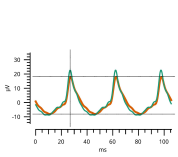
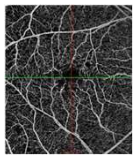
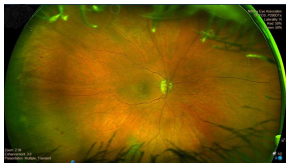
Michael Cymbor, OD, FAAO
COPE 98001-TD

Retina Update







1

Disclosure
Dr. Cymbor

- Key opinion leader and/or speaker for:
  - Visionix (Optovue)
  - Quidel
  - New World Medical
  - LKC Technologies
  - Allergan
  - Tarsus
  - Topcon
  - Thea

All financial relationships have been mitigated

2

Ways to reach out

mcymbor@nittanyeye.com

MIKECYMBOR.COM

3

Fred H. Carlin,
O.D. Community
Vision Foundation

- www.fhcvision.org

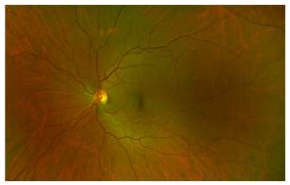
4

Case

- 46 Y/O W/F
- Type 2 Diabetes x 5 years, HTN x 5 years
  - Metformin
  - Last A1C 6.8
- No previous retinopathy
- BP 162/92 RAS
- LDL-C 160mg/dL
- Reports little to no exercise

5

Retinopathy?



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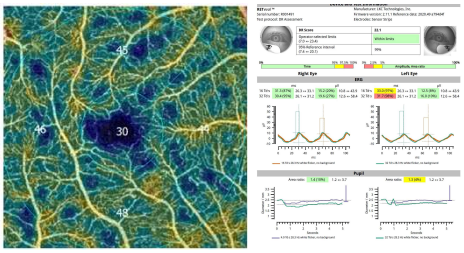
Do you...

Tell her that she has no signs of retinopathy, keep doing what she's doing and see her in a year?

7

Or do you...



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Or do you...

1. Diagnose her with hypertensive and diabetic retinopathy/retinal ischemia
2. Explain that her BP and A1C are too high and contact PCP
3. Recommend that she be on cholesterol meds
4. Recommend an exercise program
5. Consider diabetic nutraceutical supplementation and electronic blood sugar monitoring

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Interventional Management

Glaucoma

Diabetic Retinopathy?

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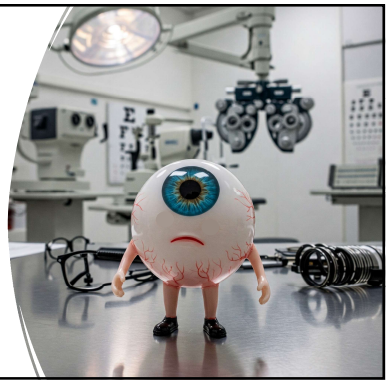
In the Management of Diabetic Retinopathy

- When is the right time to refer to retina?



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Case

- 59 Y/O W/F
- Last year's exam – mild nonproliferative diabetic retinopathy OU
- Reports fluctuating blood sugars, last A1C 8.1
- BP 147/93 RAS
- Last LDL-C was 163
- Little to no exercise
- Vision seems different
- BCVA 20/20 OD and OS
- NS1

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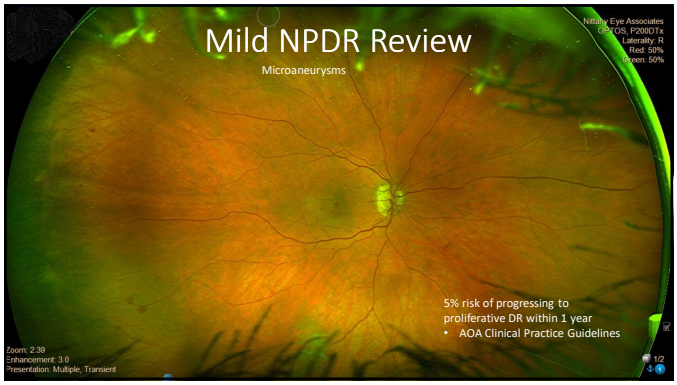

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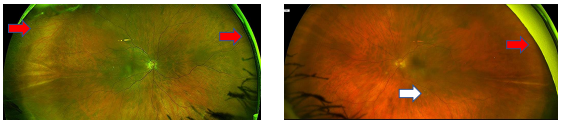
Fundus

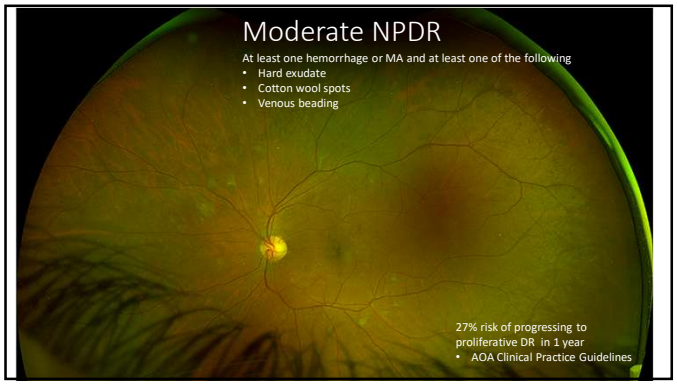


Dot and blot

Exudates

Still mild NPDR?

14



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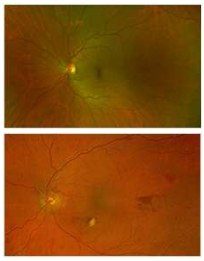
Does Medicare cover fundus photos in diabetic patients without retinopathy?



