

Papilledema vs. pseudopapilledema: Are they swollen or are they not?

Brad Sutton, OD, FAAO

Clinical Professor

IU School of Optometry

brsutton@indiana.edu

Financial disclosures

- ◆ No financial disclosures

Examination Techniques

- ◆ Stereoscopic viewing essential
- ◆ VA and VF: SVP
- ◆ Pupil testing and color vision
- ◆ Brightness comparison and red cap test



Papilledema

- ◆ Bilateral (but can be sequential with one nerve becoming swollen before the other, thus unilateral at presentation) optic nerve head swelling secondary to increased ICP
- ◆ Swollen, blurred margins with splinter hemorrhages and exudates as well as nerve fiber layer edema. Patton's folds may be seen

Papilledema

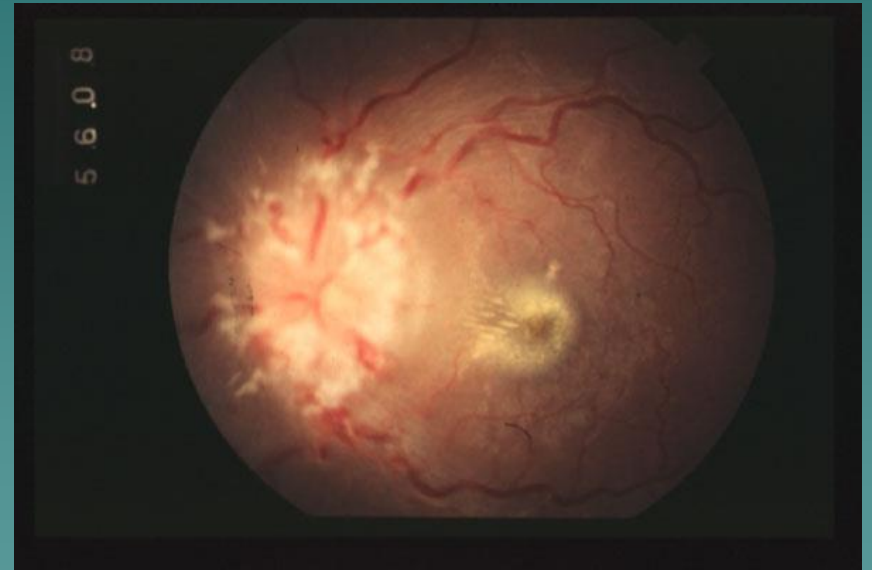
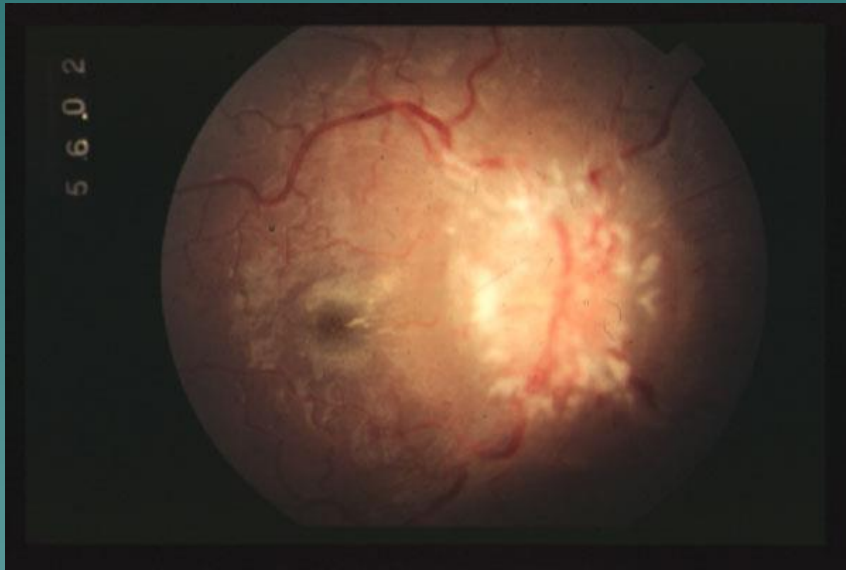
- ◆ May be asymmetric
- ◆ VA varies but typically mild reduction only or no loss at all
- ◆ May get diplopia secondary to abducens nerve compression
- ◆ With increased ICP, can get choroidal folds only (before papilledema) at lower pressure levels

Papilledema

- ◆ VF usually shows enlarged blind spot
- ◆ No pupillary defect. Normal color vision
- ◆ SVP absent with obliterated cup



Papilledema (IIH)



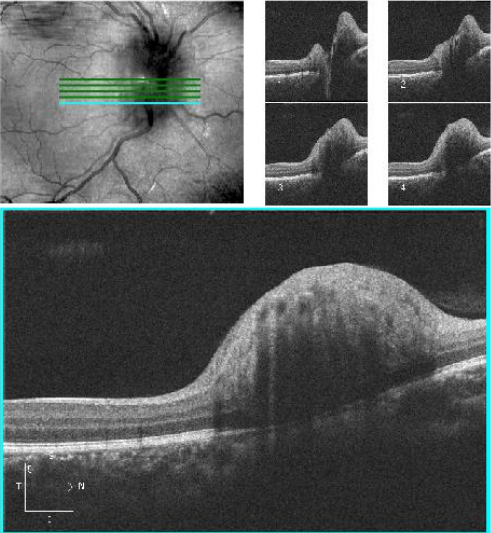
Papilledema IIH age 15



OCT

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Scan Angle: 0° Spacing: 0.25 mm Length: 6 mm

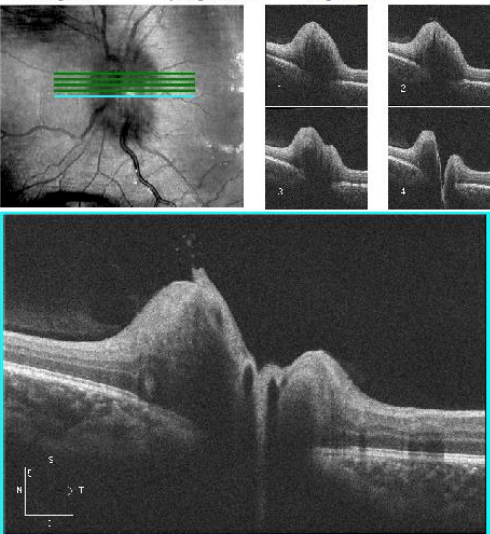


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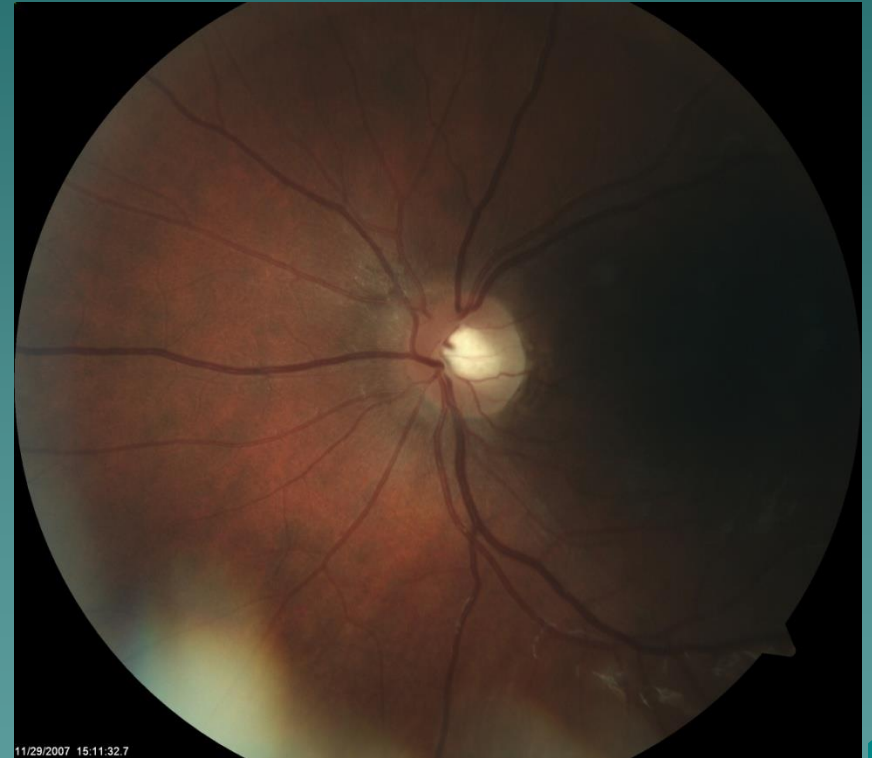
Papilledema (HTN)



