

OPTIC DISC EVALUATION IN GLAUCOMA

FUNDUS CHANGES IN GLAUCOMA MADE SUPER EASY



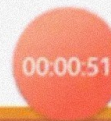
SCREEN
RECORDER



UNDERSTAND THE DEFINITION

Glaucoma is defined as a **HETEROGENOUS** group of disorders which manifests as **CHRONIC PROGRESSIVE OPTIC NEUROPATHY**

Characterized by specific **MORPHOLOGICAL CHANGES** at the **OPTIC NERVE HEAD** and the **RETINAL NERVE FIBRE LAYER** with resultant **LOSS of RETINAL GANGLION CELLS**



SCREEN
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UNDERSTAND THE DEFINITION

Glaucoma is defined as a **HETEROGENOUS** group of disorders which manifests as **CHRONIC PROGRESSIVE OPTIC NEUROPATHY**

✓ Characterized by specific **MORPHOLOGICAL CHANGES** at the **OPTIC NERVE HEAD** and the **RETINAL NERVE FIBRE LAYER** with resultant **LOSS of RETINAL GANGLION CELLS**

Which results in **LOSS OF VISUAL FIELDS**



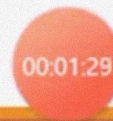
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DISC CHANGES

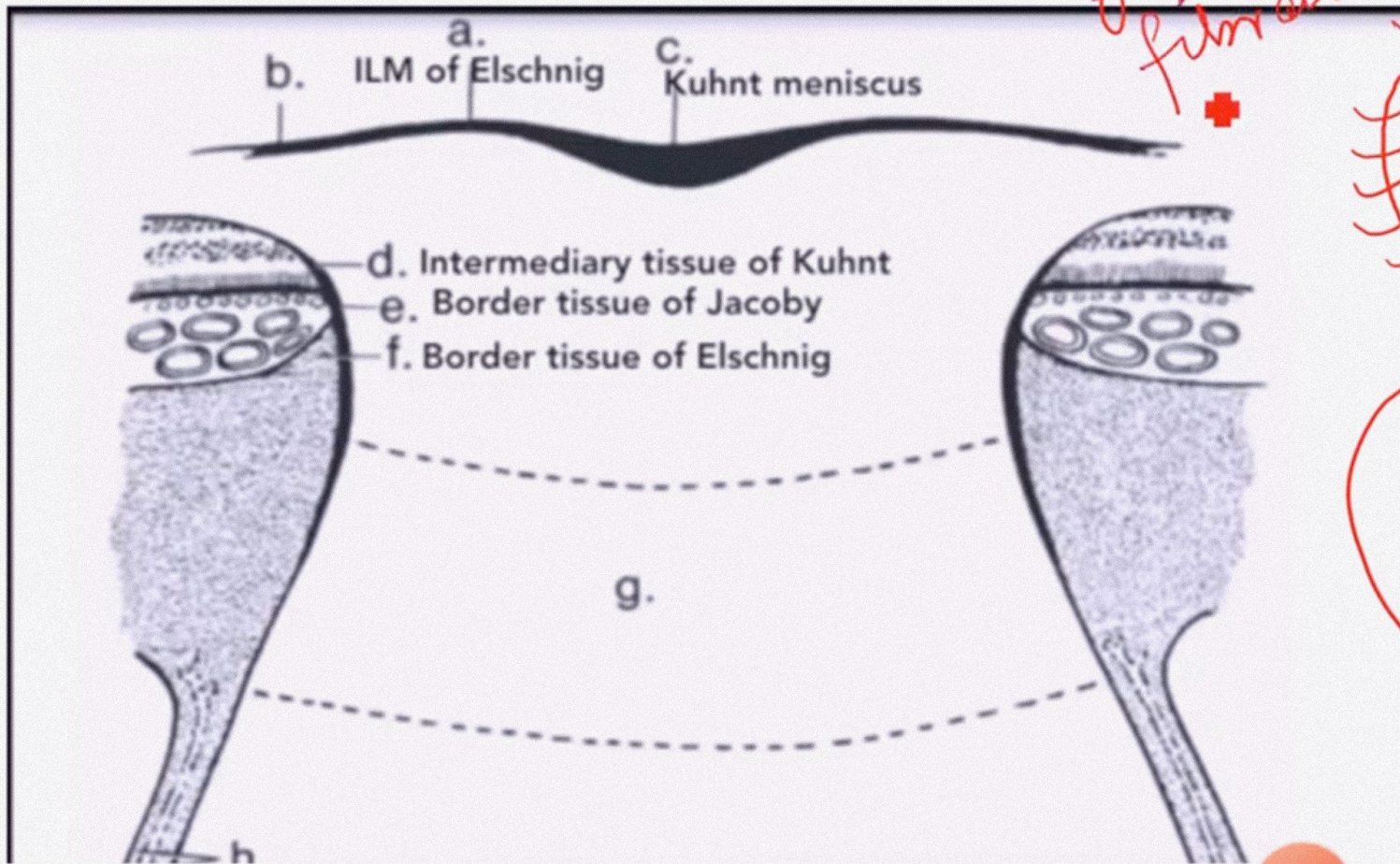
VASCULAR CHANGES

PERIPAPILLARY CHANGES

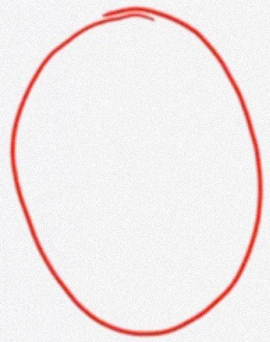
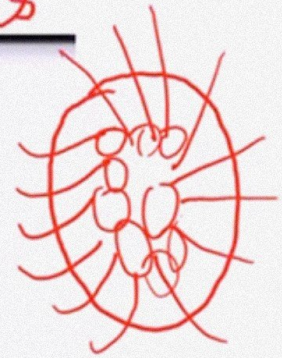


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*glial tissue
fibrous* +

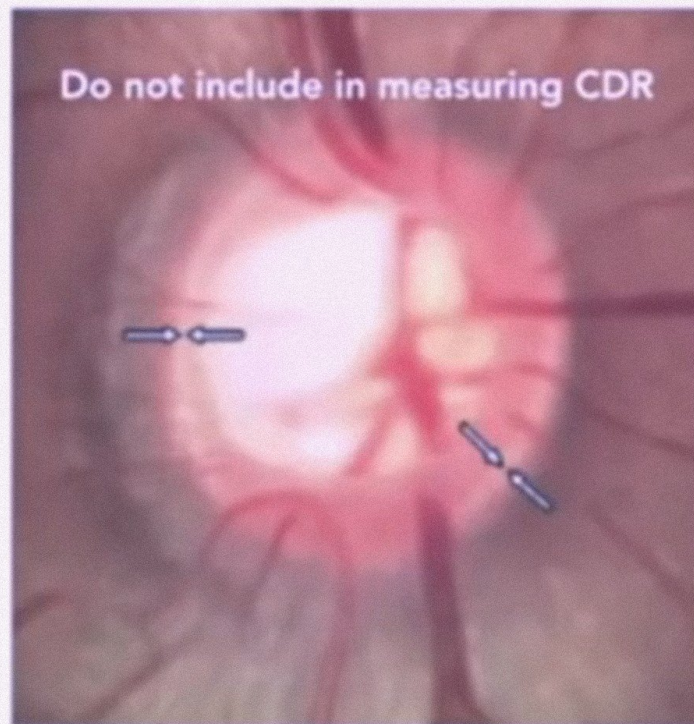


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SCREEN RECORDER



ELSCHNIG SCLERAL RING



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SCREEN RECORDER

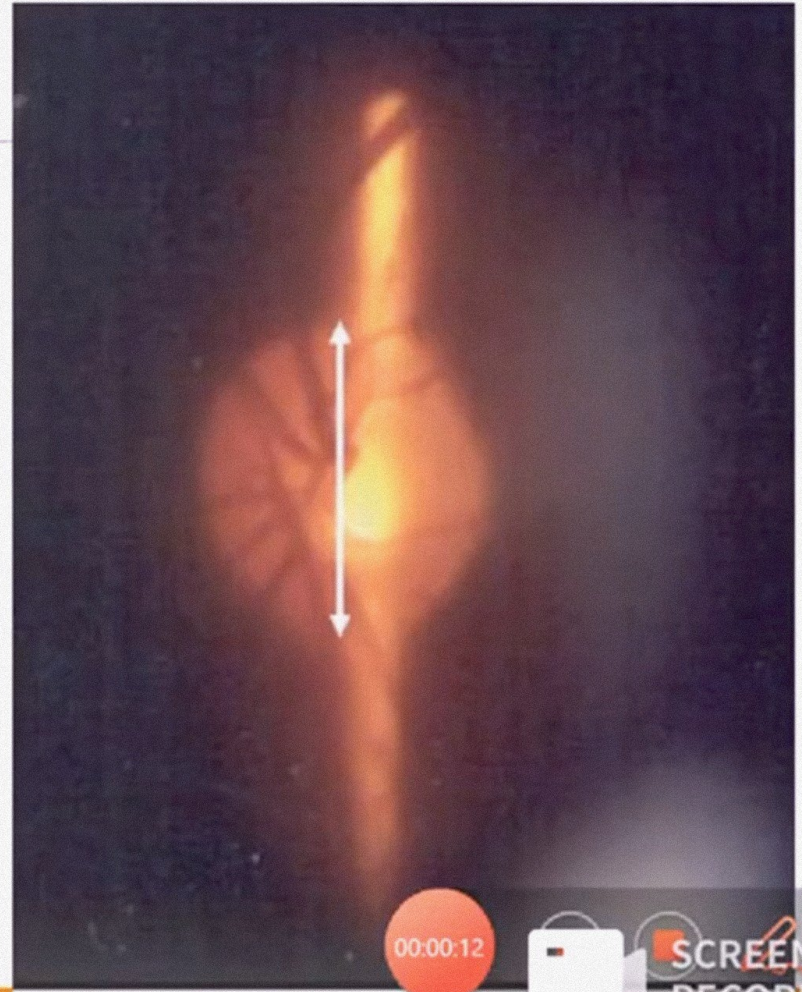


SIZE OF THE DISC



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SCREEN
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1.8 mm = Vertical

1.7 mm = Horizontal

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SCREEN RECORDER



SIZE OF THE DISC (USING SLIT LAMP)

Biomicroscopy:

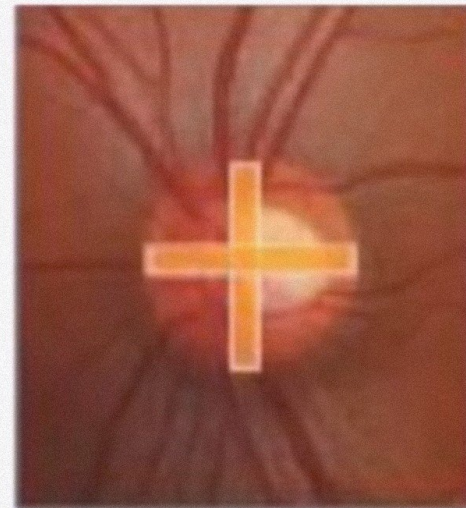
- Volk lens
- Measure length of slit beam

Correction factors:

Volk 60 D – x 1.0

Volk 78 D – x 1.1

Volk 90 D – x 1.3



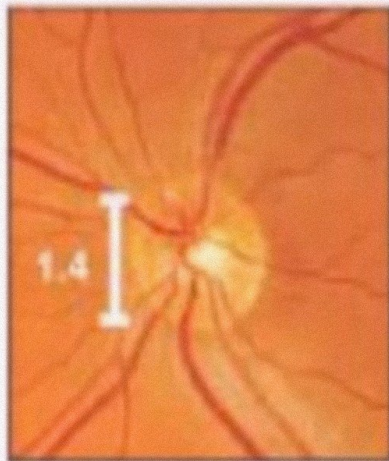
Average vertical diameter: 1.8 mm

Average horizontal diameter: 1.7 mm

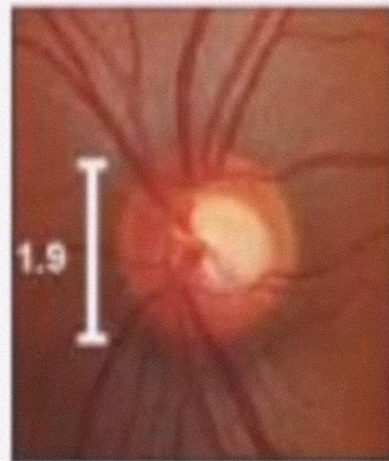
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SCREEN RECORDER

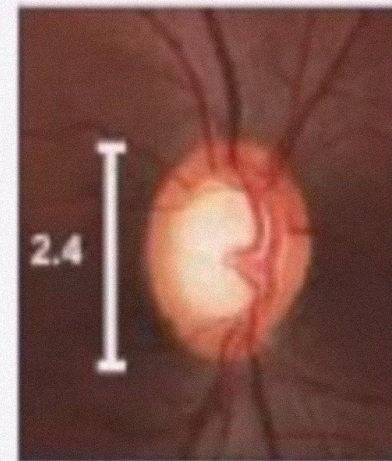




SMALL



MEDIUM



LARGE

Identify small and large optic discs

Small discs: vertical diameter < 1.5 mm

Large discs: vertical diameter > 2.2 mm

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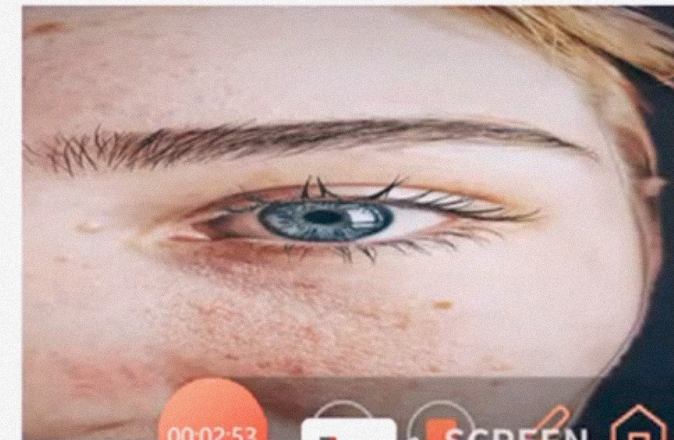
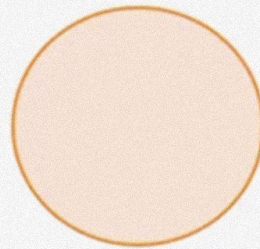
SCREEN RECORDER



