

Papilledema vs. Pseudopapilledema

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Financial disclosures

- ◆ No financial disclosures

Examination Techniques

- ◆ Stereoscopic viewing essential
- ◆ VA and VF
- ◆ Spontaneous / elicited venous pulsation
- ◆ Pupil testing and color vision
- ◆ Brightness comparison and red cap test



Papilledema

- ◆ Bilateral* optic nerve head swelling secondary to increased intracranial pressure (always, by definition)
- ◆ Swollen, blurred margins with splinter hemorrhages and exudates as well as nerve fiber layer edema. Patton's folds may be seen: concentric chorioretinal folds extending from the disc: only seen in papilledema

Papilledema

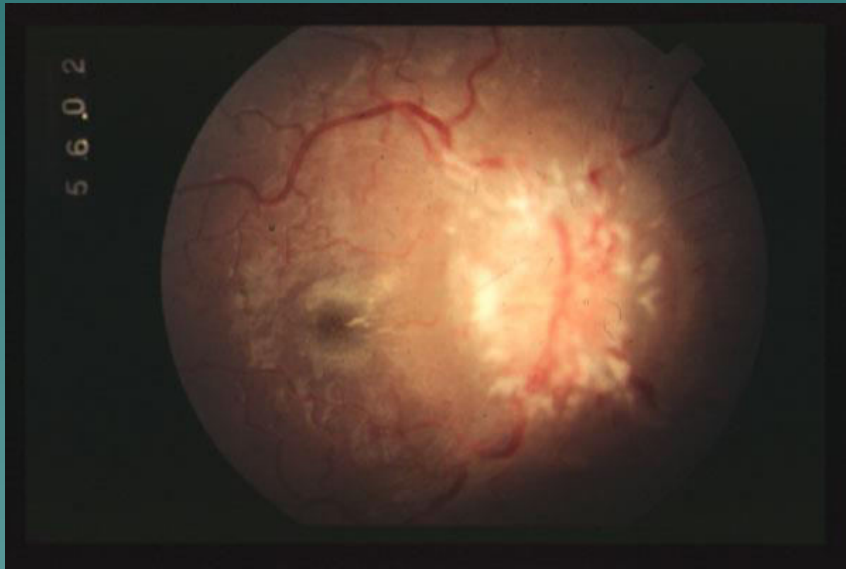
- ◆ *May be asymmetric or very rarely unilateral (sequential swelling)
- ◆ VA varies but typically mild reduction only or no loss at all
- ◆ May get diplopia secondary to abducens nerve compression causing partial lateral rectus paralysis
- ◆ With increased ICP, can get choroidal folds only (before papilledema) at lower pressure levels

Papilledema

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



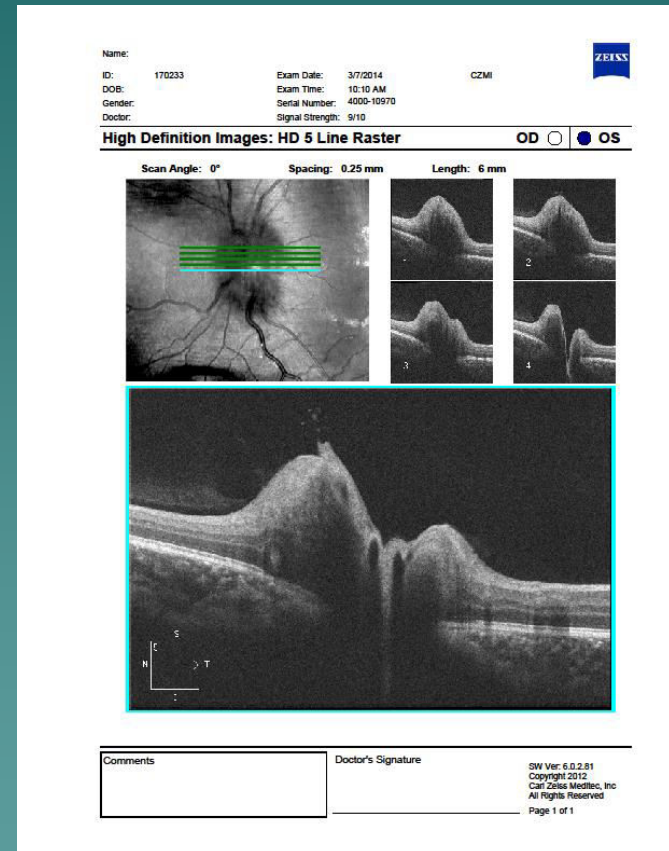
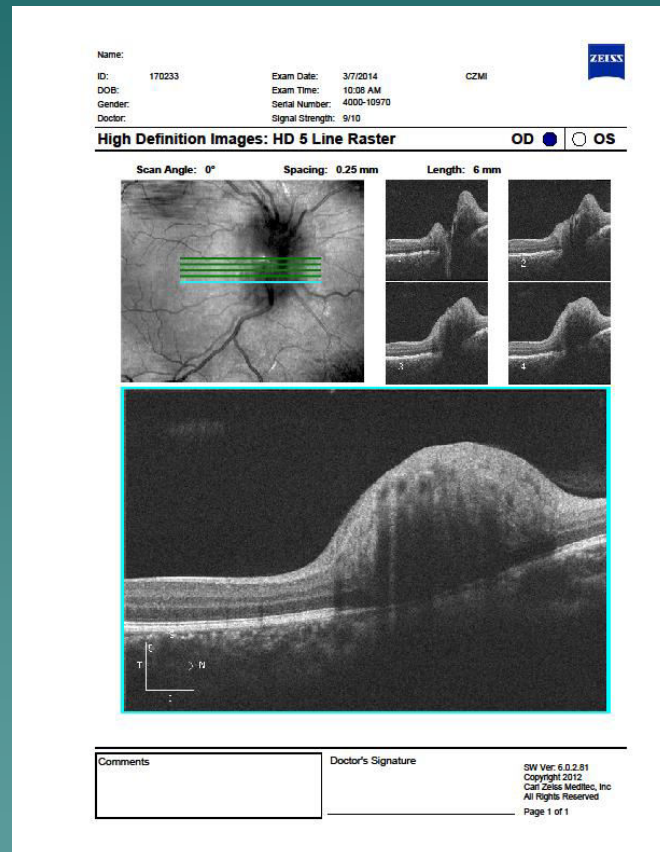
Papilledema (IIH)



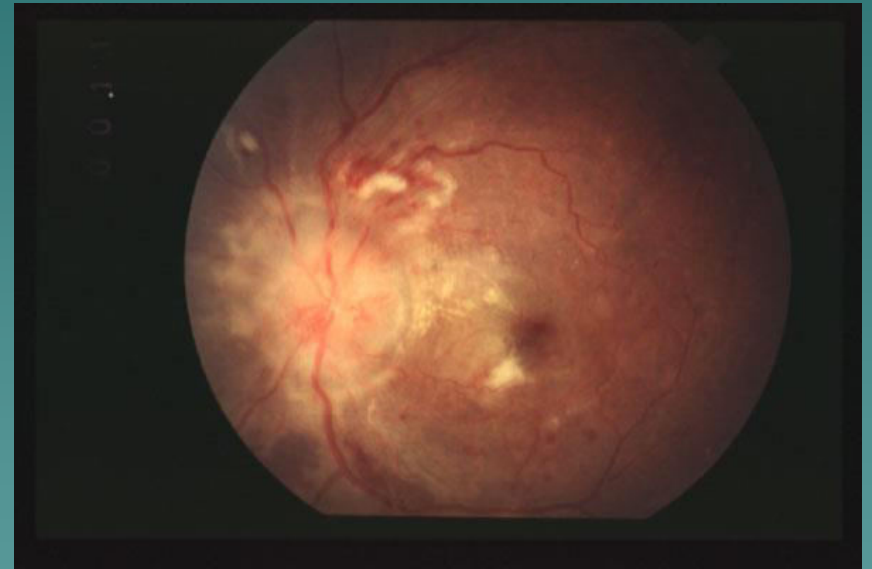
Papilledema IIH age 15



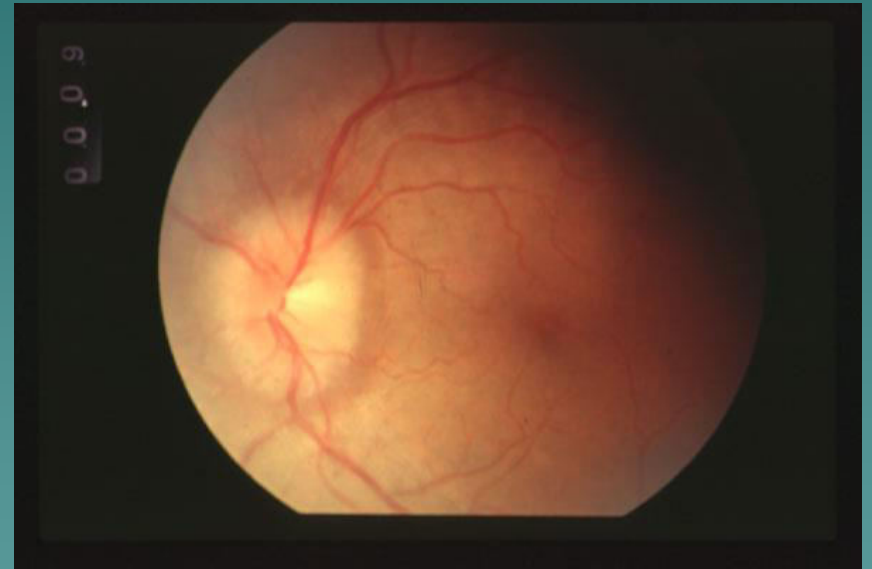
OCT



Papilledema (HTN)



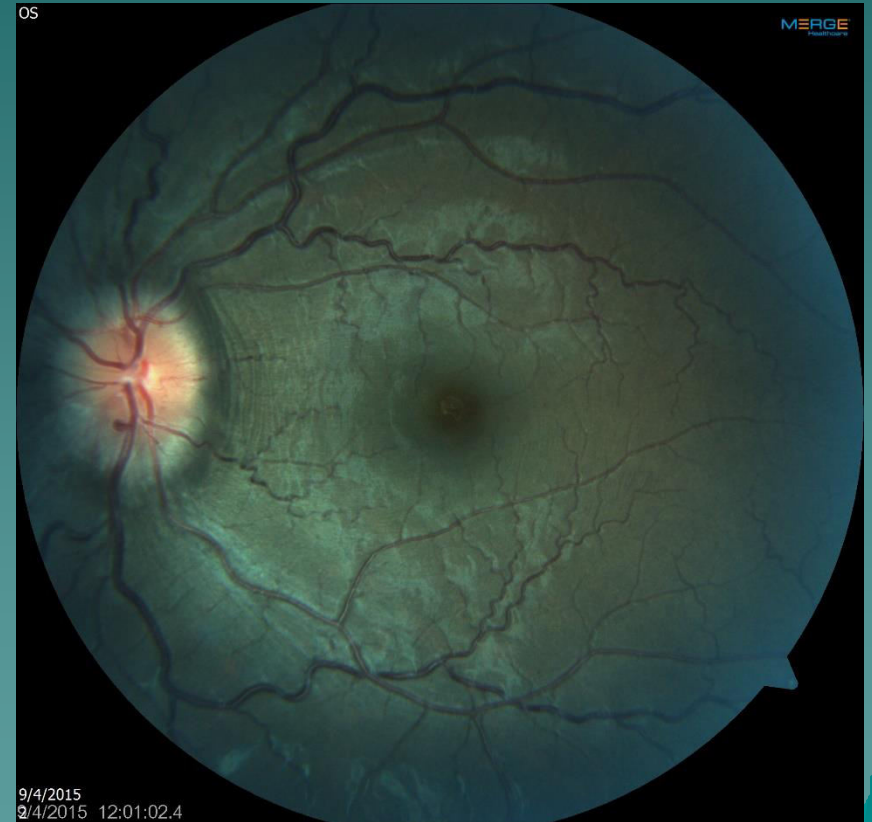
Papilledema (tumor)