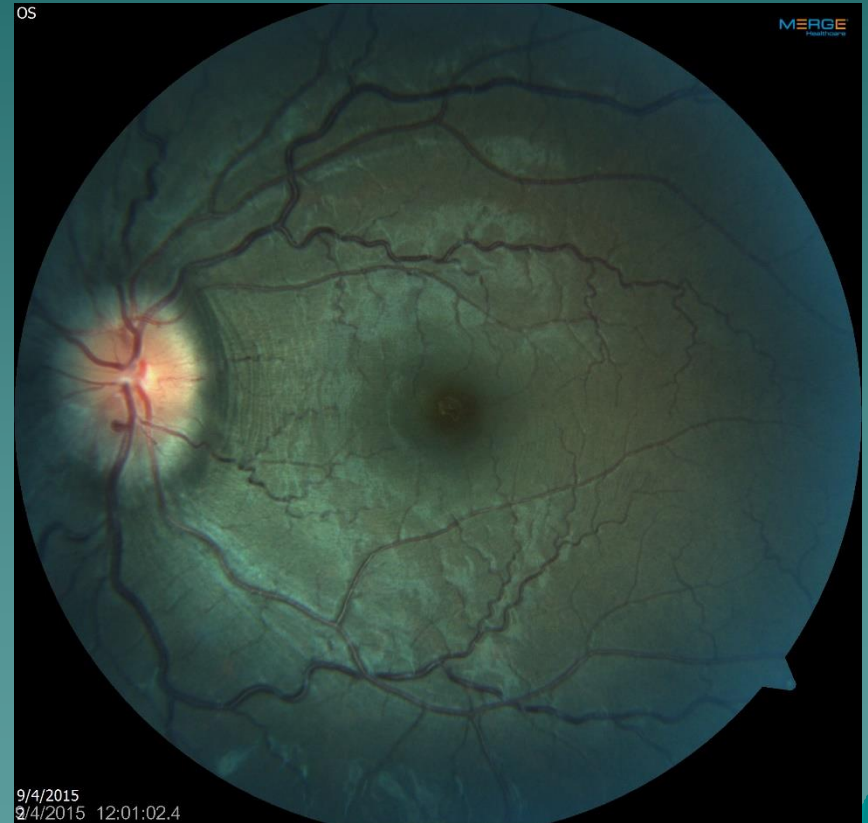
Papilledema (tumor)



Subtle papilledema (IIH)