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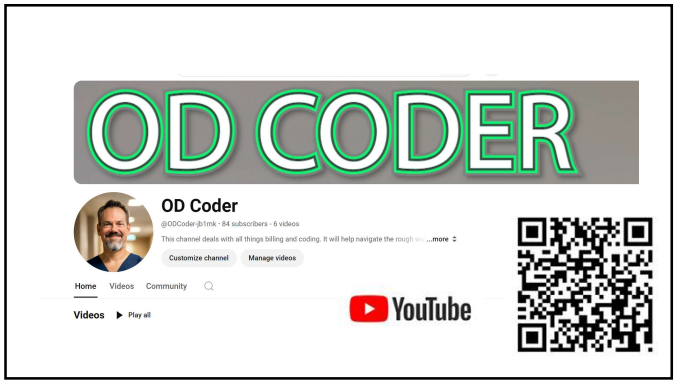

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OD Coder YouTube

- **Fundus Photography 92250**
  - $35.98
  - Written order and interpretation
  - Bilateral
    - Unilateral RT or LT with 52 modifier (reduced services)
  - Not a substitute for a dilated exam
  - "if the study is performed as a screening, it is not covered by medicare"
  - Mutually exclusive with OCT nerve/macula – 59 modifier
  - **Now covered with E11.9**

Glare sensitivity H53.71
Retinal ischemia H35.82
Visual discomfort H53.143
Visual distortions of shape and size H53.15

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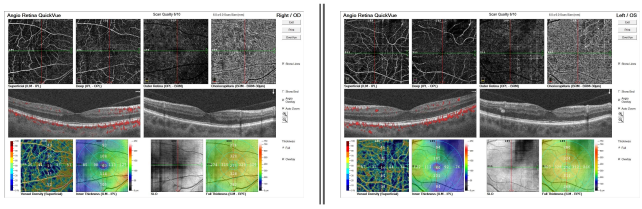
OCTA



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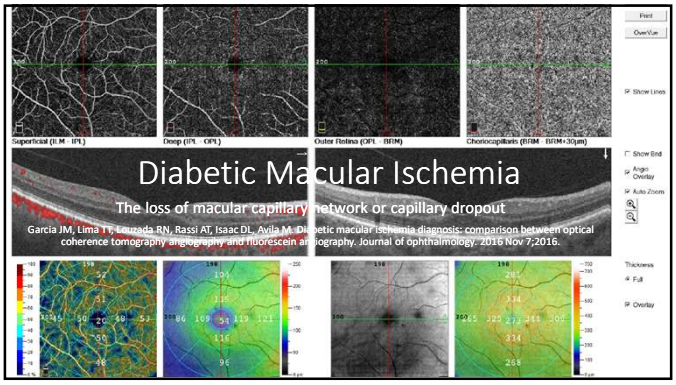

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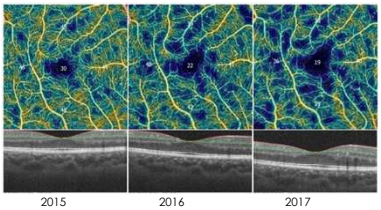
Assess Disease Progression with Multi-scan View

Vessel Density Decreases Significantly with Disease Severity[4]

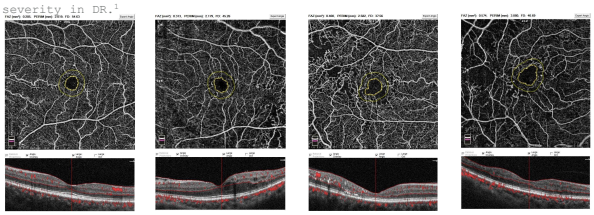


2015 2016 2017

21

Aid in Disease Severity Assessment with FAZ Measurements

FAZ size and FAZ vessel density are correlated significantly with disease severity in DR.[1]



Mild NPDR Moderate NPDR Severe NPDR PDR

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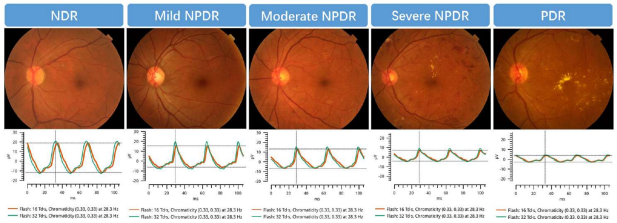

ERG is an effective screening device at all levels of DR

- Zeng Y, Cao D, Yang D, Zhuang X, Yu H, Hu Y, Zhang Y, Yang C, He M, Zhang L. Screening for diabetic retinopathy in diabetic patients with a mydriasis-free, full-field flicker electroretinogram recording device. Documenta Ophthalmologica. 2019 Nov 12:1-0.

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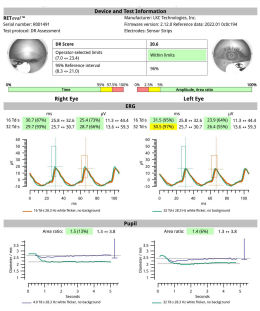
ERG



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Downgrade to moderate nonproliferative diabetic retinopathy

1. Discuss with PCP
2. Start walking program
3. Begin diabetic supplements
4. Discuss mediterranean diet
5. Recommend more aggressive HTN and cholesterol management

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Case

- 46 Y/O H/M
- Exam 1 year ago with moderate nonproliferative diabetic retinopathy
- On metformin and glipizide
- Reports borderline high cholesterol at last PCP visit, BP today 152/93
- BCVA 20/20 OD and OS
- Mac OCT below 300 microns