Subtle papilledema (IIH)



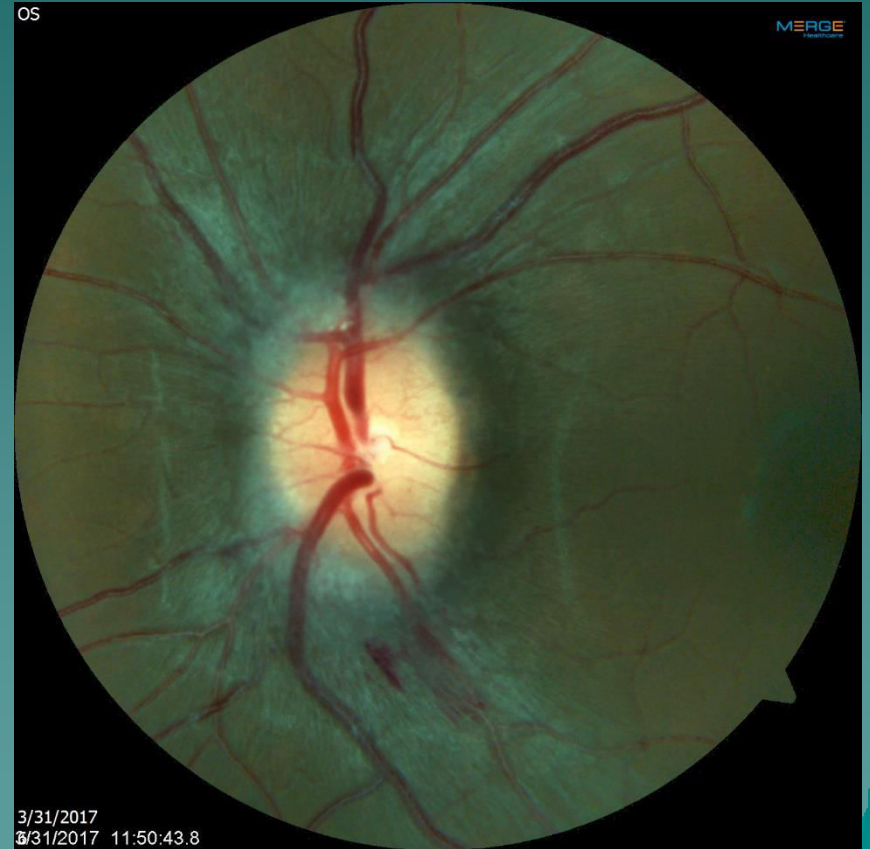
Papilledema IIH



Papilledema IIH



Papilledema IIH



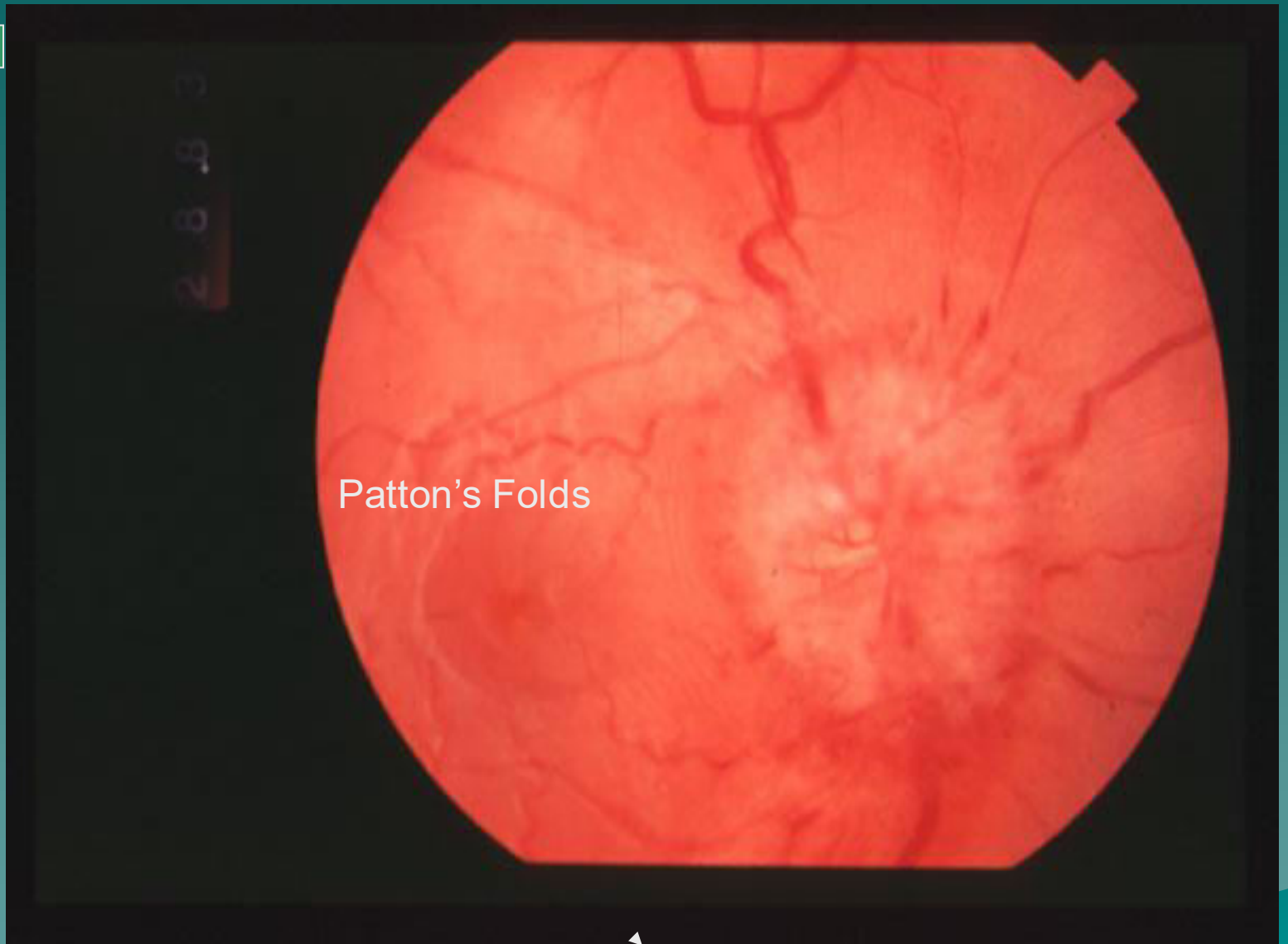
Terson's syndrome and papilledema



Due to subarachnoid hemorrhage traveling down optic nerve sheath

Papilledema progression



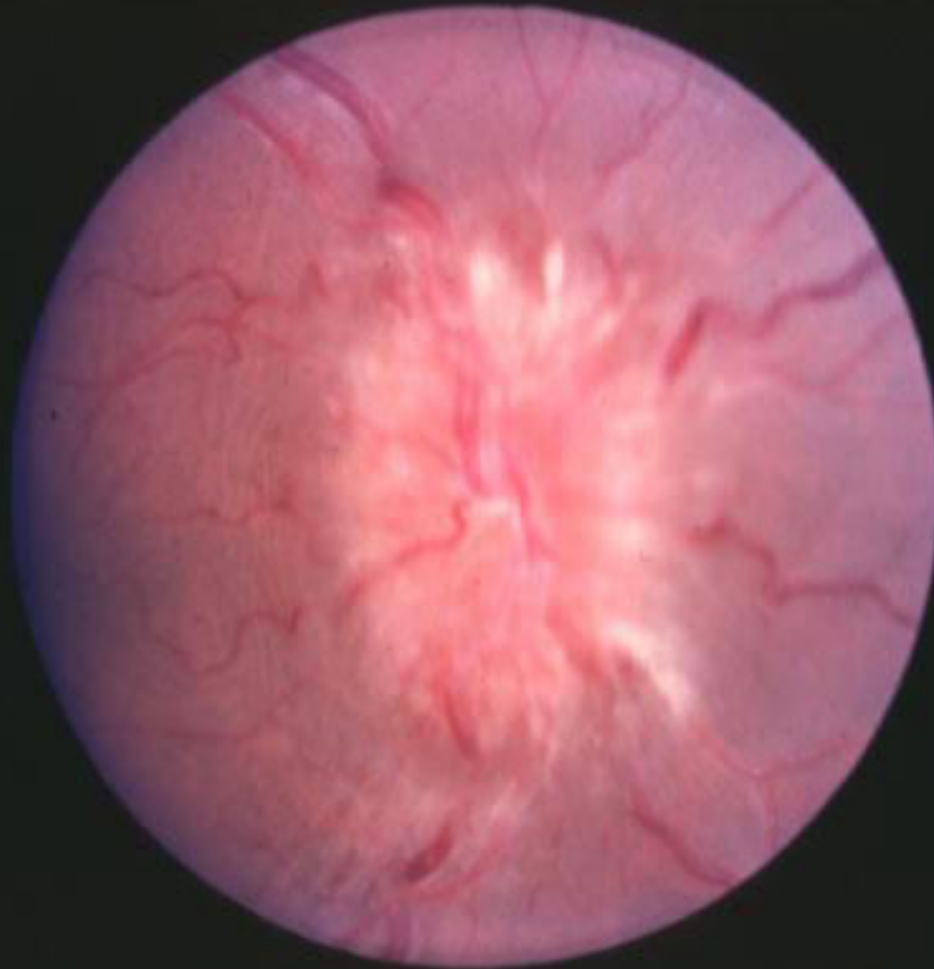


Patton's Folds

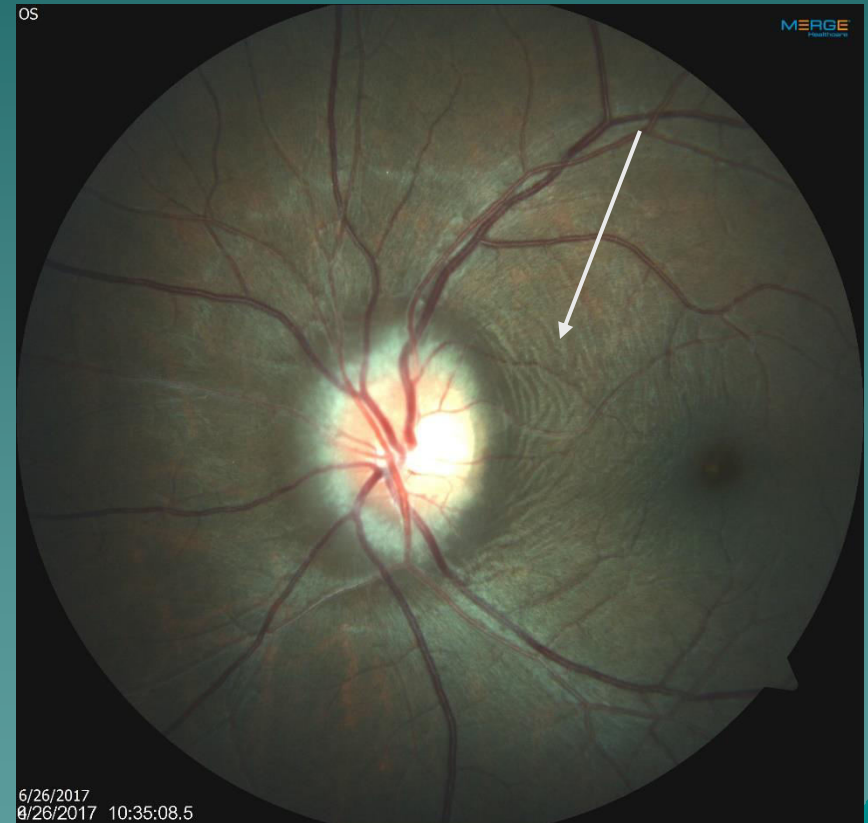
