

# SMC-FERRARA

4 MAGGIO 2013

## DIAGNOSTICA “AVANZATA” DEL GLAUCOMA

 Regione Emilia Romagna

Azienda **USL** di Ferrara



AMBULATORIO DI DIAGNOSTICA COMPUTERIZZATA

DELLA MALATTIA GLAUCOMATOSA

OSPEDALE DI COMACCHIO



*Giuseppe Lamberti*  
AZIENDA USL FERRARA

*Clinica Oculistica (dir. Prof. A. Sebastiani)*  
*Azienda Ospedaliera-Universitaria di Ferrara*

➤ Azienda USL

Regione Emilia Romagna

Azienda **USL** di Ferrara

## Ospedale di Comacchio

- PACHIMETRIA CORNEALE AD ULTRASUONI
- PERIMETRIA AUTOMATICA STANDARD
- PERIMETRIA A DUPLICAZIONE DI FREQUENZA
- OFTALMOSCOPIA LASER (GDX)



**CENTRO DI**



**DIAGNOSI "HIGH TECH"**

**DELLA MALATTIA GLAUCOMATOSA**

**TONOMETRIA DI PASCAL**

- PERIMETRIA AUTOMATICA STANDARD
- PACHIMETRIA CORNEALE AD ULTRASUONI
- OCT : STUDIO TOMOGRAFICO DELLE FIBRE
- HRT: STUDIO TOMOGRAFICO DELLA RIMA NEURALE

Analisi  
funzionale

**HFA**

ANALISI DEL DANNO

Analisi  
flussimetrica

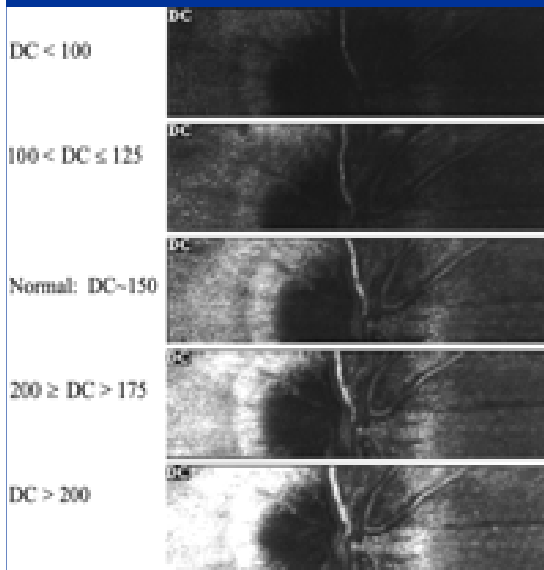
**HRF**

Analisi morfometrica  
delle fibre nervose retiniche

**OCT**

Analisi morfometrica  
della papilla ottica

**HRT**



# DICA 33

Oggetto: Pressione alta

17/07/2009 16:37:39

Il risultato del campo visivo è: il tracciato perimetrico odierno mostra una riduzione della sensibilità retinica luminosa associata ad un allargamento della macchia cieca.

Sensibilità foveale ai limiti per l'età.

Alterato valore degli indici perimetrici globali.

Collaborazione e fattore apprendimento buoni.

*Sono molto preoccupata mi è stato prescritto un collirio, il timogel una goccia al giorno in entrambi gli occhi...*

*Nel ringraziarLa anticipatamente chiedo cosa fare e cosa rischio...insomma qlc consiglio per favore*

# DICA 33

Il glaucoma non è solamente una pressione alta ma è una SINDROME proteiforme ed in quanto tale bisogna ricercare tutti i dati di diagnostica strumentale oculare che indichino insieme tale sindrome!

Faccia un OCT-HRT e GDX .

Un caro saluto

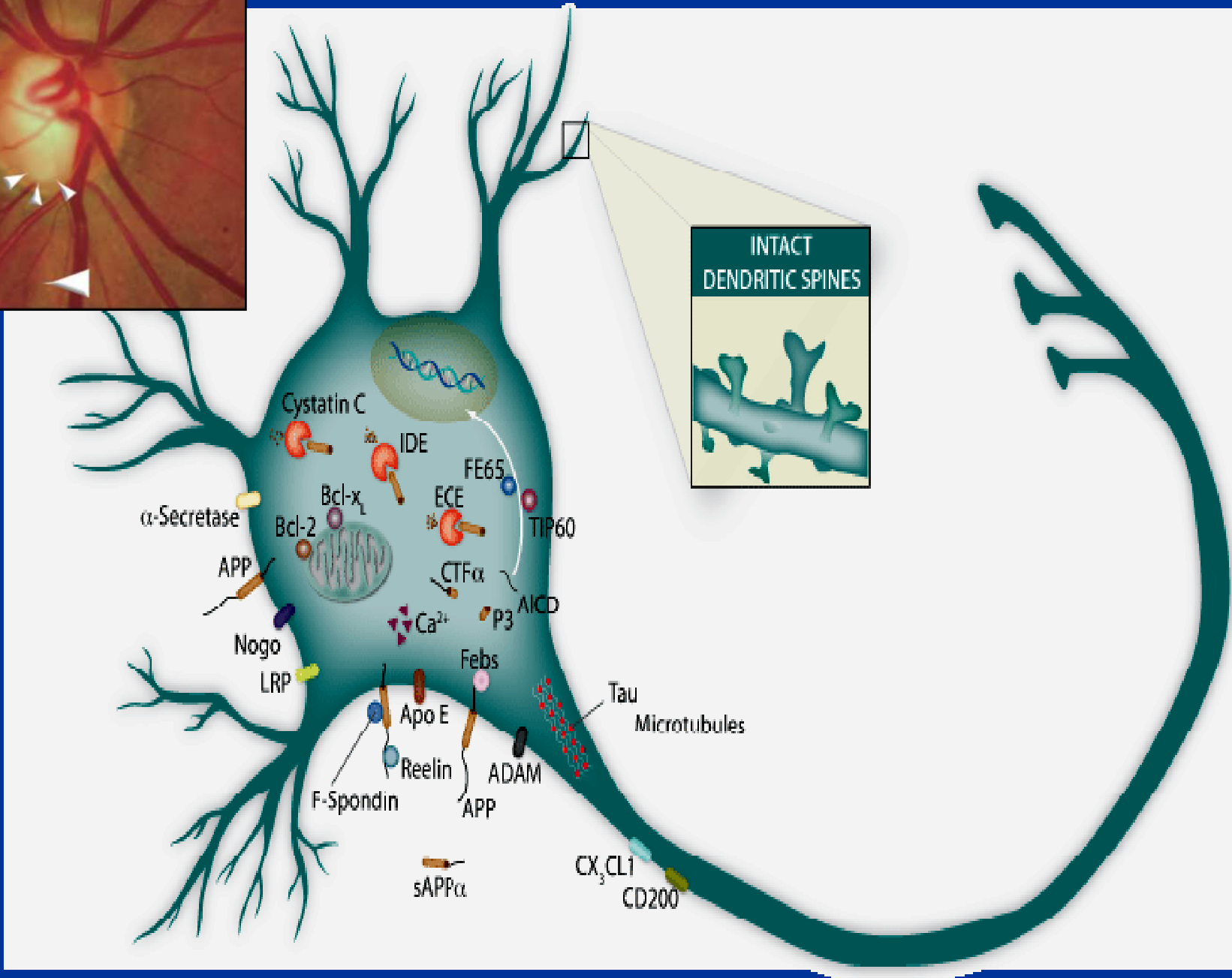
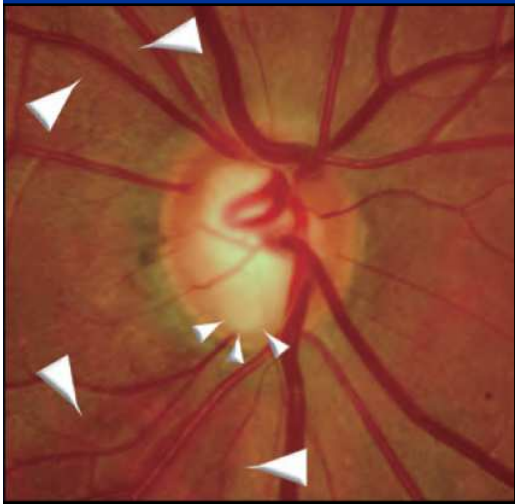
dott.XXXXXXXXXX

Specialista attività privata  
Specialista in Oftalmologia  
PISA (PI)

# INGORGO

# CONFUSIONE !





INTACT  
DENDRITIC SPINES

# Definizione

Con il termine *glaucoma* si indica un gruppo di neuropatie ottiche a carattere progressivo caratterizzate da danno apoptico dei fascicoli neurali e a congruenti difetti del campo visivo