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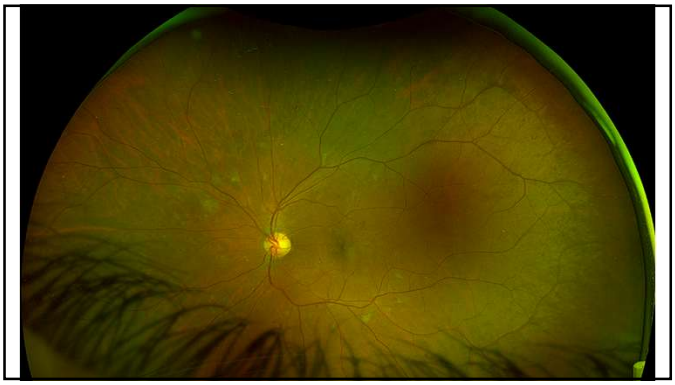

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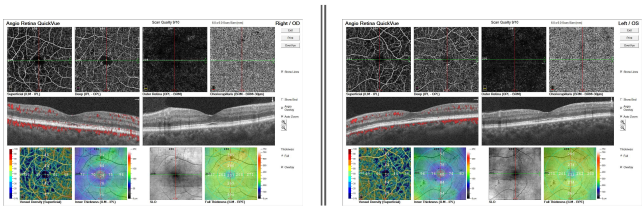
OCT-A



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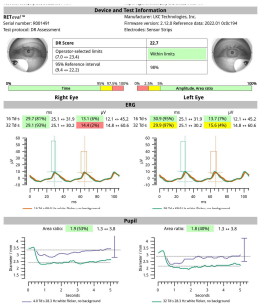
ERG



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OD Coder

YouTube

- **92273 Full field electroretinogram for diabetes**
- **92274 Multifocal electroretinogram**
- $118.32
- Written order, Interpretation and report
- Any diabetic retinopathy code
- Changes in retinal vascular appearance H35.011-013
- Hypertensive retinopathy H35.031-033
- Retinal ischemia H35.82

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Diagnosis

- Still moderate non-proliferative
- But dangerously close to the 23.5 threshold

- If ERG DR score is greater than 23.5 then **34%** chance of needing ocular intervention
- If less than 23.5 then **3%** chance of needing ocular intervention

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Management

1. Discuss with PCP
2. Start walking program
3. Begin omega-3 supplements
4. Discuss mediterranean diet
5. Recommend more aggressive HTN and cholesterol management

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The Issue of Supplementation

- I AM AN EVIDENCE-BASED CLINICIAN
- I WILL CITE ONLY THE HIGHEST-QUALITY SOURCES
- I HAVE NO SUPPLEMENTATION CONFLICTS OF INTEREST
- THERE ARE MANY COMPANIES MAKING UNSUBSTANTIATED CLAIMS

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2 diabetes supplements

1) Nuretin (PRN)
   - In this study, at 24 months, the difference between groups in the **decrease of central subfield macular thickness was significant in favor of the DHA supplementation group and gains of >5 and >10 letters were significantly higher in the DHA supplementation group as compared with controls.**
     - Lafuente, Maria, et al. "COMBINED INTRAVITREAL RANIBIZUMAB and ORAL SUPPLEMENTATION with DOCOSAHEXAENOIC ACID and ANTIOXIDANTS for DIABETIC MACULAR EDEMA." Retina, vol. 37, no. 7, July 2017, pp. 1277–1286
2) DVS Formula (Eyepromise)
   - Participants in the DVS group showed a statistically significant **improvement in visual acuity compared to the placebo group, a reduction in retinal thickness indicating a decrease in macular edema and the progression of diabetic retinopathy was significantly slower** in the DVS group compared to the placebo group.
     - Chous AP, Richer SP, Gerson JD, Kowluru RA. The Diabetes Visual Function Supplement Study (DIVFuSS). Br J Ophthalmol. 2016 Feb;100(2):227-34. doi: 10.1136/bjophthalmol-2014-306534. Epub 2015 Jun 18. PMID: 26089210; PMCID: PMC4752618.

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Case

- 63 Y/O W/M, reports little to no exercise
- HA1C 8.1
- On Toujeo (insulin)
- Recently started taking Ozempic, Jardiance
- OcHx: moderate NPDR, Hypertensive retinopathy, Chronic Angle closure glaucoma – mild, YAG PI 2020 OU, SLT 2020 OU
- IOP 21.2mmHg OD and 23.3 mmHg OS

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Are you asking about HA1C?

Is there a better metric?

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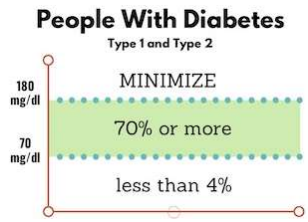
Time in Range



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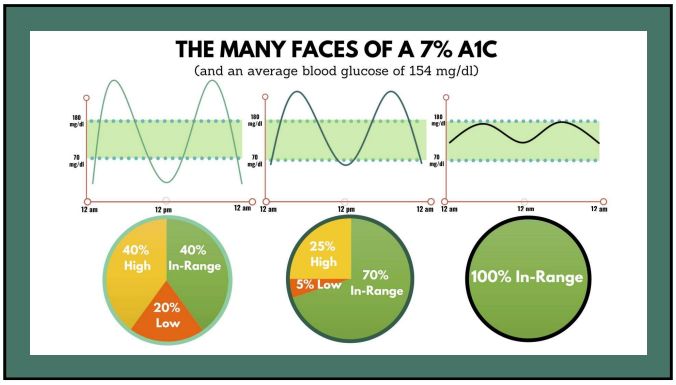

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Actual Patients

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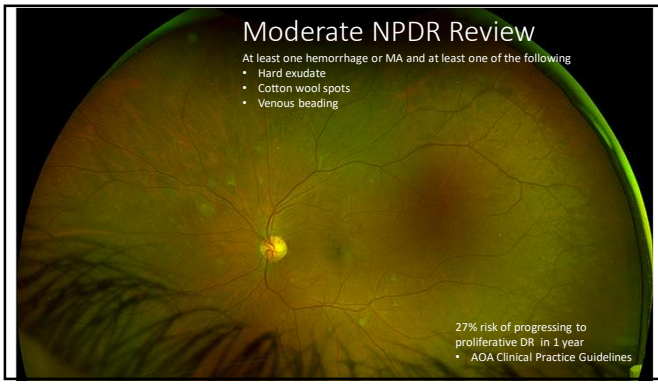

