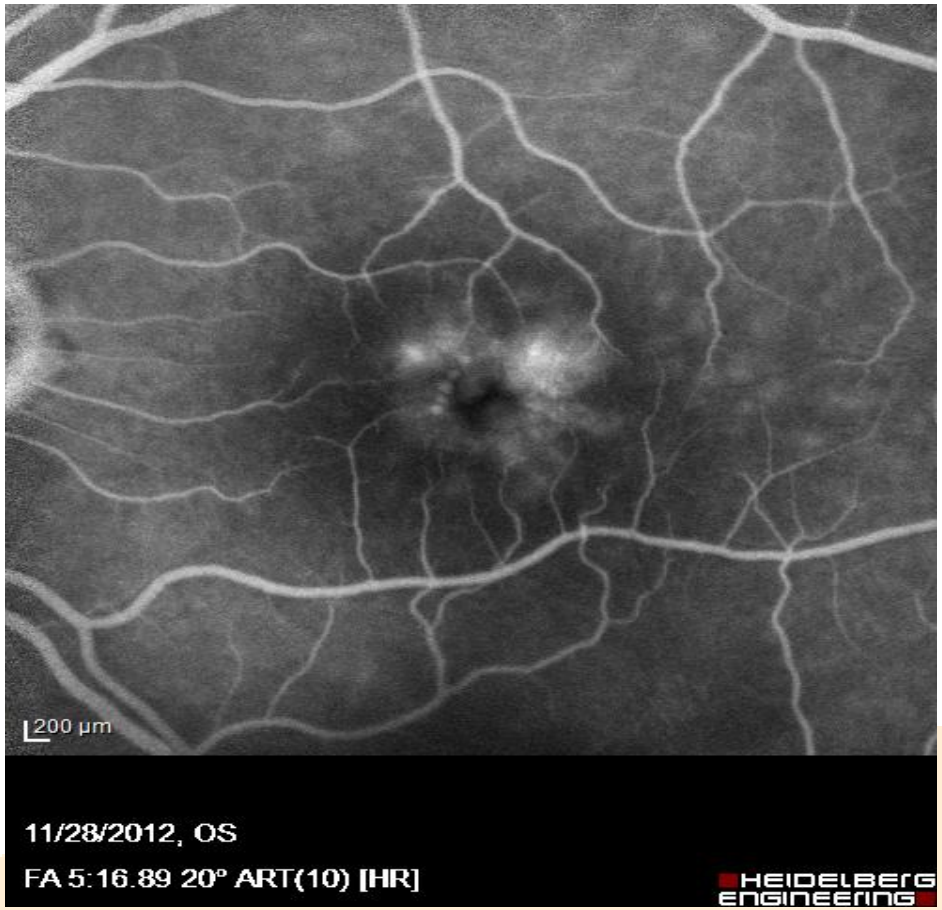
Defined as damage to photoreceptors

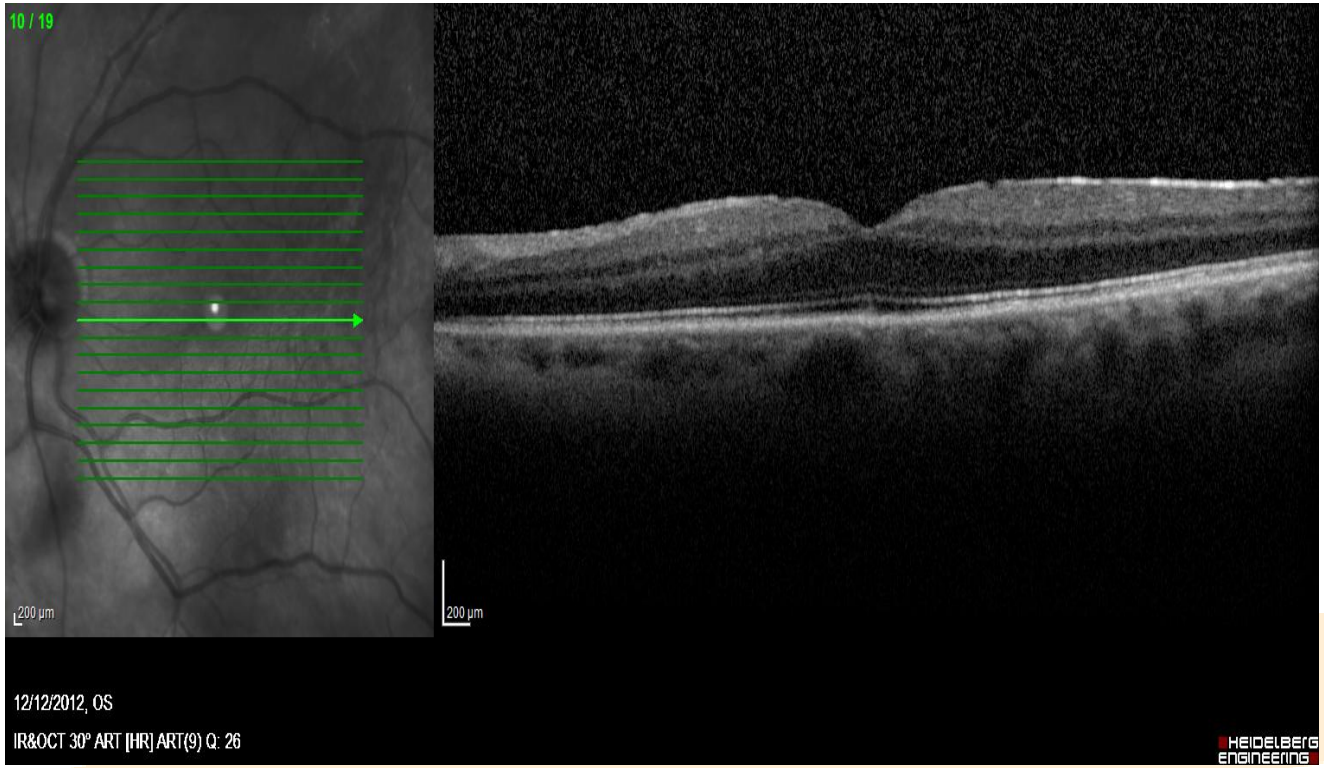
Can have some improvement over time

No effective treatment known

Case #8 – 55 yo white male with acute va loss os







Iritis and CME

Intraocular inflammation can cause CME

NSAID gtts can effectively treat

Intravitreal medicine (kenalog) may be needed if resistant

Conclusion

- OCT is a powerful diagnostic tool
- Aids in treatment decision making
- Surgical decision making
- Patient education
- Increases compliance
- Detect eye conditions early and therefore reduce risk of vision loss in our patients
- Helps identify patients (even asymptomatic) that should be referred for retinal consultation

Thank You!

References

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THANK YOU!

&

Enjoy the Evening

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CERTIFICATIONS

Board Certified - American Board of Ophthalmology - 6/09

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LSU New Orleans / Ochsner

VITREORETINAL SURGICAL FELLOWSHIPS
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Two year medical and surgical retina, primarily utilizing the 25 gauge Vitrectomy system

Eye Consultants of Atlanta (Atlanta) Aug 2008 – Aug 2009
Six months retina fellow, solely utilizing the 20 gauge Vitrectomy system

EXPERIENCE

Retina Institute of California, Arcadia, CA Sept 2009-Present

RESEARCH TRAINING

CITI GCP Training Certification April 2014

RESEARCH EXPERIENCE

A Phase III, Multicenter, Randomized, Sham Injection-Controlled Study of the Efficacy and Safety of XXX Injection Compared with Sham in Subjects with Macular Edema Secondary to Central Retinal Vein Occlusion.

A Phase III, Double-Masked, Multicenter, Randomized, Active Treatment-Controlled Study of the Efficacy and Safety of 0.5 mg and 2.0 mg XXX Administered Monthly or on an As-Needed Basis (prn) in Patients with Subfoveal Neovascular Age-Related macular Degeneration.

A Randomized, Double Masked, Active Controlled Phase III Study of the Efficacy, Safety, and Tolerability of Repeated Doses of Intravitreal XXX Trap in Subject with Neovascular Age-Related Macular Degeneration.