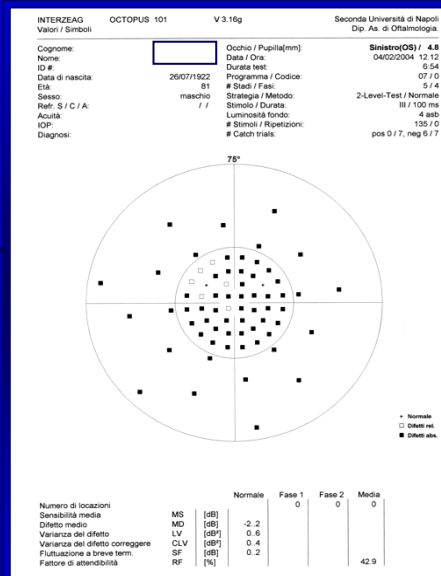
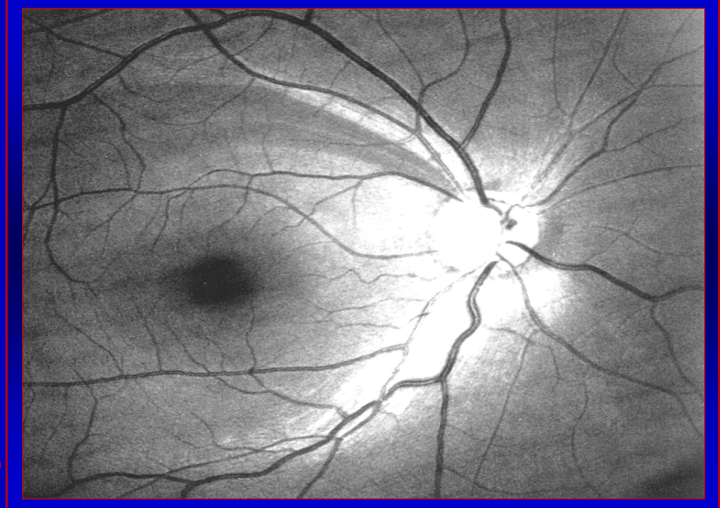
IL FATTORE DI RISCHIO PIU' IMPORTANTE  
E' LA PRESSIONE INTRAOCULARE

Non sempre la **pressione intraoculare (IOP)** risulta elevata. Esistono infatti altri fattori che possono essere implicati nella patogenesi di questa neuropatia

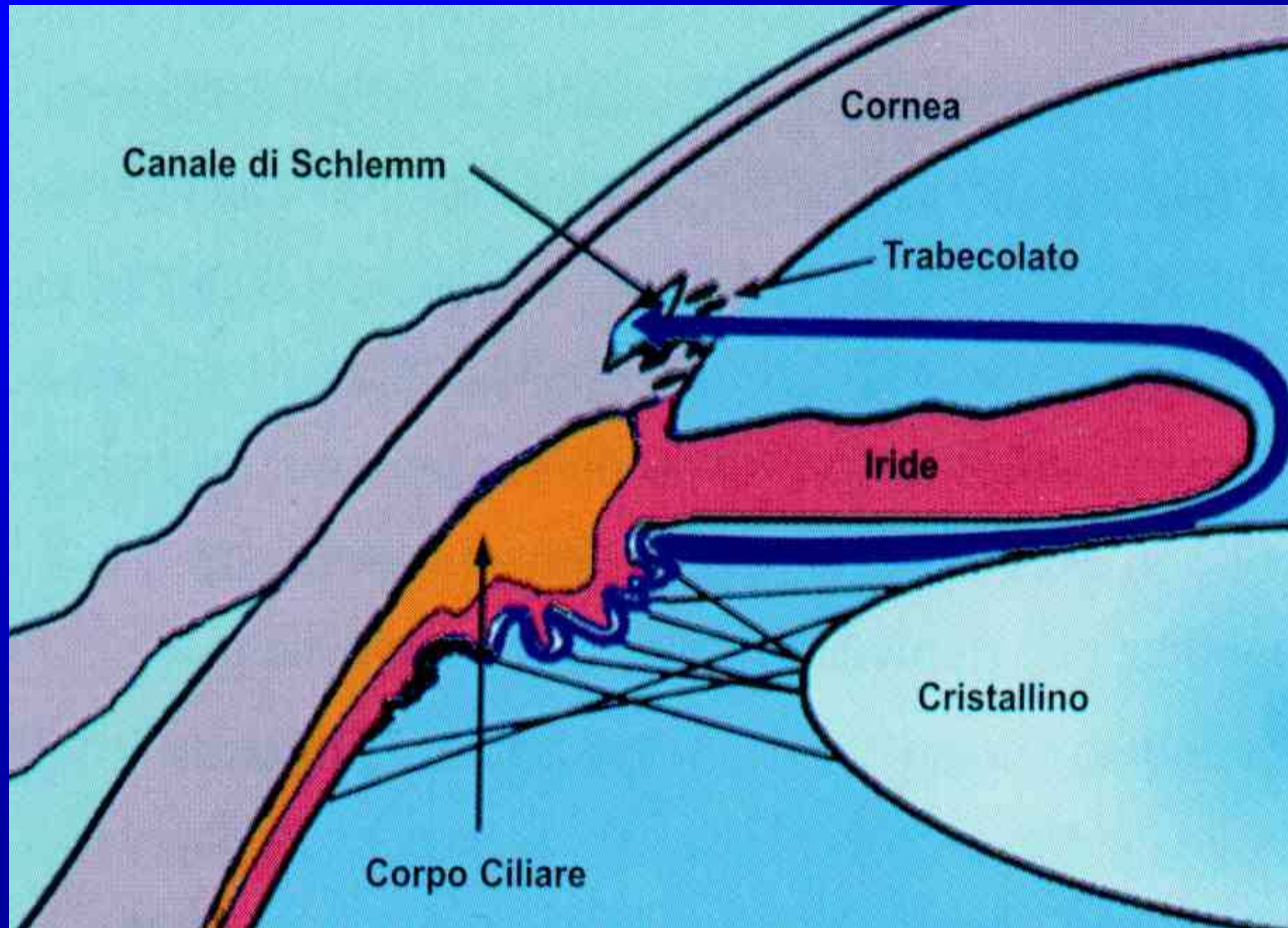
# Definizione di glaucoma

Con il termine "glaucoma" si definisce un gruppo etiologicamente eterogeneo di disordini oculari caratterizzati dalla presenza di un danno assonale a livello delle cellule ganglionari, che determina progressivamente alterazioni a carico:

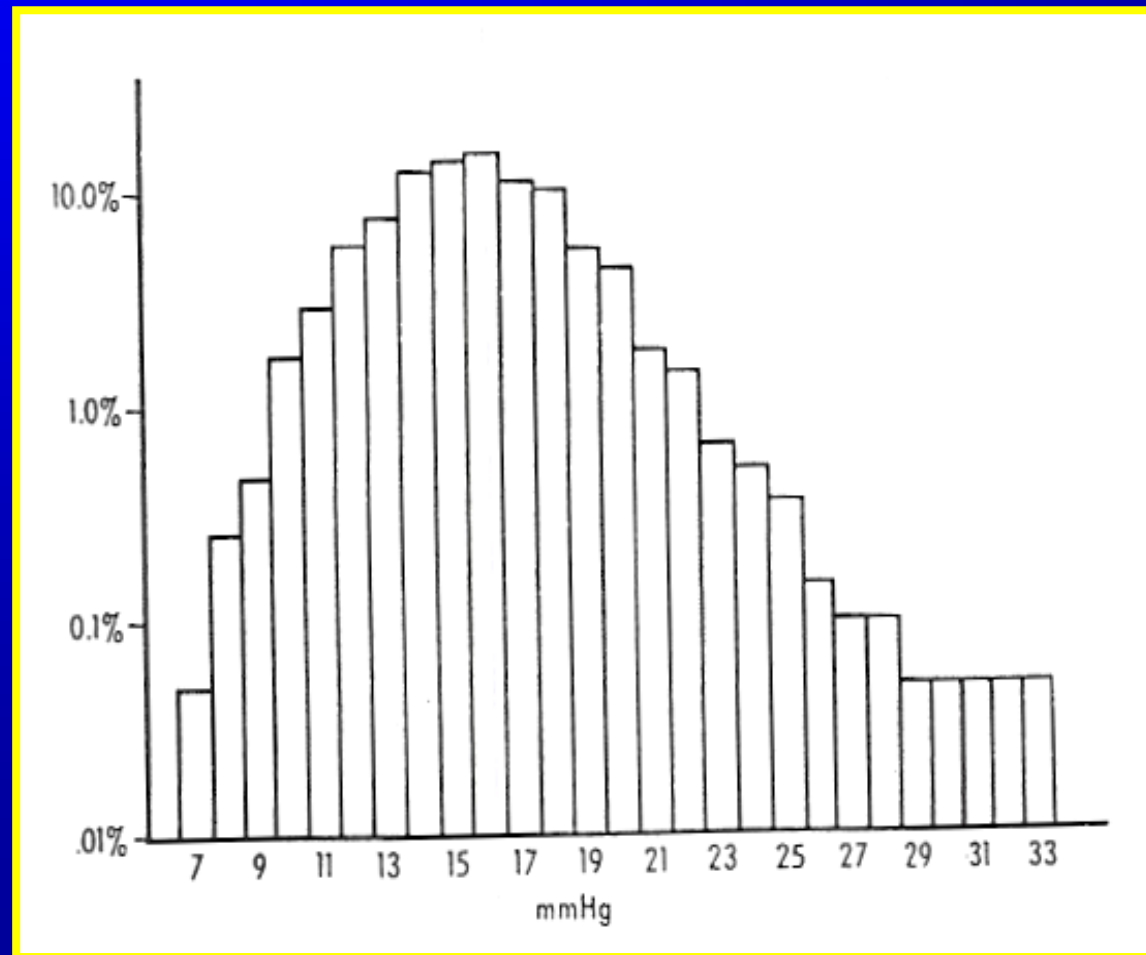
- 1) delle fibre nervose retiniche
- 2) della testa del nervo ottico
- 3) del campo visivo