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Severe NPDR

- 4-2-1 Rule - meets any of the following (what about 2?)
  - Severe intraretinal hemorrhages in 4 quadrants
  - Venous beading in 2 or more quadrants
  - IRMA in one or more quadrants

Greater than 50% chance of converting to proliferative DR in 1 year
- AOA Clinical Practice Guidelines
- And…consult with an ophthalmologist

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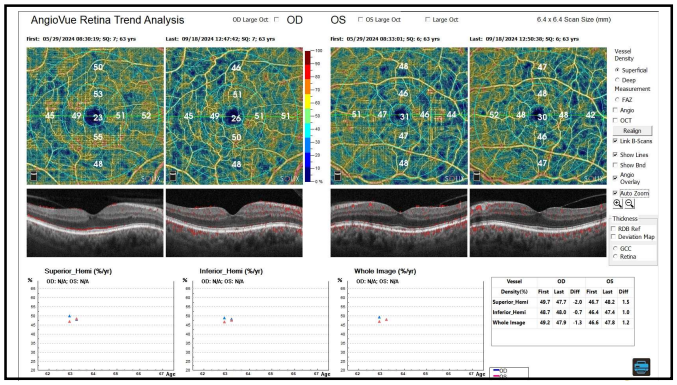

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AAO 2025 Guidelines

- "Using OCTA, preclinical microvascular changes can be detected,regions of macular nonperfusion can be quantified (studies have shown that nonperfusion correlates to severity of DR),and retinal neovascular tissue can be identified."

Diabetic Retinopathy Preferred Practice Pattern®

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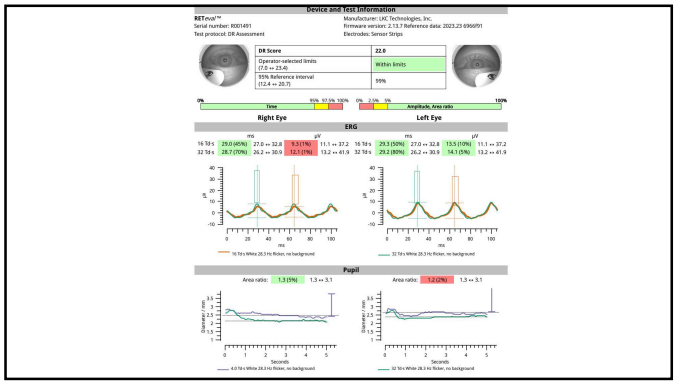

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AAO 2025 Guidelines

- "Electroretinography is also being used to evaluate neural dysfunction of the retina even in eyes without apparent retinal vascular abnormalities, and it could help to predict the location of future microaneurysms."

Diabetic Retinopathy Preferred Practice Pattern®

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Management

1. Discuss with PCP
2. Start walking program, discuss resistance training
3. Begin DR supplement
4. Discuss Mediterranian/Longevity diet

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OD CODER

OD Coder

YouTube

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OD Coder

YouTube

- **Fundus Photography 92250**
  - $35.98
  - Written order and interpretation
  - Bilateral
    - Unilateral RT or LT with 52 modifier (reduced services)
  - Not a substitute for a dilated exam
  - "if the study is performed as a screening, it is not covered by medicare"
  - Mutually exclusive with OCT nerve/macula – 59 modifier
  - **Now covered with E11.9**

Glare sensitivity H53.71
Retinal ischemia H35.82
Visual discomfort H53.143
Visual distortions of shape and size H53.15

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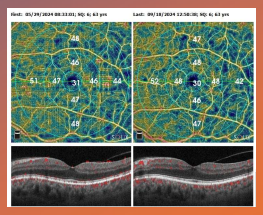
OD Coder Update

92137 OCT Angiography

- Jan 1
- Both traditional mac OCT 92134 and OCT-A 92137 must be performed and interpreted the same day
- Cannot be billed with 92133 or separately with 92134
- National Average
  - 92134 $31
  - 92137 $57
- Any codes that are reimbursable with 92134
- No glaucoma codes



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- Retinal ischemia H35.82

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Macular Thickness in DR

300-400 microns?

Over 400 microns – automatic referral

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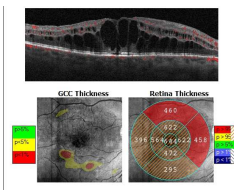
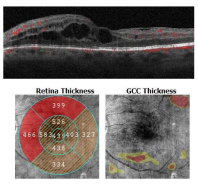
Examples





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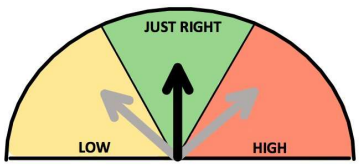
Which is worse for diabetic retinopathy, blood glucose levels that are too high or too low?



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Blood sugar limbo may exacerbate retinopathy

- "Our results show that these periodic low glucose levels cause an increase in certain retinal cell proteins, resulting in an overgrowth of blood vessels and worsening diabetic eye disease,"
- Akrit Sodhi, MD, PhD; Chuanyu Guo, Monika Deshpande; Yueqi Niu; Isha Kachwala; Haley Megarity; Taylor Nuse; Savalan Babapoor-Farrokhran; Michael Ramada; Jaron Sanchez; Neelay Inamdar; Thomas V. Johnson; Miguel Flores-Bellver; Maria Valeria Canto-Soler; Silvia Montaner. HIF-1a accumulation in response to transient hupoglycemia may worsen diabetic eye disease. Cell Reports. Published January 2023. DOI: https://doi.Org/10.1016/j.celrep.2022.111976

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What about GLP-1's?