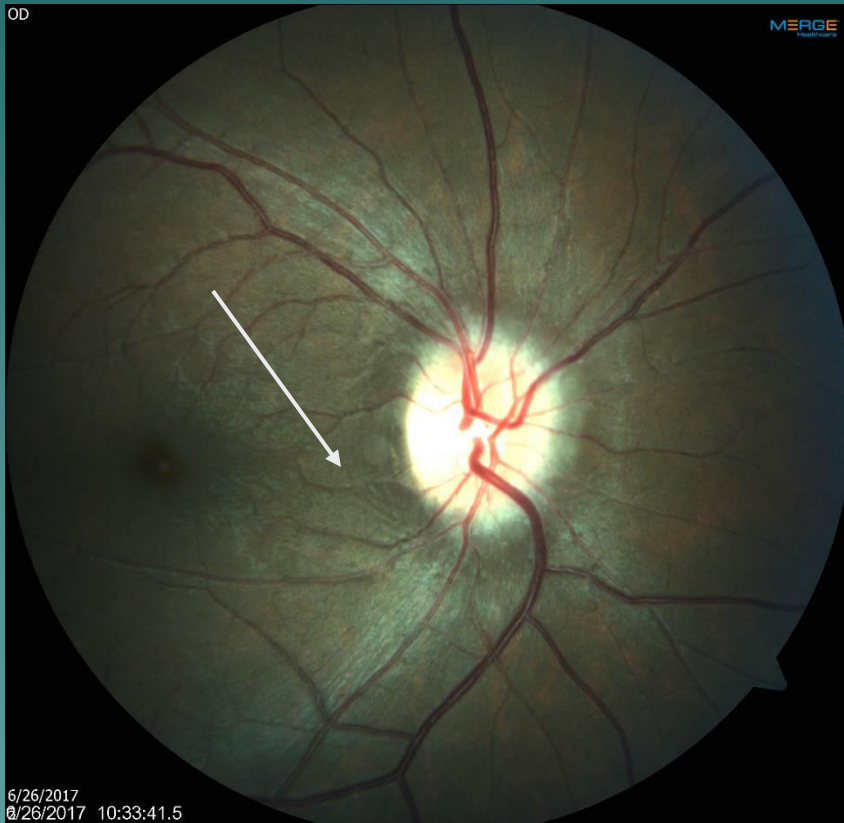
Patton's folds



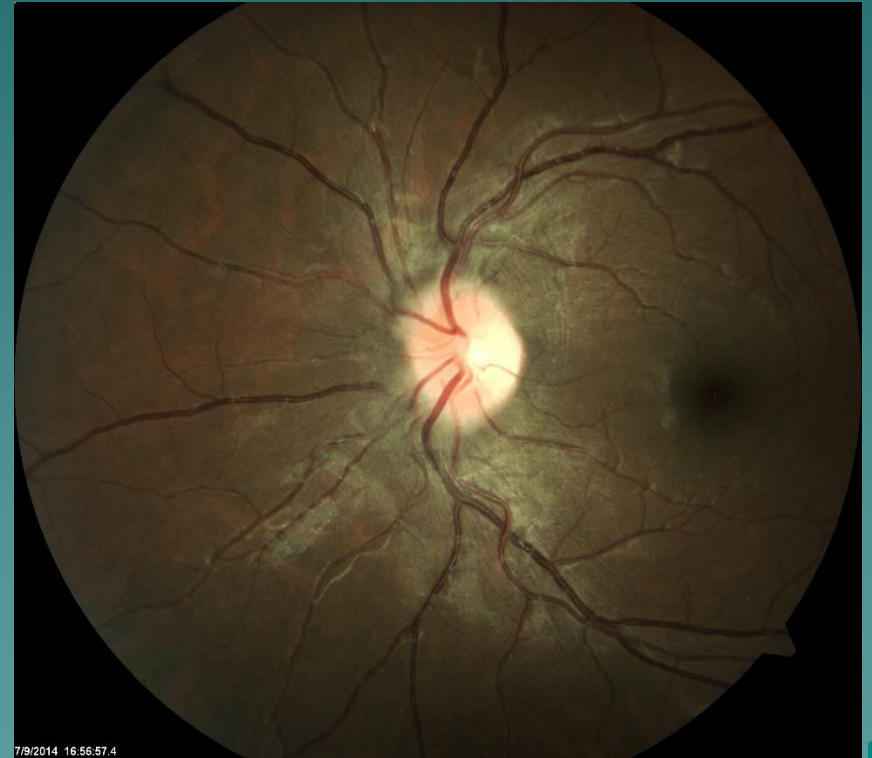
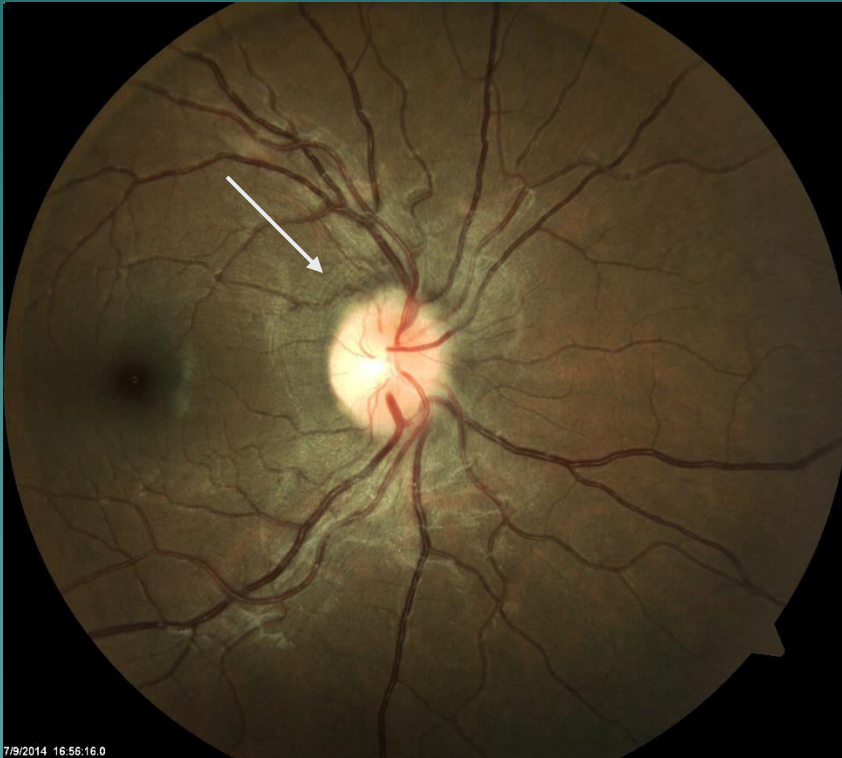
Patton's folds



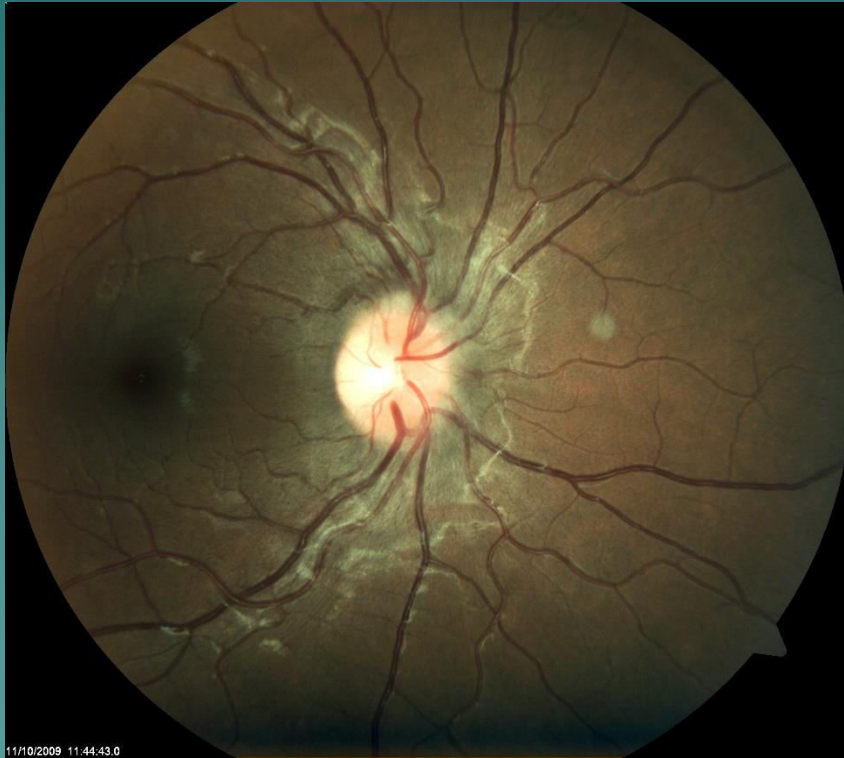
Patton's folds: RNFL thickness 231in OD, 295 in OS



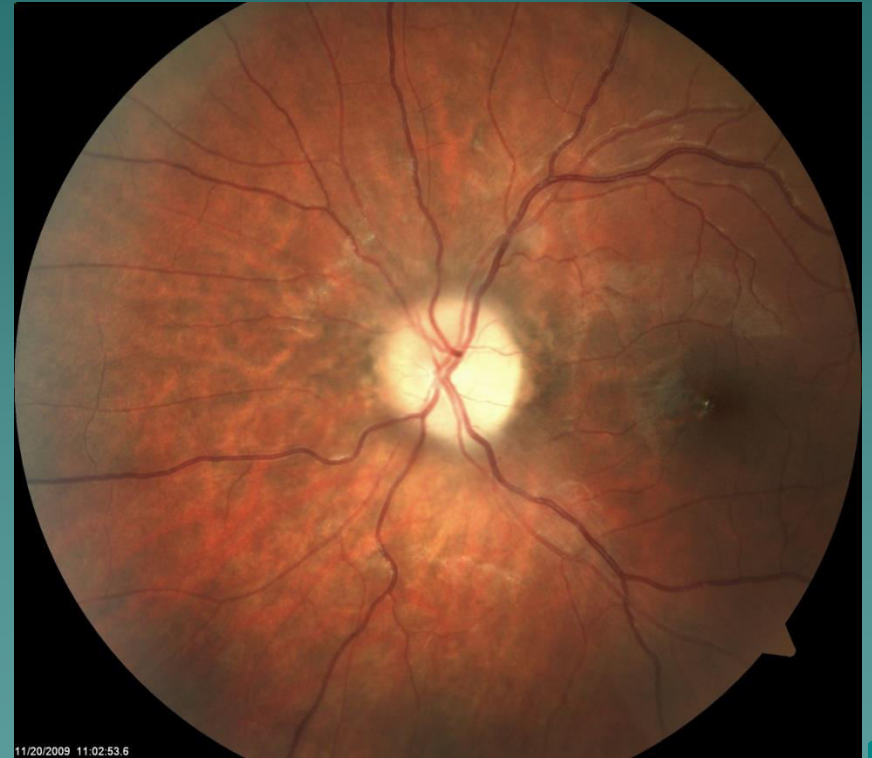
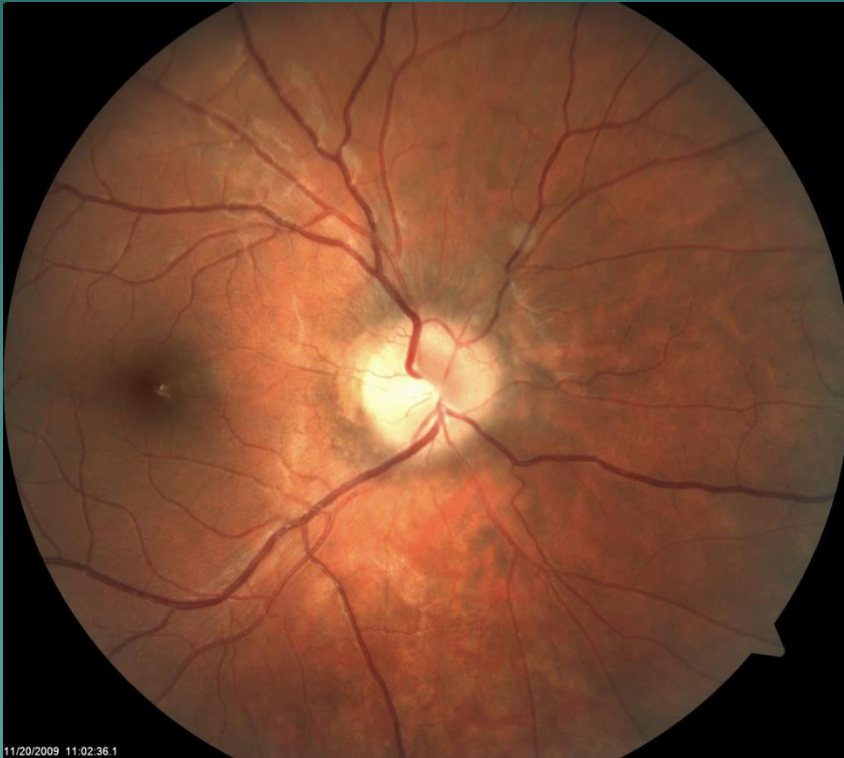
Patton's folds: now you see them.....