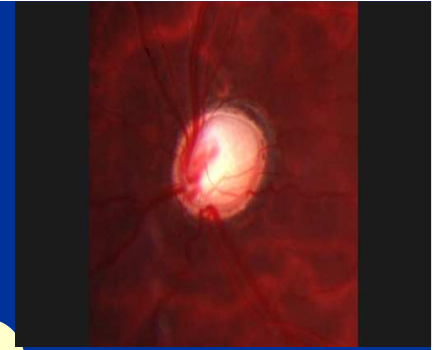
# DEFLUSSO TRABECOLARE



# Distribuzione gaussiana della IOP in una popolazione normale



# flusso vascolare stress biomeccanico



**IOP**<sub>(a)</sub> = pressione di soglia apoptotica

## **VALORE INDIVIDUALE DI IOP**

**Influenzata da fattori genetici, determinata da  
parametri metabolici, condizionata da fattori  
circolatori e biomeccanici :**

**esprime la resistenza della cellula gangliare ad  
innescare un programma di autodistruzione**

**ELASTANZA**

**PRESSIONE  
INTRAOCULARE**

**LAMINA CRIBROSA**

**PRESSIONE  
CEREBROSPINALE**



**SOGLIA APOPTOTICA  
DELLE CELLULE GANGLIONARI**

**PRESSIONE  
VENOSA  
EPISCLERALE**

**RESISTENZA  
ARTERIOLE**

**PRESSIONE  
ARTERIOSA  
MEDIA**

[Frontiers in Bioscience 8, s1140-1156, September 1, 2003]

## **GLAUCOMA: OCULAR ALZHEIMER'S DISEASE?**

**Stuart J. McKinnon**

*Departments of Ophthalmology and Cellular and Structural Biology, University of Texas Health Science Center at San Antonio  
7703 Floyd Curl Drive, MC 6230, San Antonio, Texas 78229-3900, USA*

Our data suggest a novel hypothesis for RGC death in glaucoma involving chronic amyloid-beta neurotoxicity, in a manner that mimics AD at the molecular level. With the loss of the protective effect of APP and the upregulation of toxic APP fragments that include amyloid-beta, RGCs ultimately die from chronic caspase activation, loss of synaptic homeostasis, amyloid-beta cytotoxicity and other excitotoxic events. The potential benefits from this work are that treatments contemplated for AD could be used to treat glaucoma. Conversely, novel neuroprotective strategies developed to treat glaucoma could be used to treat other chronic neurodegenerations as well.

*“LOW tech”*



**Tonometro ad  
indentazione**

→  
**LA RIGIDITA' SCLERALE**

*“high tech”*



**Tonometro ad  
applanazione**

**ANALISI DEI FATTORI DI RISCHIO**

Side View Of Probe And Probe Carrier  
Degrees Are First Zero To 180



## VALORE NOMINALE E VALORE REALE DELLA PRESSIONE INTRAOCULARE

$$IOPT \neq IOPG$$

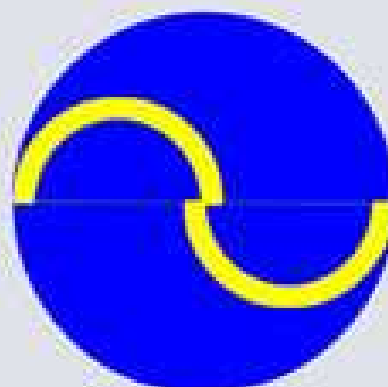
Fluorescein-stained semicircles  
seen with Goldmann tonometry



Too Small



Too Large



Endpoint

$$IOPT = IOPG / K$$



**Pachimetro ad ultrasuoni:  
valuta lo spessore corneale centrale**

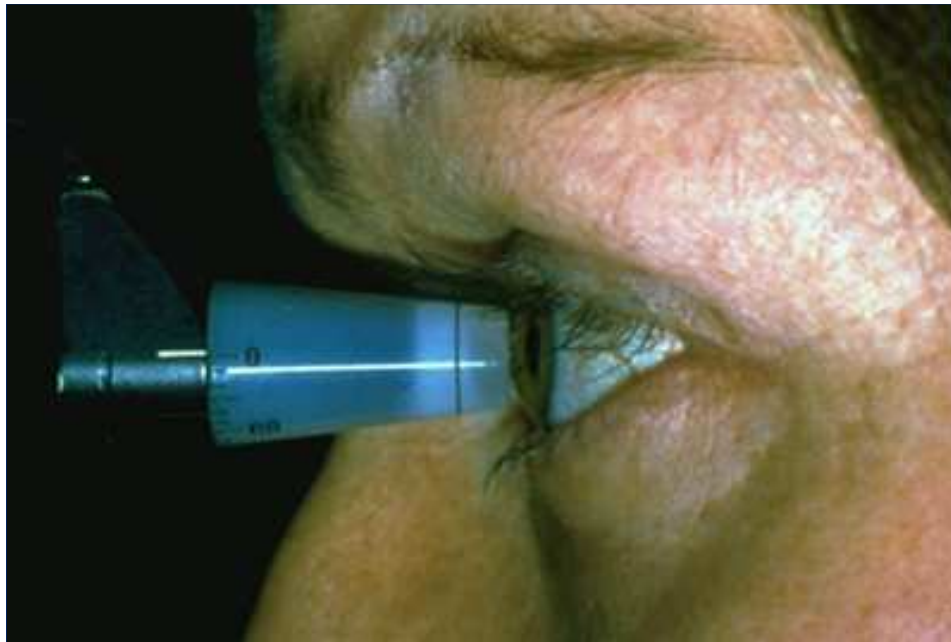


**ANALISI DEI FATTORI DI RISCHIO "HIGH TECH"**



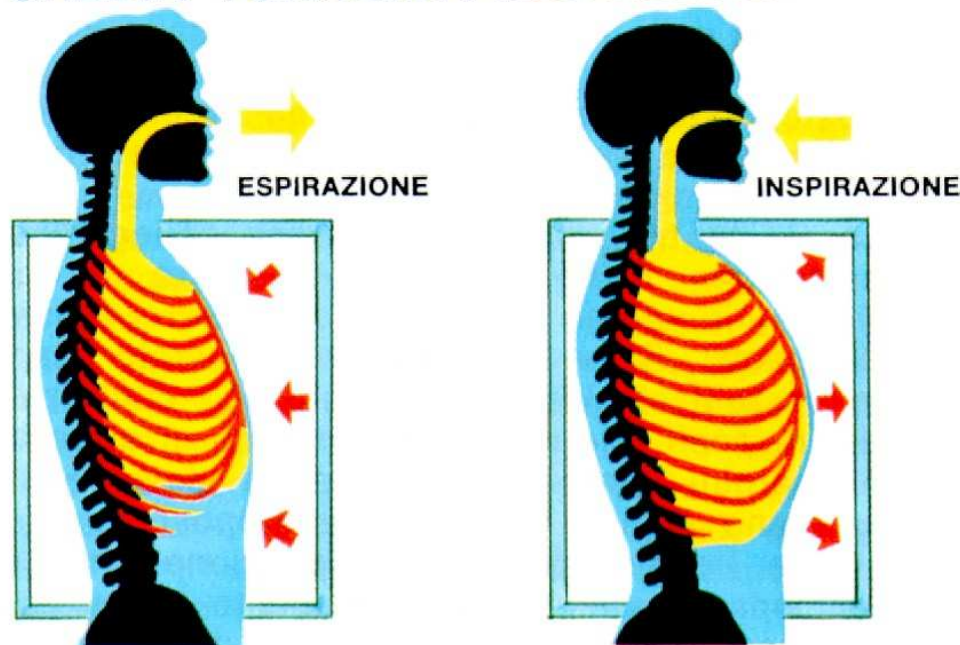
**Tonometria a contorno  
dinamico  
(PASCAL):  
valuta la pressione  
intraoculare  
indipendentemente  
dalle proprietà  
viscoelastiche della  
cornea**

