

ESG

# VISUAL FIELD

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(MD)

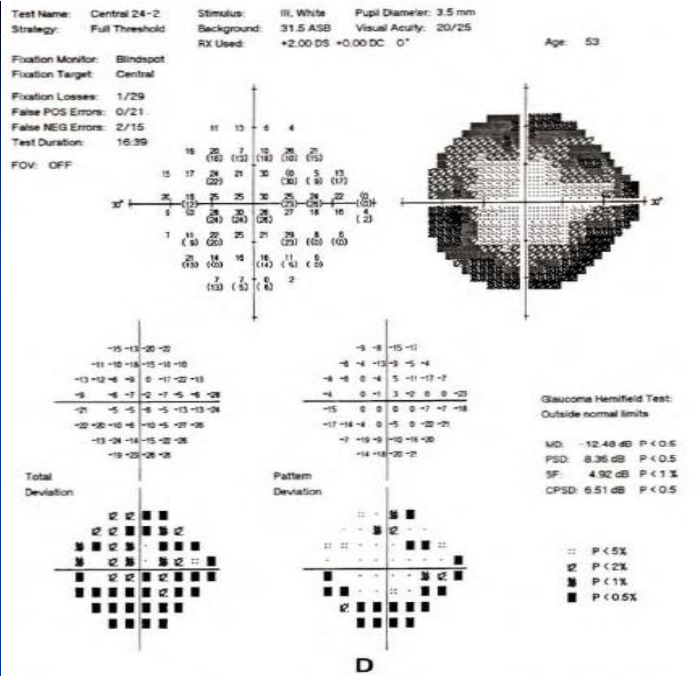
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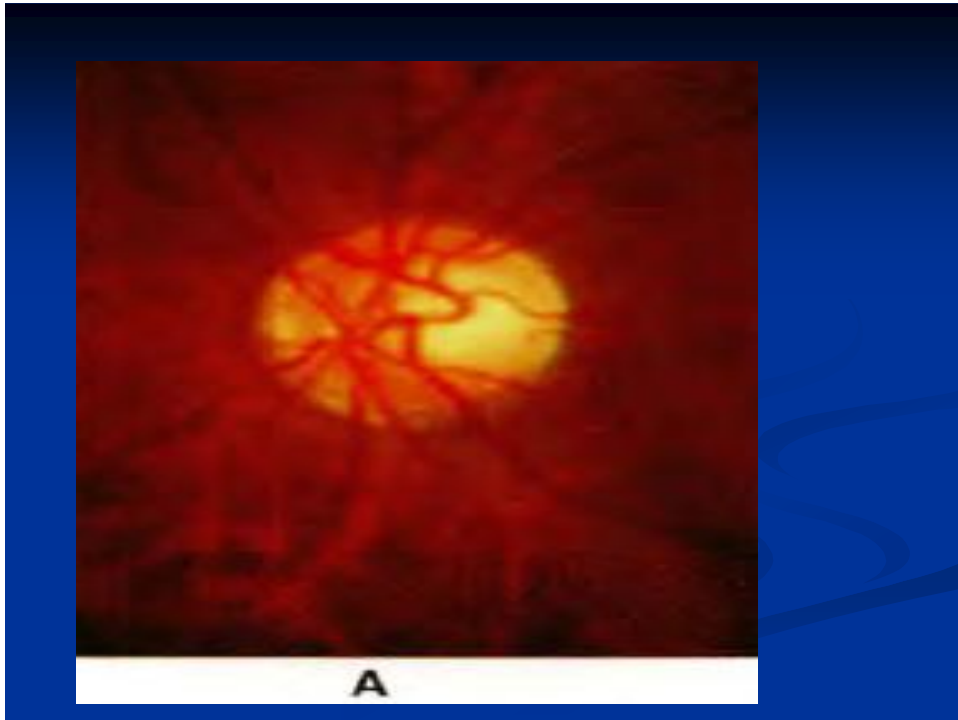
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# Visual field loss out of proportion to OCT in glaucoma

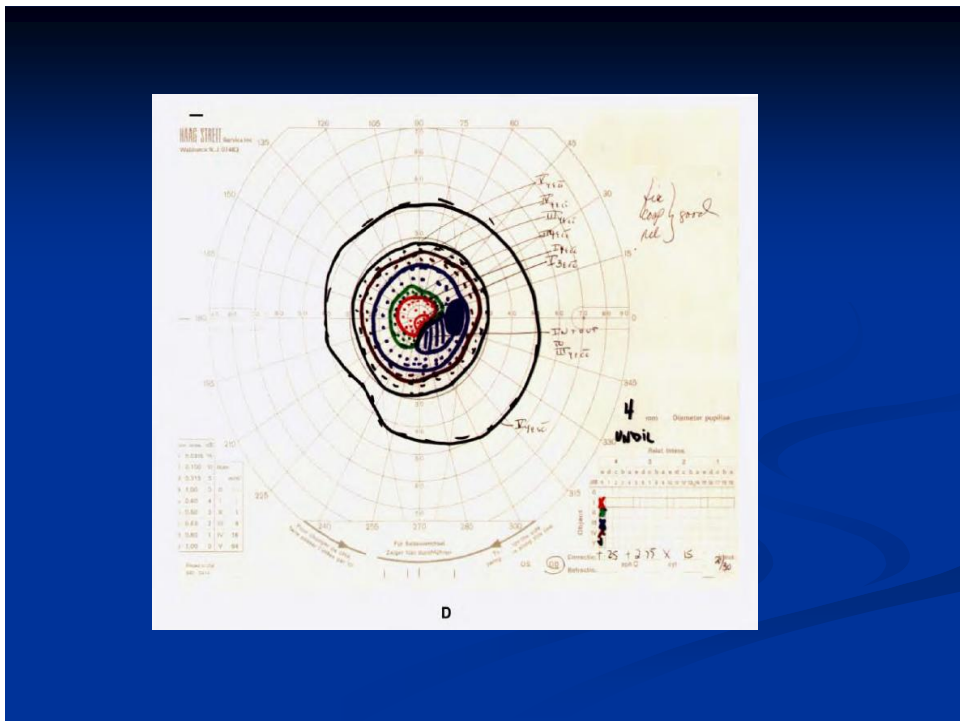
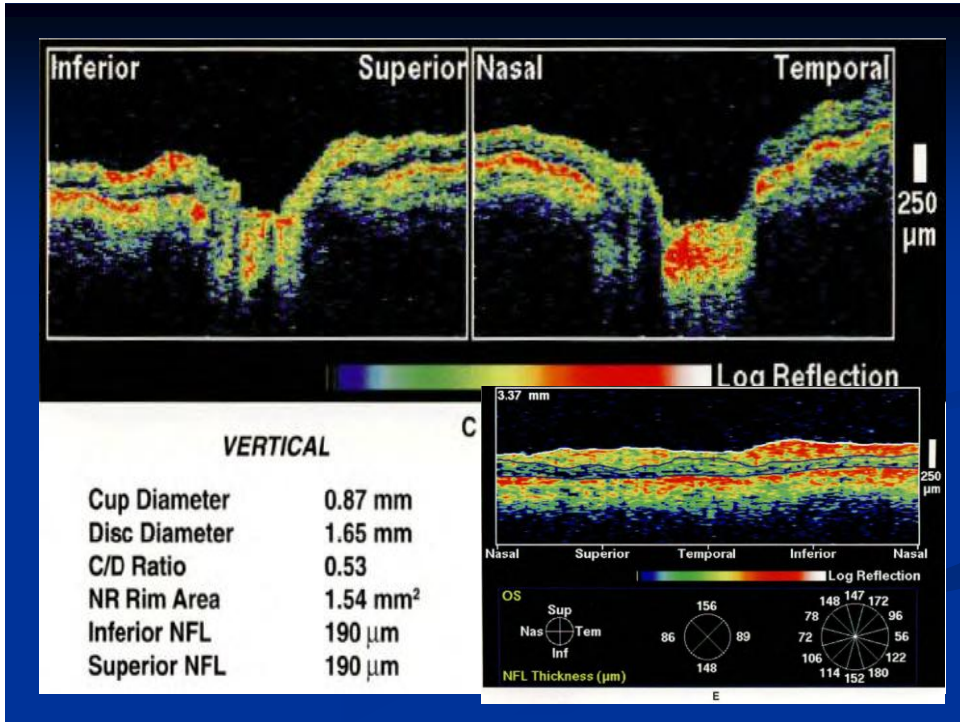