Papilledema IIH



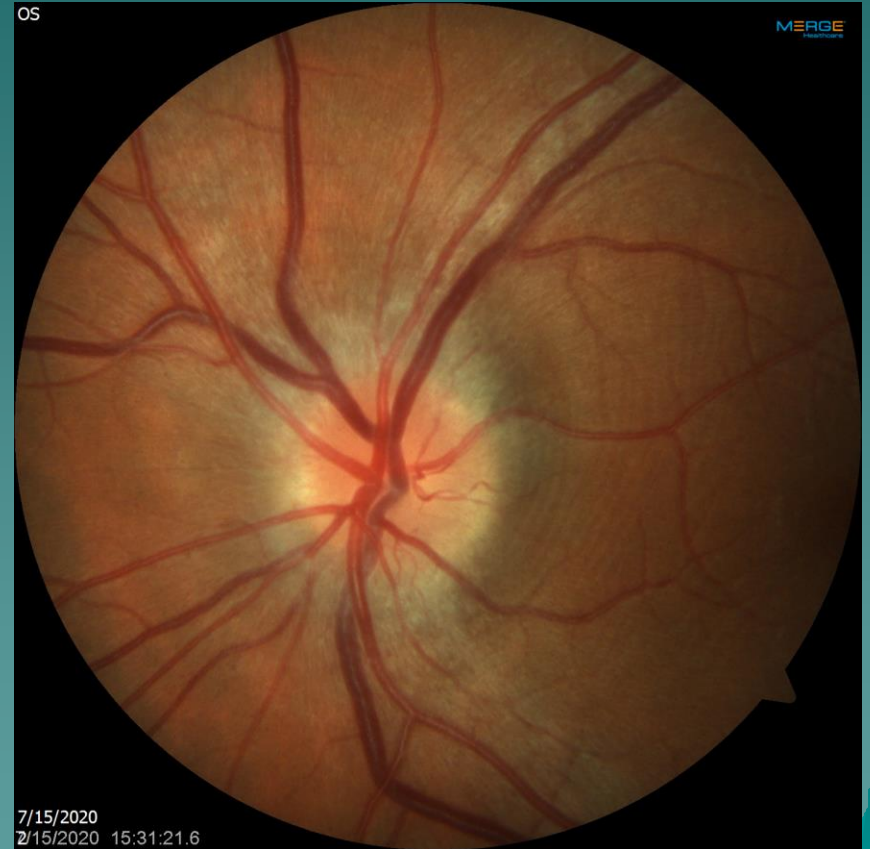
Papilledema IIH



Papilledema IIH



Papilledema with Patton's folds

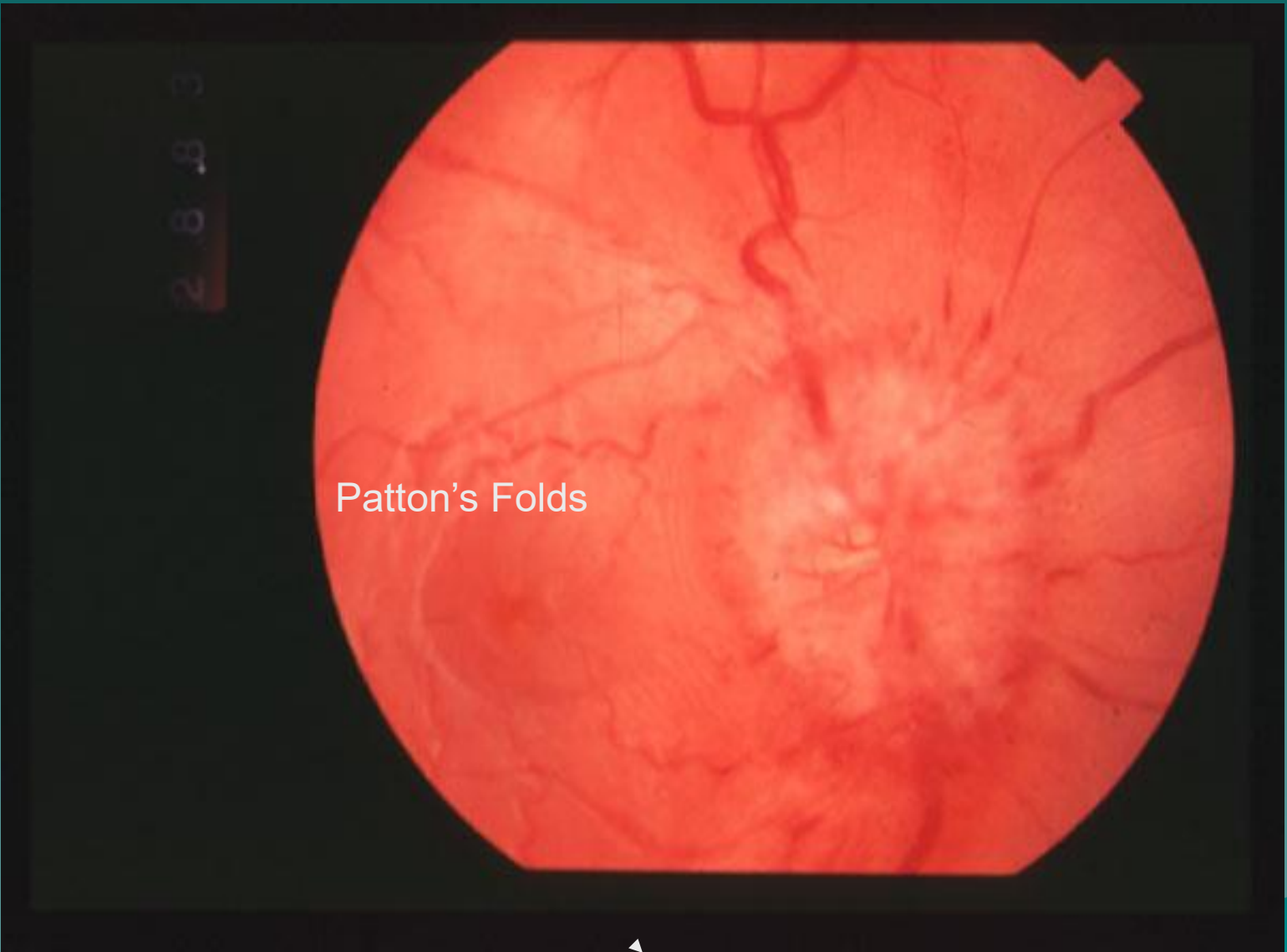


Terson's and papilledema



Papilledema progression





2.8.8.3

Patton's Folds

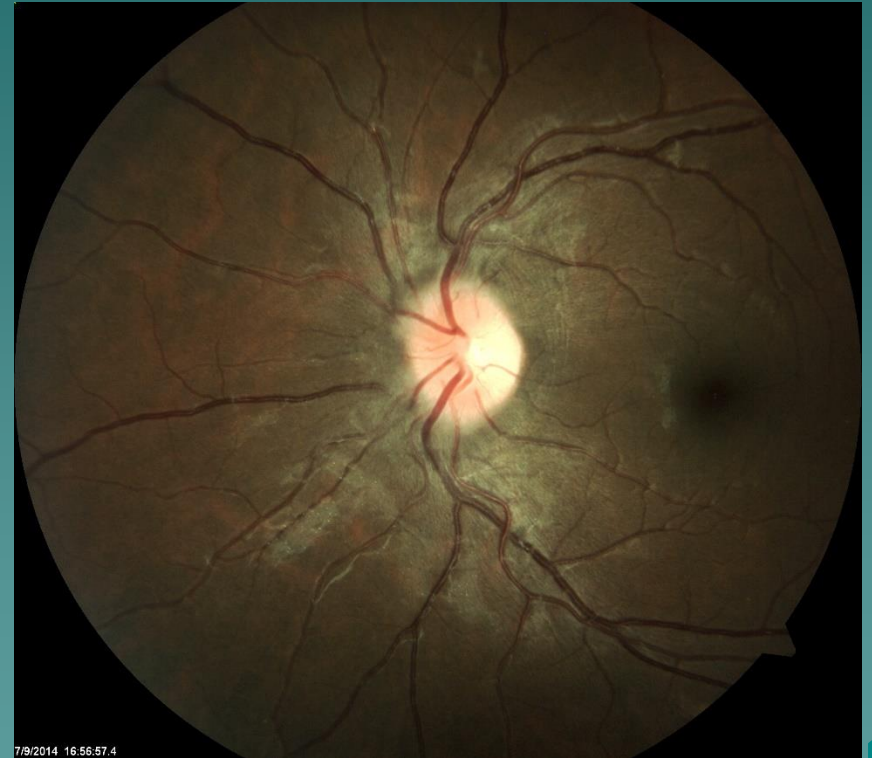
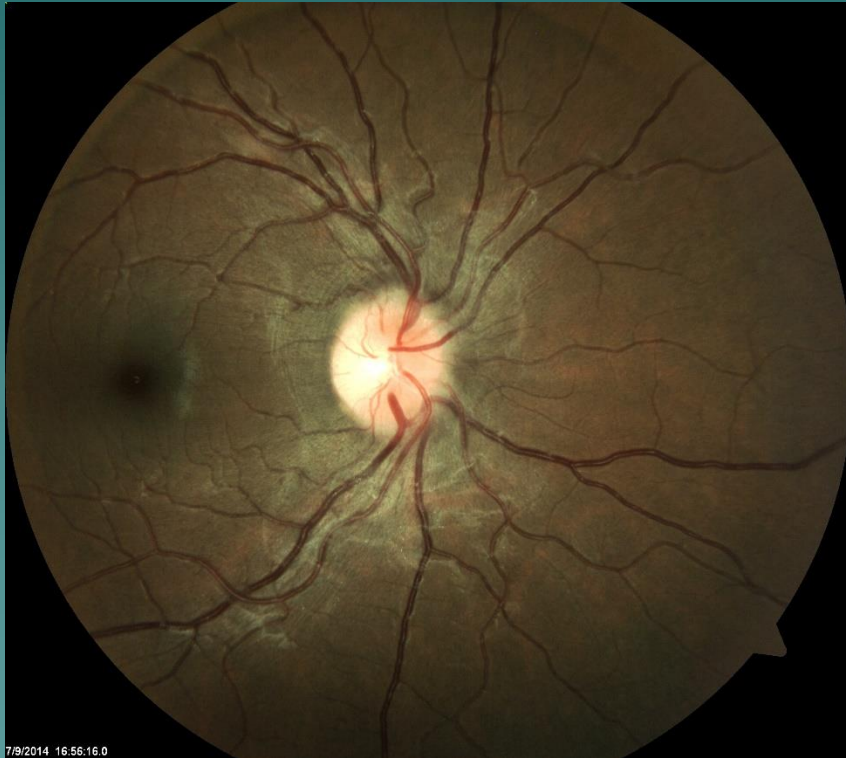




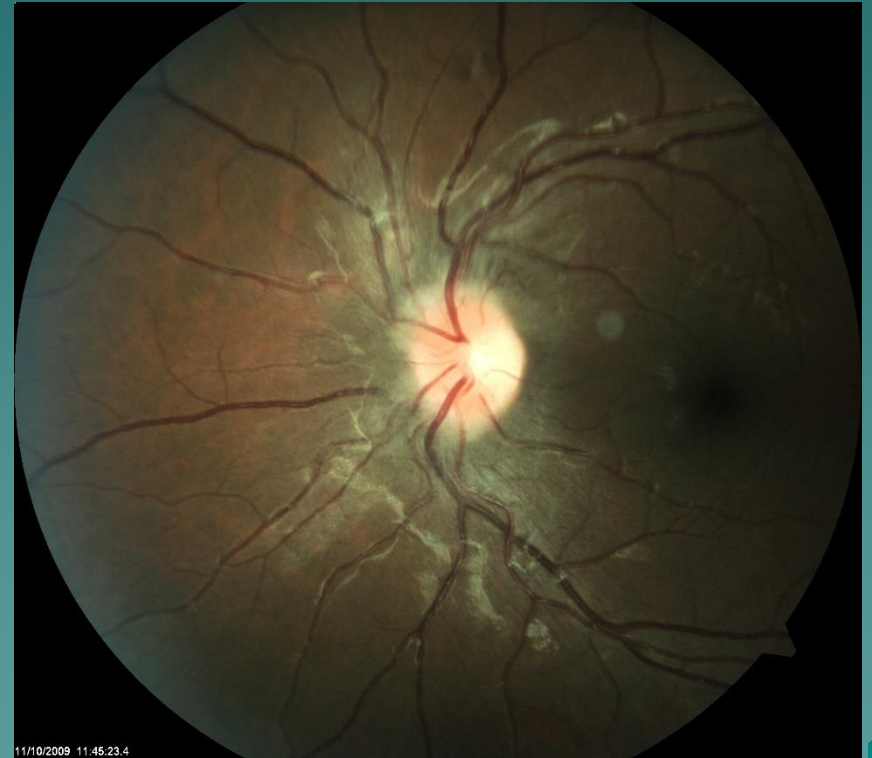
Patton's folds: RNFL thickness 231in OD, 295 in OS



Patton's folds: now you see them.....



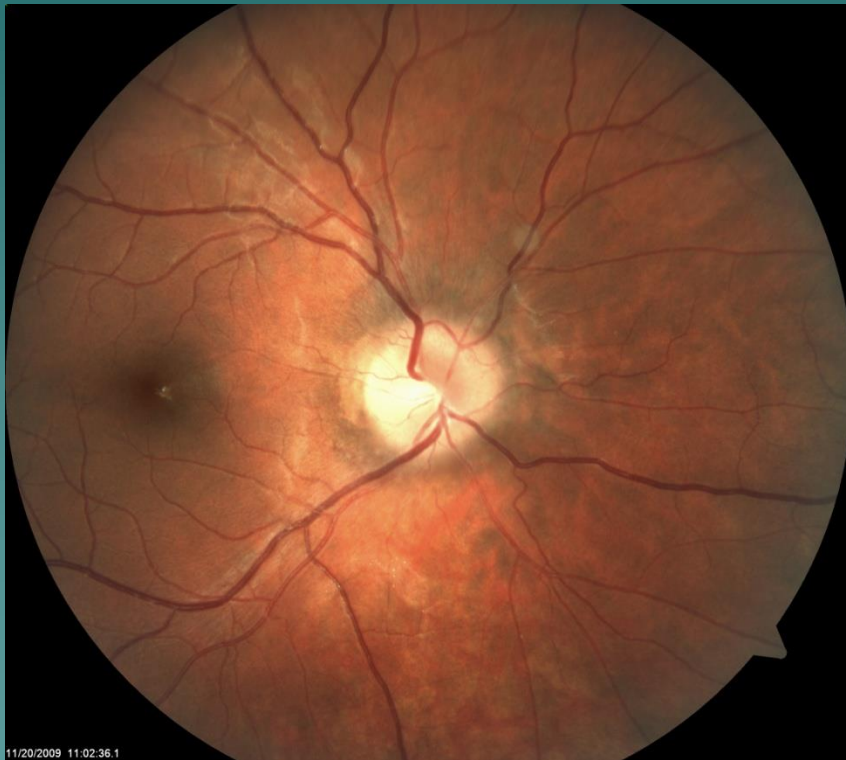
Back then in 2007 you did not...