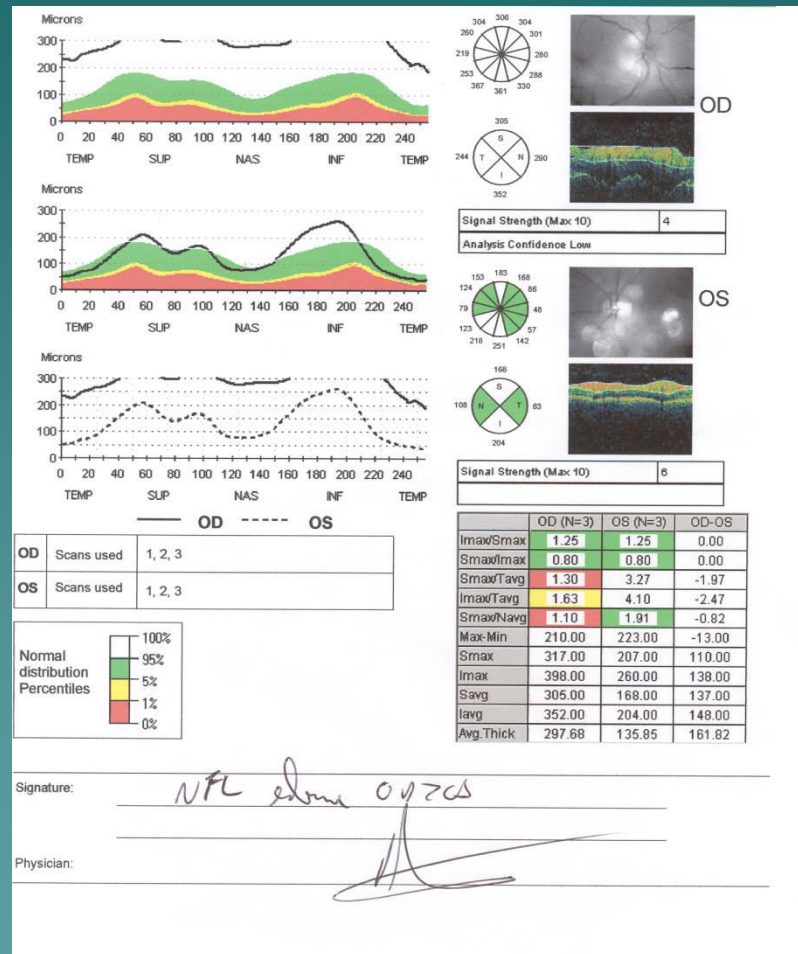
Back then in 2007 you did not...



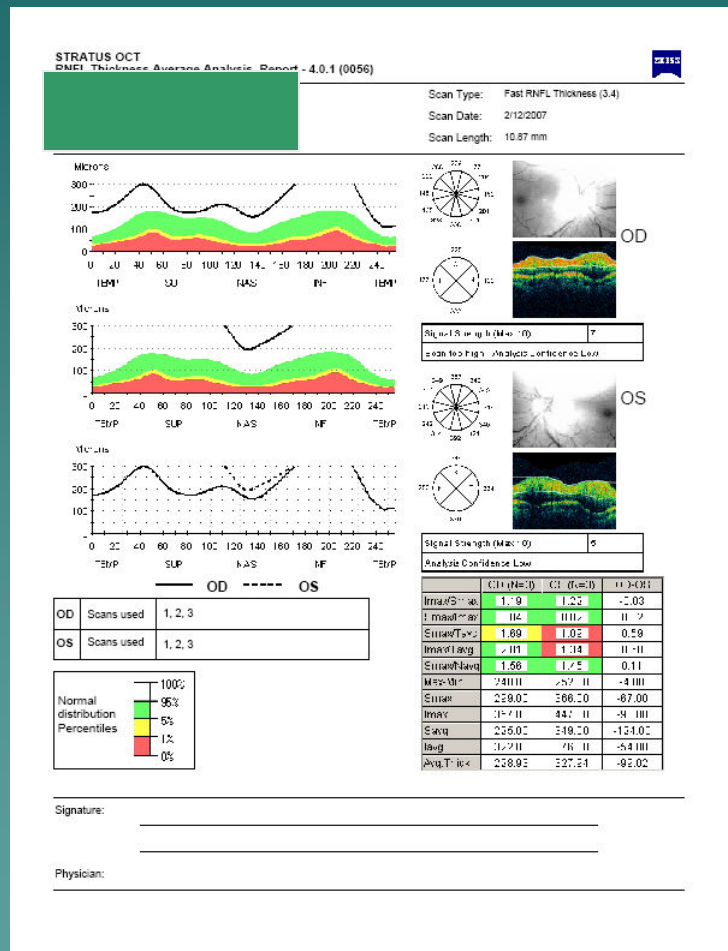
Longstanding papilledema with optic atrophy (IIH)



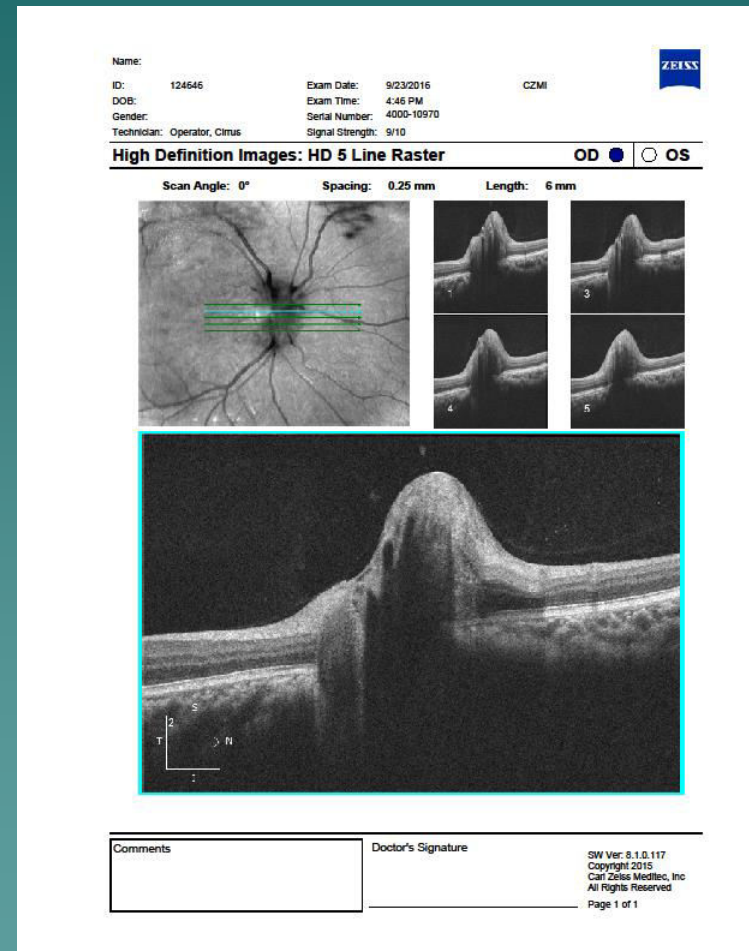
Papilledema OCT NFL



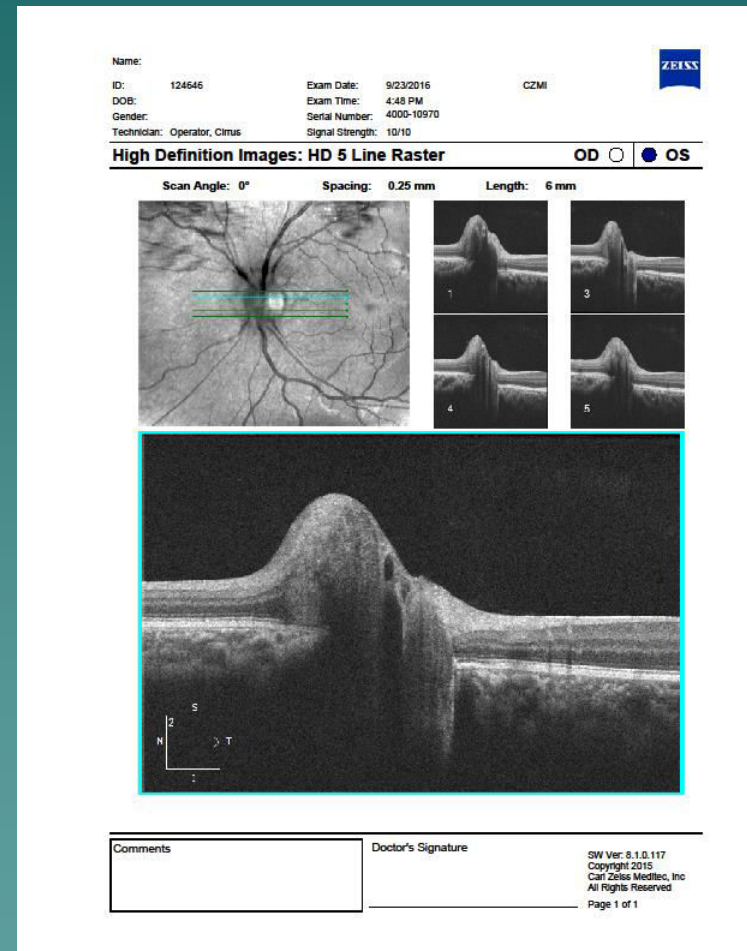
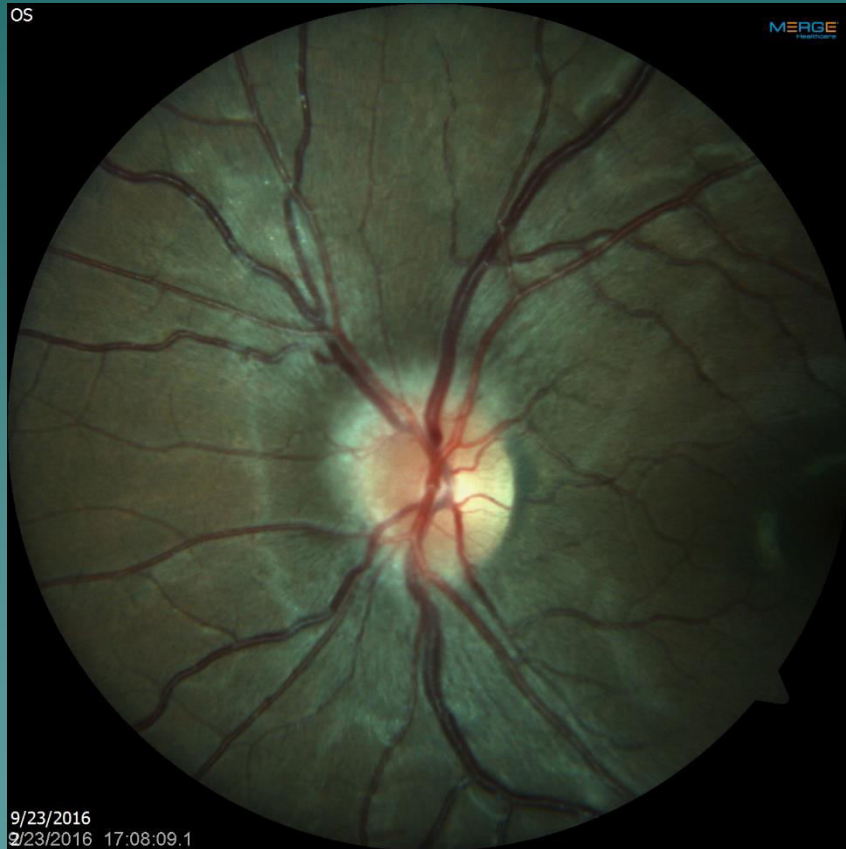
NFL edema



Papilledema OCT



Papilledema OCT



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 treatment


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
- 
- A stylized, dark teal silhouette of a mountain range is located in the bottom right corner of the slide, partially overlapping the bottom edge of the text area.