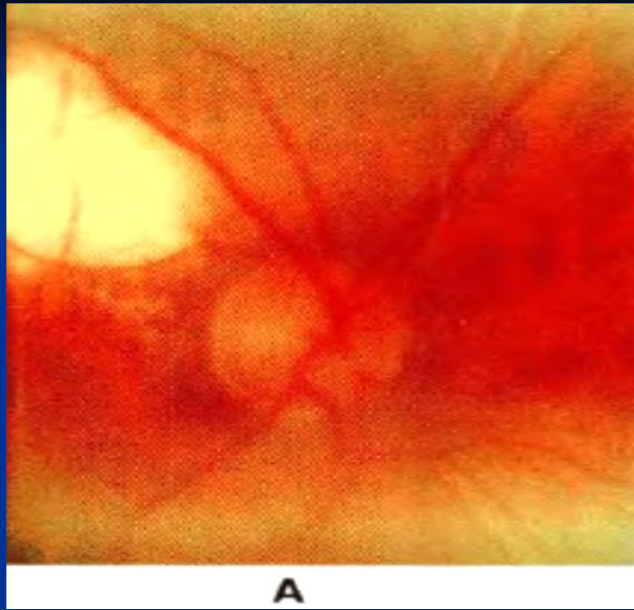


On examination, her left eye had a visual acuity of 20/25 and the intraocular pressure was 19 mm Hg.

Indirect biomicroscopy (A) revealed moderate disc cupping with mild thinning of the inferotemporal neuroretinal rim.

Humphrey visual field testing (D) displayed a dense superior arcuate and an early inferior arcuate scotoma that were out of proportion to the disc findings.



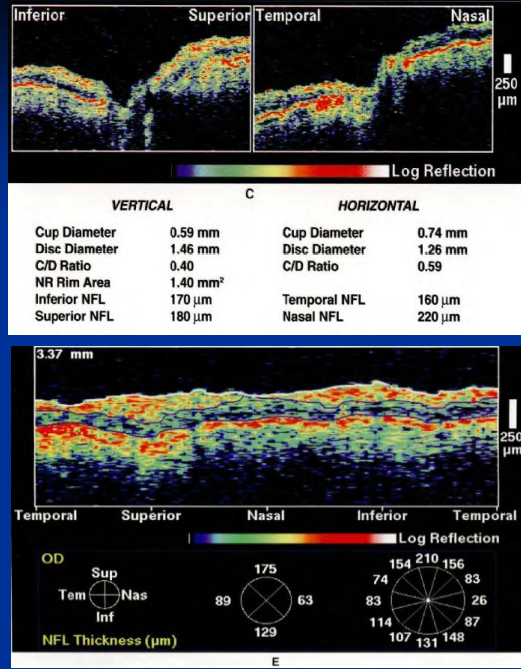


### **Inferior Seidel Scotoma due to Chorioretinal Scar**

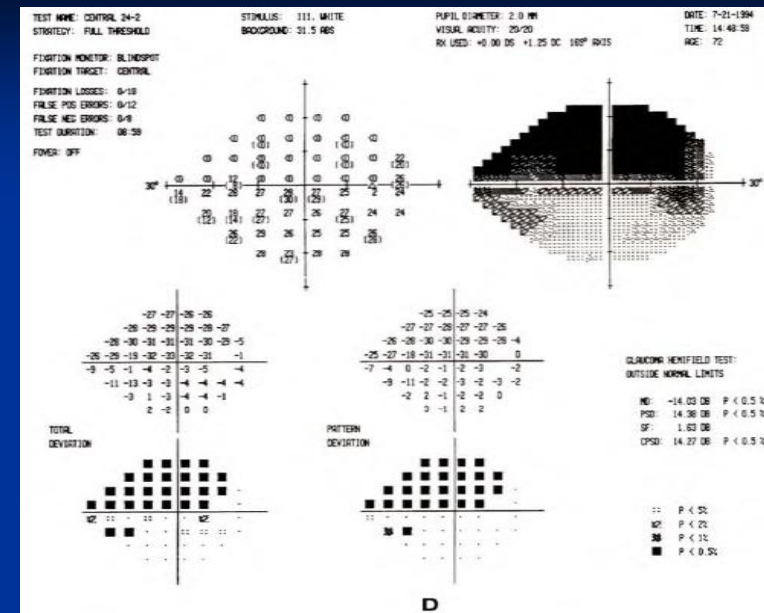
- Dilated ophthalmoscopy (A) revealed marked cupping of the optic disc with an intact neuroretinal rim, and a chorioretinal scar in the superotemporal arcade.
- A Goldmann visual field (D) displayed an inferior Seidel scotoma.