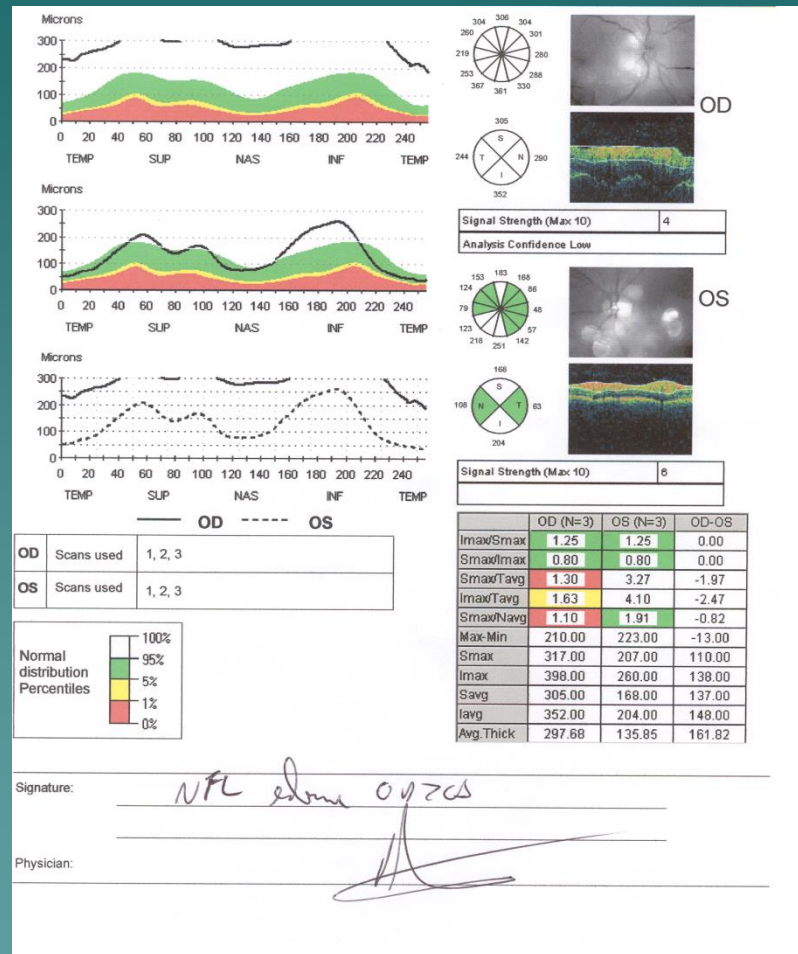
Patton's folds



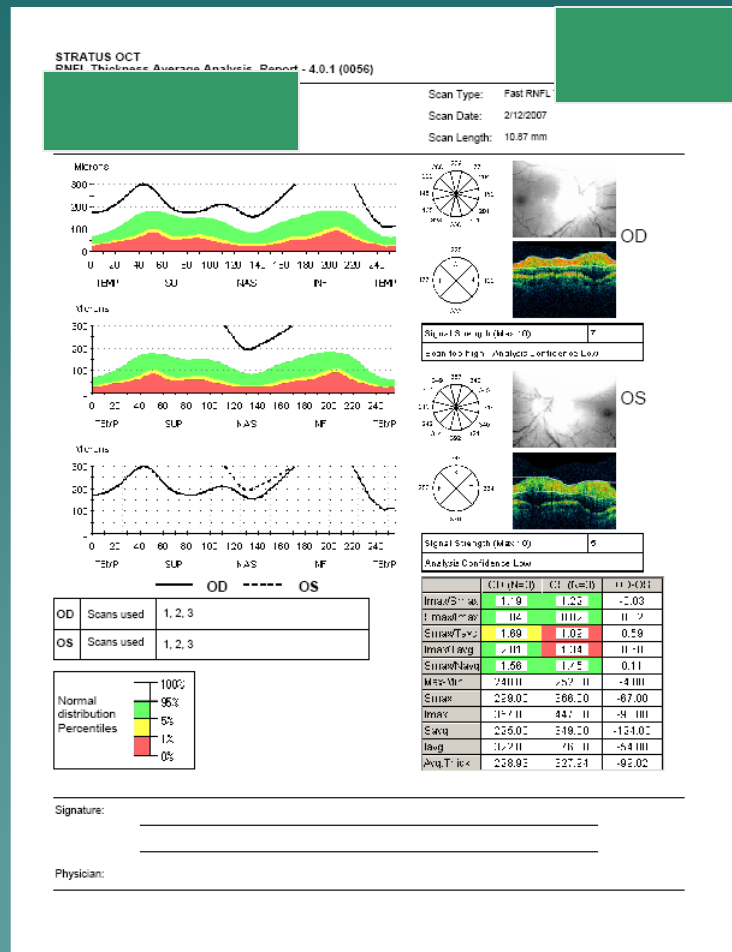
Longstanding papilledema with optic atrophy (IIH)



Papilledema OCT NFL



NFL edema



Papilledema OCT



Name:

ID: 124546 Exam Date: 9/23/2016 CZMI

DOB: Exam Time: 4:46 PM

Gender: Serial Number: 4000-10970

Technician: Operator, Cimus Signal Strength: 9/10

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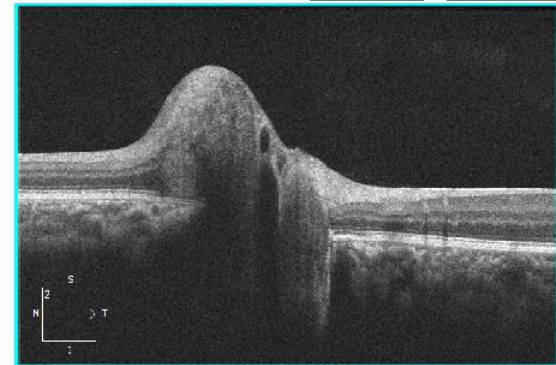
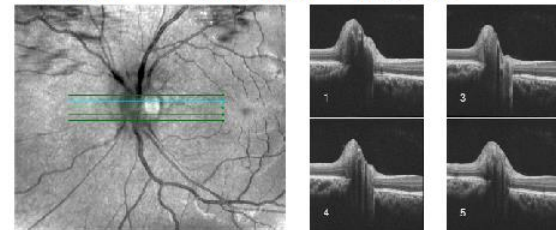
Papilledema OCT



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Increased ICP

- ◆ Variations are due to anatomical considerations
- ◆ If the channels connecting the central cavity and optic nerve sheath allow equal flow on both sides and in both directions papilledema will occur and will improve with decreased ICP

Increased ICP

- ◆ If there is a difference in the communications then the edema will be asymmetric. Usually the result of a smaller bony canal opening on one side limiting the swelling.
- ◆ If the valves are one-way then the swelling will not improve rapidly with Tx

Increased ICP

- ◆ An acute rise in ICP that resolves rapidly is not typically associated with papilledema. Elevation must be chronic
- ◆ Increased pressure is transmitted from the sub-arachnoid space to the optic nerve head via the nerve sheath. Venous pressure in CRV increases
- ◆ Disruption in axoplasmic flow at lamina cribosa leads to swelling

Increased ICP

- ◆ Studies show that ONH swelling as measured by OCT can decrease (but not instantly resolve) immediately after lumbar puncture
- ◆ Measured in lateral decubitus position with OCT sideways!
- ◆ Shows that reduction of ONH compression is very rapid
- ◆ Shows that pressure in spinal column is associated with pressure at ONH

Etiologies of Increased ICP

- ◆ Space occupying lesion ; must always be ruled out!
- ◆ Infection or anatomical abnormality
- ◆ Malignant hypertension
- ◆ IIH
- ◆ Certain medications
- ◆ ? Sleep apnea (obesity): ICP may be elevated only at night! Men especially
- ◆ Must order MRI in all cases

Idiopathic Intracranial Hypertension (IIH)

- ◆ Older term is “pseudotumor cerebri”
- ◆ Young overweight females (F 8X M)
- ◆ 1/ 100,000 in population as a whole ; 20 / 100,000 in 20 to 44-year-old women 10% over ideal weight
- ◆ May be related to medications including TCN (minocycline especially), HRT, lithium, high dose Vitamin A supplementation, steroid withdrawal
- ◆ Emerging evidence that elevated testosterone / androgen levels may be the cause
- ◆ Sleep apnea link
- ◆ Can affect children, often overlooked
- ◆ Doubles cardiovascular risk in females

IIH

- ◆ Symptoms of transient blur, diplopia , tinnitus (intracranial noises, not just ringing) , headaches , etc.
- ◆ ICP usually severely elevated ; normal is 50 – 200 mmH₂O. Over 25 cm (250 mm) considered definitively abnormal. Single measurement can be misleading : levels can vary over 24 hours
- ◆ Very rare variant of normal pressure IIH. S/S, but repeatedly normal ICP

IIH more rare over age 50

- ◆ Less often female
- ◆ Fewer headache complaints
- ◆ More frequently discovered incidentally due to papilledema with no symptoms
- ◆ Lower opening CSF
- ◆ More likely to have concomitant medical conditions
- ◆ Less likely to use tetracycline family antibiotics