**ANALISI DEI FATTORI DI RISCHIO "HIGH TECH"**



Experience increases the perceived competence by the patient, prompting him or her to relax. Patients who hold their breath during applanation tonometry have been found to increase the IOP as much as 4 to 5 mm Hg.<sup>2</sup> To gain experience with tonometry, the student can practice on a model eye made with finger cots, elastic bands, and paper clips.<sup>10</sup> The more comfortable the examiner feels the more relaxed the patient will be. Patients are also more relaxed when the procedure is explained before its application. You may want to tell the patient that the tonometer tip touches the tear film rather than the eye.

### GABBIA TORACICA (ESPANSIONE)

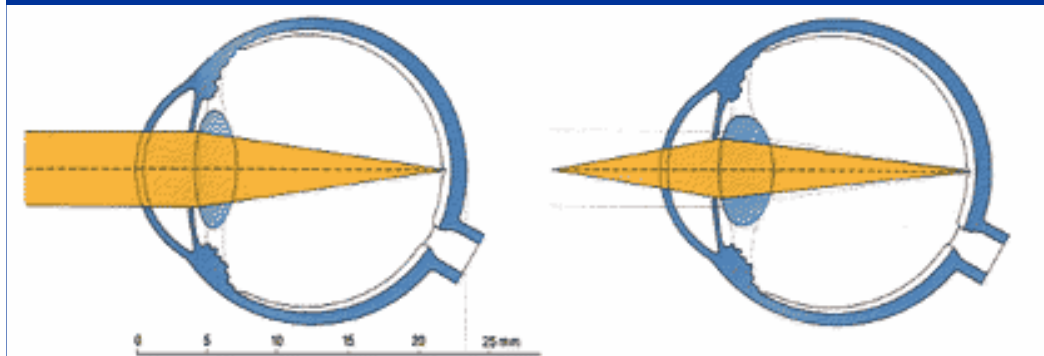


++4-5 mmHg

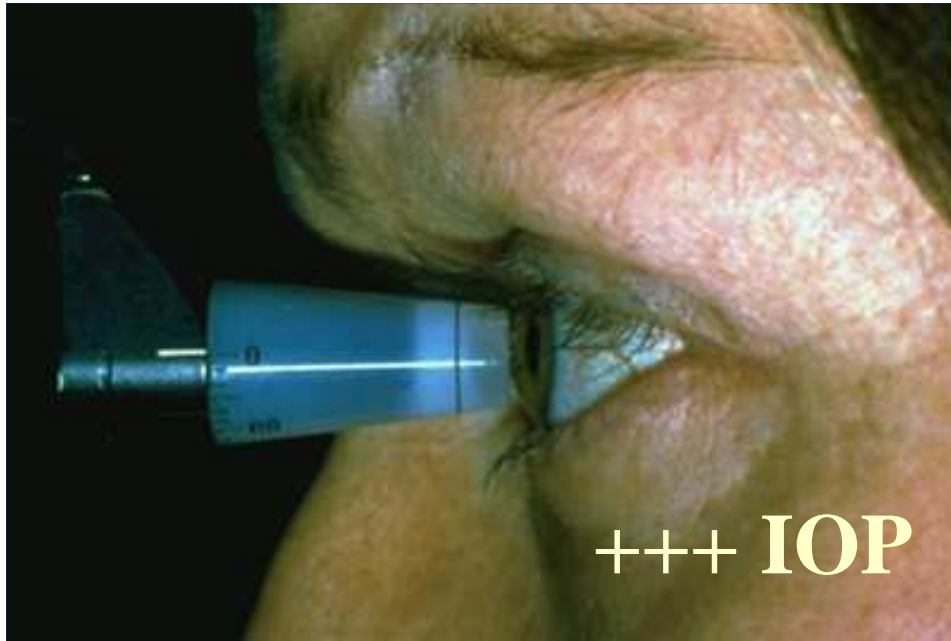


2. The examiner should have the patient look at a distant target. Accommodation has been found to reduce the IOP. Mauger et al.<sup>11</sup> found that 4 diopters of accommodation for 30 seconds reduced the IOP by 1.32 mm Hg. Use of a fixation light 10 cm from the fixing eye causes a decrease in the IOP. However, instructing the patient to fixate on a point 18 feet away does not cause a decrease in IOP.<sup>11</sup>

## ACCOMODAZIONE



**+ 1.32 mmHg**



3. It is important to have the patient properly positioned and fixating straight ahead. The IOP will vary transiently with eye position. If the position of gaze is shifted from primary position to a new position, there will be a brief increase in IOP. This variation is presumed to be the result of muscle tension on the globe.<sup>2</sup> The patient's forehead should also be firmly placed against the forehead band; if not, there may be intermittent contact of the prism with the cornea, resulting in presumed pulsations of the fluorescein rings.<sup>8</sup>





4. Patients with narrow palpebral fissures produce another problem when measuring IOP. If the eyelids must be held open, extreme care should be taken not to press on the globe. Any pressure on the globe will increase the IOP. Moses et al.<sup>12</sup> measured the IOP changes produced in patients who were instructed to "open your eyes wide." A mean increase of 1.88 mm Hg was found when the eyelids were voluntarily retracted.<sup>12</sup> Passive eyelid retraction was not found to increase the IOP.





5. Errors in Goldmann tonometry exist when the fluorescein rings are too narrow or too wide. The Goldmann tonometer manual shows the rings to be 0.39 mm wide. When the rings are too narrow because of evaporation during prolonged measurements the tonometry reading will be lower than normal.<sup>4,5</sup> Ask the patient to blink several times or instill another drop. If the rings are too wide you may have instilled too much fluorescein. Excess fluorescein can be removed with a cotton swab. Too wide a band will result in higher than normal readings.<sup>4,5</sup>