## Optical Coherence Tomography

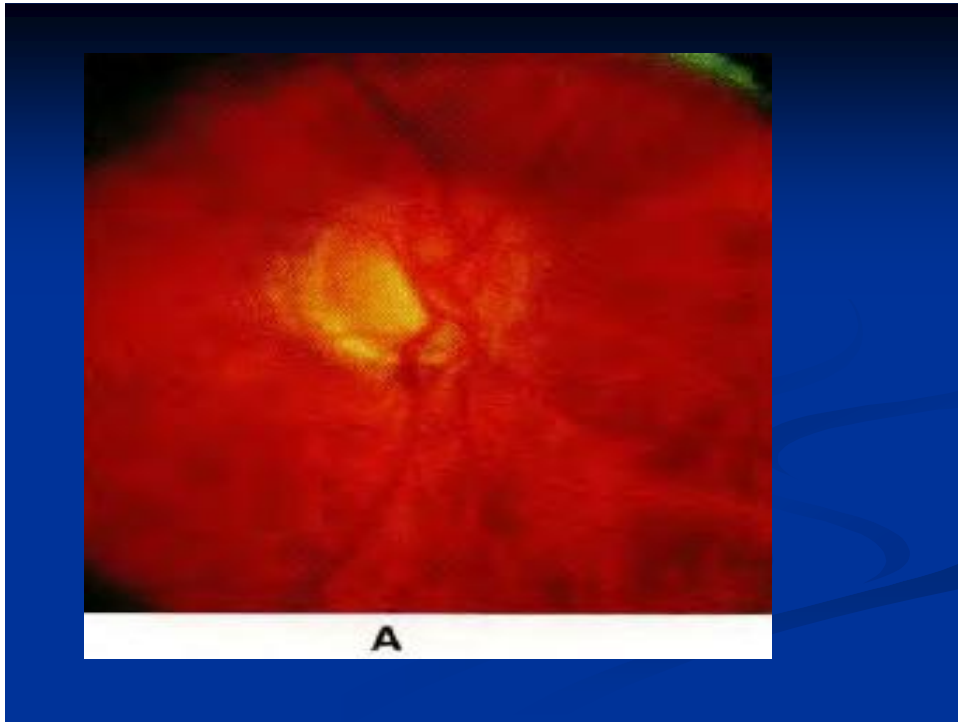
- A circular OCT image (E) acquired around the optic disc at a diameter of 3.4 mm showed a healthy superior nerve fiber layer and only slight atrophy inferiorly.
- The lack of nerve fiber layer thinning superiorly suggested that the visual field defect was due to the chorioretinal scar and not to a glaucomatous process.



## Superior Arcuate Scotoma

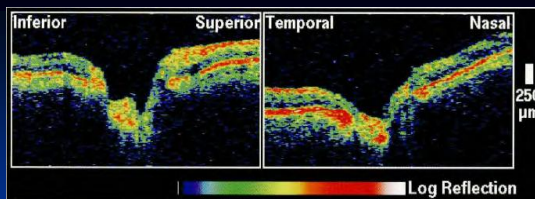




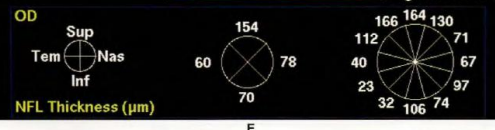
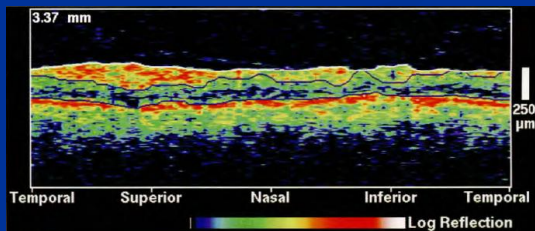


## Optical Coherence Tomography

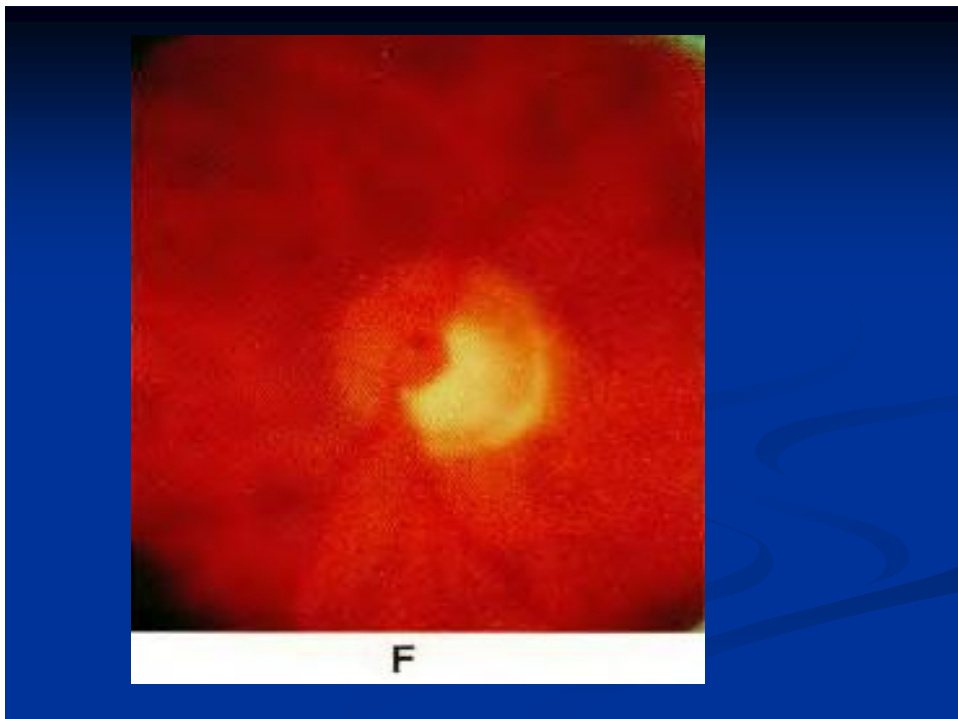
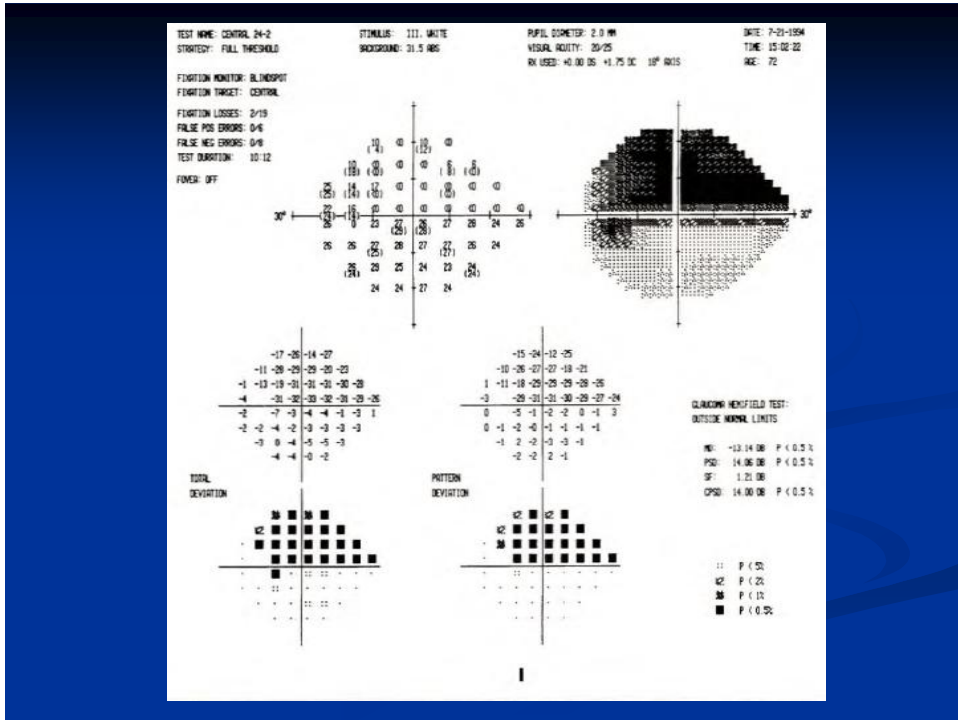
- A 3.4 mm diameter circular tomogram (E) revealed atrophy of the retinal nerve fiber layer inferiorly. The thinning was most significant from 7:00 to 9:00, consistent with the superior visual defect observed clinically.