Phase 2 Multicenter, Randomized, Dose Escalation, Fellow Eye Controlled, Study Evaluating the Safety and Clinical Response of a Single, Subretinal Administration of Human Umbilical Tissue-Derived Stem Cells (XXX) in Subjects with Visual Acuity Impairment Associated with Geographic Atrophy Secondary to Age-related Macular Degeneration

Randomized, Double-Masked, Vehicle Controlled, Clinical Evaluation To Assess The Safety And Efficacy Of XXX For Improvement In Clinical Outcomes Among Diabetic Subjects Following Cataract Surgery.

A Phase 2, Randomized, Active-Controlled, Double-Masked, Multi-Center study to assess the safety and efficacy of daily subcutaneous XXX Administered for 3 months as monotherapy or adjunctive to XXX, in Subjects with Diabetic Macular Edema.

A Phase 2, Randomized, Double-Masked, Placebo-Controlled, Parallel Group, Multi-Center Study to Compare The Efficacy And Safety of a Chemokine CCR2/5 Receptor Antogonist (XXX) With That Of XXX In Adult Subjects with Diabetic Macular Edema.

PUBLICATIONS, ABSTRACTS, AND ARTICLES SUBMITTED FOR PUBLICATION

ABSTRACTS:

1. Culotta AJ and Arend L: Comparison of pneumatic retinopexy versus surgery for primary rhegmatogenous retinal detachments at one private institution. (Poster presentation at ARVO 2005; Fort Lauderdale, Florida)

2. Breslin PA, Culotta AJ, Kwon MS et al : Taste matching among three bitter compounds. 1998. An abstract concerning taste matching which revealed that moderate concentrations of urea, quinine HCL, and sucrose octaacetate are indiscriminable because they either act at a common receptor cell type or at a higher level of signal integration to lead to indistinguishable neural signals. This study was done at Monell Chemical Senses Center in Philadelphia, PA.

TEXT CONTRIBUTIONS:

1. I prepared a chapter entitled "Differential Diagnosis of Exophthalmos" as part of a CD-ROM production being prepared for medical students interested in ophthalmology by Zeynel A. Karcioglu, former director of residency training at Tulane University

INTERESTS Tennis, running, reading, traveling, Italian language and culture

Signature: _____ **Date:** _____