Fluorescein-stained semicircles seen with Goldmann tonometry



Too Small

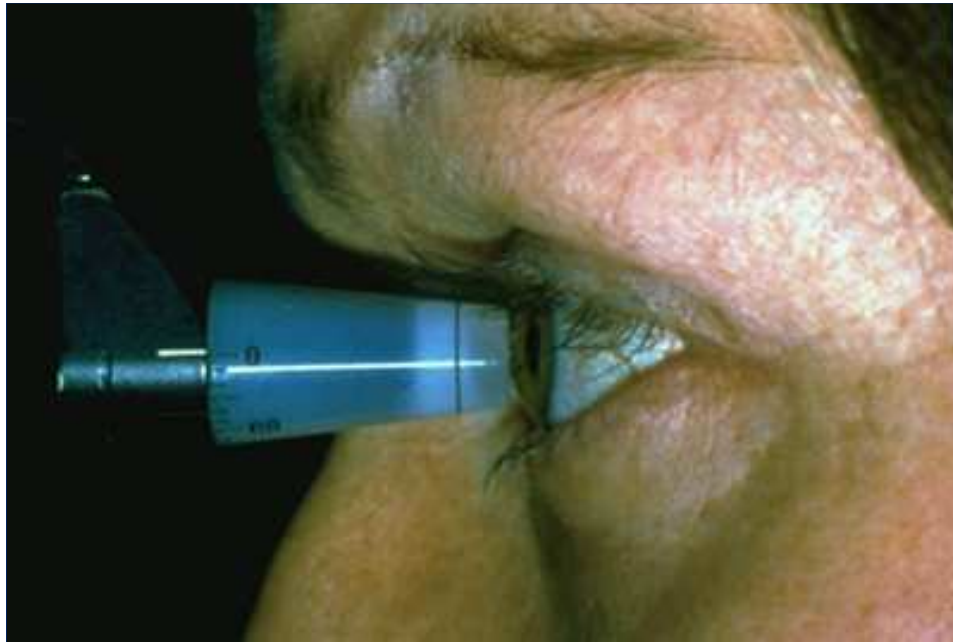


Too Large



Endpoint



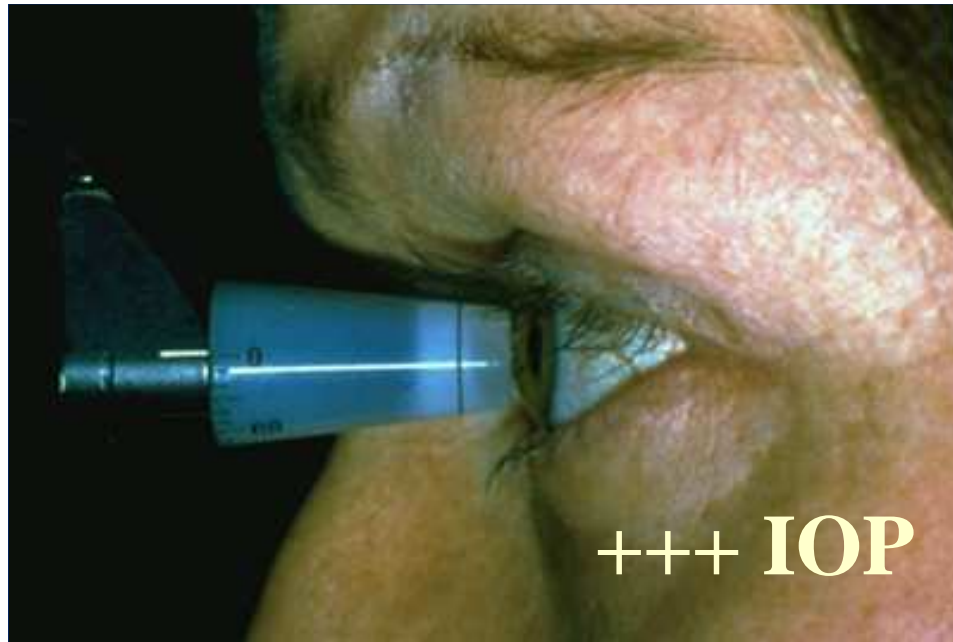


Create the equal semicircles.

7. Prolonged corneal contact or repeated applanation on the same eye within a period of several minutes may cause a 2 to 3 mm Hg decrease in pressure.<sup>13</sup> Prolonged corneal contact may also result in corneal abrasions.

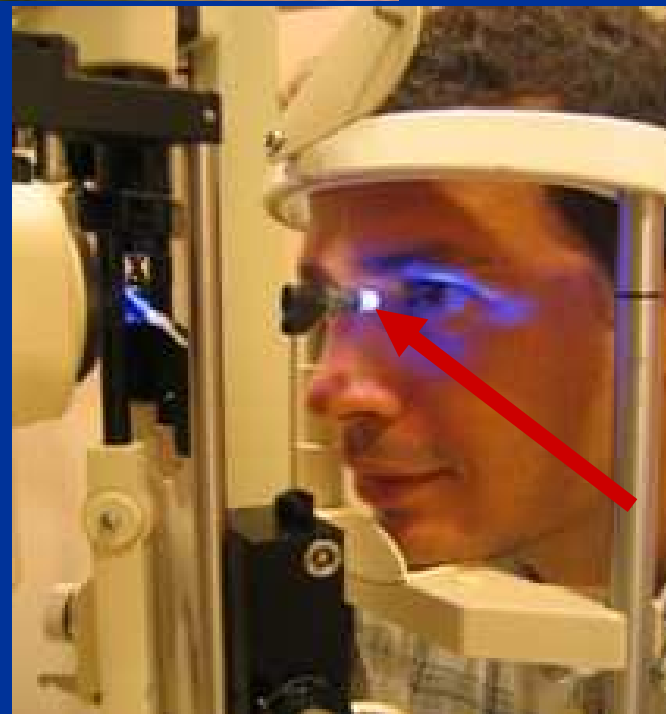


**-2-3 mmHg**



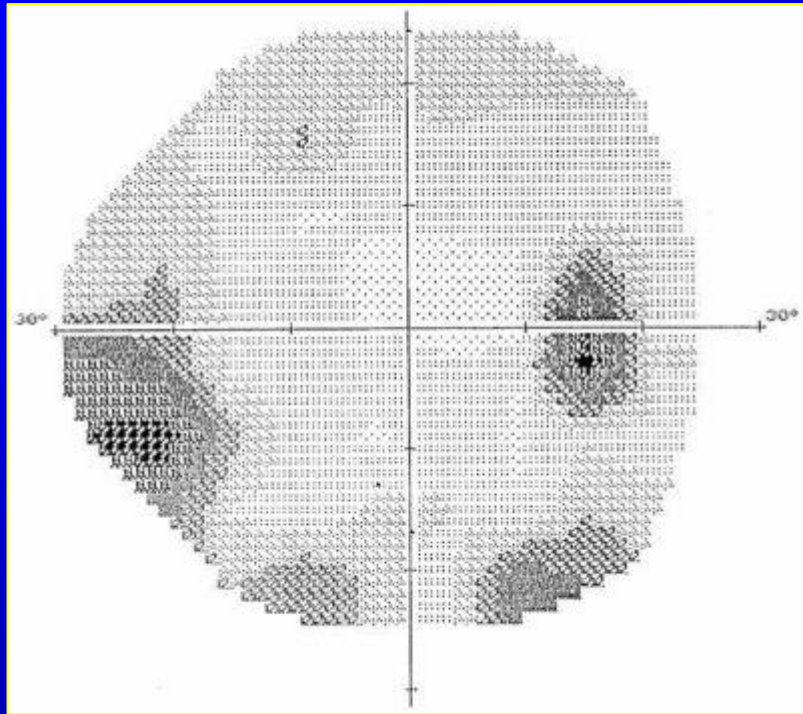
+++ IOP

6. An elevated IOP will be produced when the tonometer tip is not centered on the cornea. Make sure that the two semicircles created by the tonometer head are equal in size. Slight movements of the head will significantly change the position of the tonometer tip. Adjust the slit lamp up or down to create the equal semicircles.

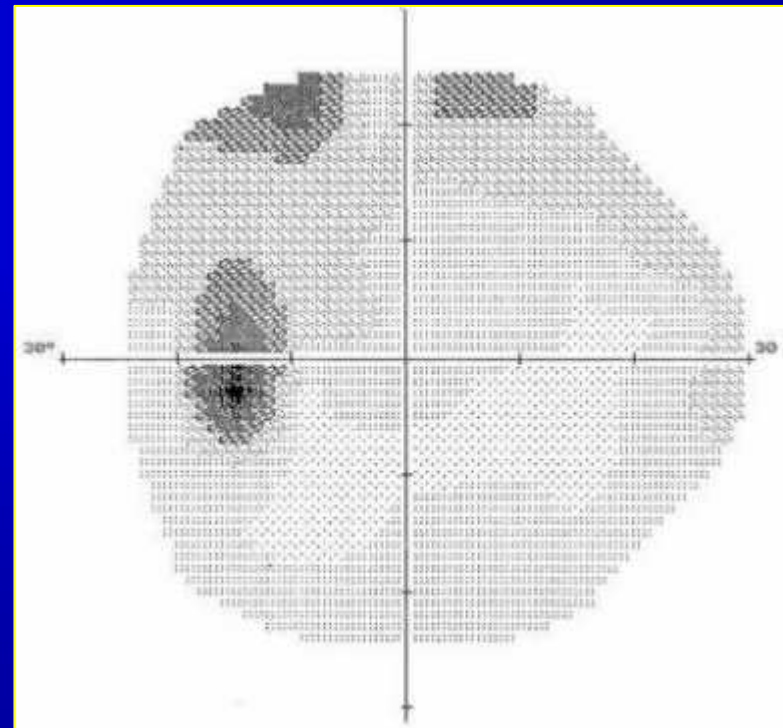


# 1. Difetti fascicolari

## a) "Salto" nasale



## b) Deformazioni della macchia cieca



## FENOTIPO ESCAVATO

# E



Classificazione di Nicoletta-Drance

“Disc appearance and risk factors in Glaucoma”