Glucagon-like peptide

- Hormone released when food is eaten to slow gastric emptying
- Increases insulin release
- Controls the feeling of satiety after eating

Options

- Trulicity
- Ozempic
- Rybelsis
- Mounjaro

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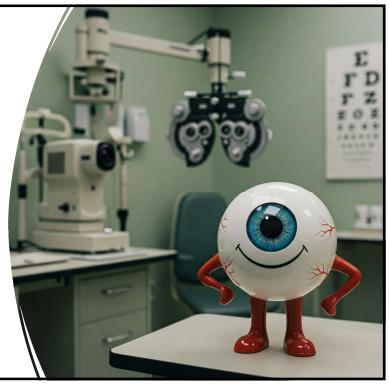
In the Management of Diabetic Retinopathy

- When is the right time to refer to retina?
  - Advanced diagnostics like OCT-A and ERG can help



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Physical activity = lower risk of Diabetic Retinopathy

- In Type 1
  - Along with lipid levels
- In Type 2
  - Impact is more pronounced in **vision threatening DR**
  - Improves lipid profile, BMI and blood pressure

Ren C, Liu W, Li J, Cao Y, Xu J, Lu P. Physical activity and risk of diabetic retinopathy: a systematic review and meta-analysis. Acta diabetologica. 2019 Aug 1;56:823-37.

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Diabetic Retinopathy Exercise Tips

- Prioritize blood sugar control
  - Monitor levels, increase gradually to reduce BS dips
- Proper footwear
  - Peripheral neuropathy issues – custom fitting
- Cardio and Strength training
  - Yoga and Tai Chi
- Use caution within 1 week of intravitreal injections
  - Slightly increased risk of vitreous hemorrhage, endophthalmitis

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Case

- 80 Y/O W/F
- Dx with AMD 2013
- Used AREDS/AREDS2 "off and on"
- 6 months ago Adapt Dx Rod Intercept 13.2

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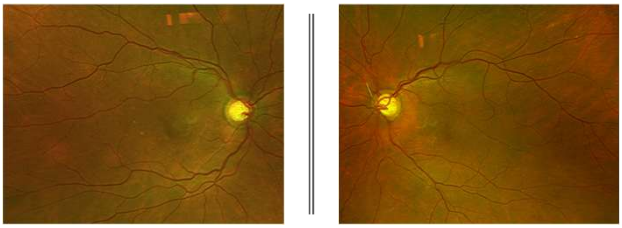
Optomaps



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And now...

- 6 months ago, began new supplement, reports excellent compliance
- Begins a consistent walking program
- Adapt Dx 12.1 (Baseline 13.2)

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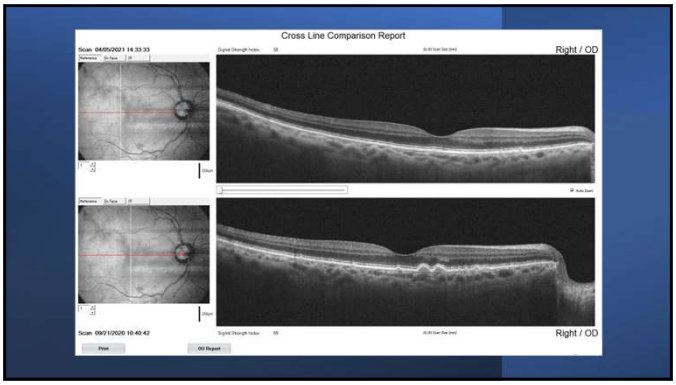

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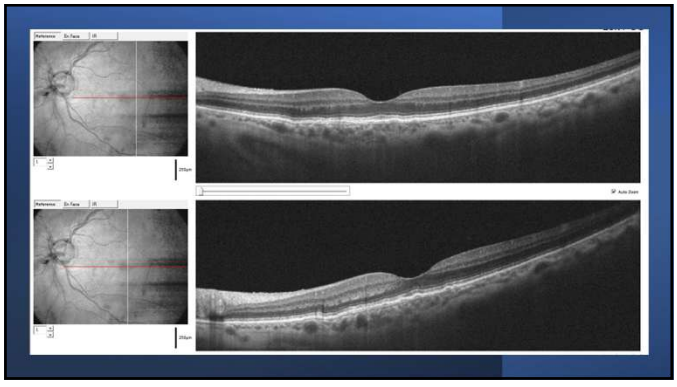

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2 AMD supplements prior to Intermediate Stage

Numacula Omega (PRN)

The AREDS 30 study supports Numaqula omega 3 by showing a **30% reduced risk of developing both CGA and wet form AMD over the 12-year study.**

SanGiovanni, John Paul, et al. "ω-3 Long-Chain Polyunsaturated Fatty Acid Intake and 12-y Incidence of Neovascular Age-Related Macular Degeneration and Central Geographic Atrophy: AREDS Report 30, a Prospective Cohort Study from the Age-Related Eye Disease Study." The American Journal of Clinical Nutrition, vol. 90, no. 6, 7 Oct. 2009, pp. 1601–1607.

Macuhealth

Antioxidant supplementation in patients with nonadvanced age-related macular degeneration results in **significant increases in macular pigment and improvements in contrast sensitivity, glare disability, and photostress recovery**.

Akuffo, Kwadwo Owusu, et al. "Relationship between macular pigment and visual function in subjects with early age-related macular degeneration." British Journal of Ophthalmology 101.2 (2017): 190-197.