SIZE OF OPTIC DISC (DIRECT OPHTHALMOSCOPE)



- USE DIRECT OPHTHALMOSCOPE SPOT LIGHT
- USE THE 5 degree APERTURE
- OR THE MEDIUM APERTURE SIZE TO OBTAIN A ROUGH ESTIMATE

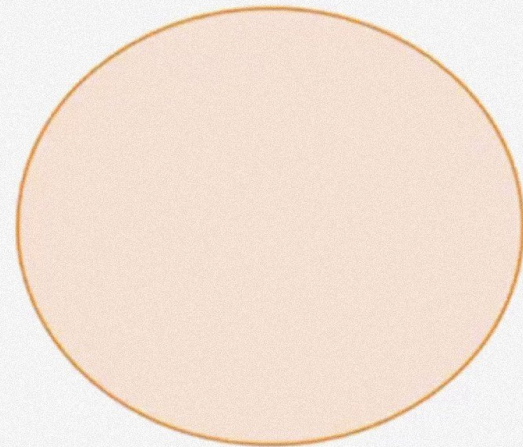
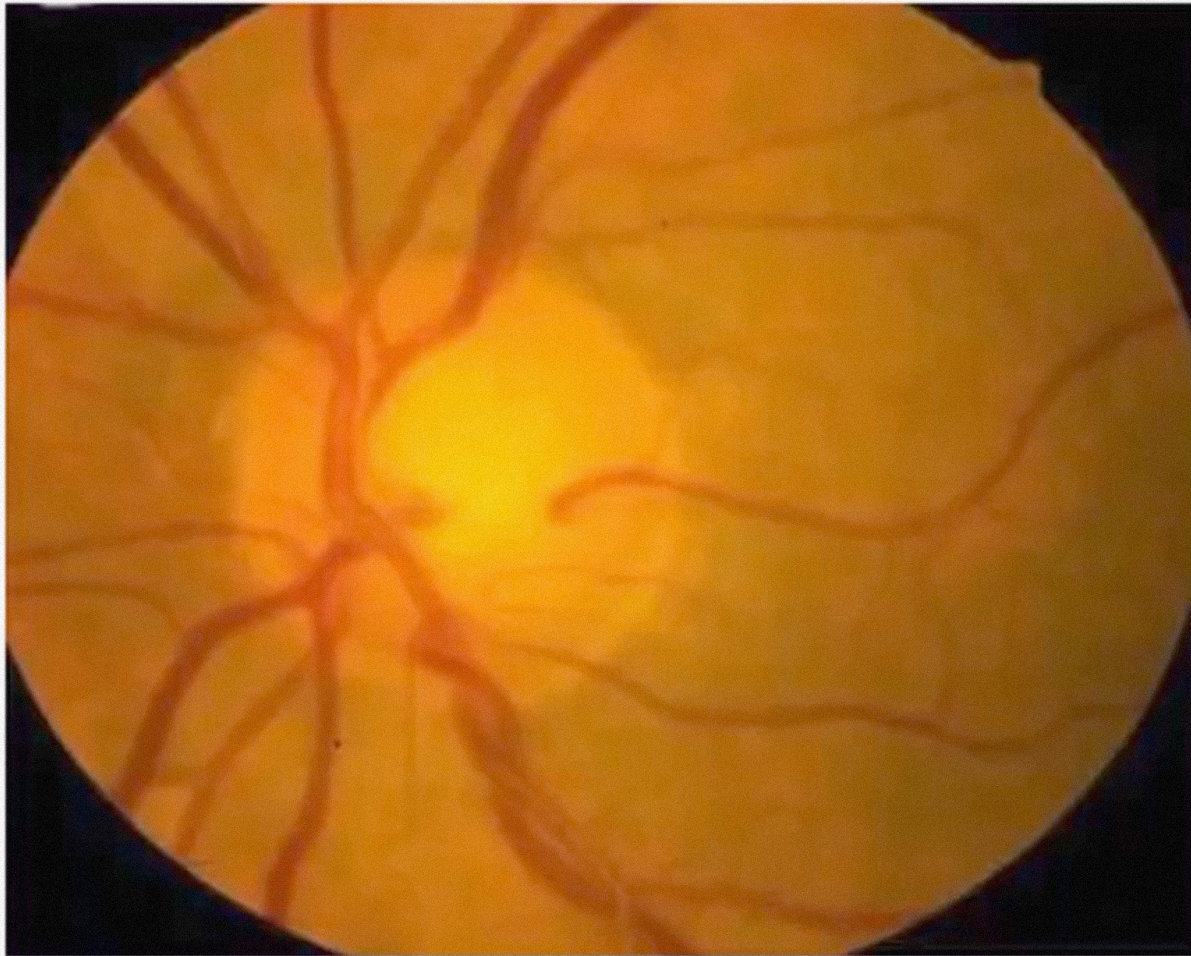


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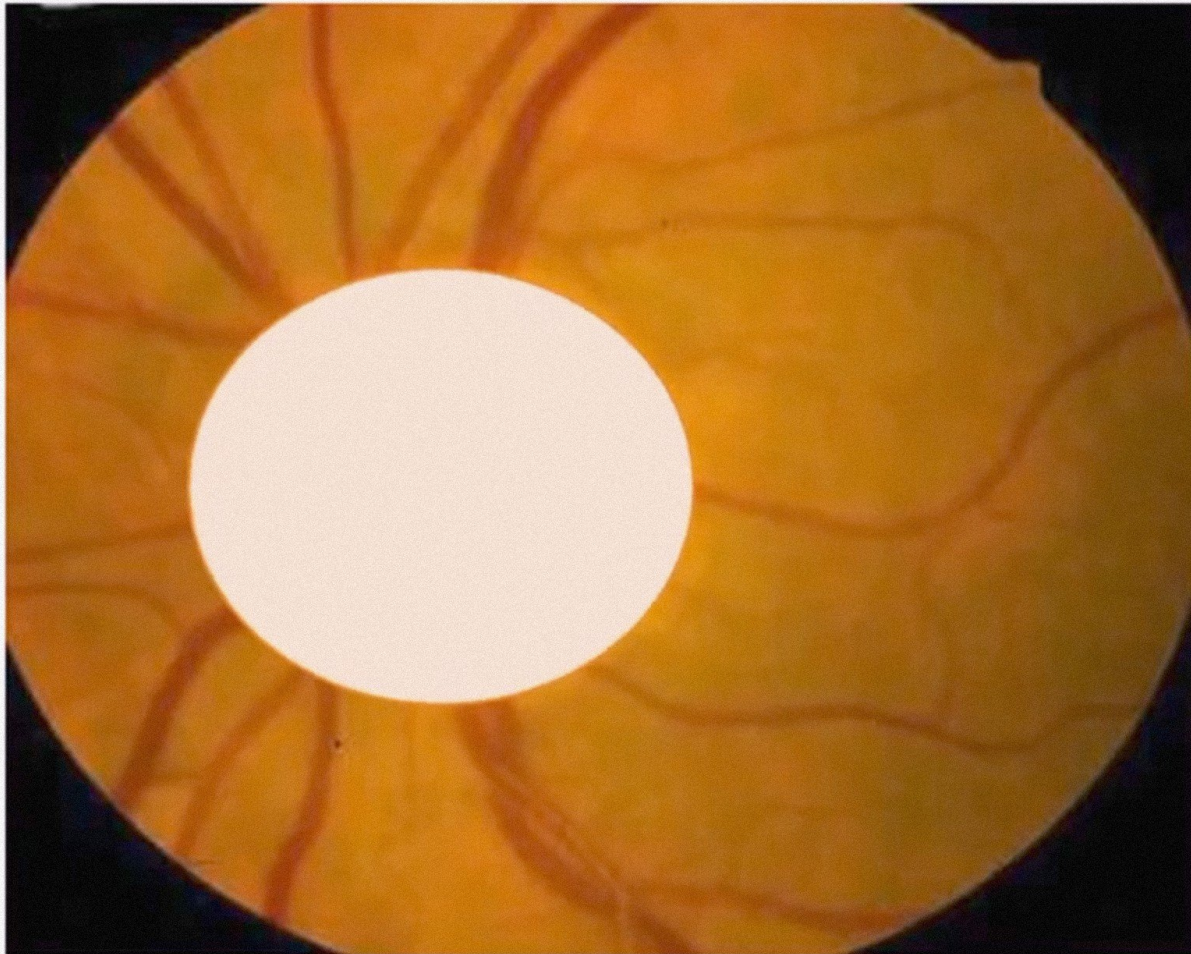


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SCREEN RECORDER





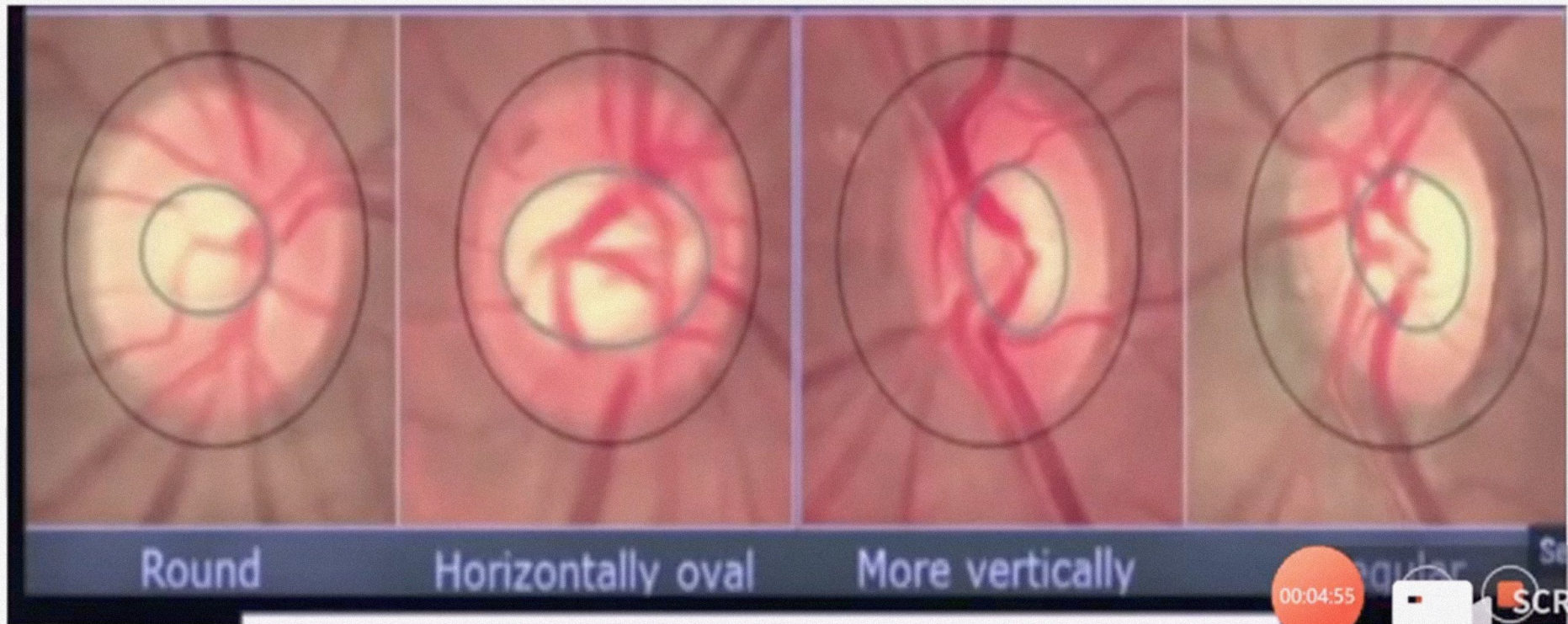
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SCREEN RECORDER