VERTICAL		C	HORIZONTAL	
Cup Diameter	1.40 mm		Cup Diameter	0.68 mm
Disc Diameter	1.70 mm		Disc Diameter	1.31 mm
C/D Ratio	0.82		C/D Ratio	0.52
NR Rim Area	0.73 mm <sup>2</sup>			
Inferior NFL	220 μm		Temporal NFL	180 μm
Superior NFL	250 μm		Nasal NFL	120 μm

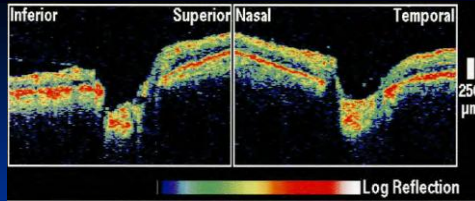




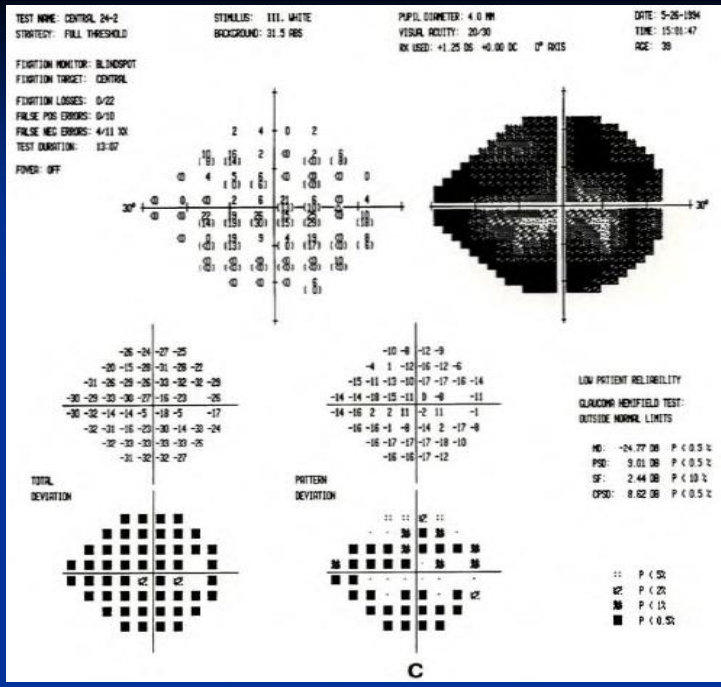
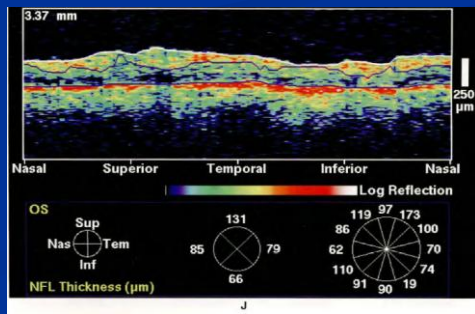


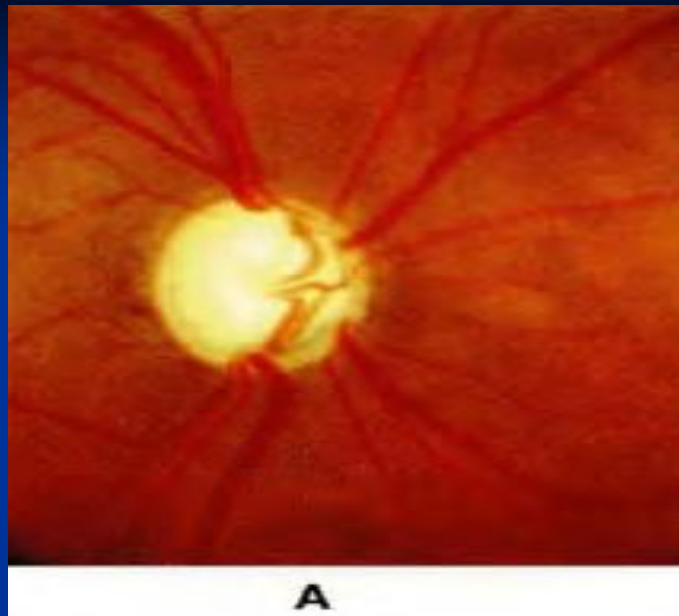
## Optical Coherence Tomography

- A virtual absence of nerve fibers was observed inferotemporally at 5:00 in the circular OCT tomogram (j) corresponding to the area of visual field loss.
- A narrow, focal notch in the nerve fiber layer was seen superiorly, and did not coincide with a clinically detectable visual field defect.