IIH

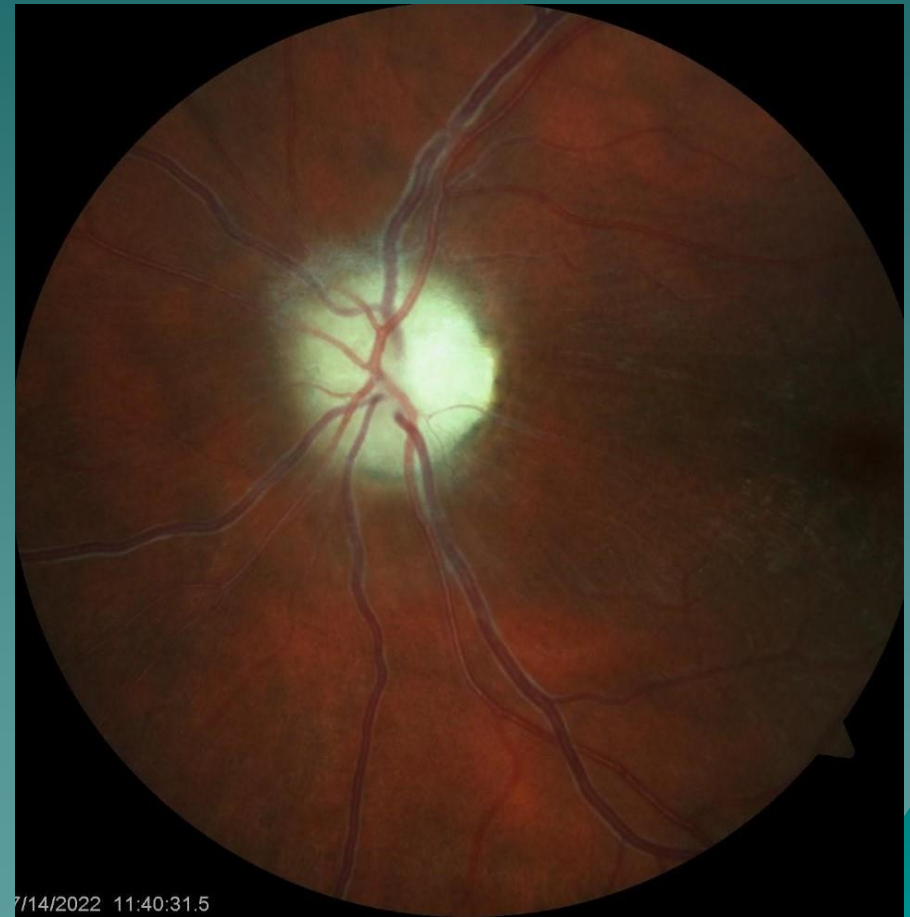
- ◆ Diagnosis involves normal MRI / MRV and CSF studies with elevated ICP
- ◆ Watch for spinal chord tumors
- ◆ Differential:
Cerebral Venous Sinus Thrombosis
- ◆ MRV



CVST(cerebral venous sinus thrombosis)

- ◆ Young women and some men
- ◆ Often not overweight
- ◆ Can be life threatening
- ◆ Treat with blood thinners, Diamox
- ◆ Can be seen with MRI, but potentially missed if MRV not performed
- ◆ Stenosis may be secondary to IIH

Optic atrophy post CVST induced papilledema



IIH Management

- ◆ Refer to a neurologist
- ◆ Medical management includes Diamox , Lasix, Topamax
- ◆ Weight loss



IIH Management

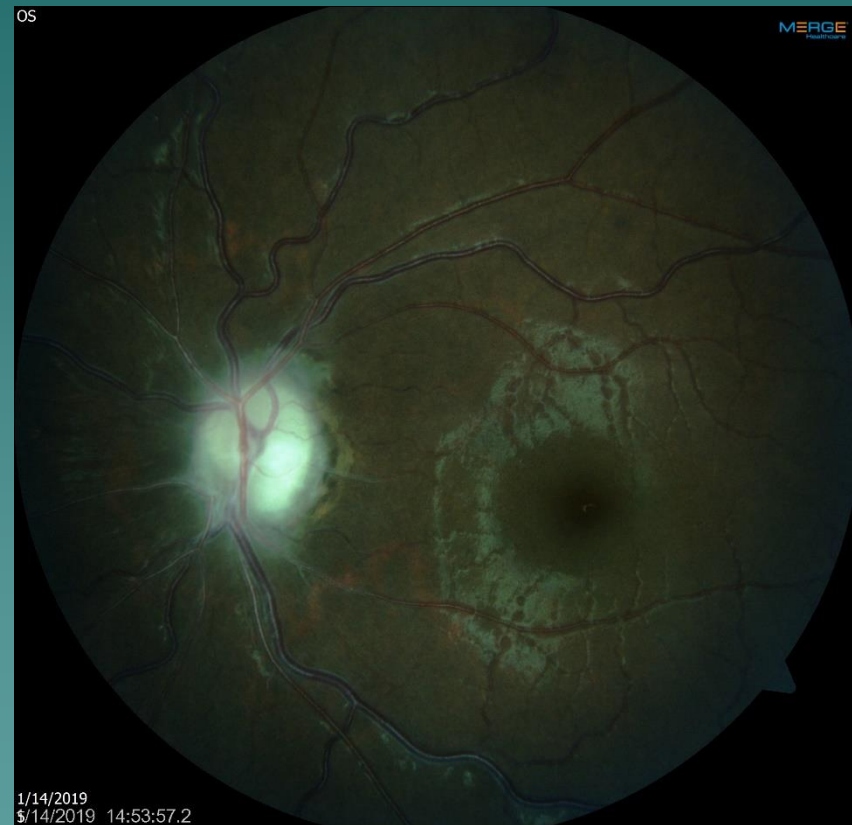
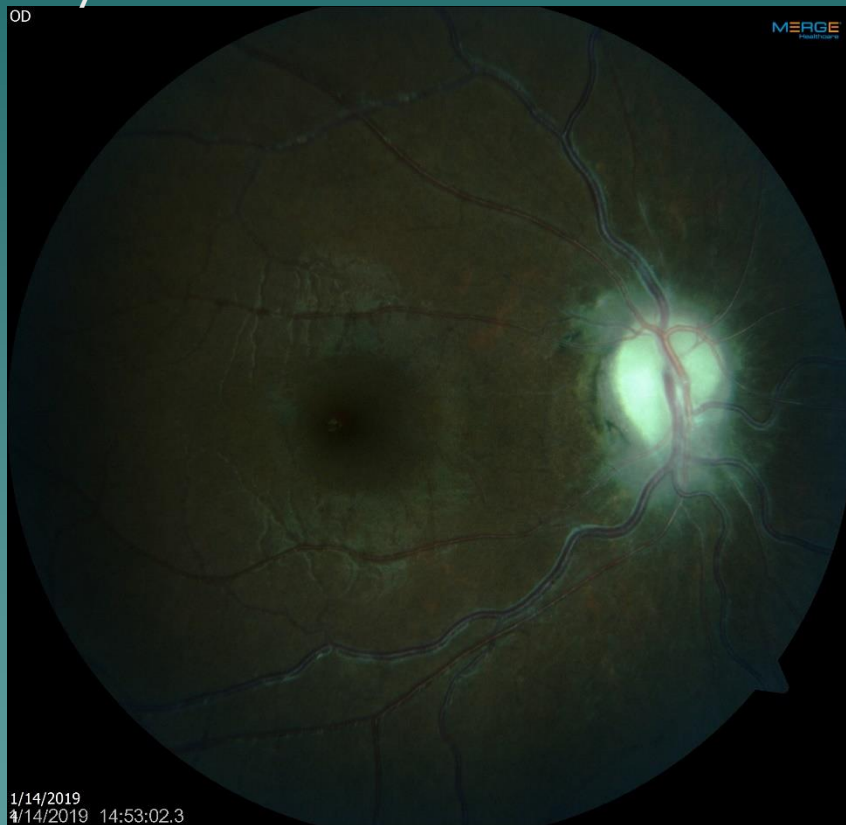
- ◆ If recalcitrant....
 - ◆ Repeated lumbar taps (ugh!)
 - ◆ Lumbo-peritoneal shunt
 - ◆ Ventricular shunt

IIH Management

- ◆ If progressive changes in visual acuity or visual field occur , consider an optic nerve sheath decompression
- ◆ Several small fenestrations in the optic nerve sheath are created to allow room for expansion
- ◆ Performed by a neuro-ophthalmologist. Often do worse eye only because 50% get improvement in the fellow eye

Chronic IAH induced edema leading to atrophy: S/P decompression

22 year old AA F



Light perception

10/700

Papilledema IIH opening LP 550



After 3 weeks on Diamox



Side by side comparison



Minocycline induced elevated ICP papilledema



Optic Nerve Head Drusen

- ◆ Increased prevalence in small nerves with small cups. Therefore, more common in whites than in AA. Higher incidence in patients with RP (10%)
- ◆ Compression of axons leads to stasis of axoplasmic flow and hyaline is excreted then calcifies over time, leading to the formation of drusen
- ◆ Nerve appears elevated but no splinter hemes or exudates and the margins are distinct.
- ◆ Abnormal vessel branching