SHAPE OF DISC



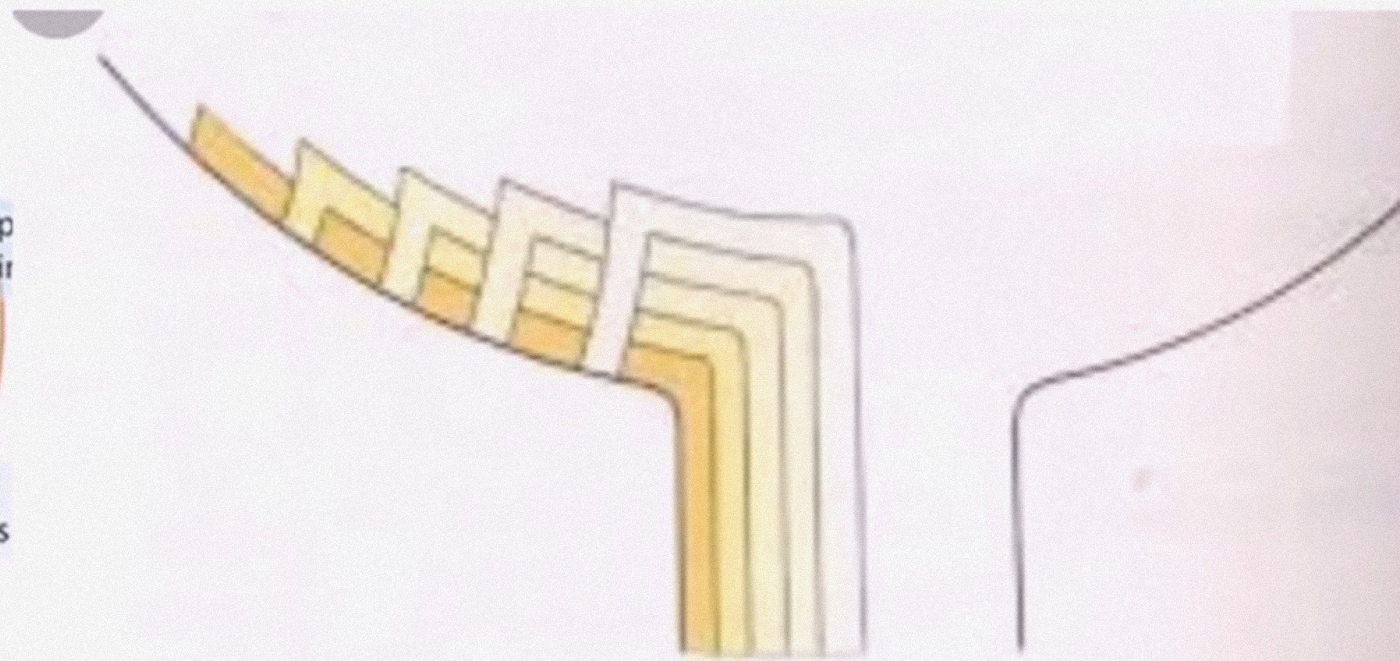
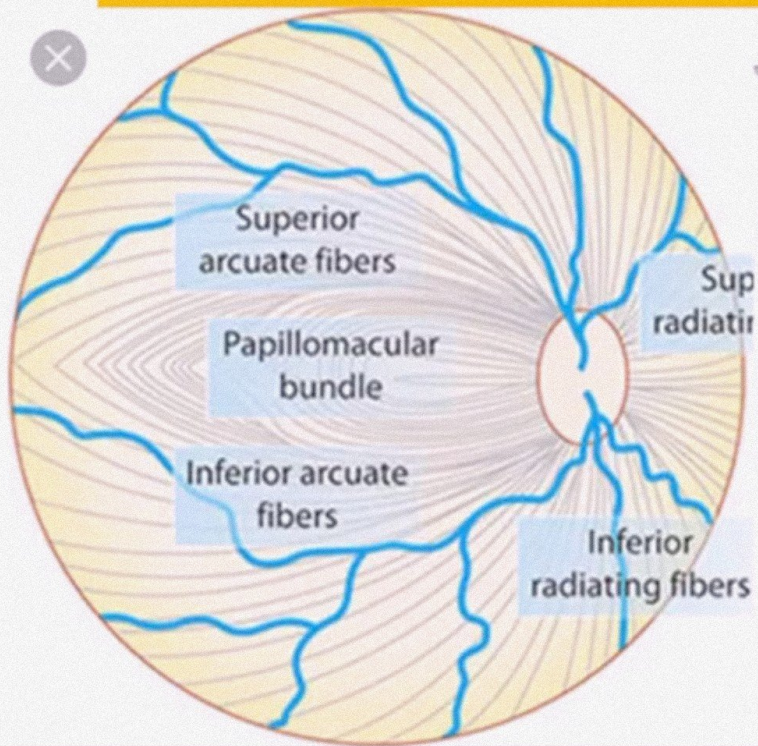
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SCREEN RECORDER



ARRANGEMENT OF FIBERS AT DISC AND OPTIC NERVE



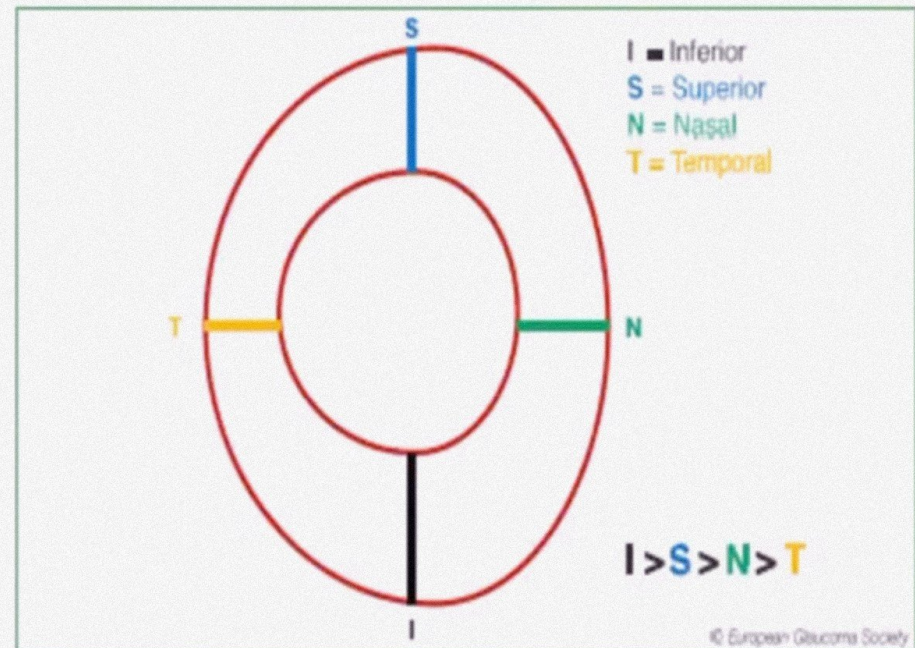
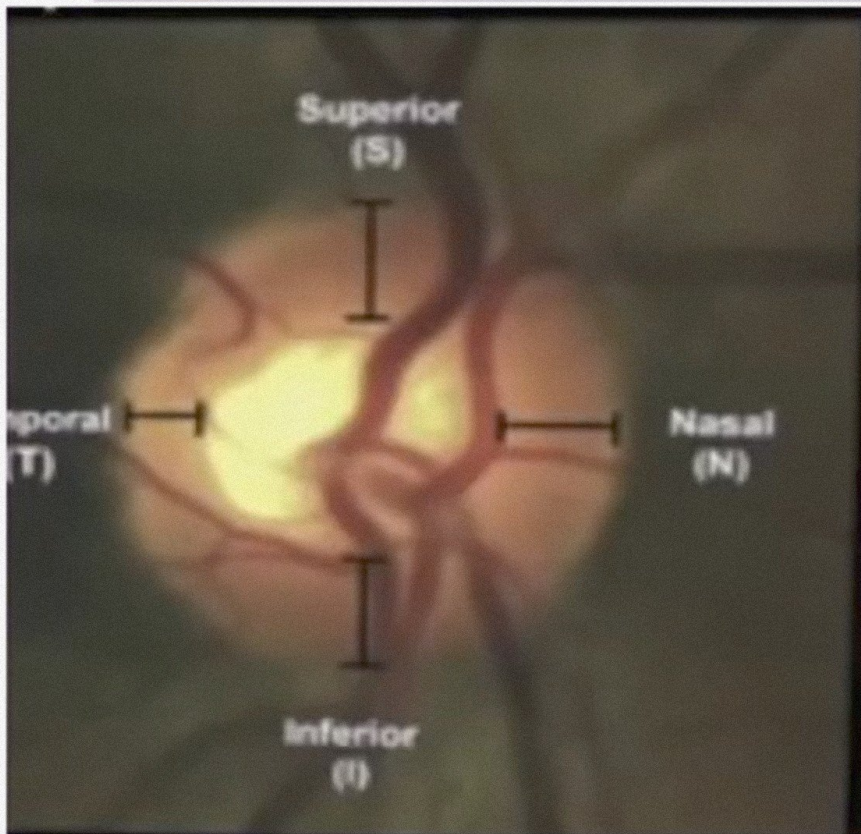
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SCREEN RECORDER



NEURORETINAL RIM THICKNESS (ISNT RULE)

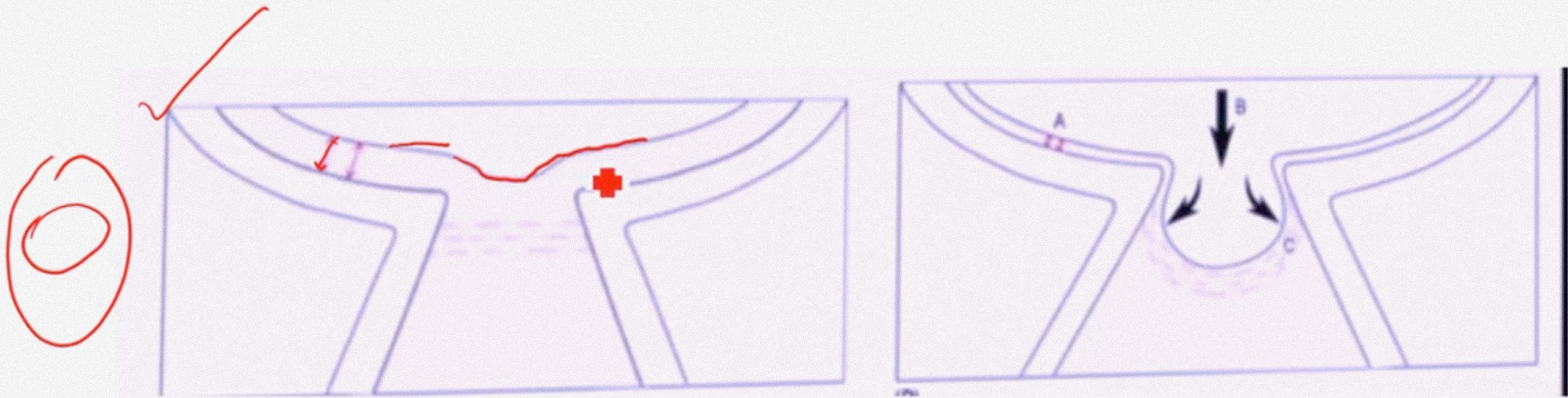


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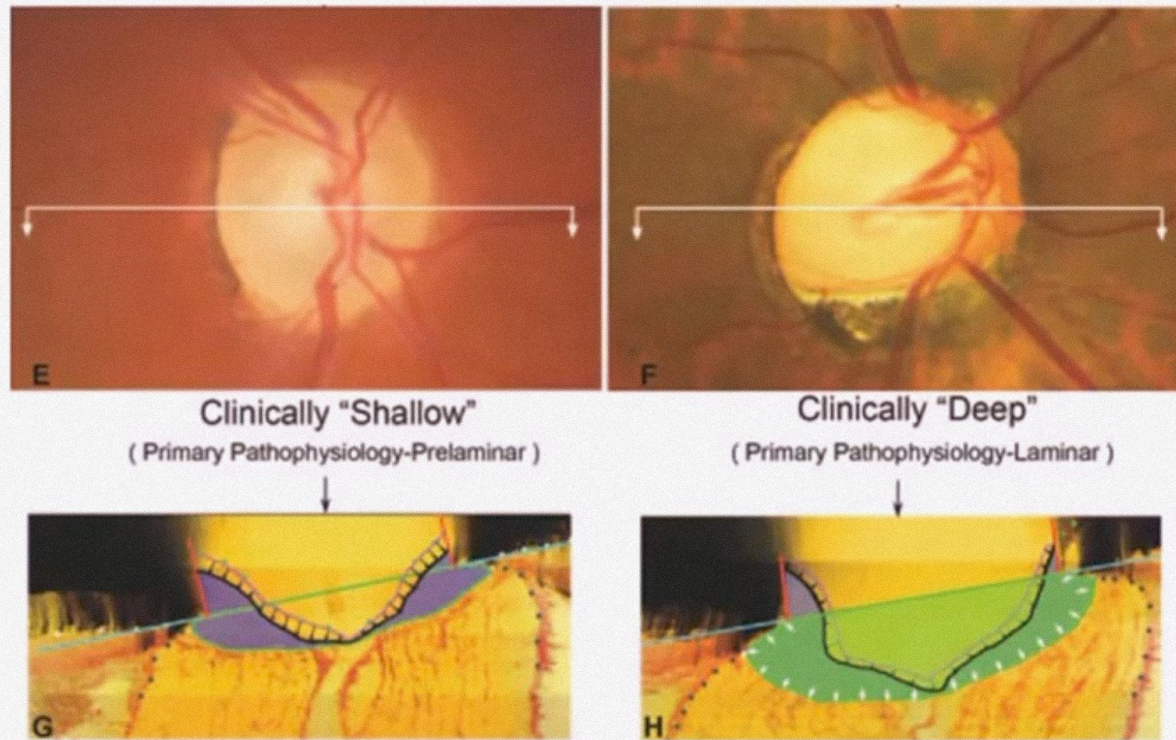
SCREEN RECORDER