Idiopathic Intracranial Hypertension (IIH)

- ◆ Older term is “pseudotumor cerebri”
 - ◆ Young overweight females (F 8X M)
 - ◆ 5/ 100,000 in population as a whole ; 20 / 100,000 in 20 - 44 year old women 10% over ideal weight
 - ◆ May be related to medications including TCN, 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
- 
- A stylized, dark teal mountain range graphic is located in the bottom right corner of the slide, extending from the bottom edge and slightly up the right edge.

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

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



CVST

- ◆ Mostly young women
- ◆ Often not overweight
- ◆ Can be life threatening
- ◆ Treat with blood thinners, Diamox
- ◆ Can be seen with MRI, but potentially missed if MRV not performed (MRV by far the most sensitive)

IIH Management

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



IIH Management

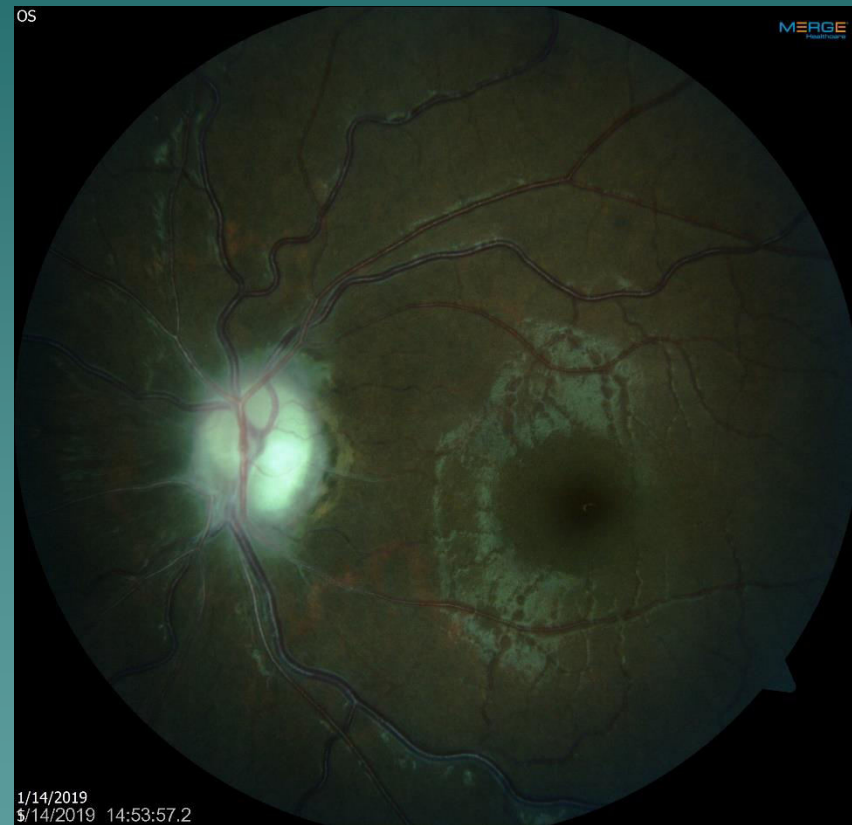
- ◆ If recalcitrant....
 - ◆ Repeated lumbar taps (ugh!)
 - ◆ Lumbo-peritoneal shunt
 - ◆ Ventricular shunt

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 IIH induced edema leading to atrophy: S/P decompression


22 year old AA F



Light perception

10/700

Foster Kennedy Syndrome

- ◆ Swollen optic nerve on one side , advanced optic atrophy on the other
 - ◆ Advanced optic atrophy prevents swelling making a bilateral problem appear to be unilateral
 - ◆ Often seen in chiasmal tumors
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- A stylized, dark teal silhouette of a mountain range is positioned in the bottom right corner of the slide, extending from the right edge towards the center.

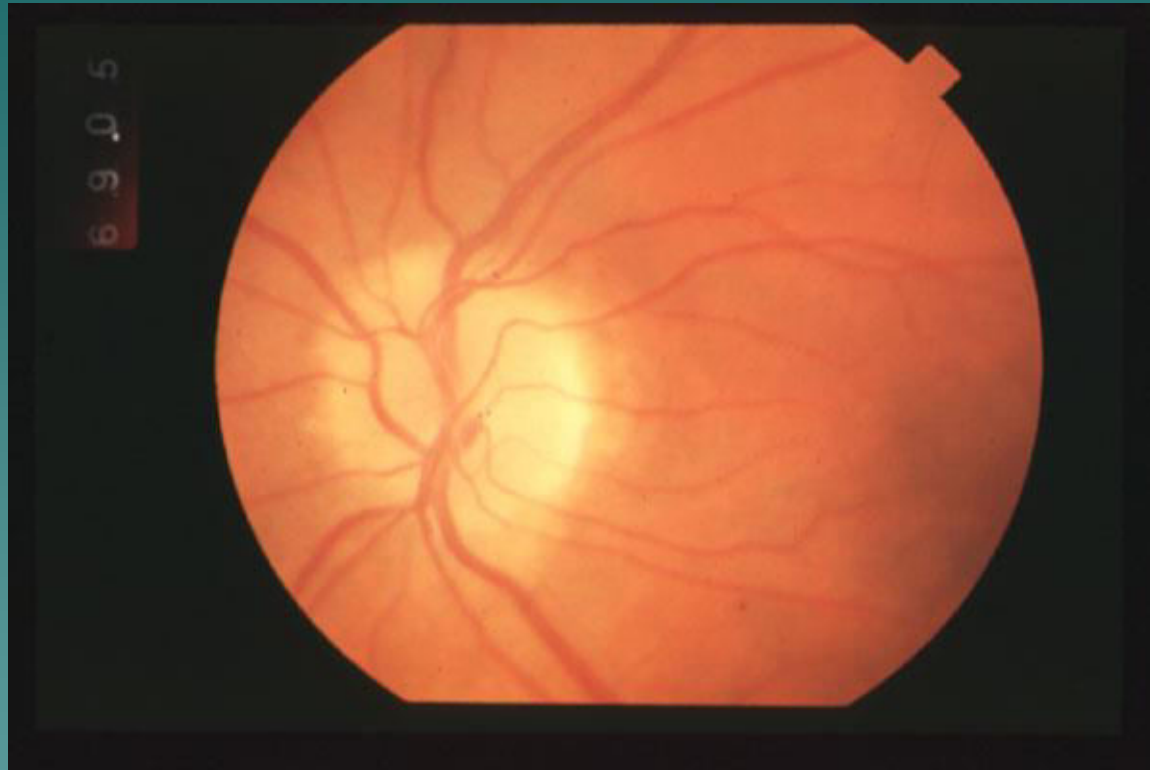
Compressive Optic Neuropathy

- ◆ Compression leads to axoplasmic stasis and retrograde death of nerve fibers
- ◆ Pale, choked, swollen nerve
- ◆ Rarely see hemes; + APD

Compressive Optic Neuropathy

- ◆ Optic atrophy and severe vision loss with time
- ◆ MRI with and without contrast: neurosurgery referral


Sphenoid wing meningioma



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

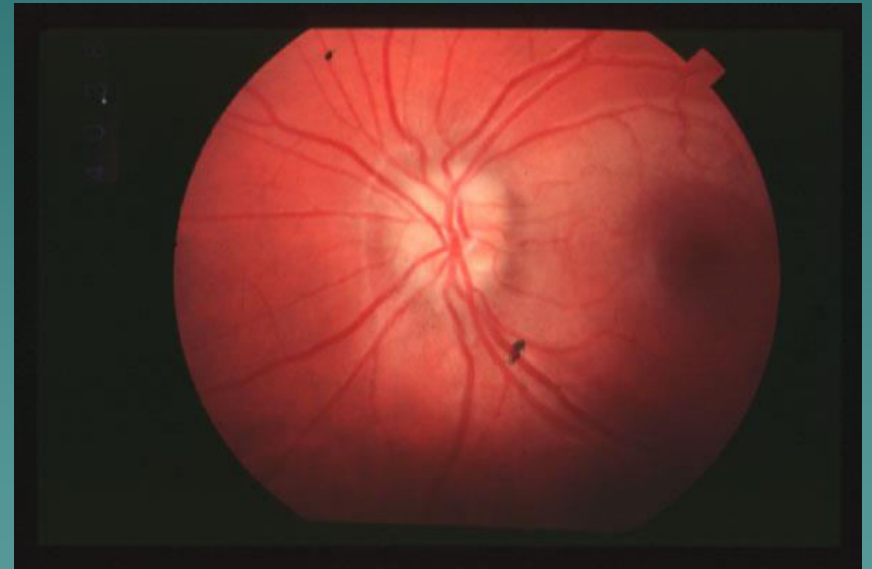
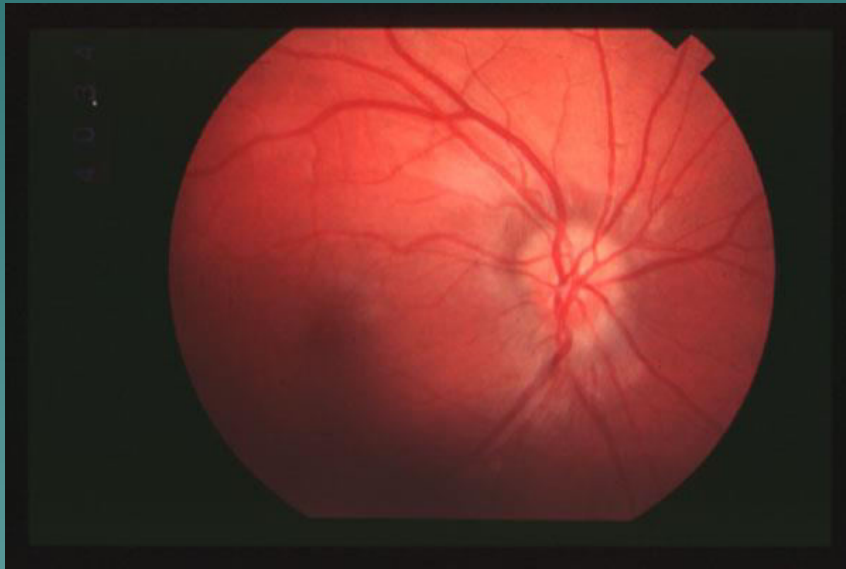
Optic Nerve Head Drusen

- ◆ 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
- 
- A decorative graphic in the bottom right corner of the slide, consisting of a stylized, jagged mountain range silhouette in a teal color that matches the background.