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OD Coder

- **Computer ophthalmic imaging posterior segment 92134**
- $37.80
- Written order and report
- Bilateral
  - Unilateral RT or LT with 52 modifier (reduced services)
- Once every 2 months
- Pathologies
  - Hundreds
  - Visual distortion of shape and size* H53.15
  - Scotomas and visual field defects H53.411-.483
  - Retinal ischemia H35.82
  - Degenerative myopia H44.2E1-.2E3
  - Other long-term drug treatment Z79.899 (baseline and annually)
- Mutually exclusive with 92250**

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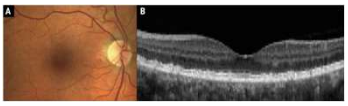
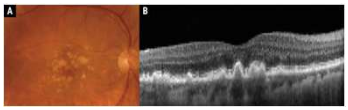
AMD Staging



Mild AMD characterized by medium-sized drusen (63µm to 125µm)

- **Category 1**: Early AMD characterized by fewer than five small drusen, each below 63µm in size.
- **Category 2**: Mild AMD defined as multiple small drusen, a single intermediate-sized drusen from 63µm to 124µm or RPE changes.
- **Category 3**: Moderate AMD characterized by one large drusen greater than 125µm, extensive intermediate drusen or GA non-centrally.
- **Category 4**: Advanced AMD defined as more than one large drusen or GA centrally.



Intermediate AMD demonstrating large-sized drusen (>125µm)

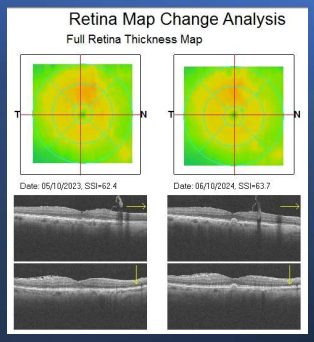
Age-Related Eye Disease Study Research Group. The AREDS system for classifying age-related macular degeneration from stereoscopic color fundus photographs: the A Related Eye Disease Study Report Number 6. Am J Ophthalmol. 2001;132(5):668-81.

68

Case

- 88 Y/O W/M
- Here for AMD exam, last visit 1 year ago
- OcHx: Mild nonexudative AMD, hypertensive retinopathy, macular pucker OD
- Not taking his supplements (macuhealth), reports little to no exercise

69



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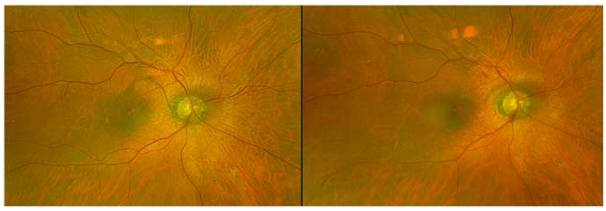

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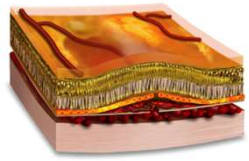
Reclassify?

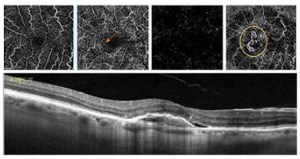
- Intermediate AMD
  - ARED2
  - Omega-3?
  - Exercise?

72

Type 1 "Occult" CNV

- New vessels develop in the choroid
- New vessels located **BELOW RPE** and ABOVE Bruch's membrane





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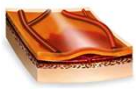
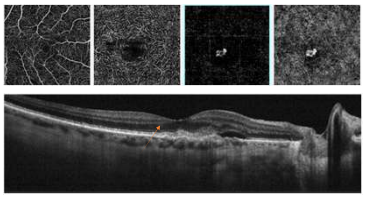
Type 2 "Classic" CNV

- New vessels develop in choroid
- New vessels located **ABOVE the RPE** and ABOVE Bruch's membrane





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Case

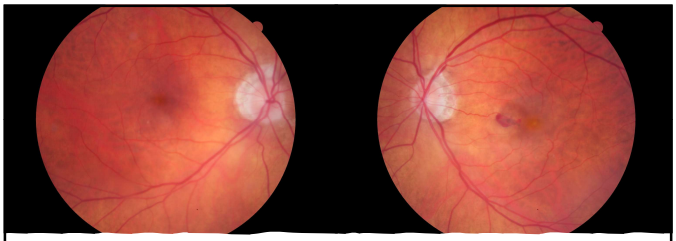
72 Y/O W/M

"VISION IN THE LEFT EYE IS MOT AS BRIGHT AS THE RIGHT EYE"

BCVA 20/25 OD AND 20/30 OS

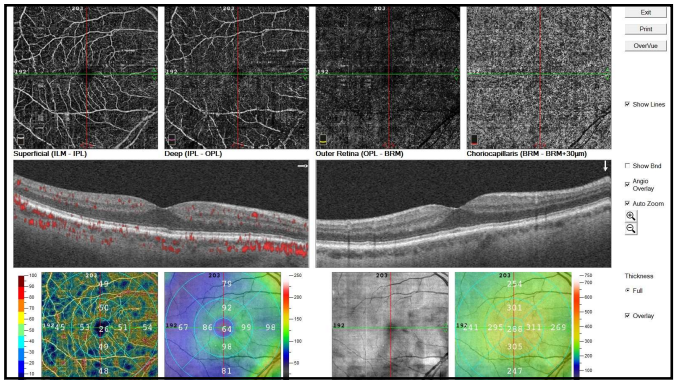
PREVIOUS EXAM 9 MONTHS AGO – DX WITH MILD DRY ARMD OU

75



Fundus Photos

76



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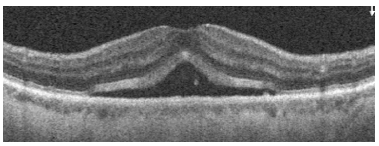
OS OCT Cross Section