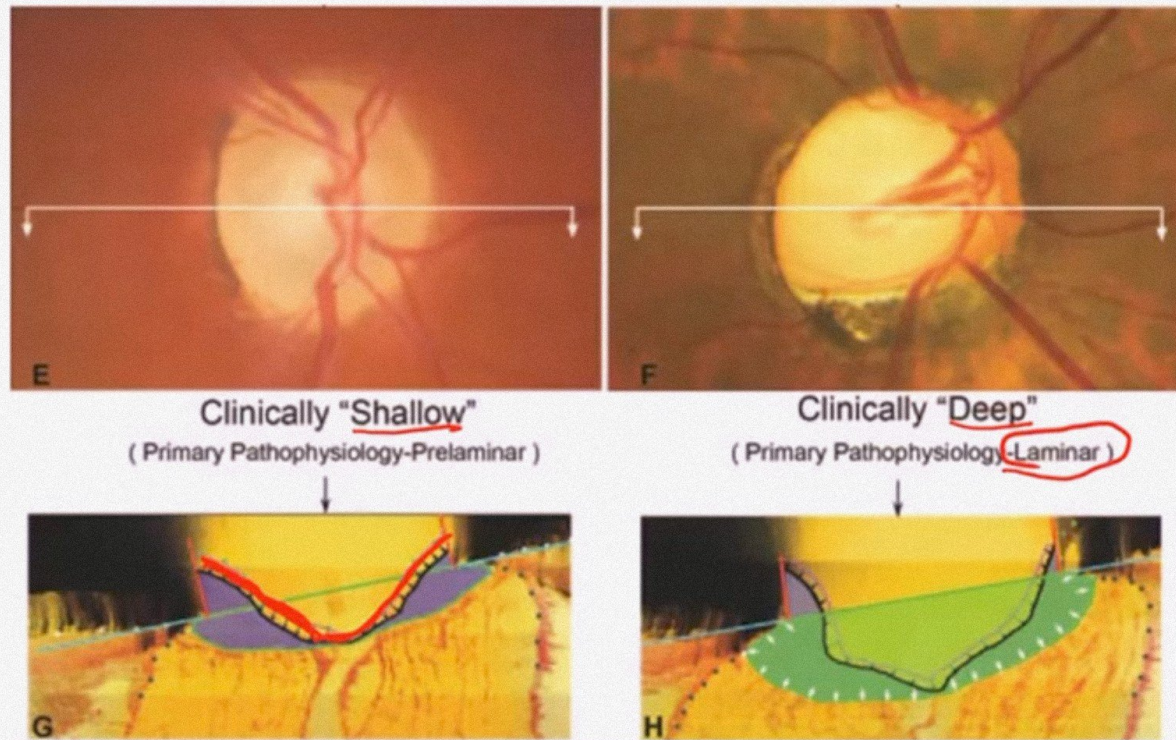
CONCEPT OF CUPPING



SHALLOW CUPPING VS DEEP CUPPING



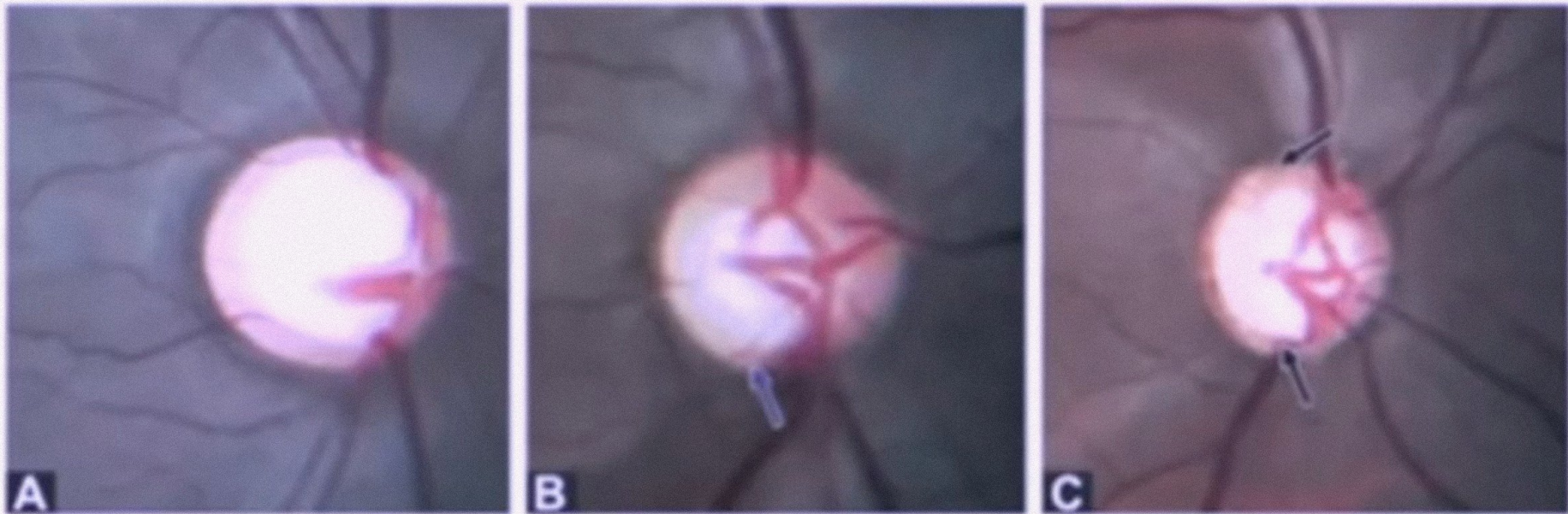
SHALLOW CUPPING VS DEEP CUPPING



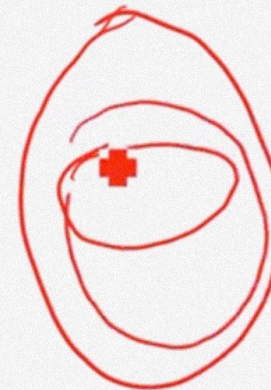
Lamina dot sign



PATTERNS OF CUPPING



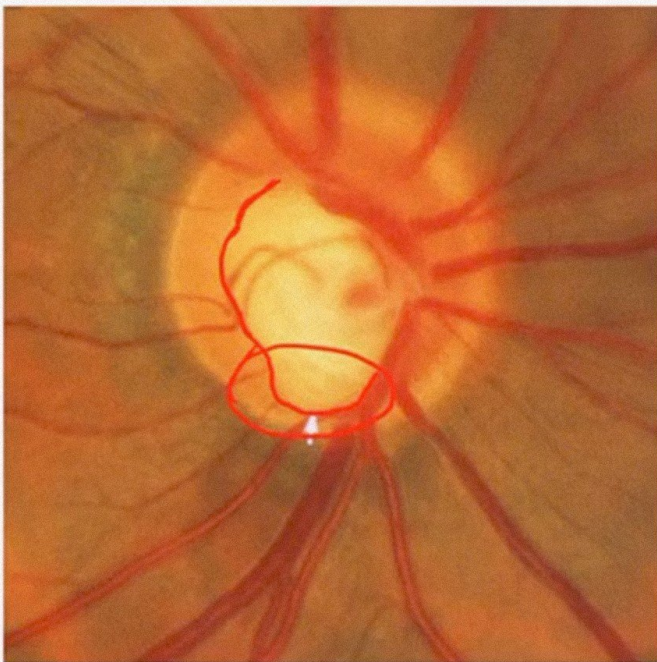
THINNING OF RIM



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NOTCHING OF RIM



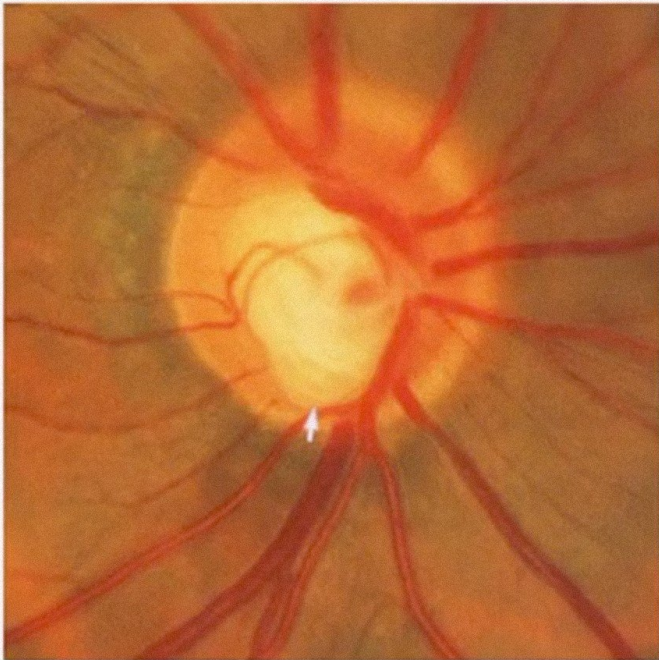
*focal
NRF
loss*



SCREEN
RECORDER



NOTCHING OF RIM



SAUCERISATION

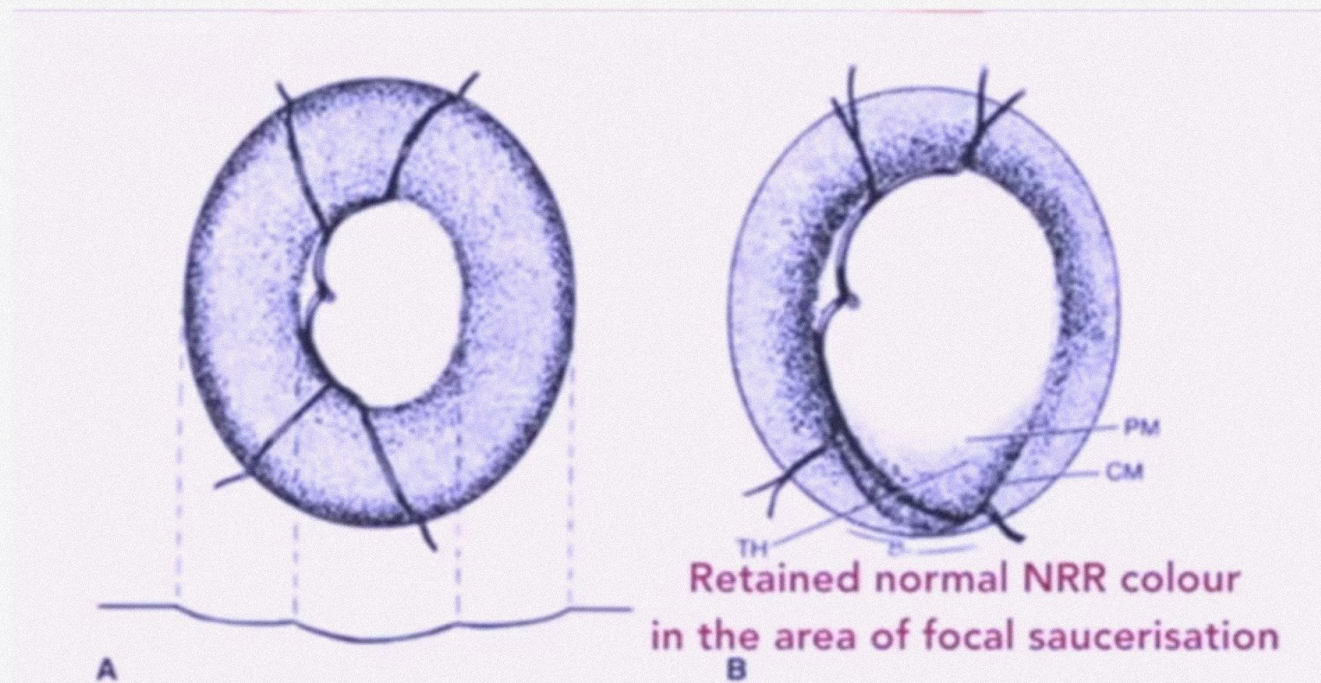
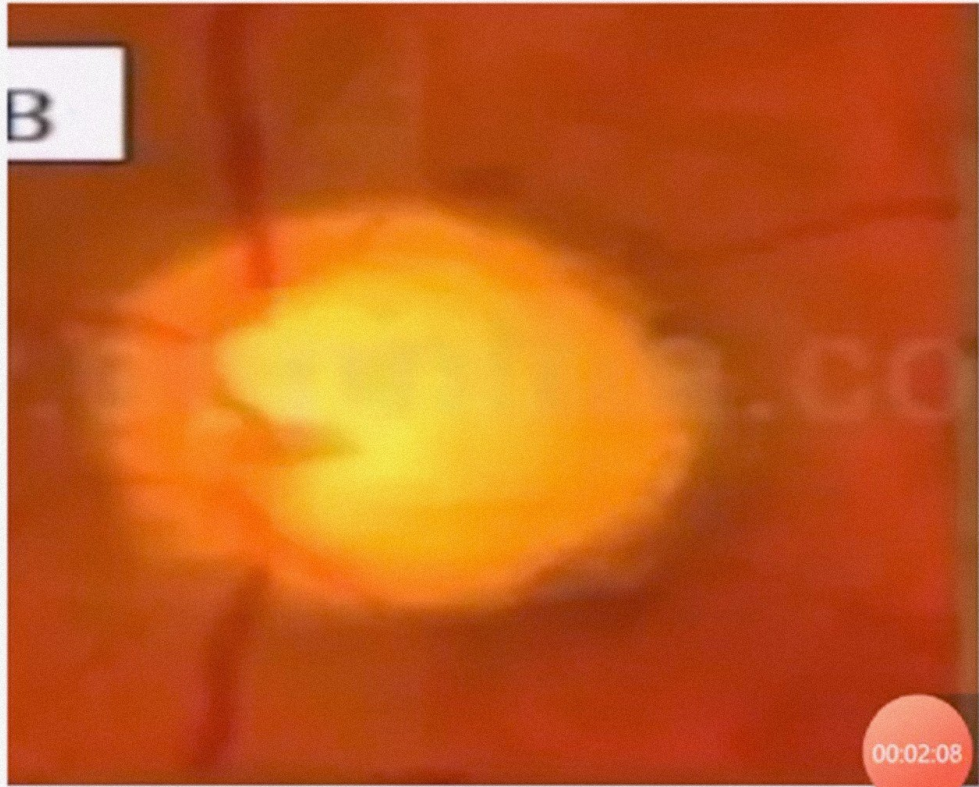


Figure 4.15 Glaucomatous optic atrophy. Pallor-cup discrepancy. A: Saucerization with corresponding

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SCREEN RECORDER





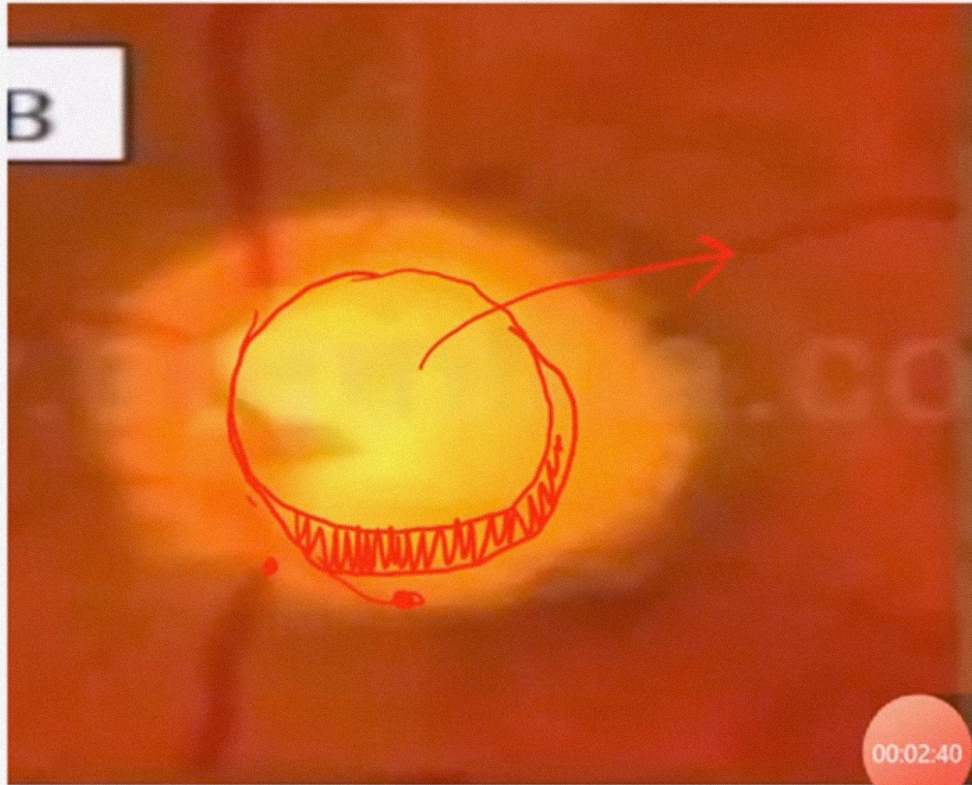
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Saucerical +