Can J Ophthalmol 2008; 43:322-7

**ESCAVAZIONE GENERALIZZATA**

# FENOTIPO FOCALE

Classificazione di Nicoletta-Drance, 2008

# F

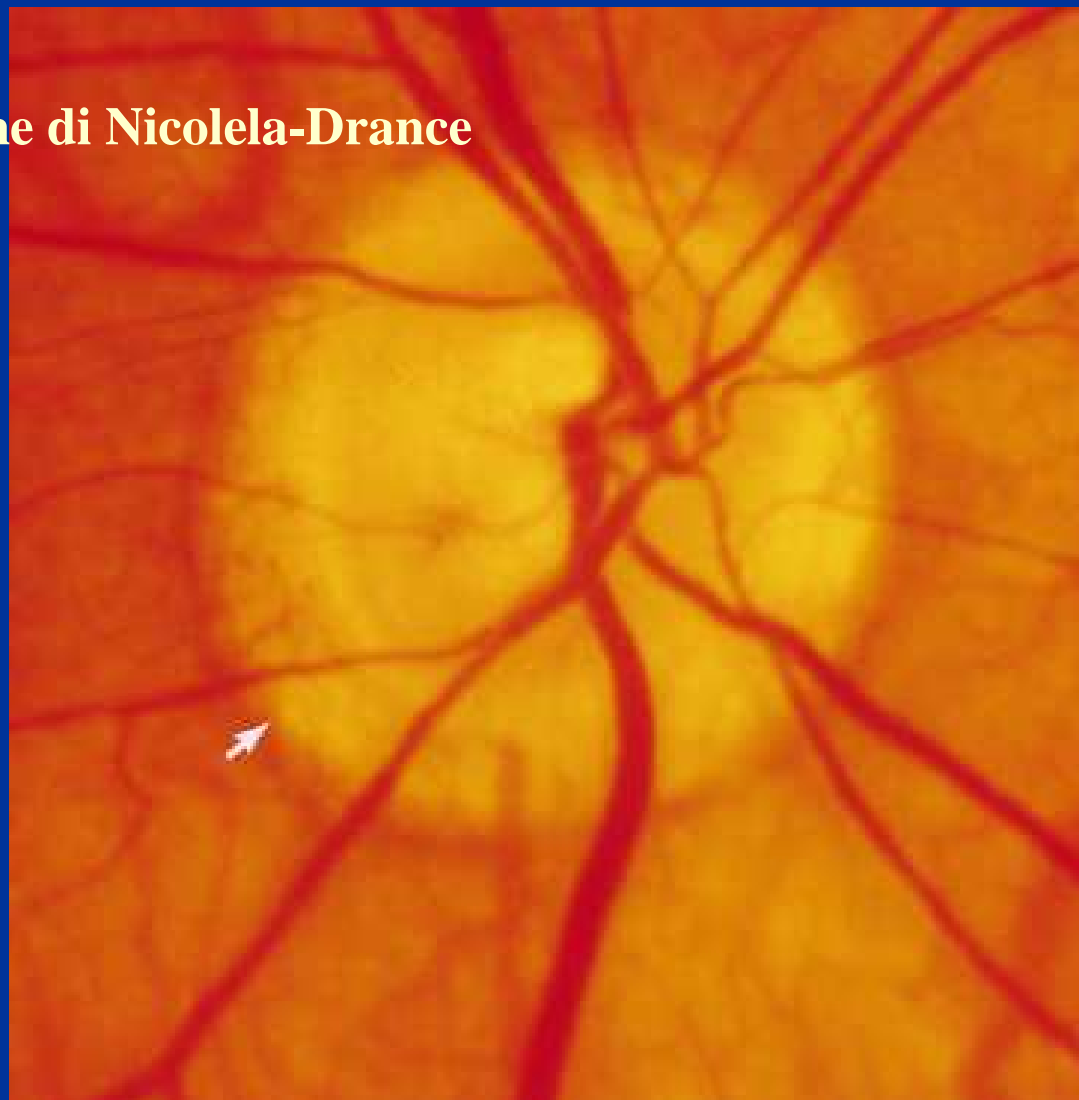


**ESCAVAZIONE FOCALE (NOTCH)**

## FENOTIPO SCLEROTICO

Classificazione di Nicoletta-Drance

S

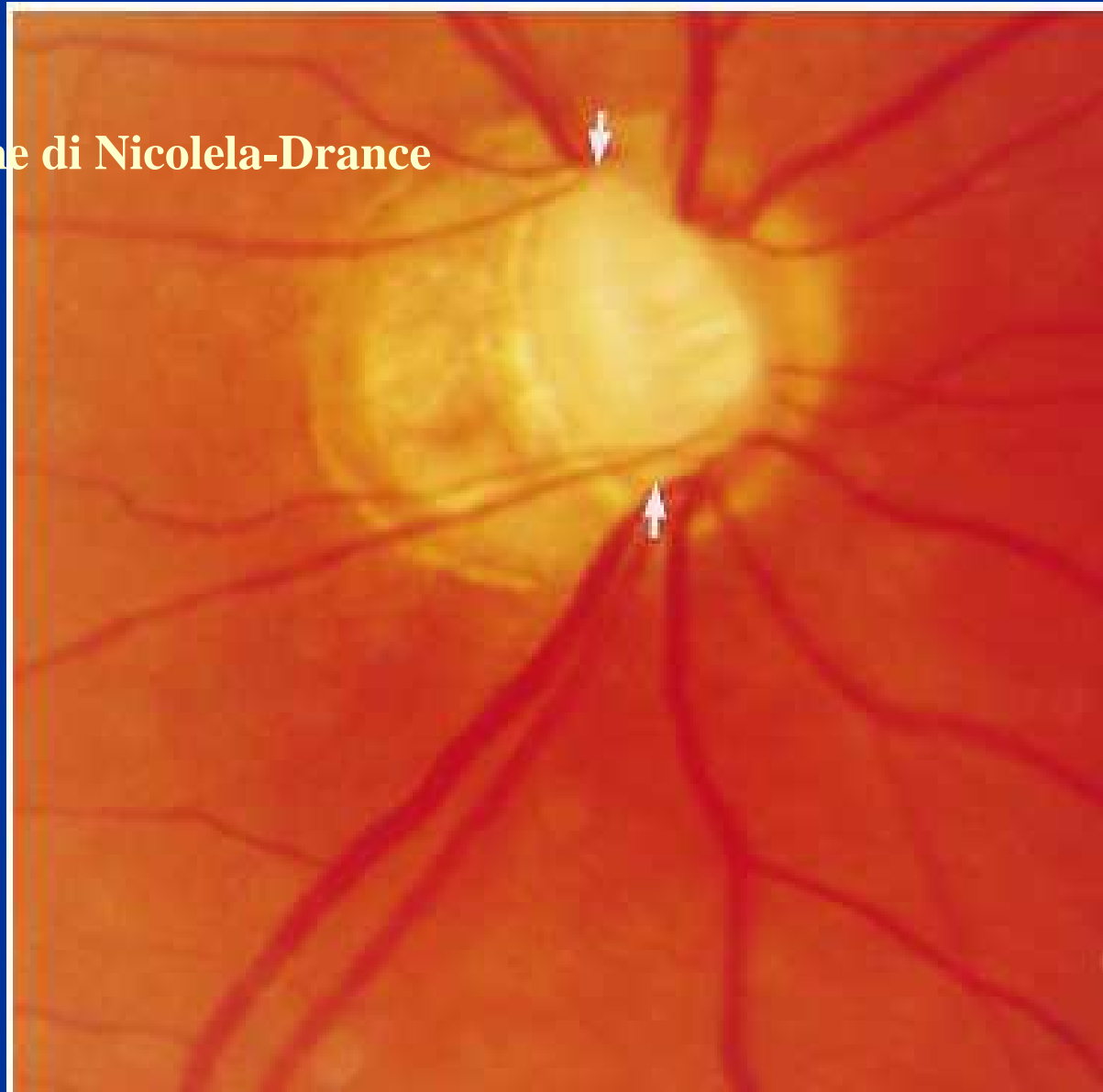


**PAPILLA OTTICA PALLIDA-ARTERIOLOSCLEROSI**

# FENOTIPO MIOPICO

Classificazione di Nicoletta-Drance

**M**



**CORIORETINOSI MIOPICA-DISVERSIONE PAPILLARE**

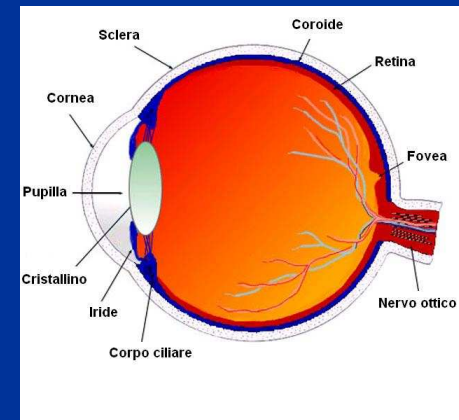
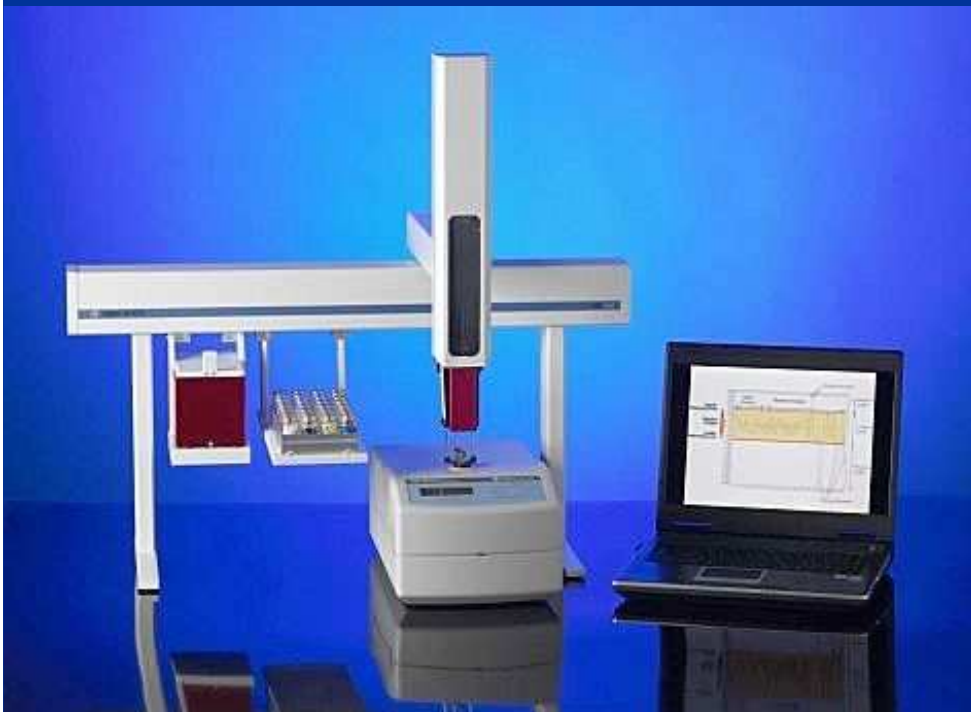
# FENOTIPO **NE**



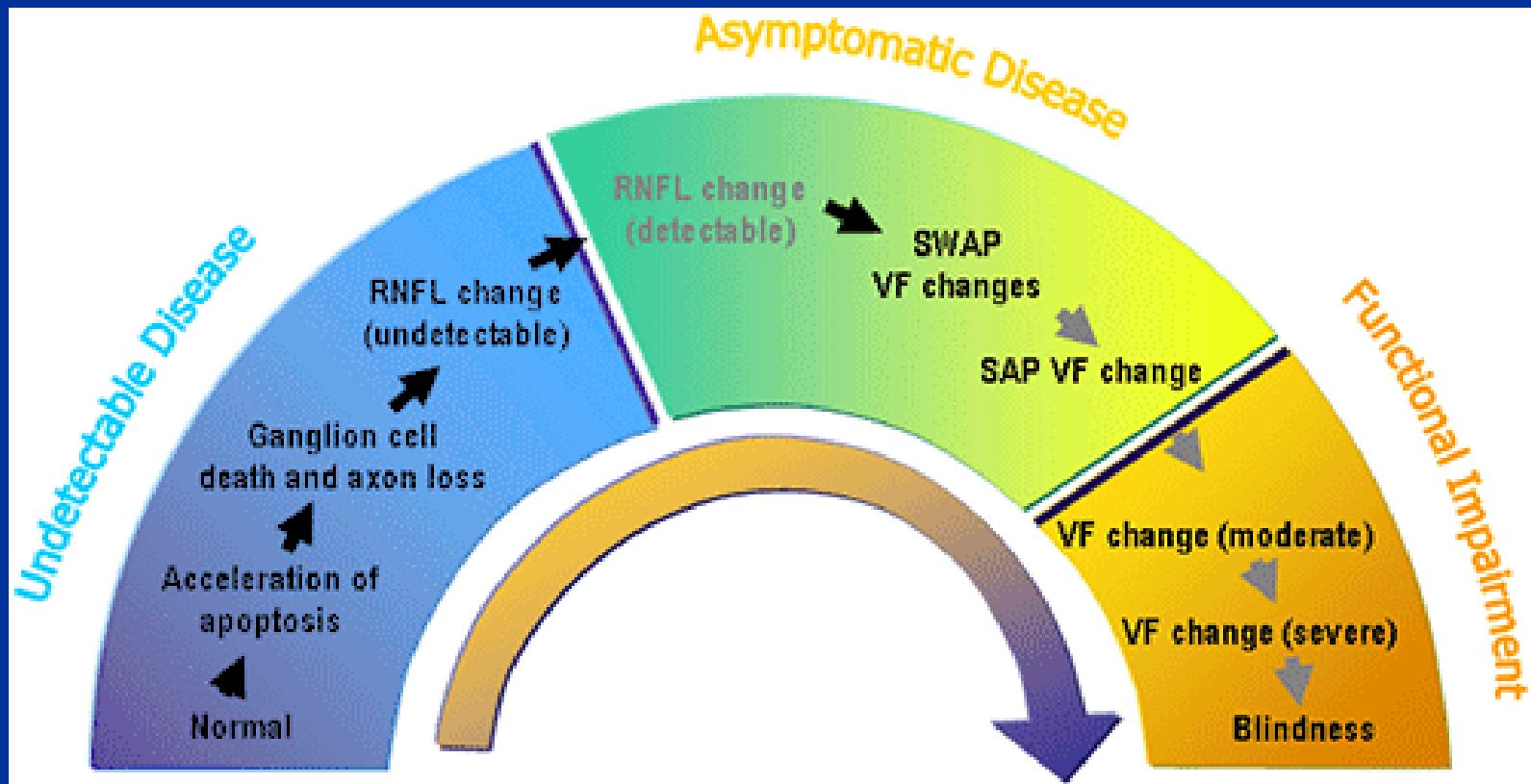