	VERTICAL	H	HORIZONTAL
Cup Diameter	1.38 mm		Cup Diameter 1.23 mm
Disc Diameter	1.70 mm		Disc Diameter 1.40 mm
C/D Ratio	0.81		C/D Ratio 0.88
NR Rim Area	0.77mm <sup>2</sup>		
Inferior NFL	90μm		Nasal NFL 210 μm
Superior NFL	150 μm		Temporal NFL 150 μm



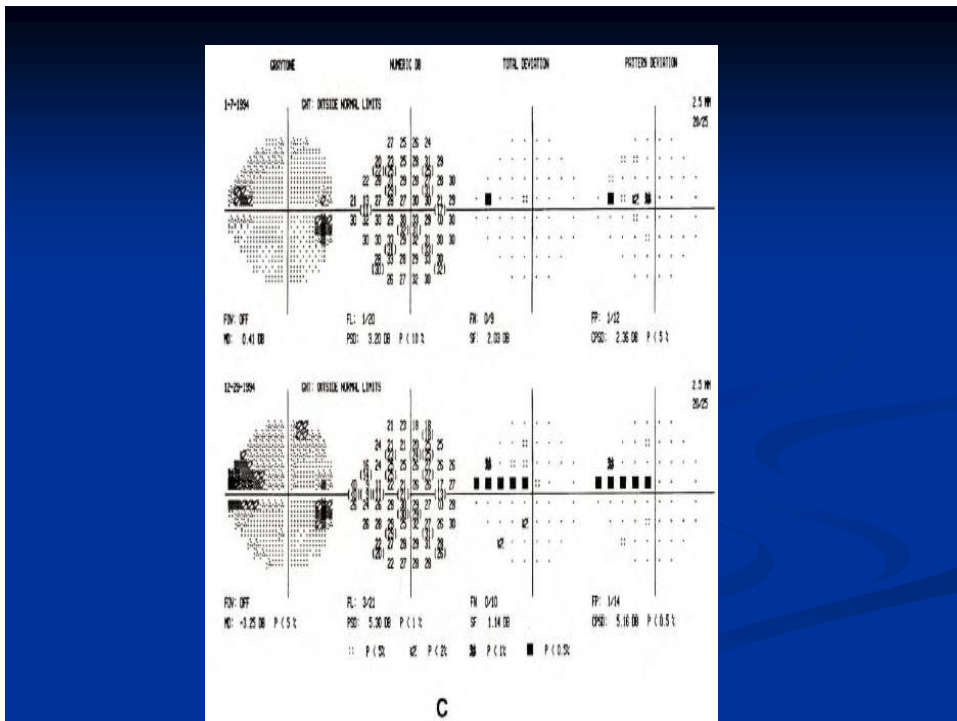
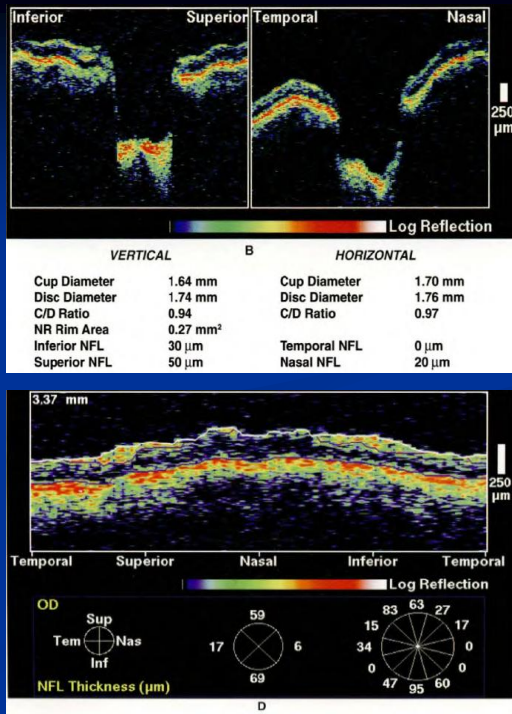


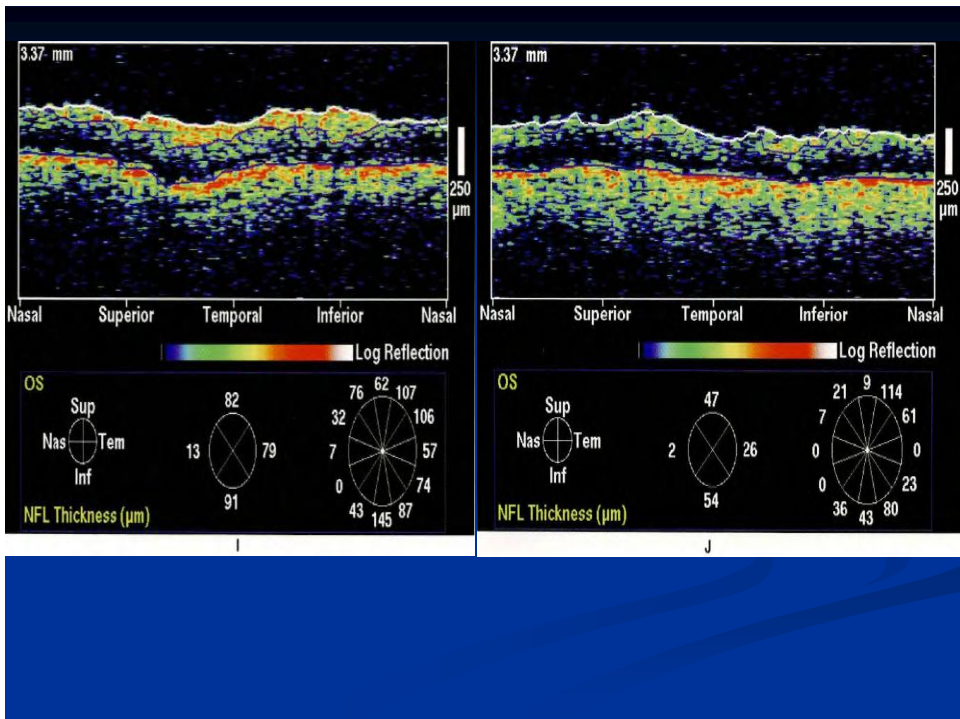
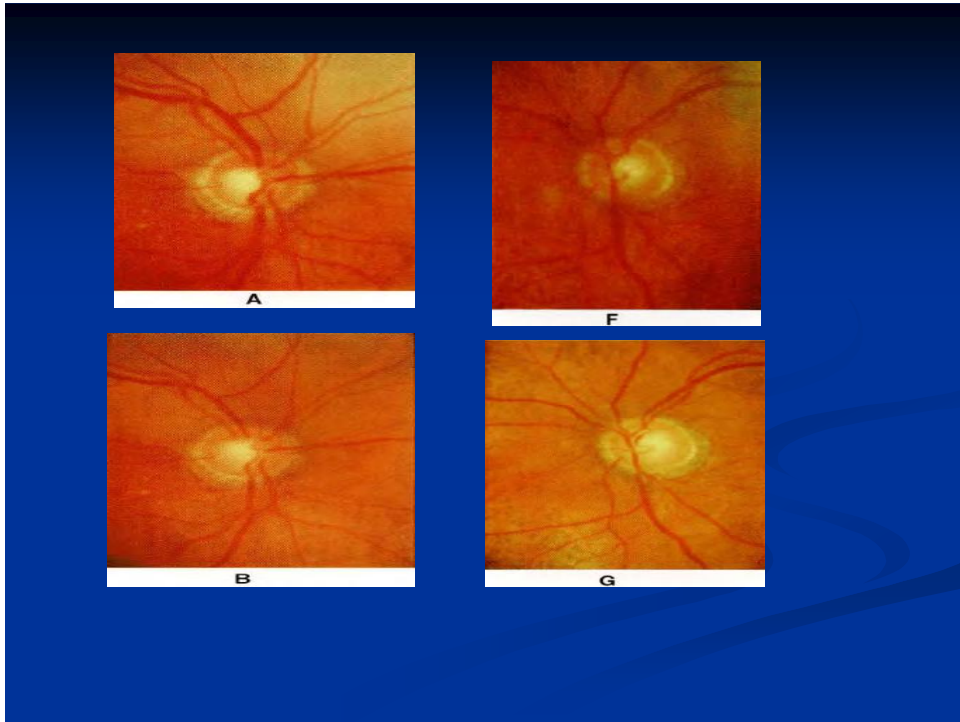
### End-Stage Glaucoma