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SCREEN RECORDER



BEAN POT CUPPING

1. EVENTUAL LOSS OF ALL THE NEURAL RIM TISSUE
2. Total cupping characterized by white disc with bending of all vessels at the disc margin
3. BEAN POT : CROSS section of the histologic section reveals EXTREME POSTERIOR DISPLACEMENT OF THE LAMINA CRIBROSA AND UNDERMINING OF THE DISC MARGIN



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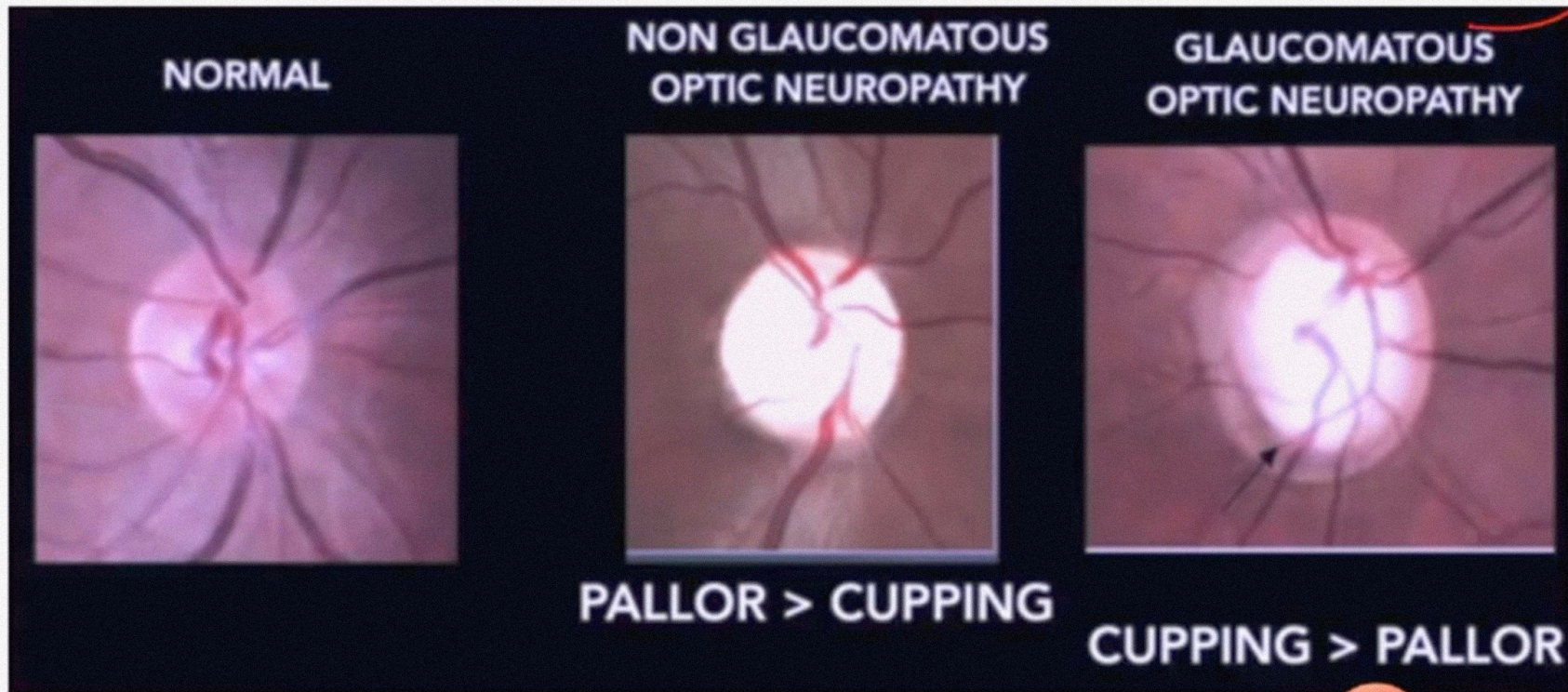


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In Disc
↳ Neuroretinal Rim more pinkish in color
↳ Cup more pale in color

PALLOR VS CUPPING



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SCREEN RECORDER



CUP DISC RATIO (C/D or CDR)

Diameter of cup expressed as a fraction of the diameter of the disc.

VERTICAL CDR more important than **horizontal CDR**

SMALL DISCS have SMALL CUPS with a median C/D ratio of 0.3 (avg)

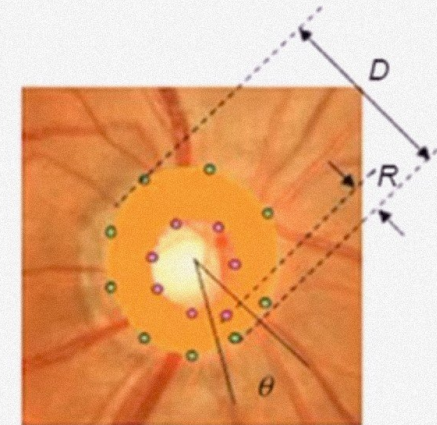
LARGE DISCS have LARGE CUPS with a median C/D ratio of 0.5 (avg)

Only 2 % of the population have a CDR of more than 0.7



Disc Damage Likelihood Scale (DDLS)

	Stage	The thinnest width of the rim (Rim Disc Ratio)		
		Small disc <1.50 mm	Average size disc 1.50–2.00 mm	Large disc >2.00 mm
Normal	0a	0.5	0.4 or more	0.3 or more
	0b	0.4 up to 0.5	0.3–0.4	0.2–0.3
At Risk	1	0.3 up to 0.4	0.2–0.3	0.1–0.2
	2	0.2 up to 0.3	0.1–0.2	0.05–0.1
Glaucoma damage	3	0.1 up to 0.2	0.01–0.1	0.01–0.05
	4	0.01–0.1	No rim <45 degrees	No rim <45 degrees
	5	No rim <45 degrees	No rim 45–90 degrees	No rim 45–90 degrees
Glaucoma disability	6	No rim 45–90 degrees	No rim 91–180 degrees	No rim 91–180 degrees
	7	No rim >90 degrees	No rim >180 degrees	No rim >180 degrees



$$\text{Rim disc ratio} = \frac{R}{D}$$

Figure 1 Normogram of the disc damage likelihood scale.

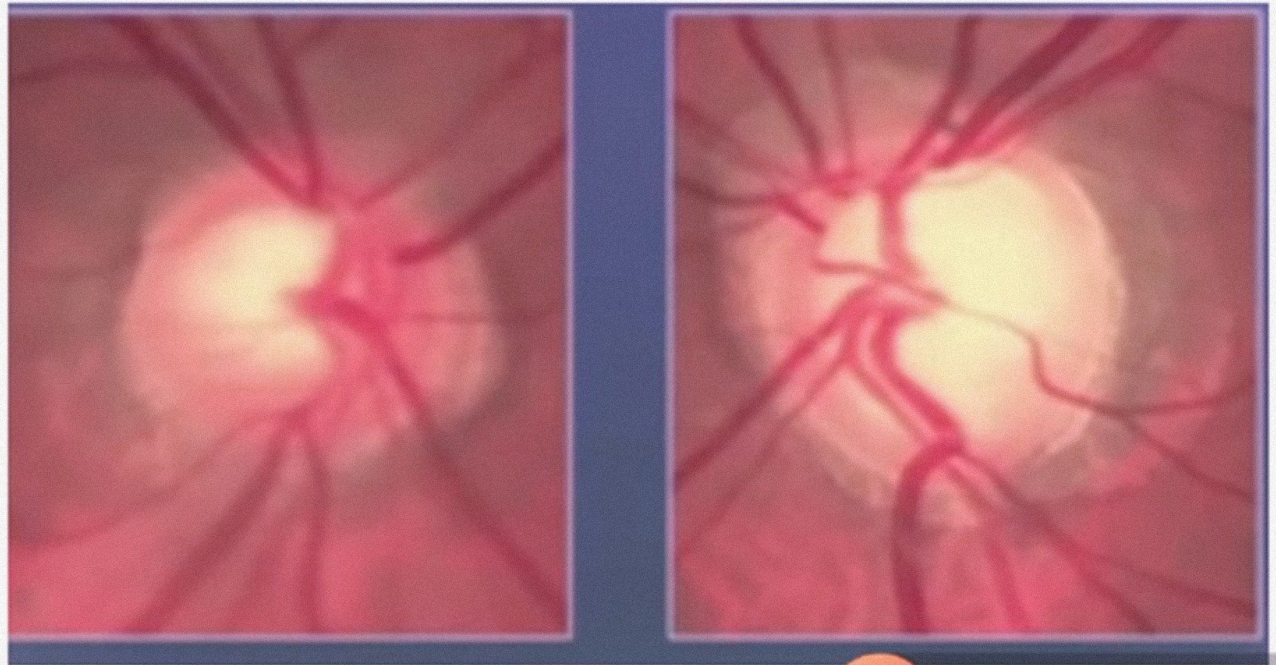
Notes: The disc damage likelihood scale: a method of estimating the risk of glaucomatous damage of the optic nerve head. Figure courtesy of Kowa Company Ltd., Tokyo, Japan.

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ASYMMETRICAL CUP DISC RATIO

Assymetry of 0.2 or more between the eyes should raise a suspicion of glaucoma

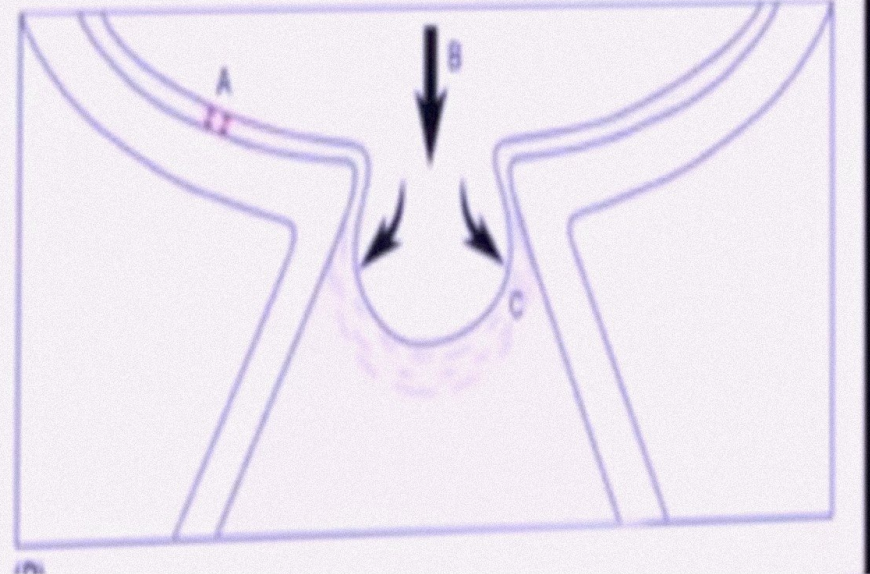
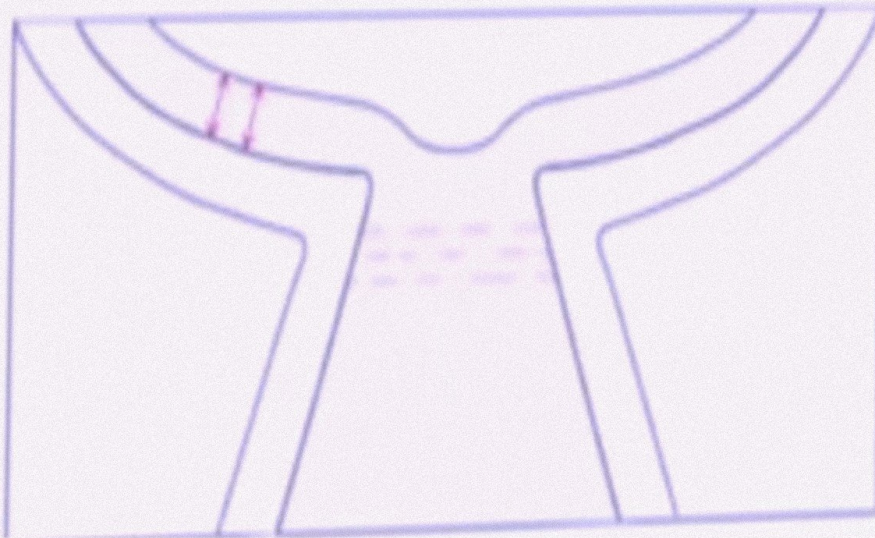