**PAPILLA OTTICA NON ESCAVATA-AFFOLLAMENTO ASSONALE**



# CANE DA TARTUFO NASO ELETTRONICO



# ➤ GLAUCOMA PREPERIMETRICO



$\lambda = 780\text{nm}$



GDX : acronimo indicante  
“diagnosi del glaucoma”

*Oftalmoscopio a scansione laser con un un ellissometro integrato che  
analizza la radiazione riflessa e misura indirettamente lo spessore  
dello strato delle fibre nervose retiniche*



Cristallo di calcite

### BIRIFRANGENZA:

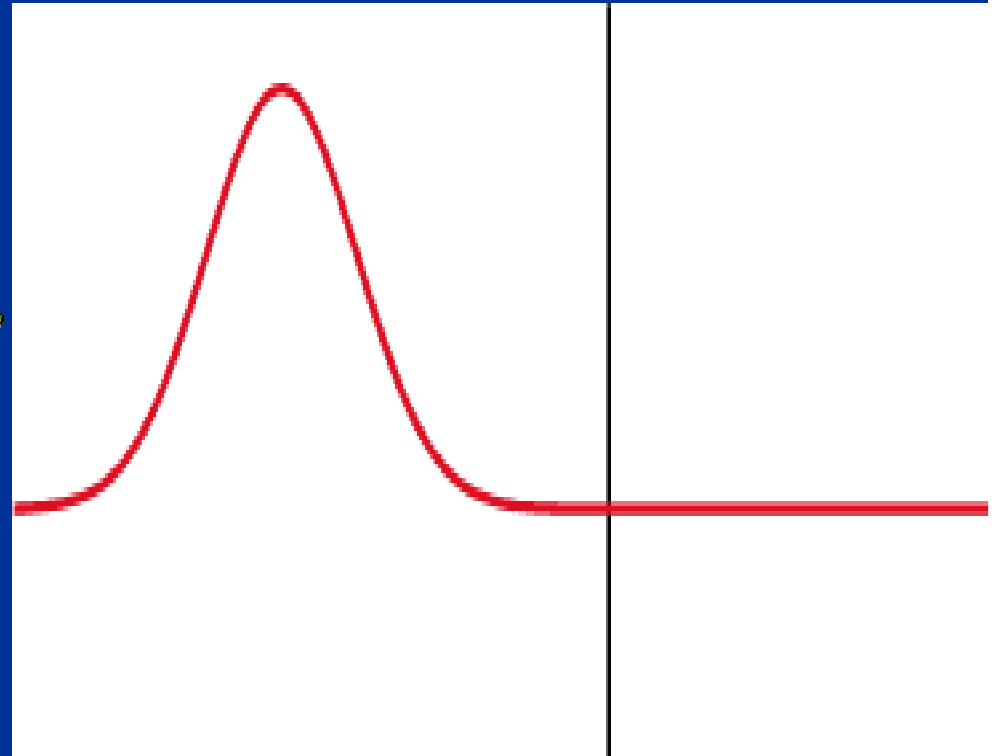
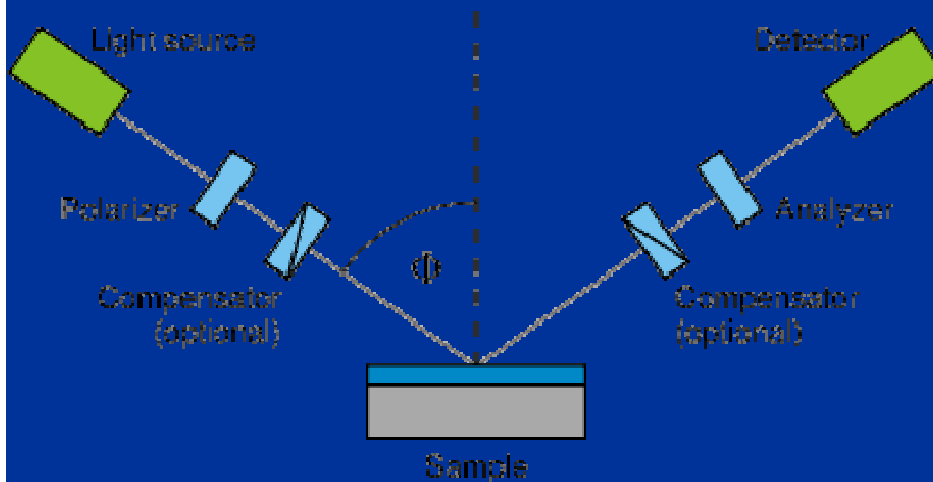
Un materiale polarizzante divide un'onda luminosa trasmessa o riflessa