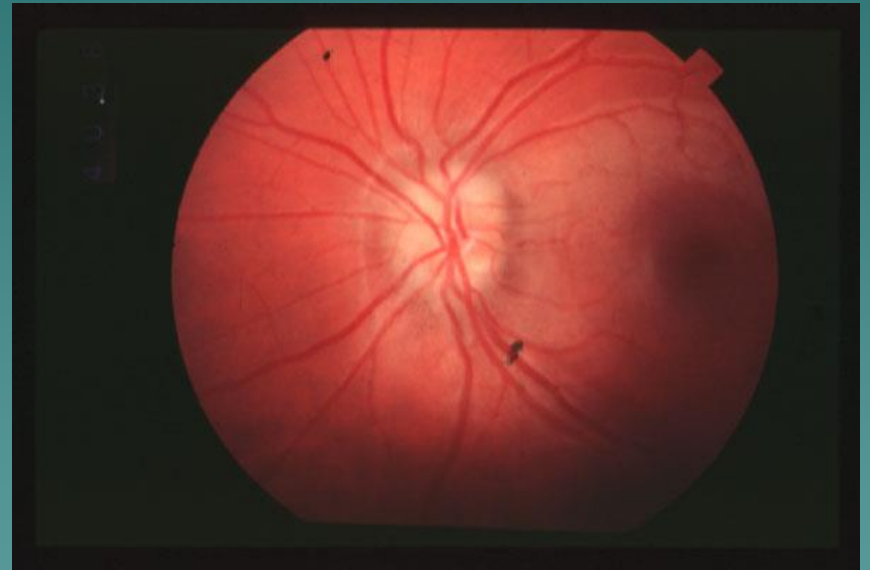
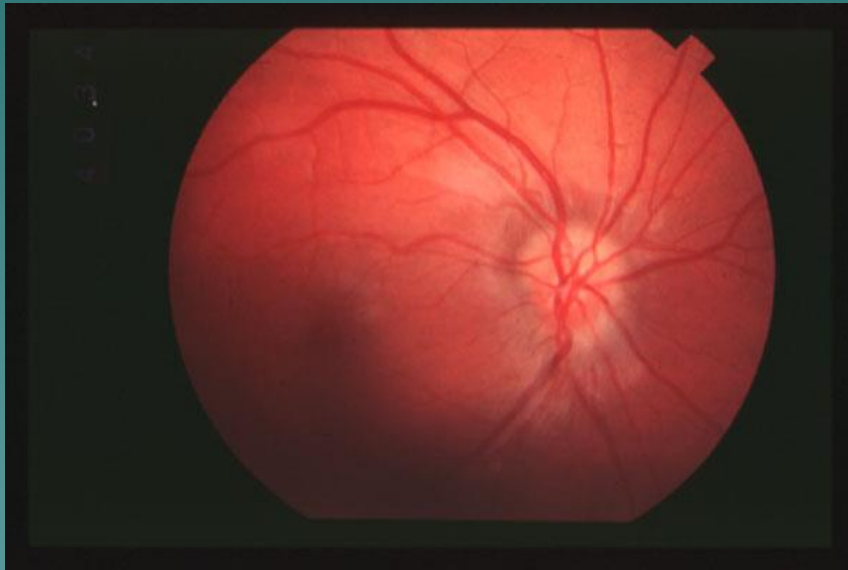
Optic Nerve Head Drusen

- ◆ Not always visible! Buried early in life but become visible with time. Creation of more drusen push some forward to the surface of the nerve
- ◆ Can cause decreased vision and variable visual field defects. More loss with visible drusen
- ◆ Common and under diagnosed

Optic Nerve Drusen

- ◆ SVP/EVP not affected: APD and color vision loss rare but possible
- ◆ Change with time
- ◆ Use B-scan or OCT to detect buried drusen
- ◆ Also seen with CAT scan, MRI, IVFA, and FAF