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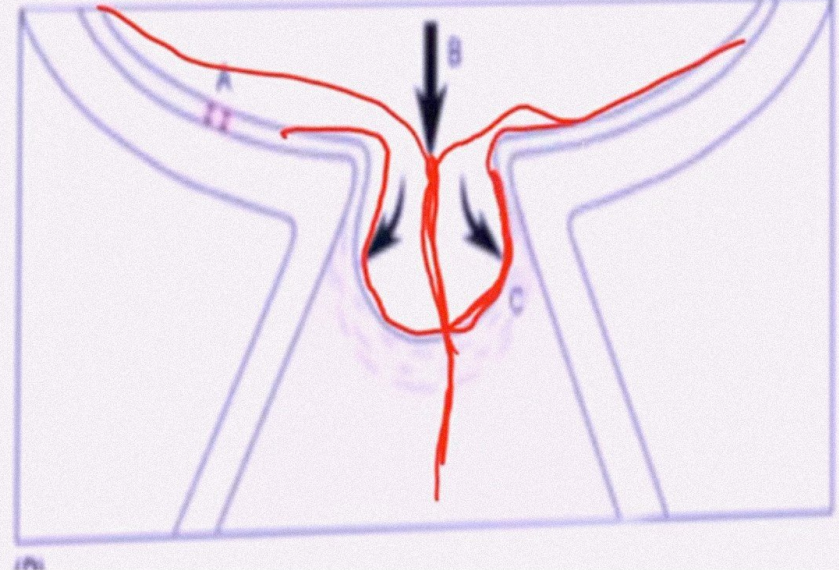
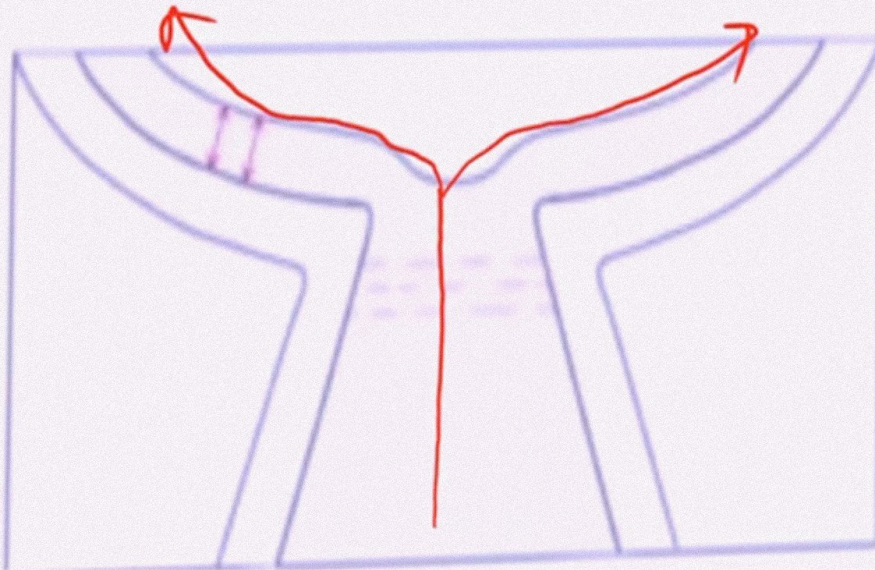
SCREEN RECORDER



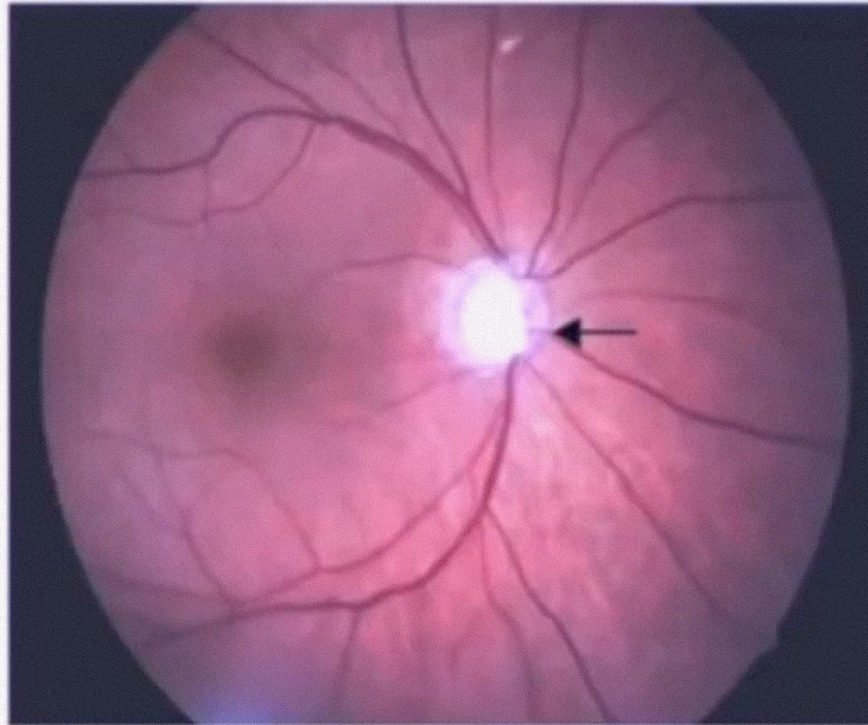
VESSEL CHANGES



VESSEL CHANGES



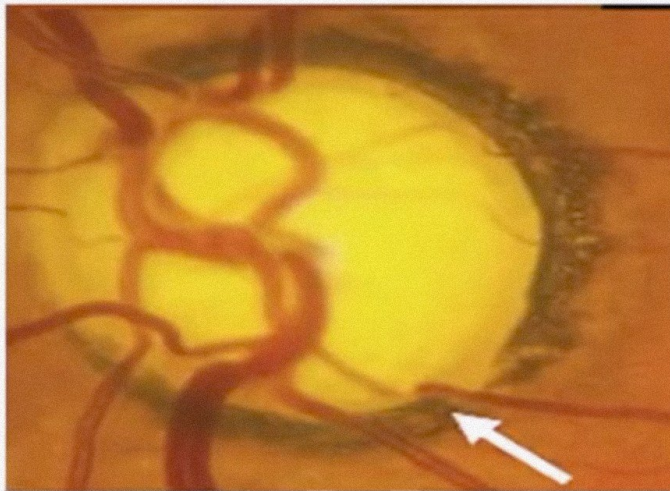
NASALISATION OF VESSEL



BAYONETING

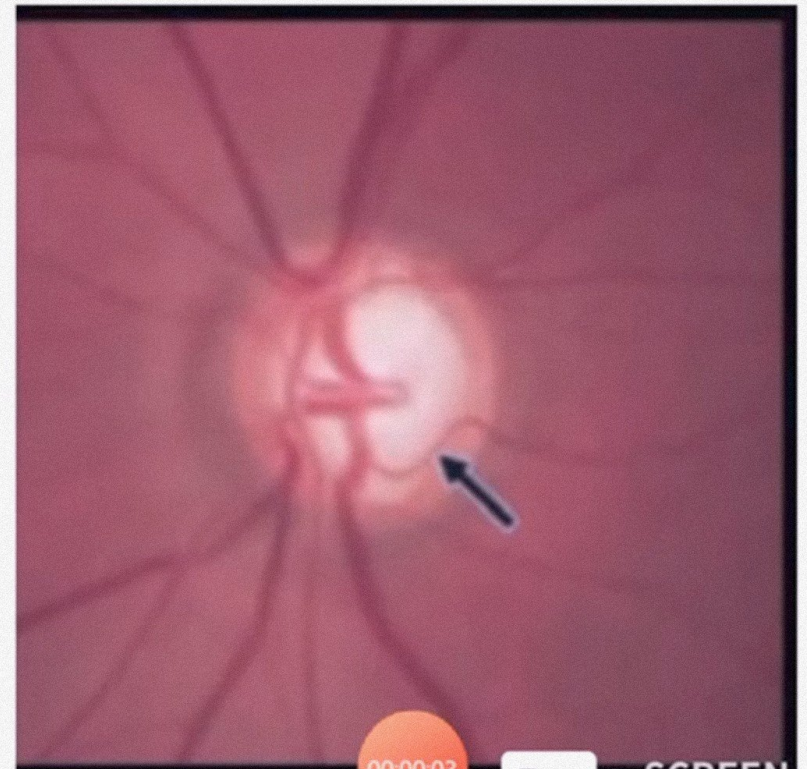
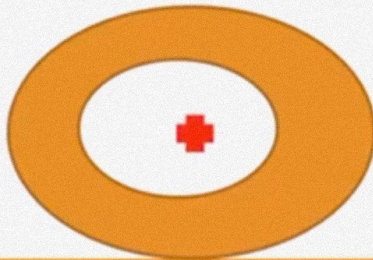
When the local thinning of the neural rim tissue reaches the disc margin, a sharpened rim is produced .

if a retinal vessel crosses the sharpened rim, it will bend sharply at the edge of the disc creating bayoneting at the disc edge .



BARING OF CIRCUMLINEAR VESSEL

1. These signs arise when there is erosion of the NRR leaving the blood vessels distant from the neural tissue.
2. Some patients have blood vessels that track along the inner margin of the NRR,
3. with glaucoma these arc-shape vessels may be left bare or isolated from the margin of the cup. Bridging (overpassing) refers to vessels that hang in space over an area of lost neural tissue

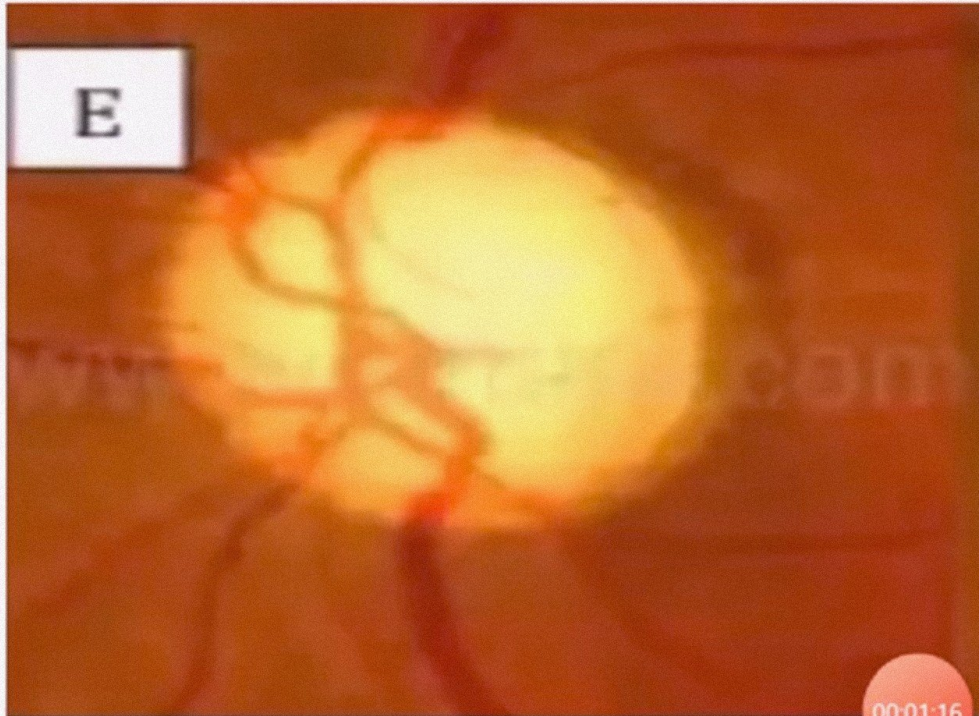


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OVERPASS



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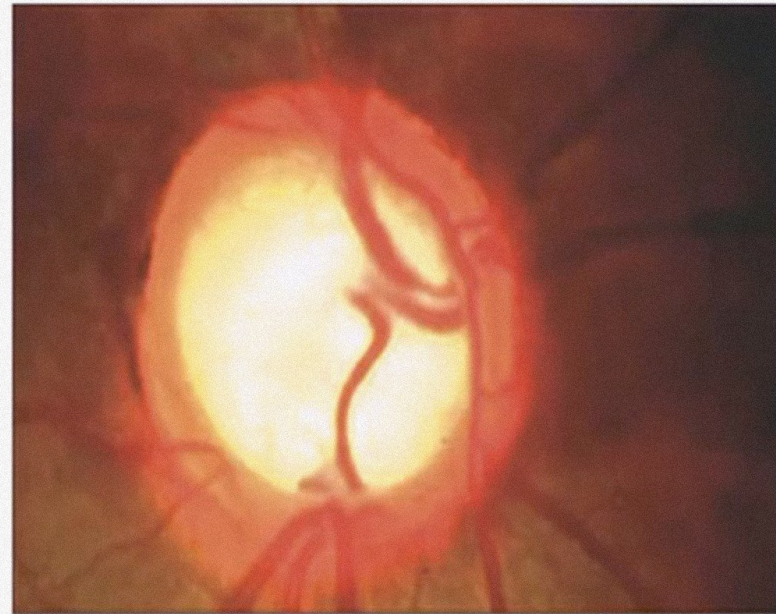


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LAMINAR DOT SIGN

Continued deepening of the Cup causes exposure of the underlying LAMINA CRIBROSA, recognized as GRAY DOTS on the lamina



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PERIPAPILLARY CHANGES

1. PERIPAPILLARY HEMORRHAGE
2. RETINAL NERVE FIBRE BUNDLE DEFECTS
3. PERIPAPILLARY PIGMENTARY CHANGES



SCREEN
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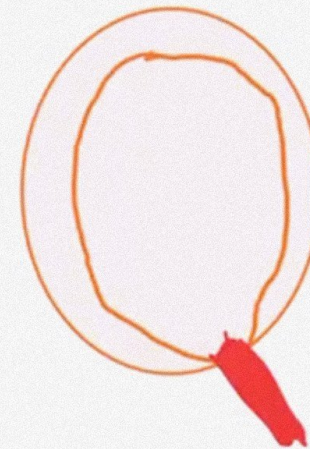