- A 40-year-old Haitian man was taking pilocarpine 6% four times a day for primary open-angle glaucoma, until four days prior to examination, when he ran out of medication.
- He had previously undergone laser trabeculoplasty in his right eye.
- On examination of this eye, the visual acuity was 20/20 and the intraocular pressure was 27 mm Hg.
- Gonioscopy *revealed* that the angle was open to the scleral spur, except inferiorly, where it was open to the ciliary body band.
- Dilated ophthalmoscopy (A) showed a deep, *excavated* cup with an absence of neuroretinal rim.
- A Humphrey visual field (C) displayed only a small remaining central island of vision

# Optical Coherence Tomography

- Minimal nerve fiber tissue was *observed* on a 3.4 mm diameter circular OCT tomogram (D) around the optic disc.
- The dramatic attenuation of the *nerve* fiber layer was consistent with this patient's degree of cupping and visual field loss.



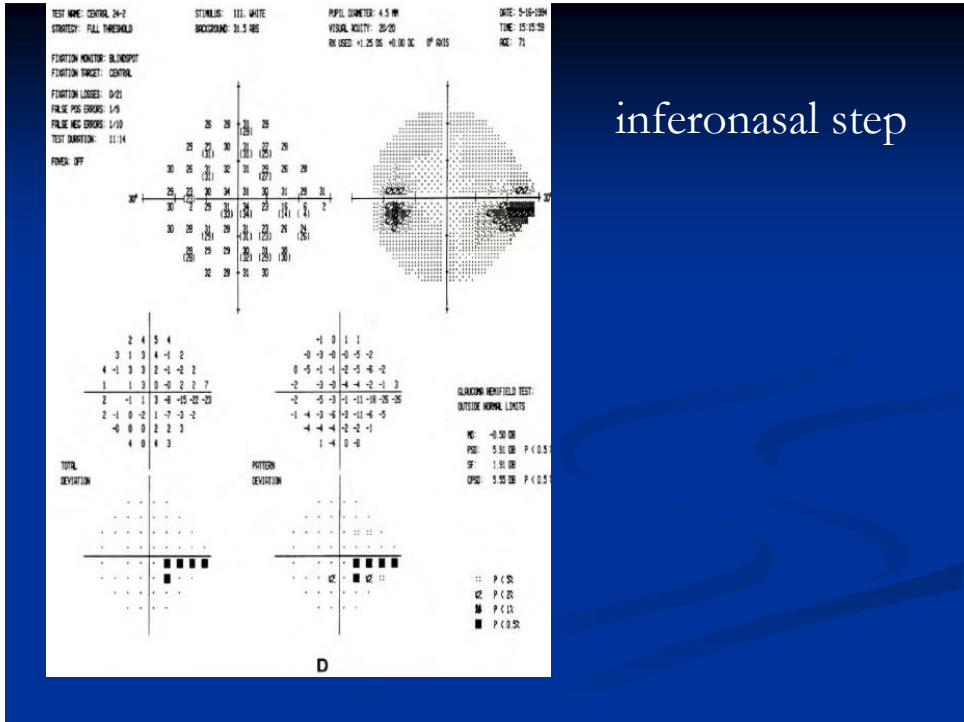


## Focal Defects in the Nerve Fiber Layer

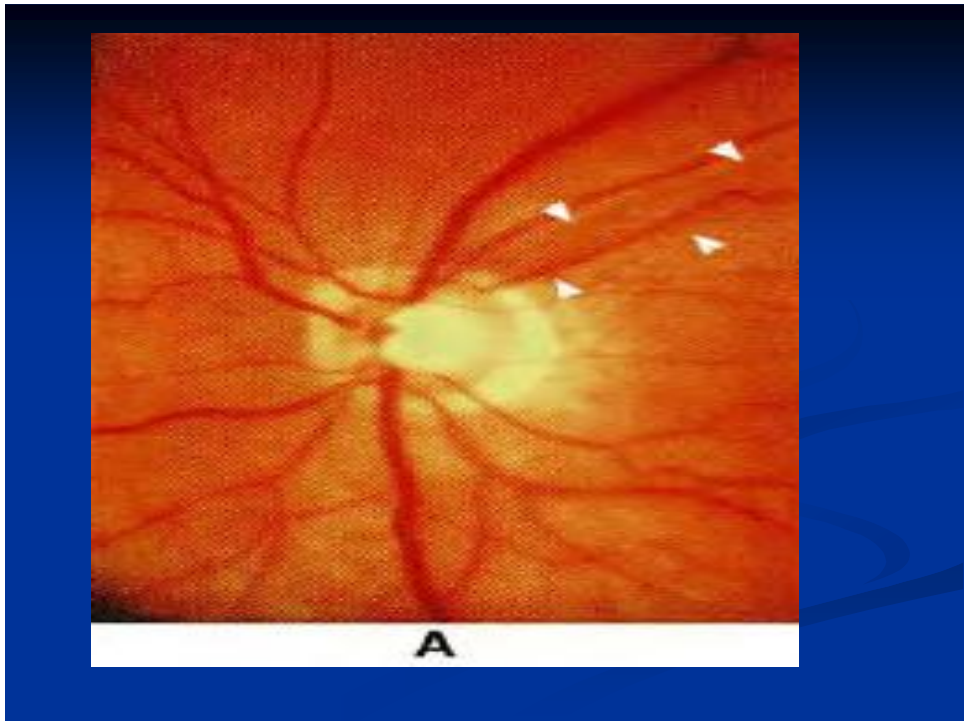
- Glaucoma may often cause focal regions of retinal nerve fiber layer (NFL) loss. These areas of NFL thinning can be difficult to detect by the traditional methods of ophthalmoscopy, stereoscopic biomicroscopy and optic nerve head photography, or evaluation of the red free NFL reflex.
- The ability of OCT to profile the NFL in cross-section with high resolution is useful in the identification of focal or diffuse areas of NFL thinning.
- A circular OCT tomogram acquired around the optic disc provides information on NFL thickness in a cylindrical cross-section surrounding the nerve head.