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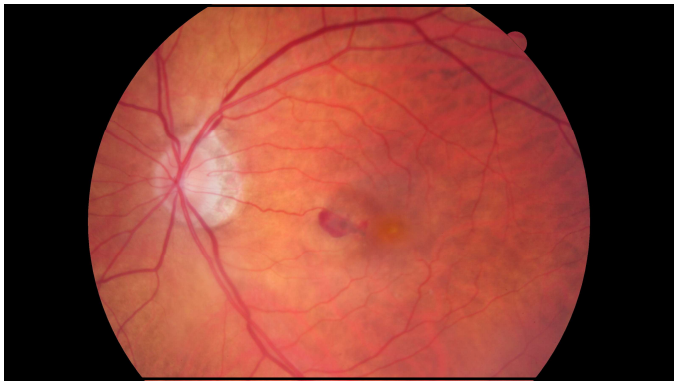

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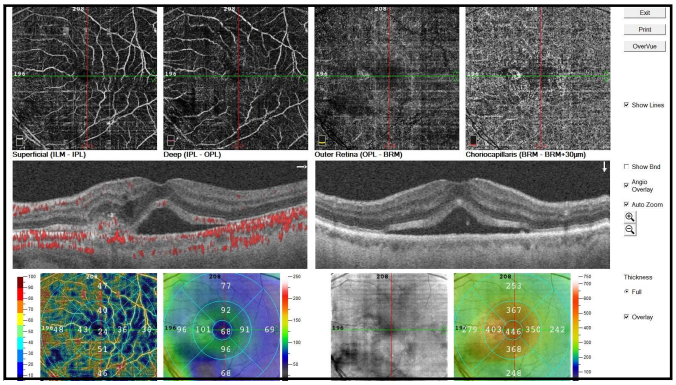

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Diagnosis? SRNV

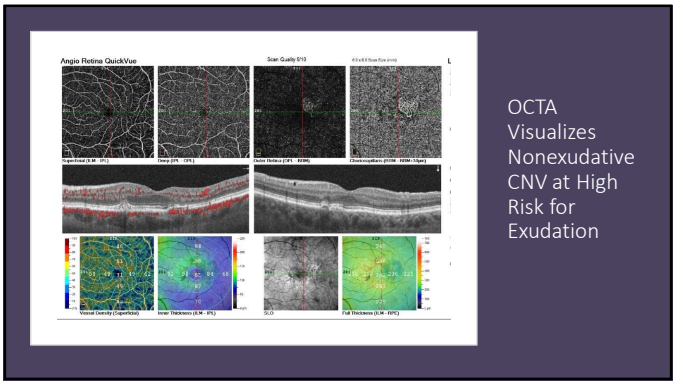
Type 1 or Type 2?

Type 2

Send to retina for anti-VEGF treatment

Avastin

81



OCTA Visualizes Nonexudative CNV at High Risk for Exudation

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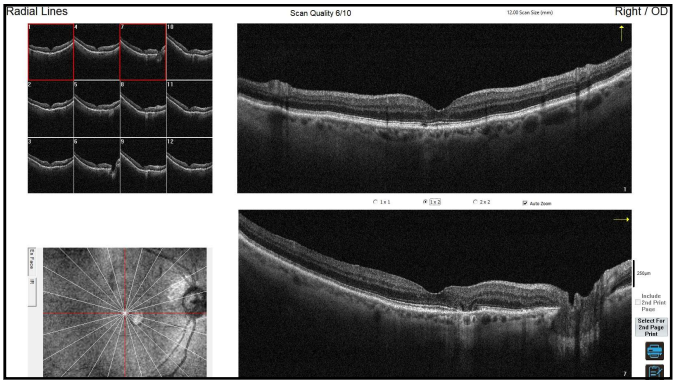

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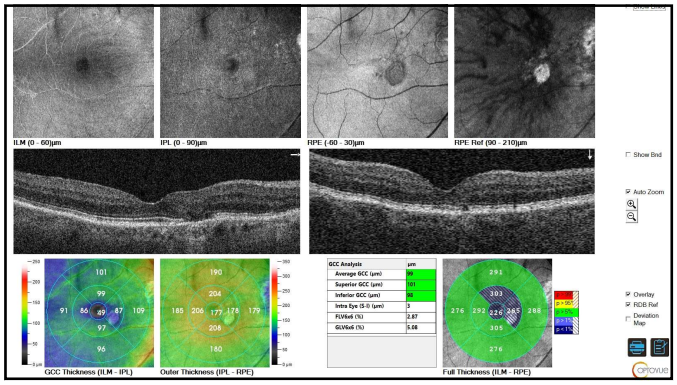

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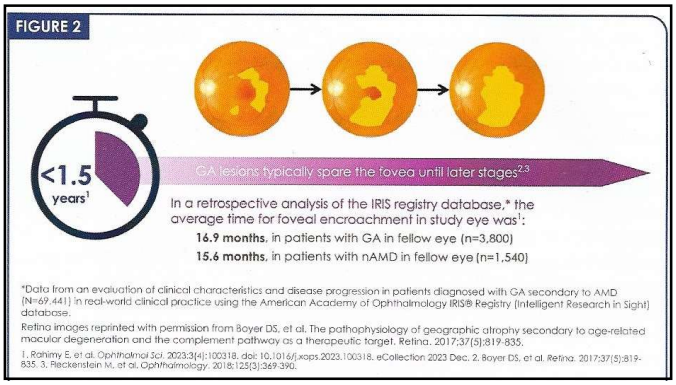