OPTIC DISC HEMORRHAGES

Referred to as SPLINTER HEMORRHAGE or DRANCE haemorrhage

More common in patients with NORMAL TENSION GLAUCOMA than POAG

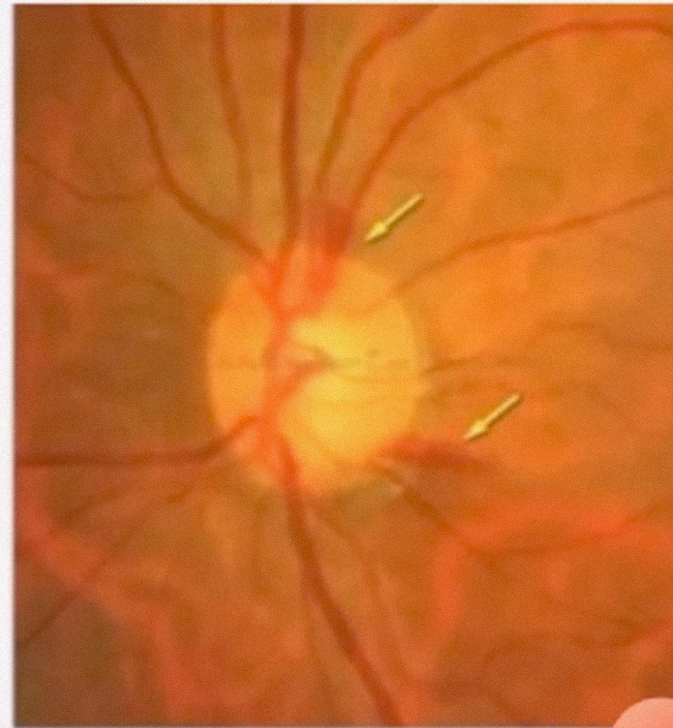
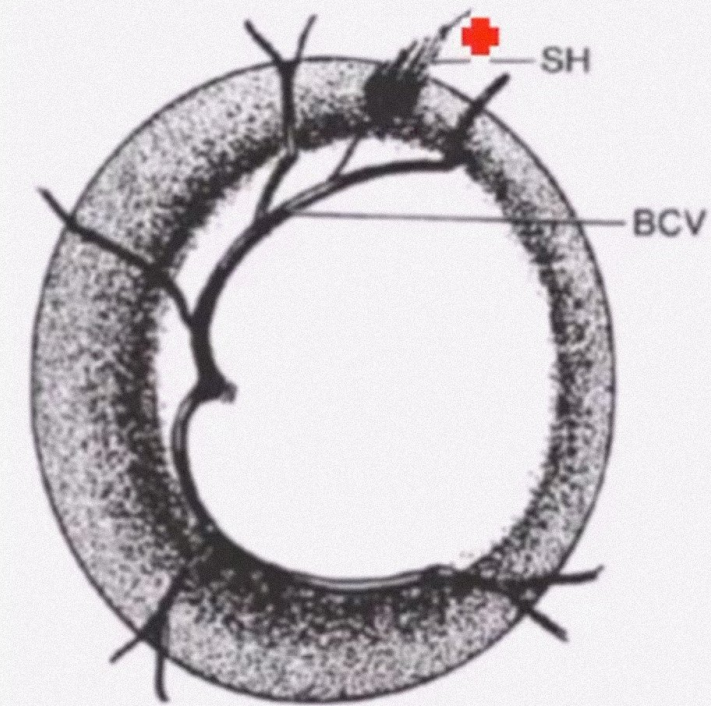
They cross the DISC MARGIN but during resorption, the papillary portion disappears first and extrapapillary hemorrhage remains



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HAEMORRHAGE OF THE RIM




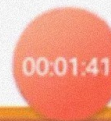
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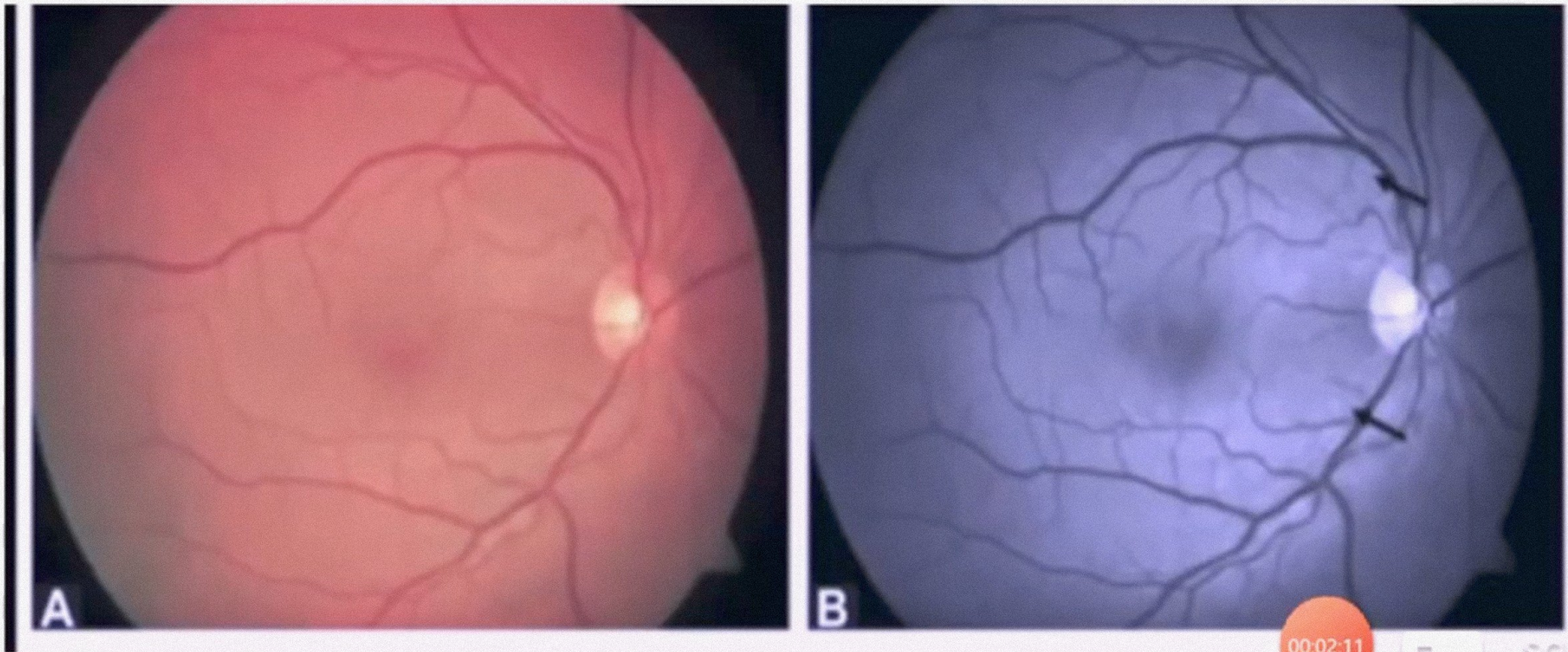
RETINAL NERVE FIBRE LAYER DEFECTS

1. DARK STRIPES or WEDGE SHAPED defects in peripapillary region
2. DIFFUSE  LOSS OF RETINAL NERVE FIBRE LAYER
3. FOLLOW DISC HEMORRHAGES and correlate with visual fields defects and lost neural rim tissue



SCREEN
RECORDER





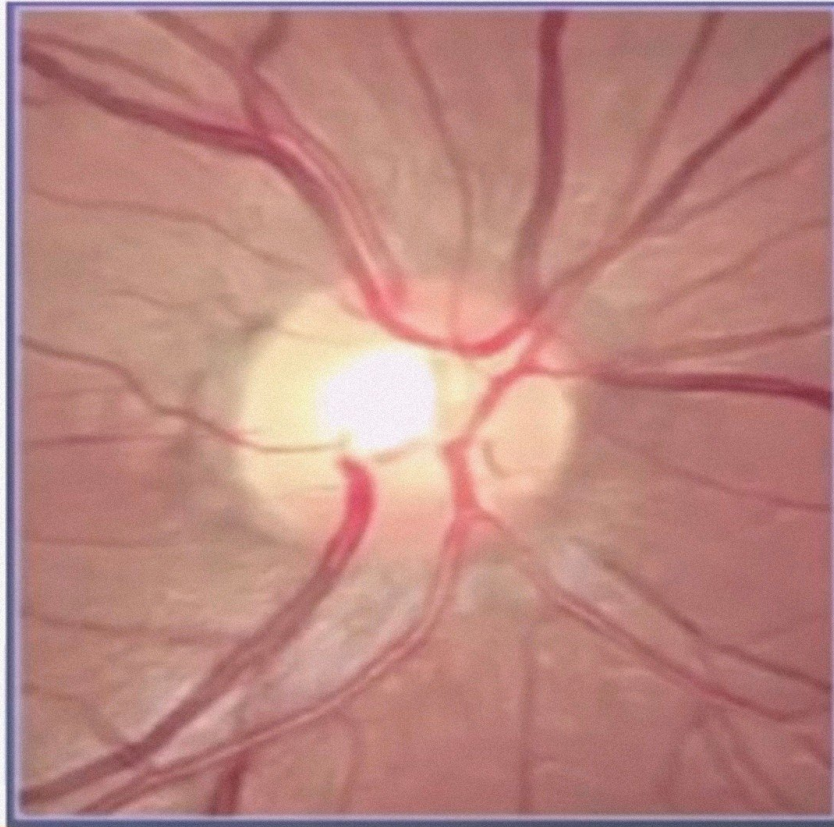
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SCREEN RECORDER



Normal Retinal
nerve fiber layer
is shiny and glossy
which obscure normal
vessels

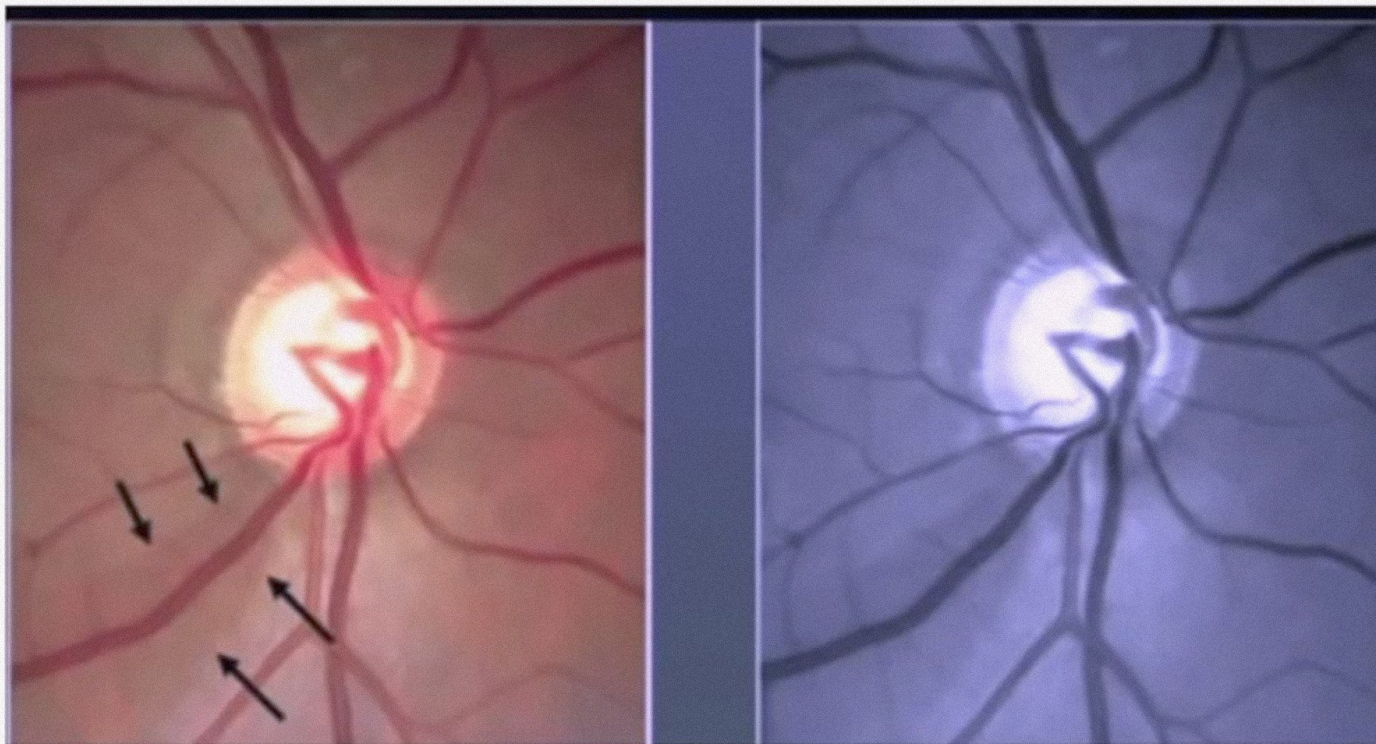


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SCREEN
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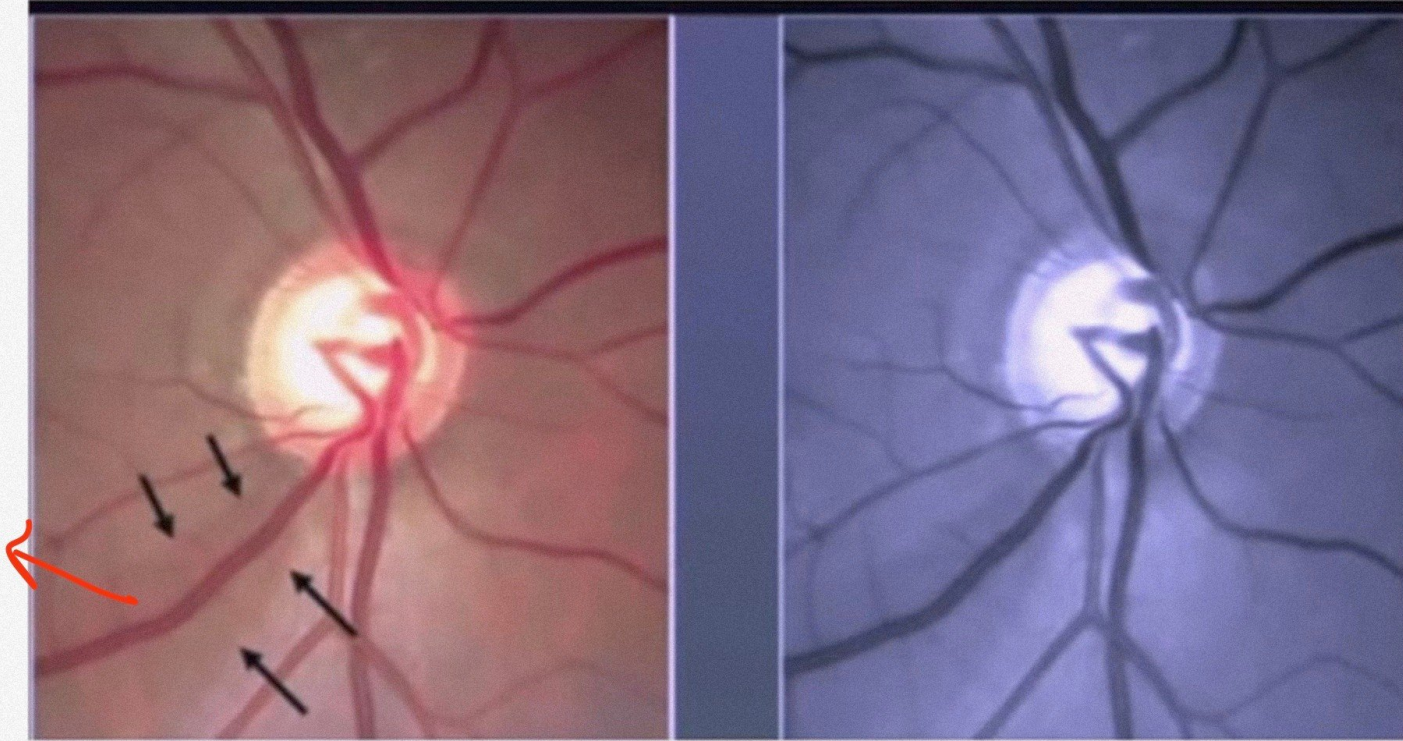
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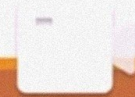
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more clearer due to Retinal nerve fiber defect