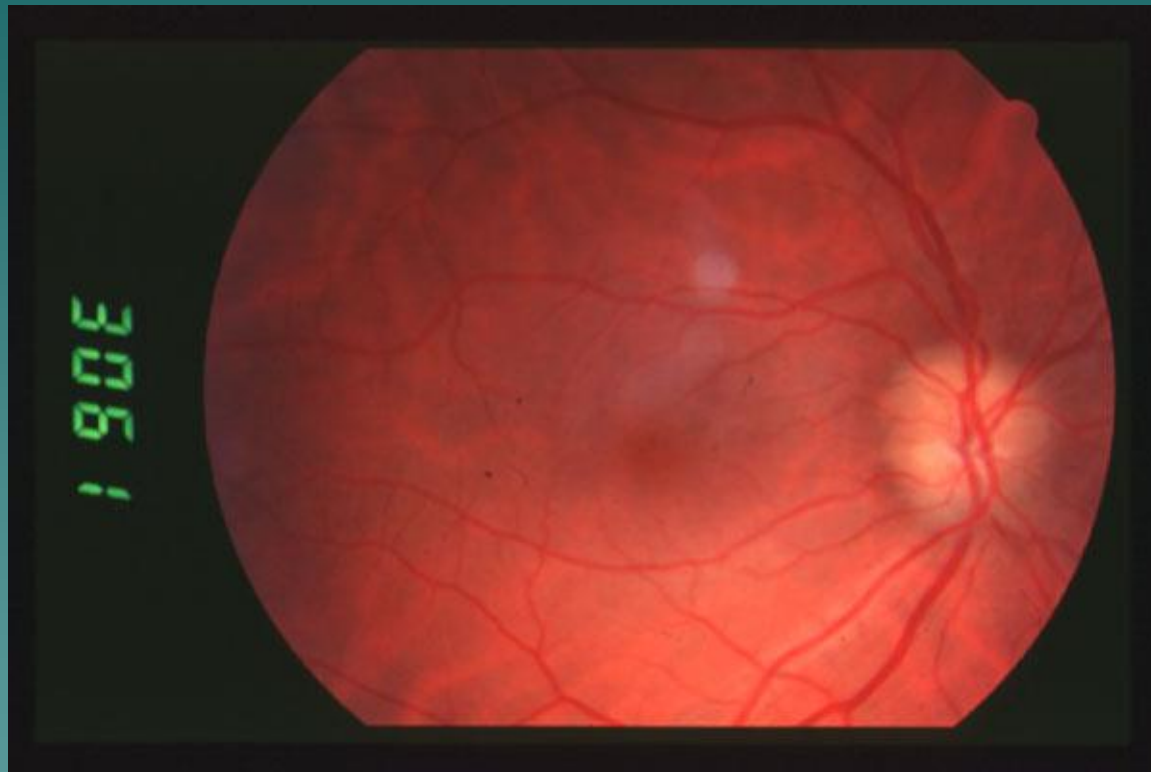
ONH Drusen



ONH Drusen



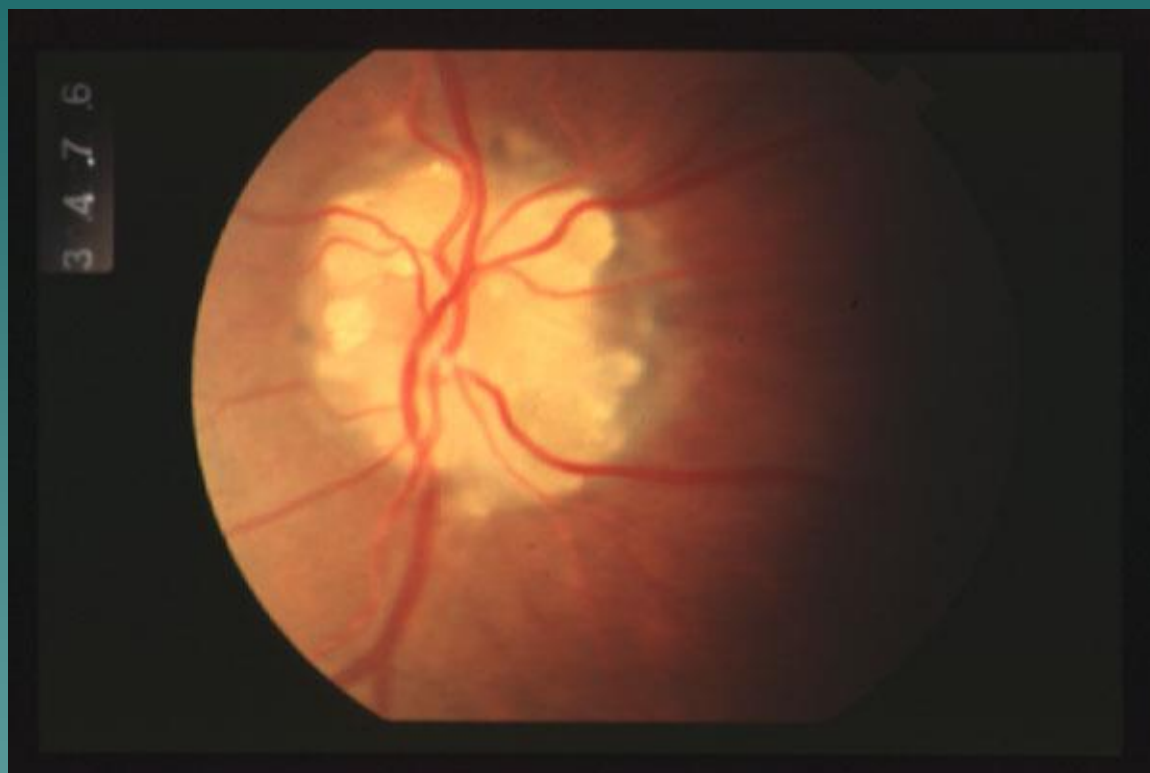
ONH Drusen



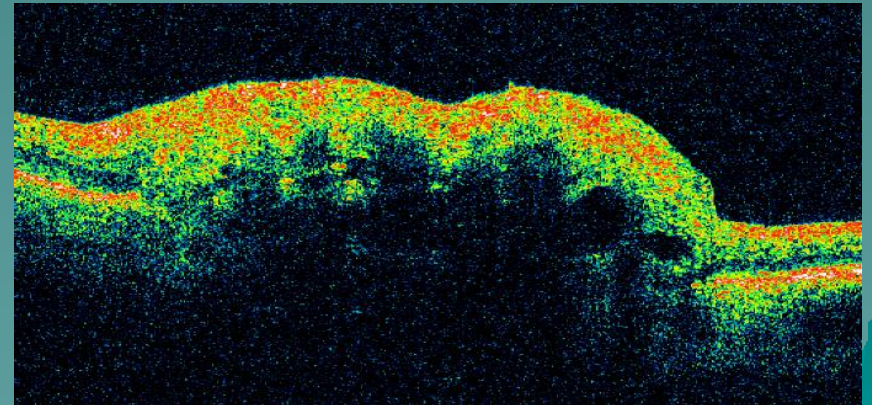
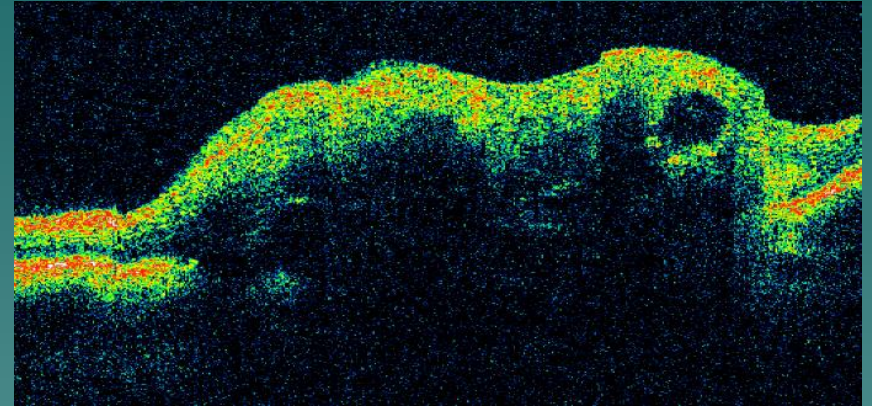
ONH Drusen



ONH Drusen



ONH drusen



ONH DRUSEN SD-OCT

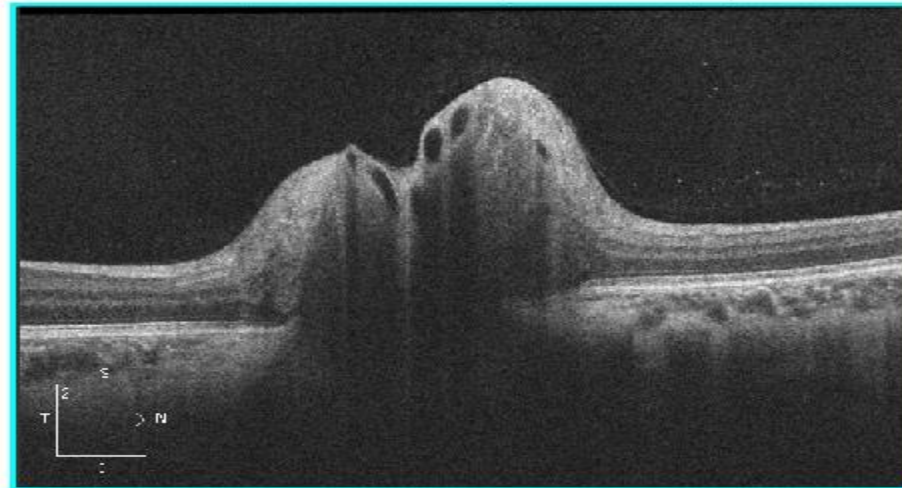
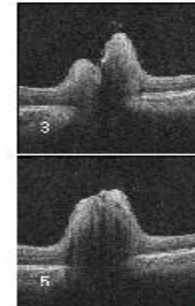
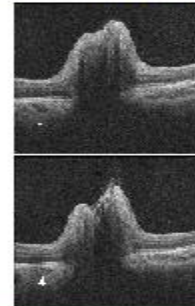
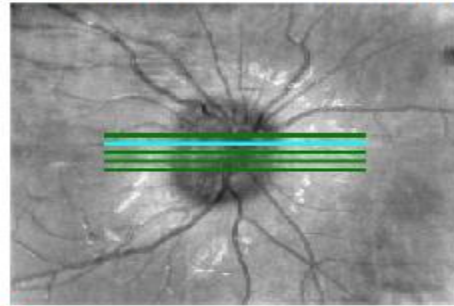
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ONH DRUSEN SD OCT

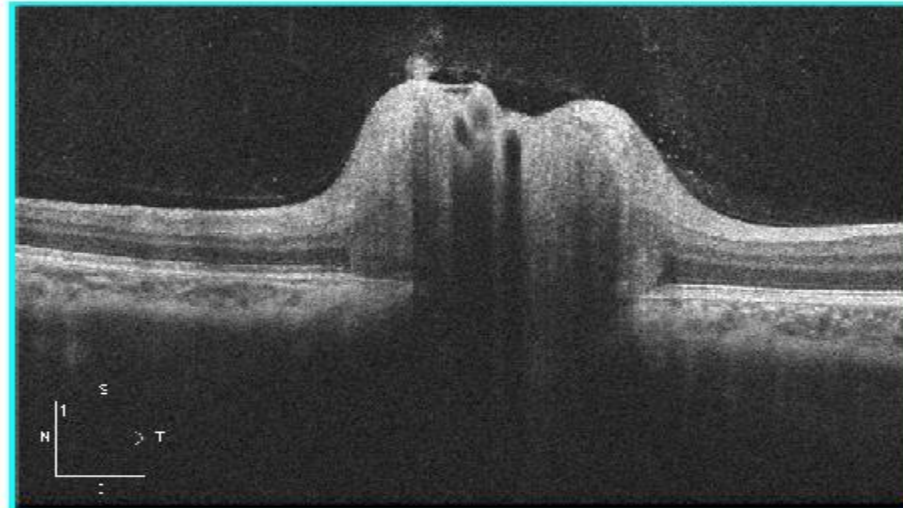
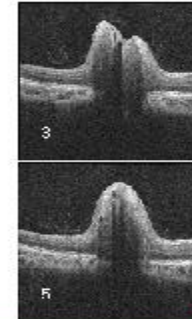
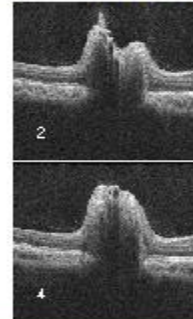
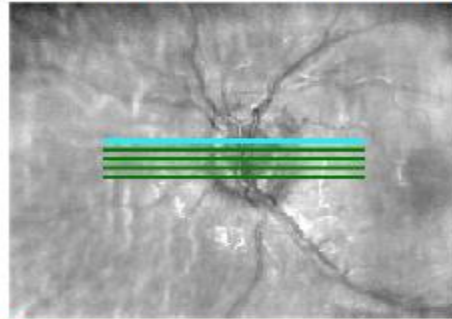
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Color SD-OCT

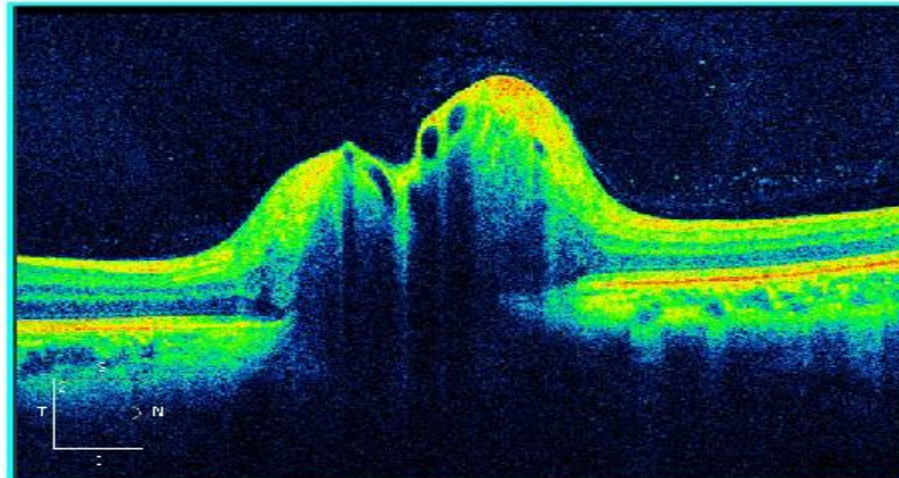
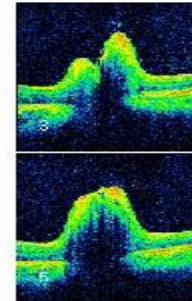
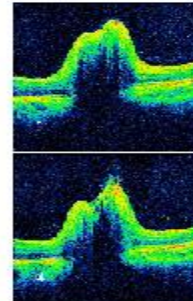
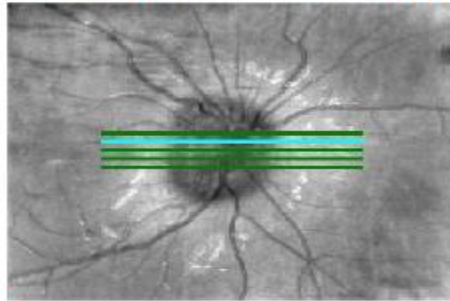
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ONH drusen detection with OCT

- ◆ Optic Disc Drusen Consortium Consensus.....
- ◆ Always use EDI
- ◆ Blood vessels are more solid, cast a shadow, and can show as figure 8
- ◆ Drusen always prelaminar
- ◆ Drusen always hyporeflective
- ◆ Drusen often have a hyper-reflective border, especially superiorly

ONH drusen detection with OCT

- ◆ Drusen can conglomerate, and these areas can have some internal reflectivity from borders
- ◆ The old concept of a hypo-reflective fluid wedge at the edge of the nerve in true papilledema DOES NOT APPLY with SD-OCT. Was a time domain OCT artifact.