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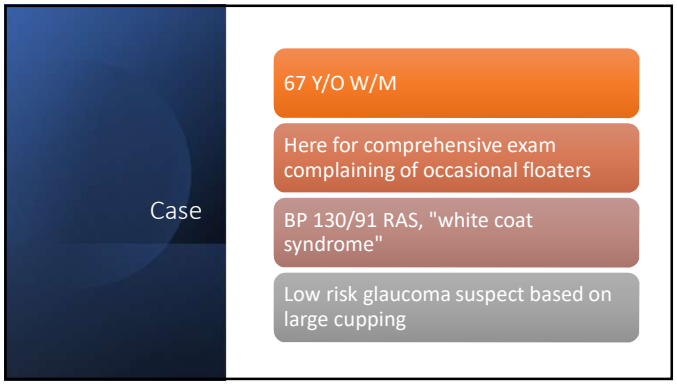

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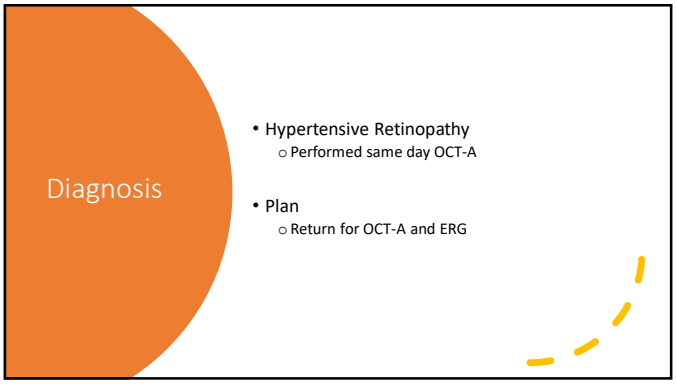

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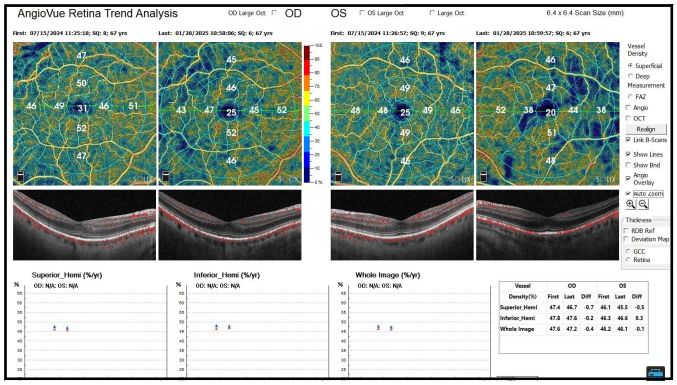

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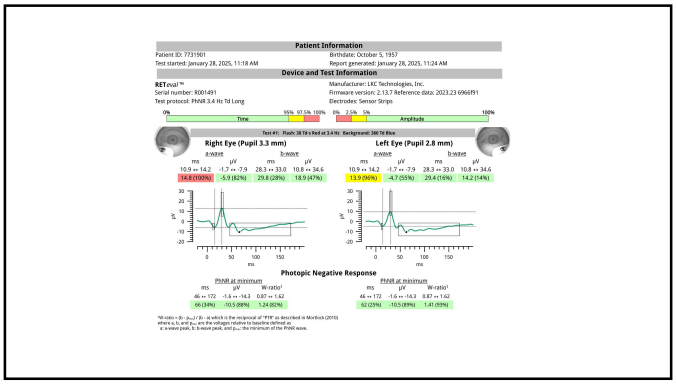

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Hypertensive Retinopathy

- Signs
  - constricted and tortuous arterioles
  - retinal hemorrhage
  - hard exudates
  - cotton wool spots
  - Nerve edema
  - widening of the arteriole reflex
  - arteriovenous crossing signs
  - copper or silver wire arterioles

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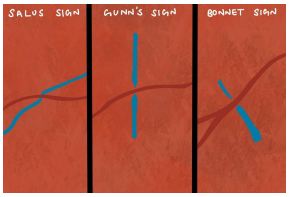
See the signs

- Salus sign – deflection of the vein
- Gunn's sign – tapering of vein at the crossing
- Bonnet's sign – banking of the distal vein to the crossing



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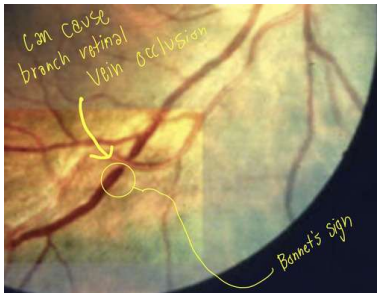
Bonnett's Sign



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Underdiagnosis of Hypertensive Retinopathy

- Low Sensitivity of Detection Methods
  - **Sensitivity** of detecting HR ranged from **3% to 21%**
    - Indicating that many cases may go unnoticed
      - van den Born BJ, Hulsman CA, Hoekstra JB, Schlingemann RO, van Montfrans GA. Value of routine funduscopy in patients with hypertension: systematic review. BMJ. 2005 Jul 9;331(7508):73.
- High Prevalence Yet Limited Recognition
  - **44%** of referred hypertensive patients **had undiagnosed HR**
    - **including HR in the assessment of end-organ damage increased the number of patients requiring treatment from 3% to 14%**
      - HR is often overlooked in treatment decisions
        - Kolman SA, van Sijl AM, van der Sluijs FA, van de Ree MA. Consideration of hypertensive retinopathy as an important end-organ damage in patients with hypertension. J Hum Hypertens. 2017 Feb;31(2):121-125.
- Diagnostic Challenges and Variability
  - High interobserver (**20% to 40%**) and intraobserver (**10% to 33%**) variability
    - Schmieder RE. Hypertensive retinopathy: a window to vascular remodeling in arterial hypertension. Hypertension. 2008 Jan 1;51(1):43-4.

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Summary

- Your patients are counting on us to help manage the 3 most common retinal diseases
- Improving and refining management protocol leads to better patient care
- Our patients deserve it

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Thank You!!!

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