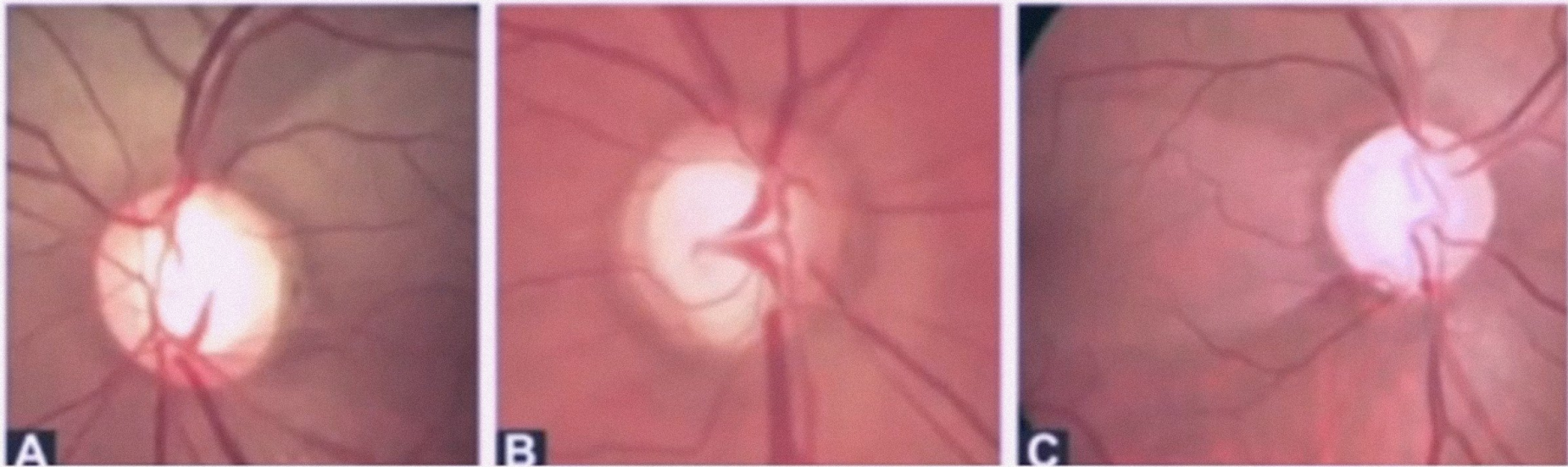
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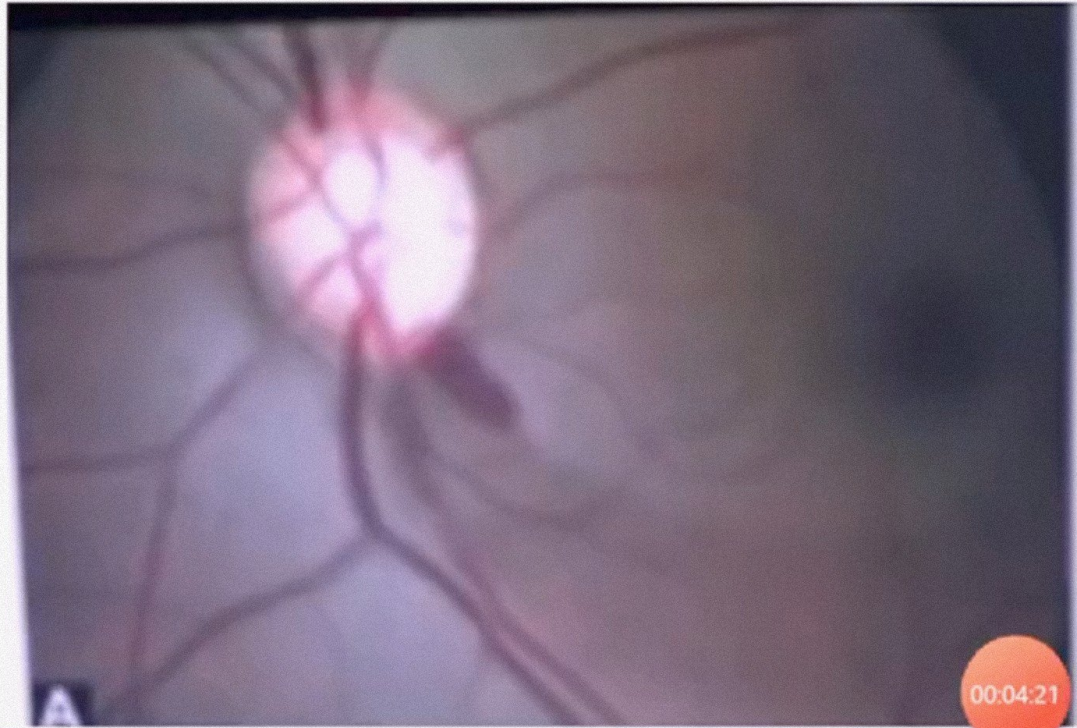
NOTCH FOLLOWS RNFL LOSS



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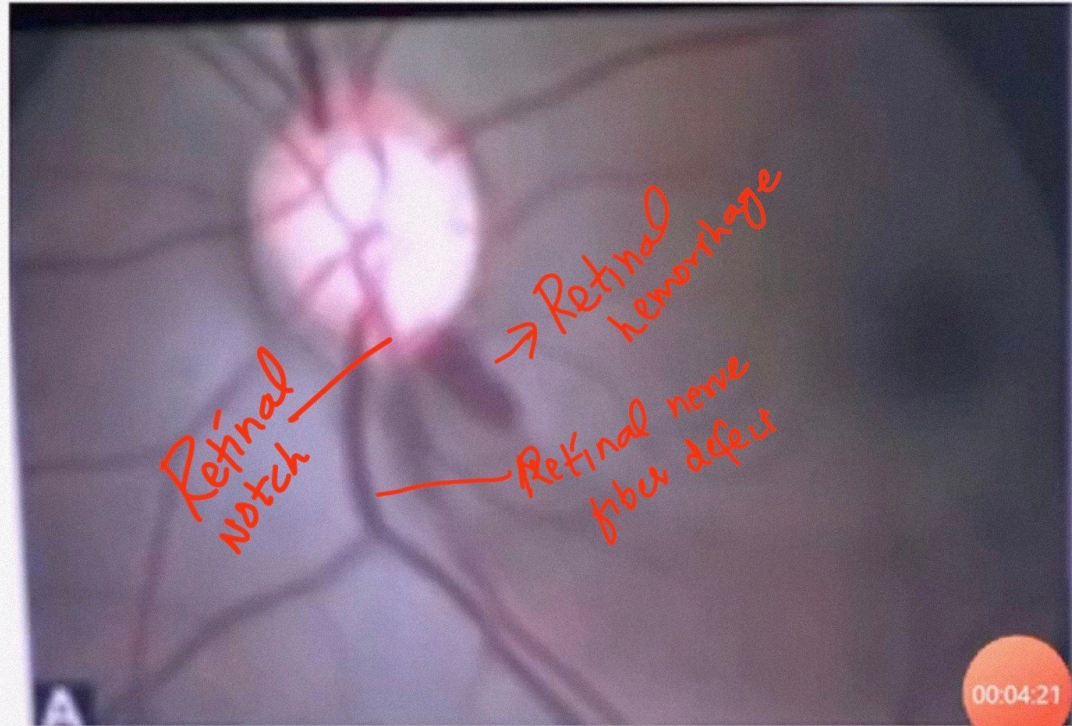
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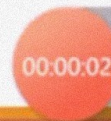
ALPHA AND BETA ATROPHY ZONES

▪ ALPHA ZONE

- HYPO AND HYPER PIGMENTED AREAS
- PRESENT IN NORMAL AND IN GLAUCOMATOUS EYES ALSO

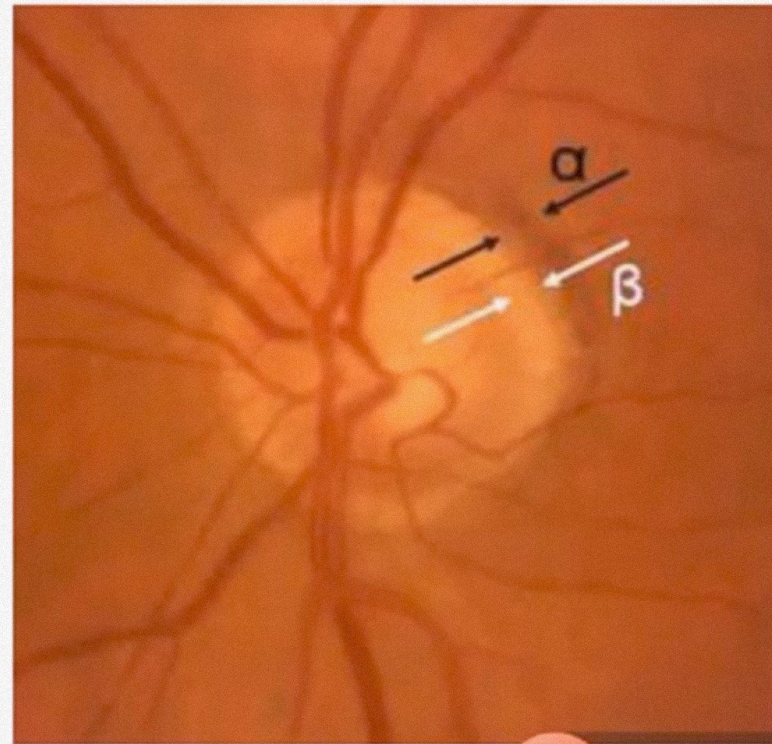
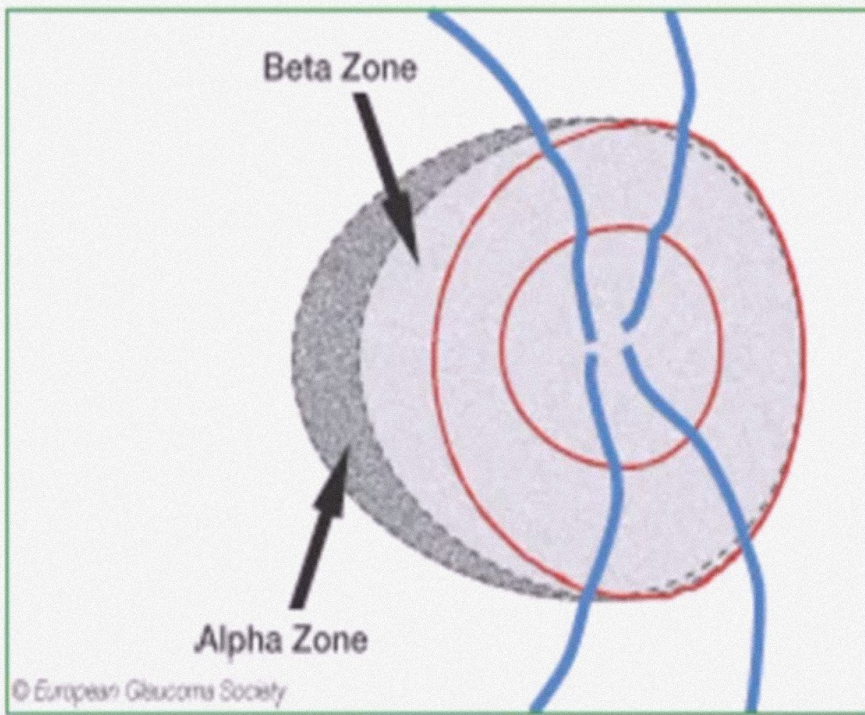
▪ BETA ZONE

- ATROPHY OF PIGMENT EPITHELIUM & CHORIOCAPILLARIES
- LARGE CHOROIDAL VESSELS ARE VISIBLE
- MORE COMMON IN GLAUCOMATOUS EYES



SCREEN RECORDER





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SCREEN RECORDER



Finally!

ONH → Optic Nerve head

Table 5 Signs of progressive ONH damage

- Changes in NRR contour
- Development/enlargement of a notch
- Shift in position of blood vessels
- Disc hemorrhage especially recurrent
- Progressive changes in RNFL
- Enlargement of PPA (beta zone)
- Development of focal NRR pallor

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SCREEN RECORDER