- The normal variations in NFL thickness are readily apparent in such a section, and focal or diffuse NFL thinning may be identified by visual inspection.
- Alternatively, an automated computer image processing algorithm may be used to quantitatively measure the retinal and NFL thickness from the **circular tomograms, providing an objective assessment** of the size and severity of the NFL loss.





inferonasal step

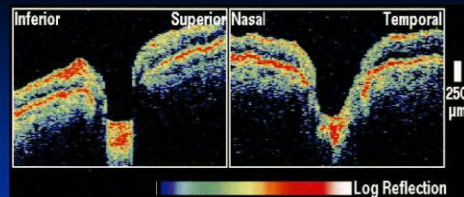




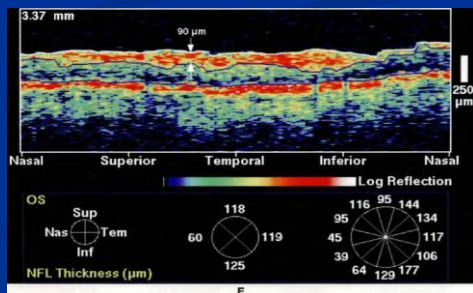
- Dilated fundus examination showed a narrow focal defect in the superotemporal nerve fiber layer (A) and a thinning of the neuroretinal rim temporally. A distinct inferonasal step was noted on the Humphrey visual field (D) corresponding to the nerve fiber layer defect observed ophthalmoscopically

### Optical Coherence Tomography

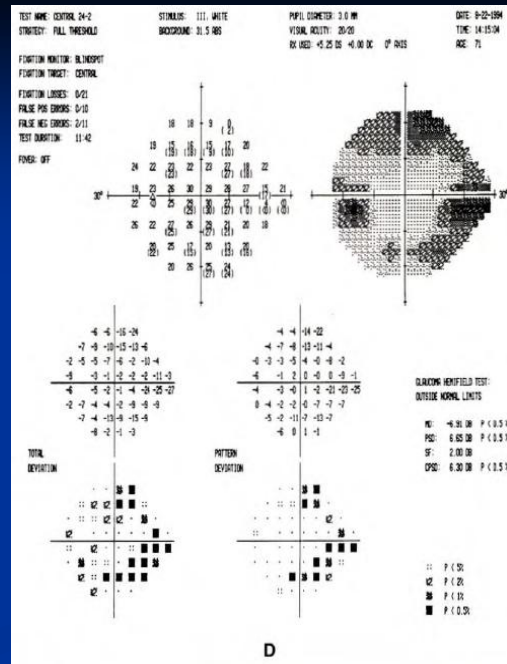
- A circular OCT tomogram (E) taken at a diameter of 3.4 mm around the optic disc revealed a generally healthy nerve fiber layer with the exception of a focal area of thinning in the superotemporal nerve fiber layer (arrows), consistent with the defect observed clinically.
- The thinning was primarily evident at the superficial margin of the nerve fiber layer, and reached a minimum thickness of 90  $\mu$ m in the image.



VERTICAL		HORIZONTAL	
Cup Diameter	1.22 mm	Cup Diameter	1.52 mm
Disc Diameter	1.77 mm	Disc Diameter	1.94 mm
C/D Ratio	0.69	C/D Ratio	0.78
NR Rim Area	1.29 mm <sup>2</sup>		
Inferior NFL	210 $\mu$ m	Nasal NFL	190 $\mu$ m
Superior NFL	190 $\mu$ m	Temporal NFL	160 $\mu$ m

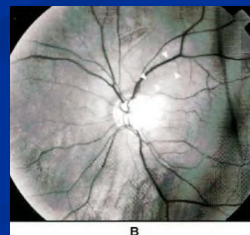
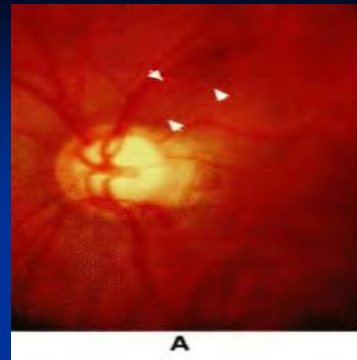


- A Humphrey visual field (D) revealed an inferior arcuate scotoma consistent with the nerve fiber layer defect and an early superior nasal step as well.



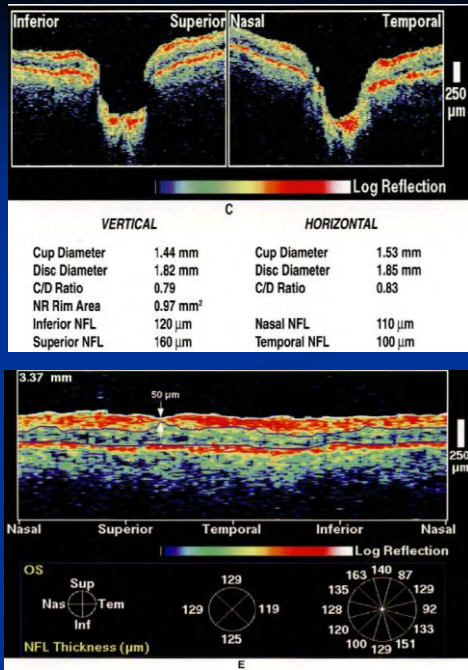
## Focal Nerve Fiber Layer Defect

- Ophthalmoscopy (A) revealed a moderately cupped disc with an attenuated neuroretinal rim temporally.
- The nerve fiber layer reflex (B) displayed a focal reduction in the superotemporal area.