Peripapillary Hyper-reflective Ovoid Mass-like structures (PHOMS)

- ◆ "Fomms"
- ◆ Seen best with EDI
- ◆ Only seen with OCT, nothing else
- ◆ Circular inertube like structure around the disc above Bruch's membrane
- ◆ Herniated optic nerve fibers
- ◆ Seen in any condition that leads to nerve swelling or congestion
- ◆ ION, papilledema, disc drusen

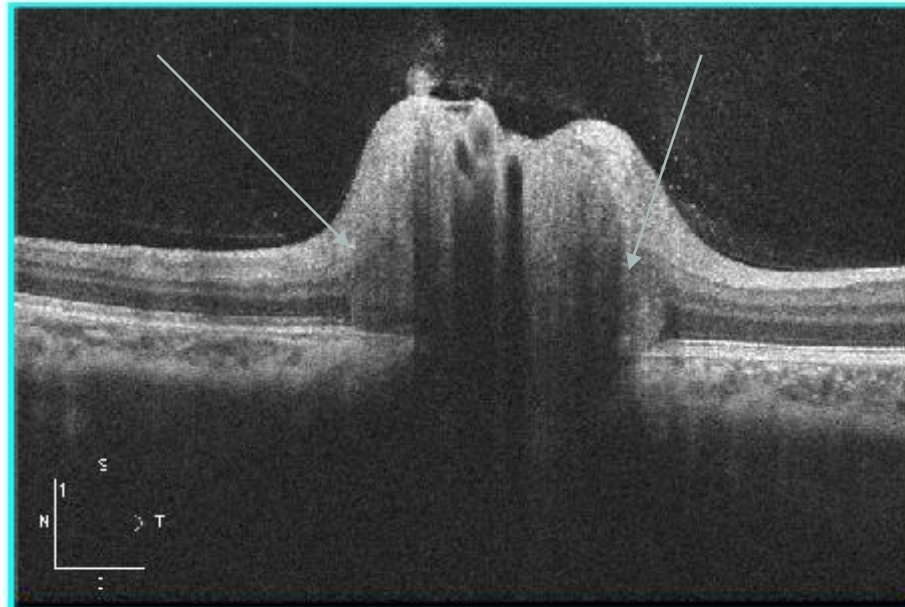
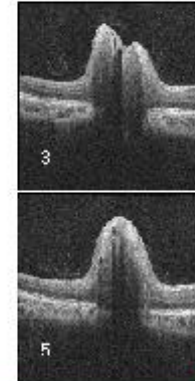
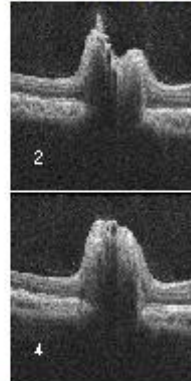
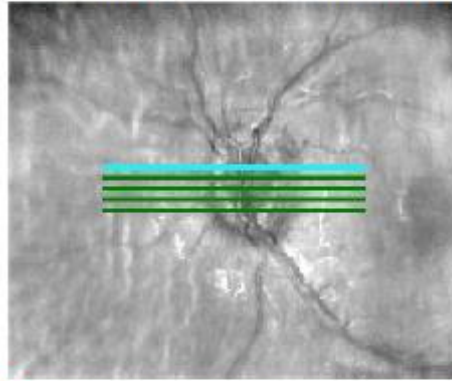
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FAF ONH Drusen



FAF ONH Drusen



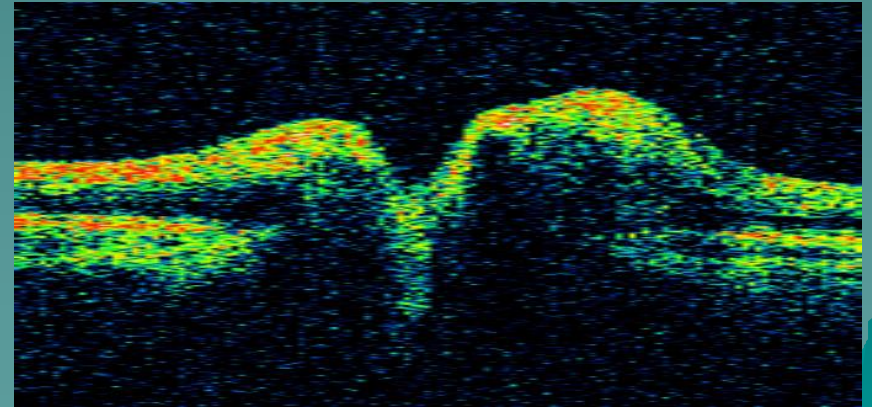
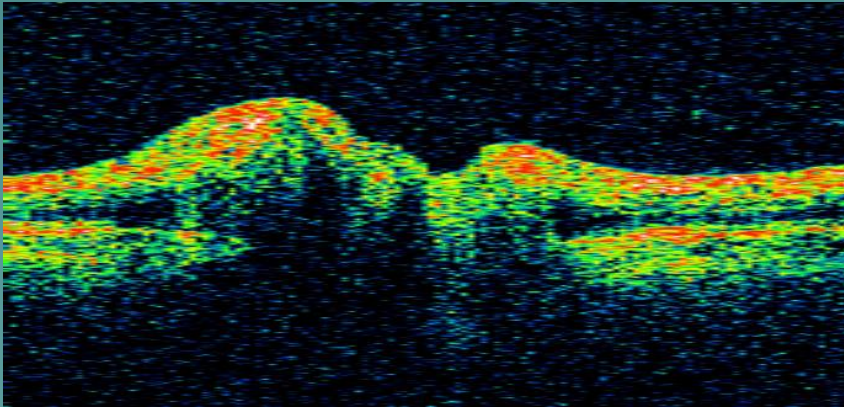
NFL loss with ONH drusen



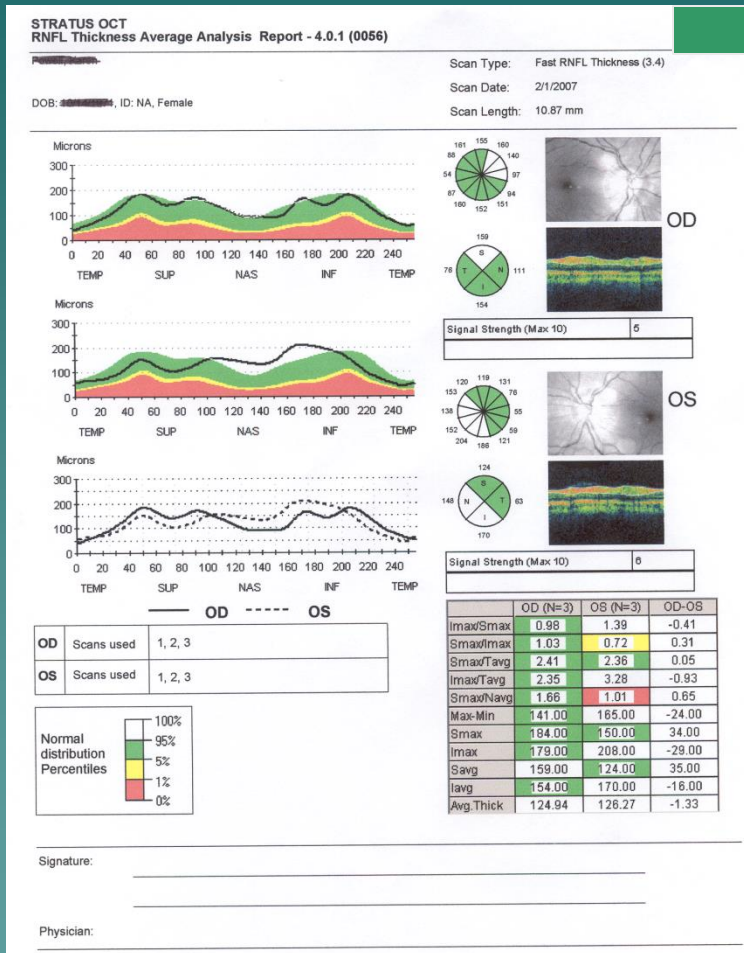
Longstanding ONH drusen OU & new cat scratch disease OS



IIH with ONHD and papilledema



IH with ONHD and papilledema



ONH drusen MRI



ONH drusen B-scan