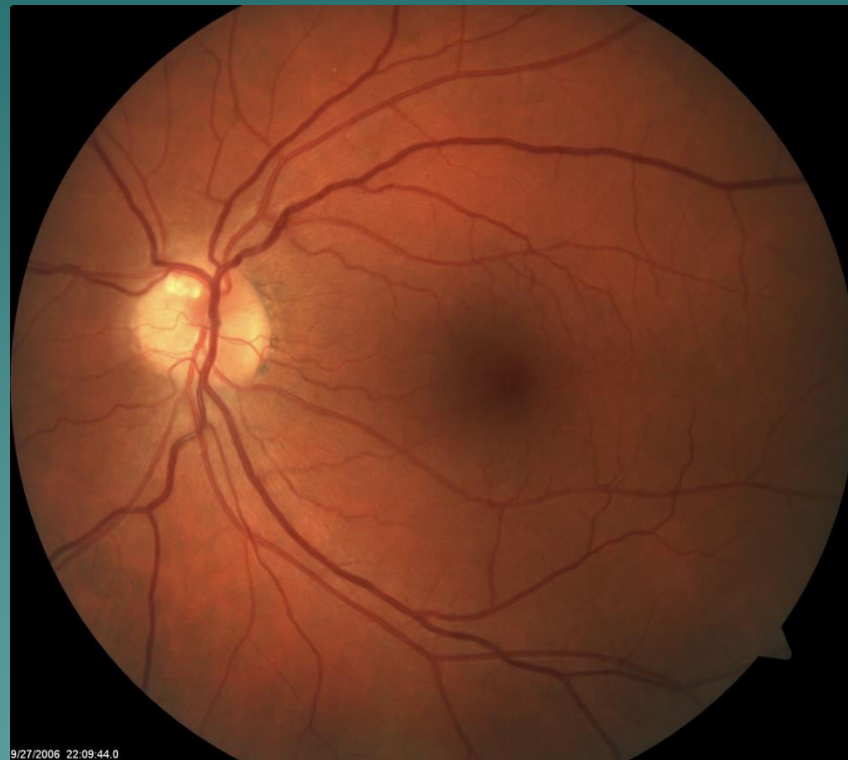
Optic Nerve Drusen

- ◆ 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

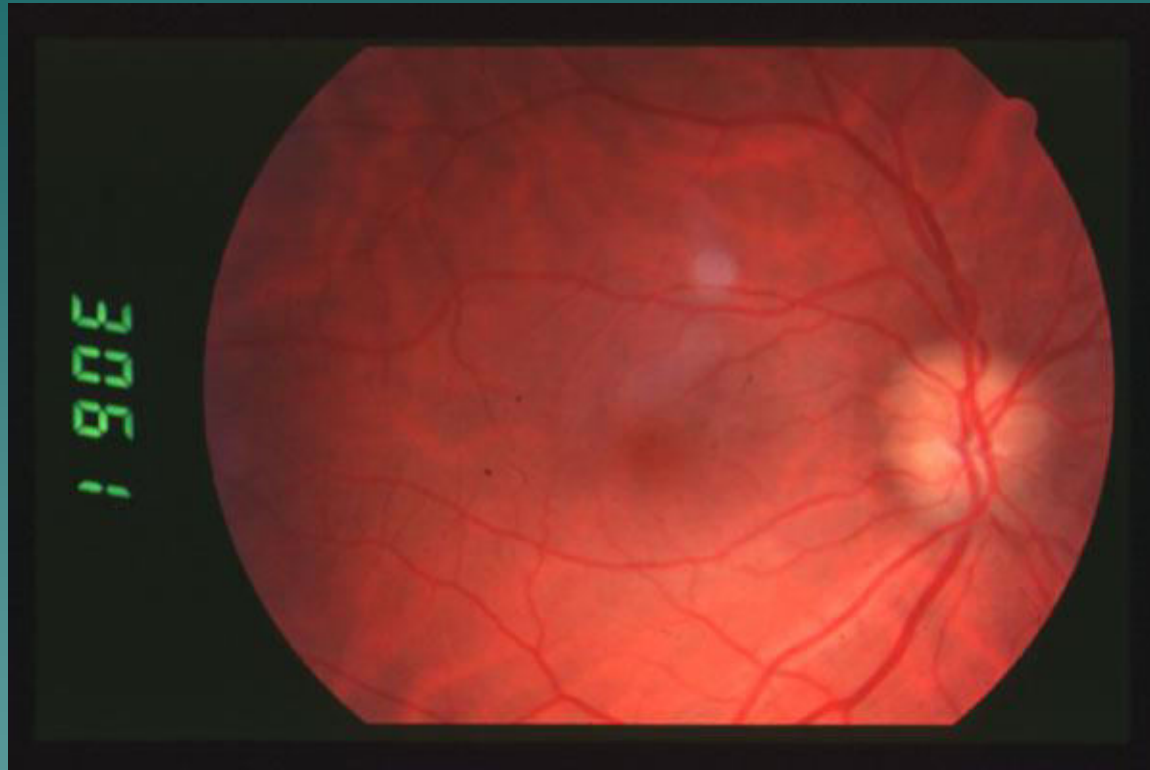
ONH Drusen



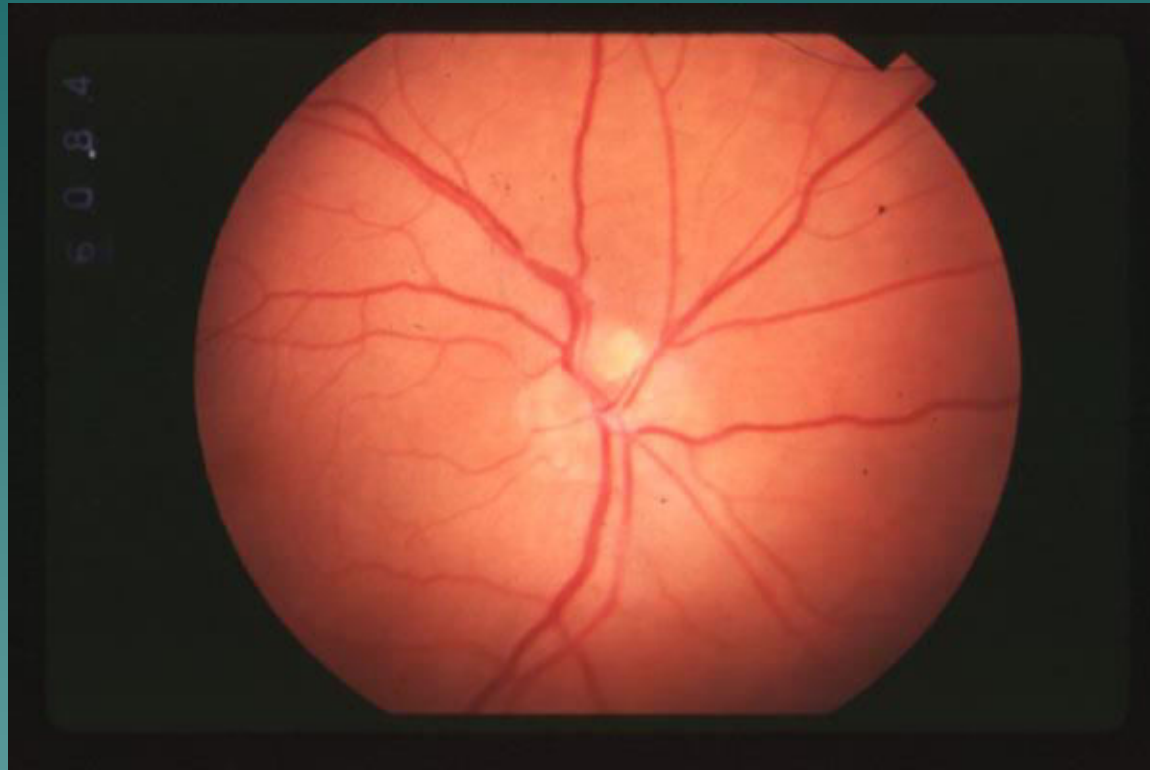
ONH Drusen



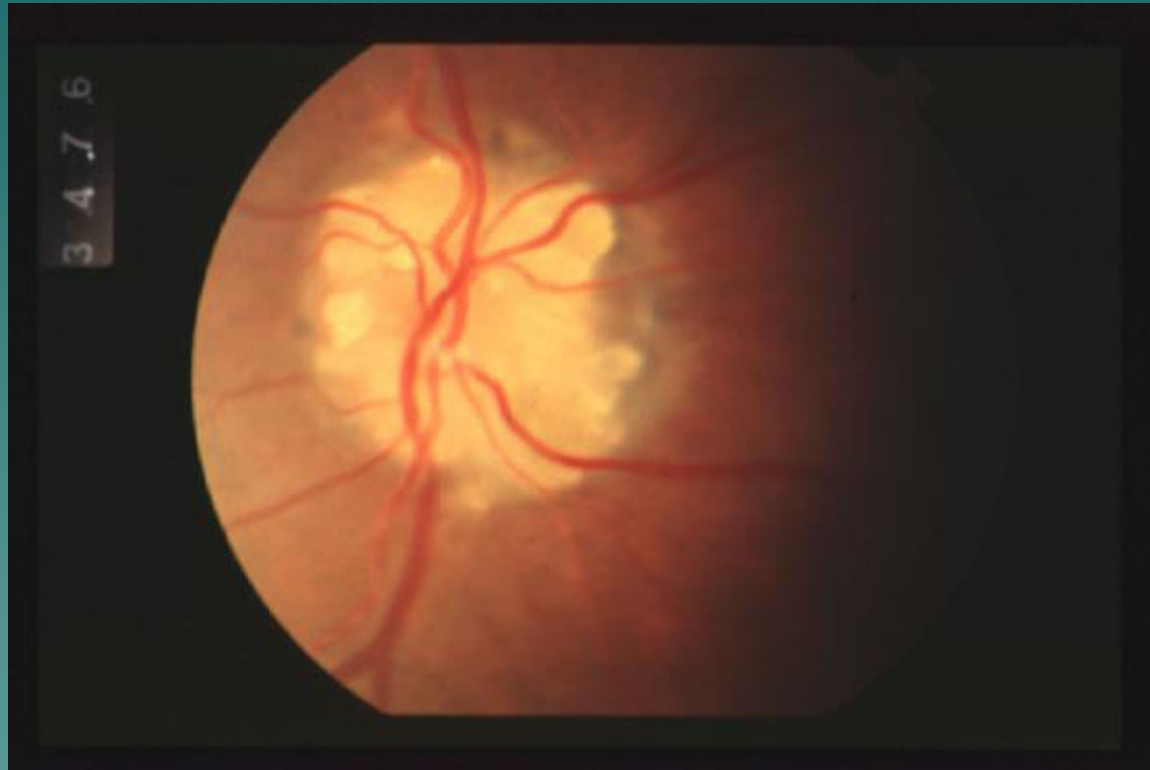
ONH Drusen



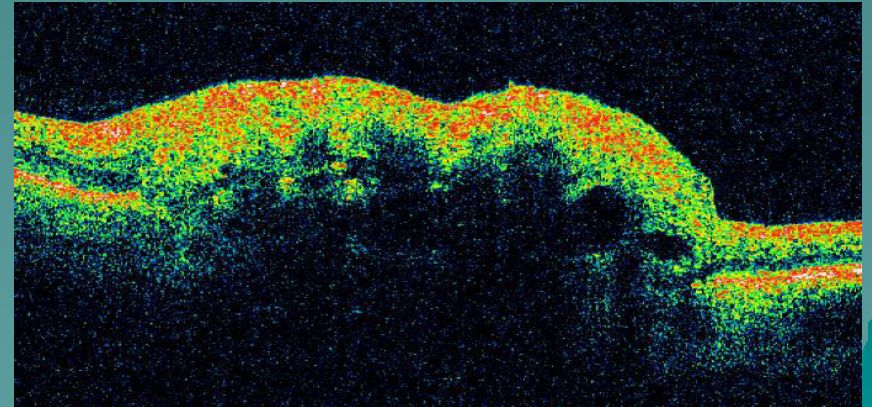
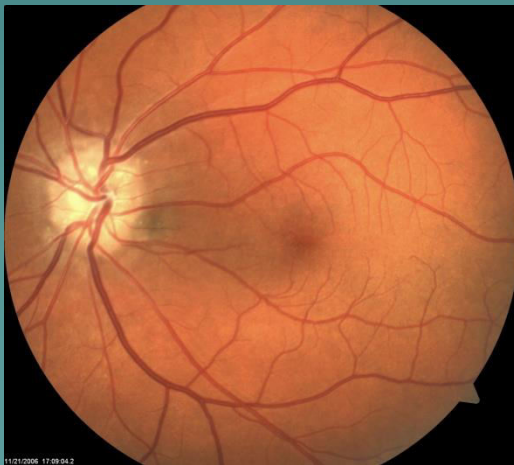
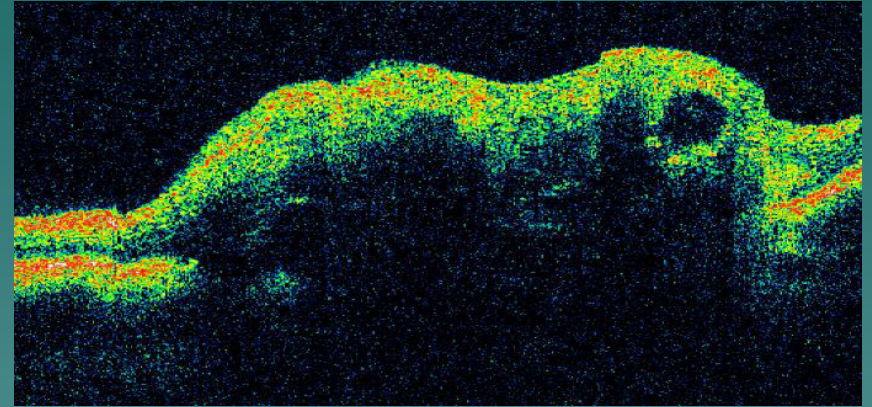
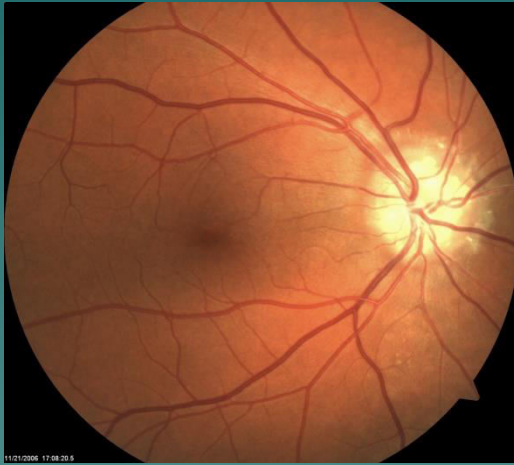
ONH Drusen



ONH Drusen



ONH drusen



ONH DRUSEN SD-OCT

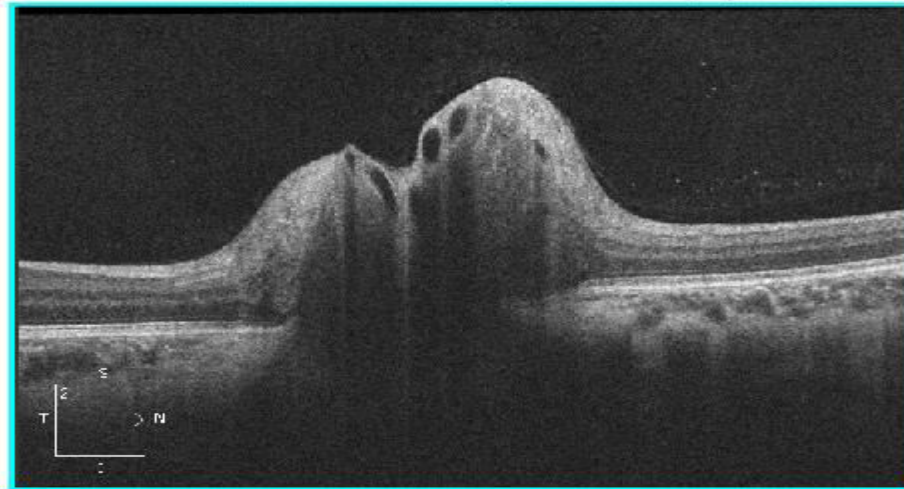
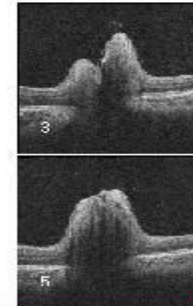