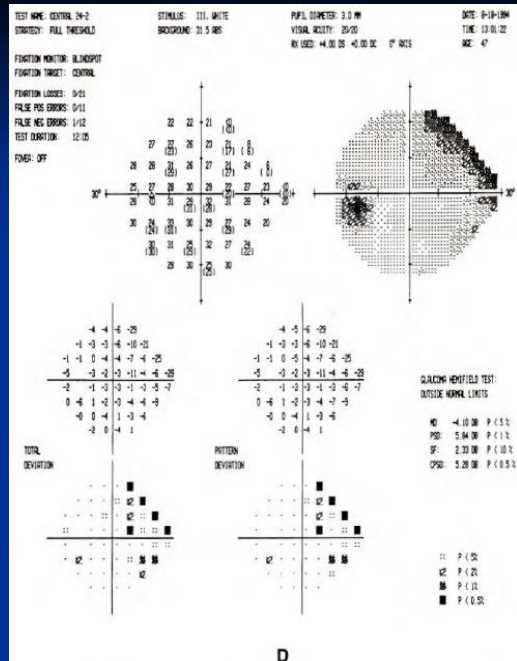


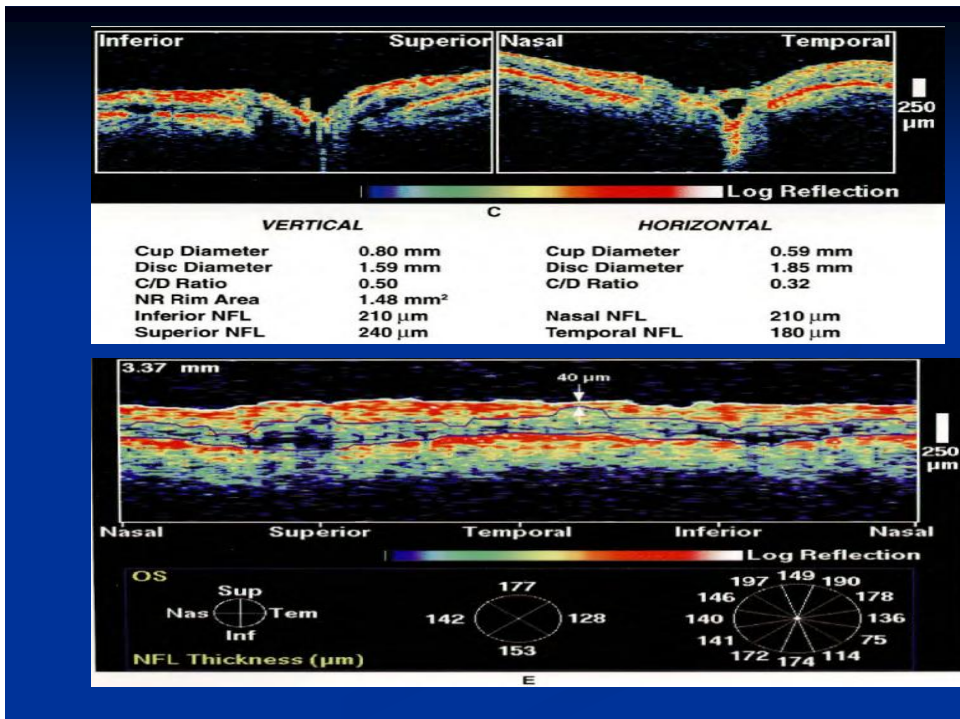
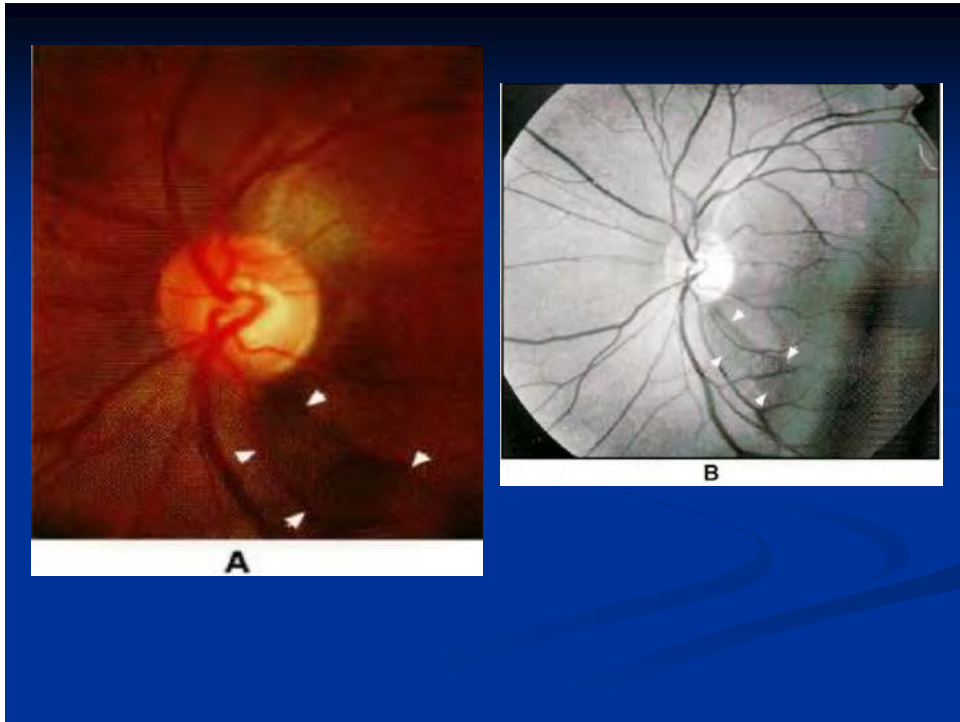
### Optical Coherence Tomography

- A 3.4 mm diameter circular scan (E) around the optic disc delineated focal thinning of the superior temporal nerve fiber layer consistent with the clinically observed focal nerve fiber layer defect.
- The depression appeared to arise from both the superficial and deep margins of the nerve fiber layer and reached a minimum thickness of 50 μm in the image.
- The average nerve fiber layer thickness at 1:00, determined by the computer, was correspondingly reduced to 87 μm.



A Humphrey visual field (D) showed a superior nasal step and a possible, early inferior nasal step.





## Message

- -Field is important for follow up of glaucomatous patients.
- - To be familiar with field essential to be familiar with disc.
- - Quality of life may be not good with bad fields