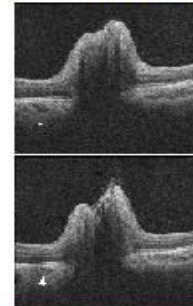
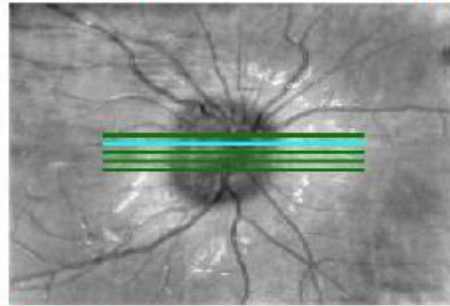
High Definition Images: HD 5 Line Raster

OD ☒ OS ☐

Scan Angle: 0°

Spacing: 0.25 mm

Length: 6 mm

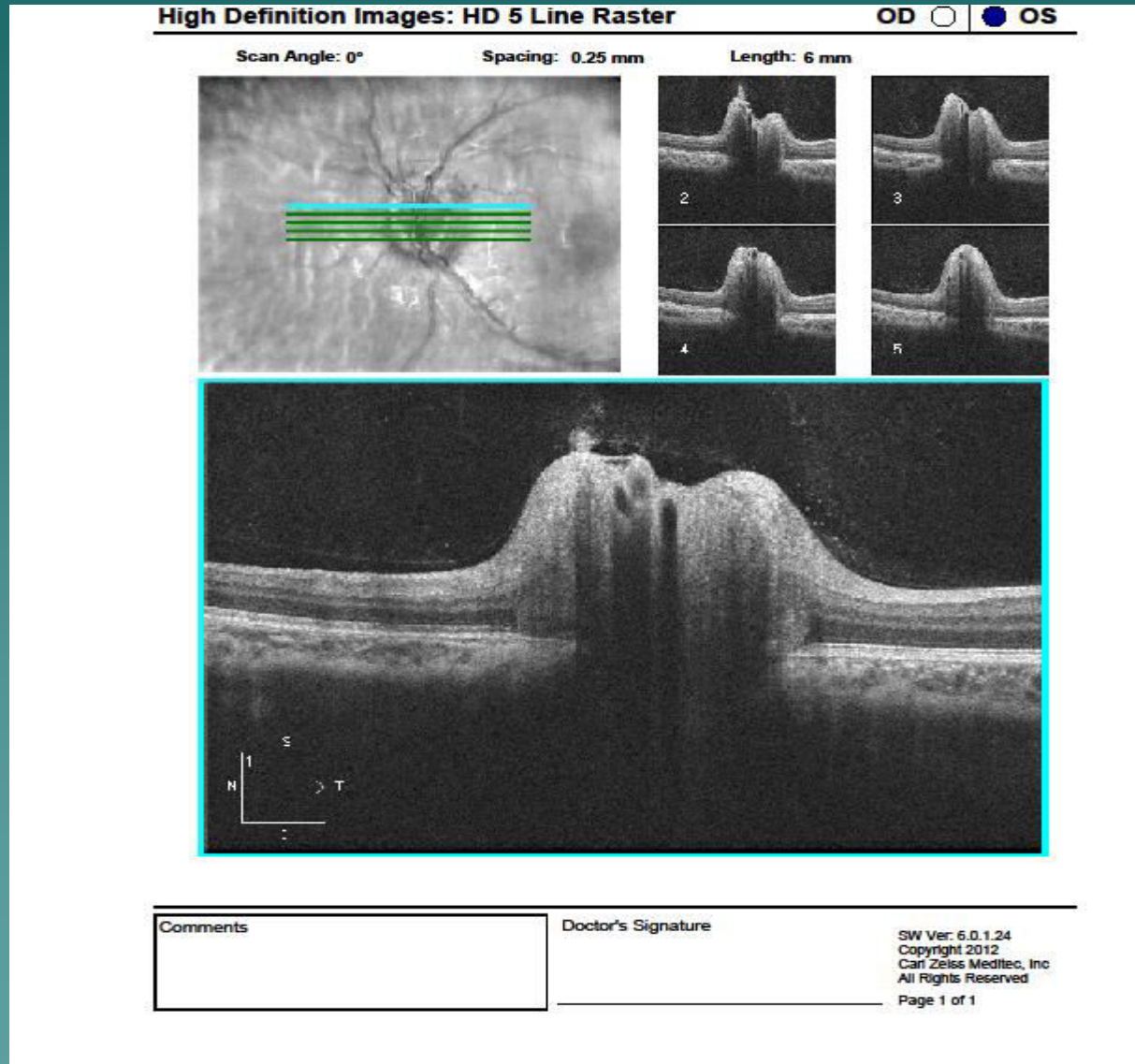


Comments

Doctor's Signature

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ONH DRUSEN SD OCT



Color SD-OCT

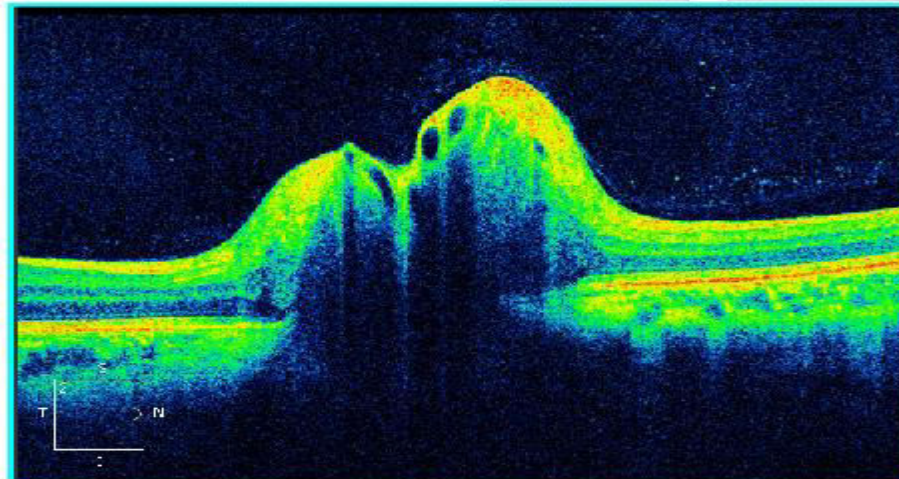
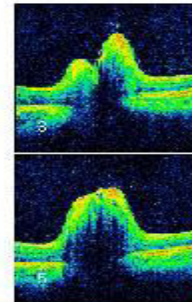
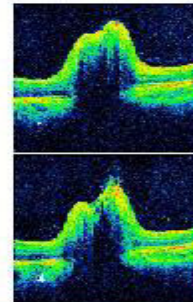
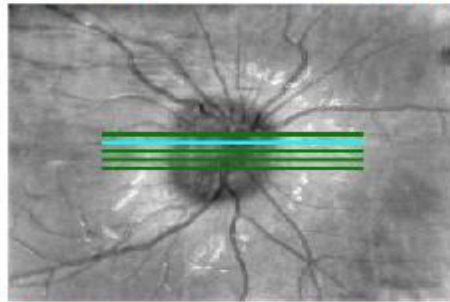
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OD ☒ OS ☐

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Length: 6 mm



Comments

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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 hyperreflective border, especially superiorly

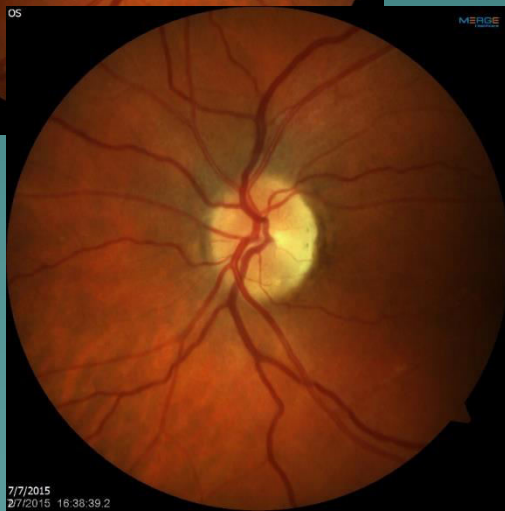
ONH drusen detection with OCT

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

FAF ONH Drusen



7/7/2015
1/7/2015 16:37:11.3



7/7/2015
2/7/2015 16:38:39.2



7/7/2015
1/7/2015 16:37:35.7



7/7/2015
2/7/2015 16:38:59.4

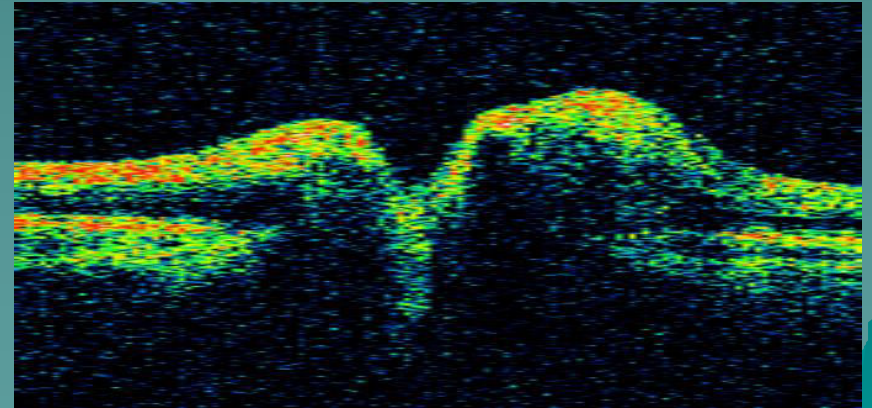
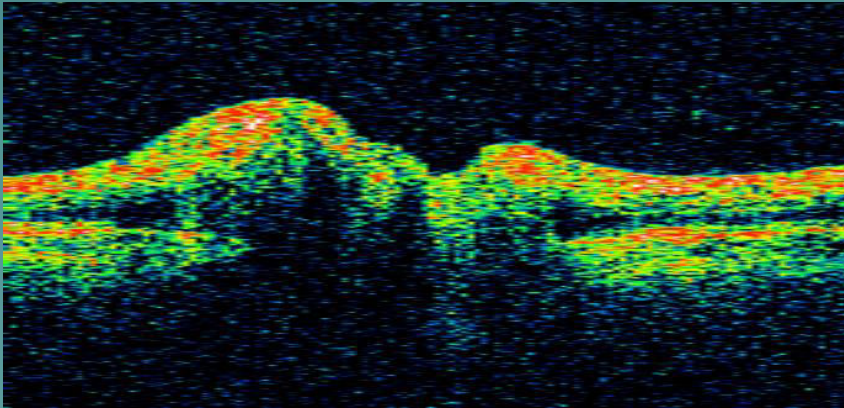
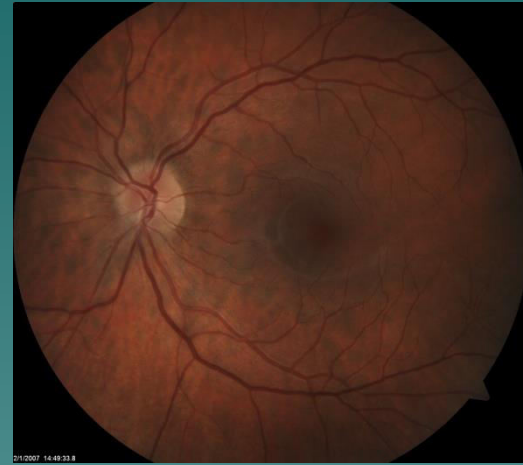
FAF ONH Drusen



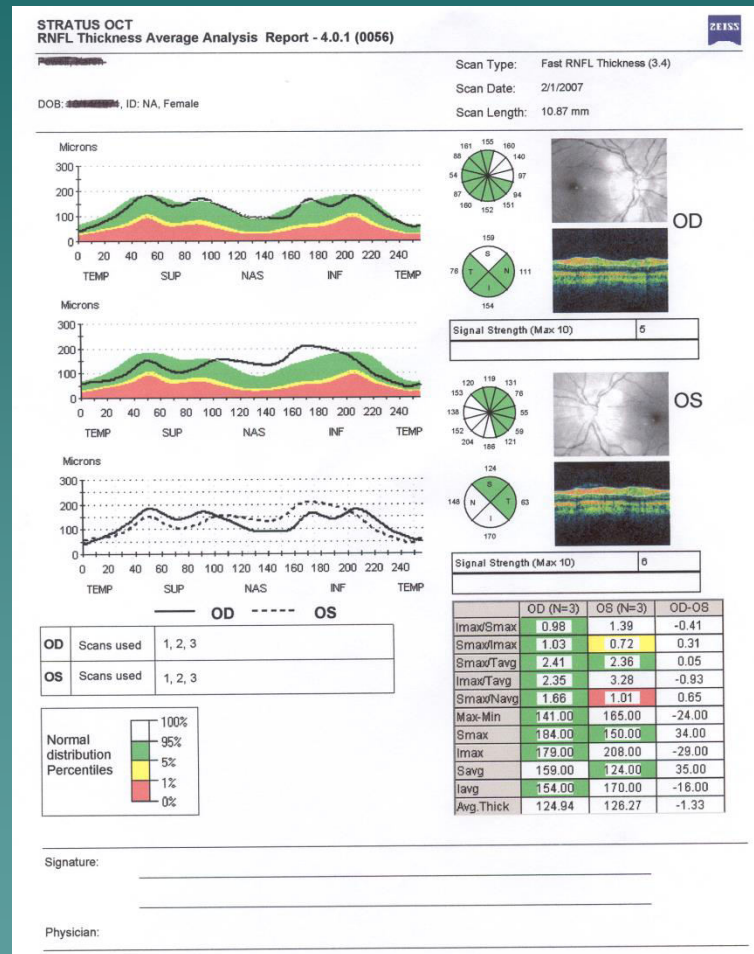
NFL loss with ONH drusen



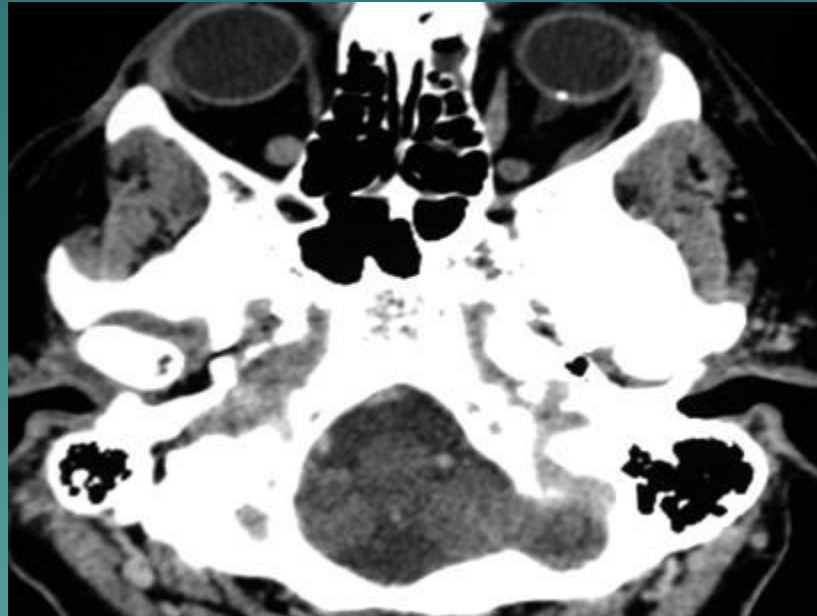
IIH with ONHD and papilledema



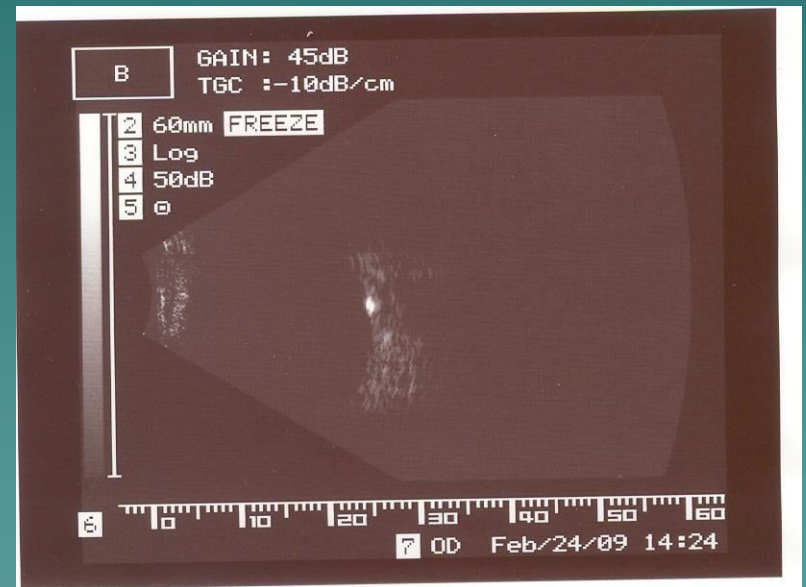
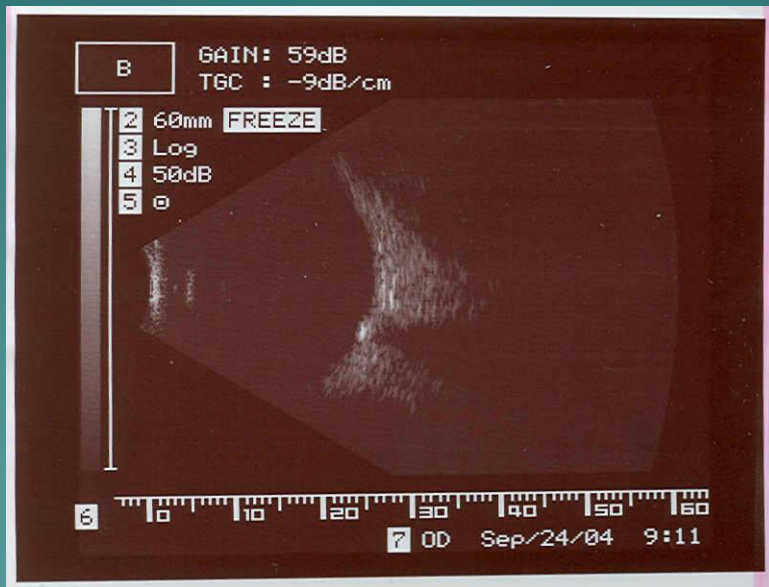
IIH with ONHD and papilledema



ONH drusen MRI



ONH drusen B-scan



The end!