in due componenti che viaggiano a differenti velocità e con diverse lunghezze d'onda e con una differenza di fase (RITARDO)



$$\rho = \frac{r_p}{r_s} = \tan(\Psi) e^{i\Delta}$$

Thus,  $\tan\Psi$  is the amplitude ratio upon reflection, and  $\Delta$  is the phase shift (difference).

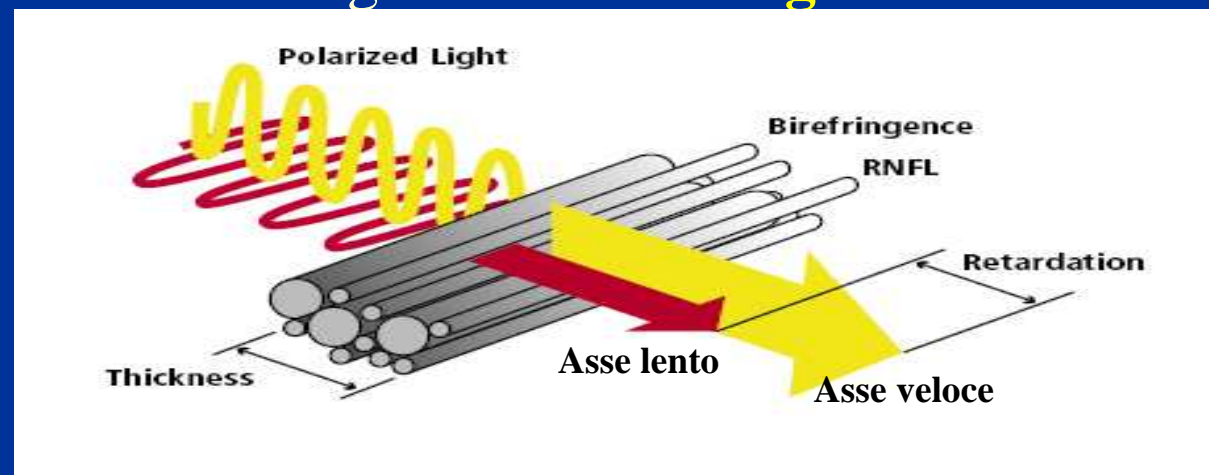


The exact nature of the polarization change is determined by the sample's properties (thickness, complex refractive index or dielectric function tensor). Although optical techniques are inherently diffraction limited, ellipsometry exploits phase information and the polarization state of light, and can achieve angstrom resolution

✓ Lo strato delle fibre nervose retiniche (RNFL) è costituito da fasci di assoni ordinatamente paralleli contenenti **microtubuli**, organuli intracelulari cilindrici con diametro più piccolo della lunghezza d'onda della luce



✓ I microtubuli parallelamente ed ordinatamente disposti diventano sorgente di **birifrangenza**



✓ La differenza di fase indotta dalla **birifrangenza** dello strato delle fibre nervose retiniche è funzione del suo **spessore**

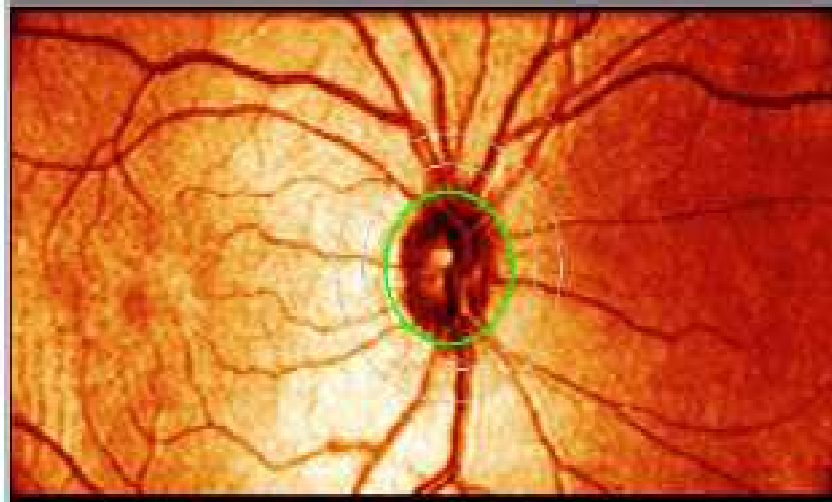
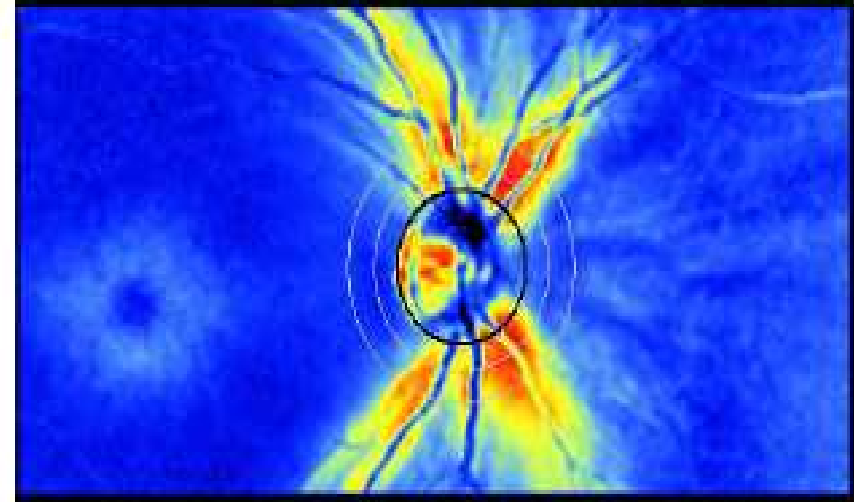


IMMAGINE DI RIFLETTANZA



*IMMAGINE DI RITARDO*

Dal momento che tutte le strutture birifrangenti dell'occhio umano determinano un cambiamento nella polarizzazione del raggio luminoso che le attraversa, il ritardo totale di un raggio proiettato sulla retina peripapillare sarà determinato non solo dalla birifrangenza dell'NFL ma anche dalla birifrangenza delle altre strutture. L'accuratezza delle misurazioni dipende quindi dalla possibilità di separare l'entità del ritardo determinata dall'NFL dal ritardo totale registrato. Per compensare il ritardo dovuto alla

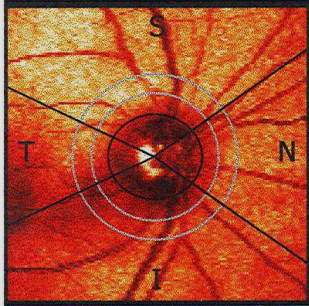
OD Destra

Q: 10 Operatore:  
H: 1961 µm V: 1675 µm  
Data: 08/08/07 11:57

OS Sinistra

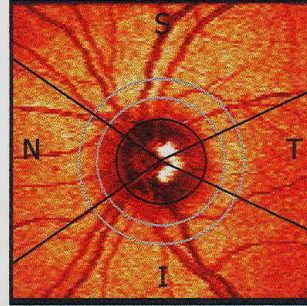
Q: 10 Operatore:  
H: 1768 µm V: 1675 µm  
Data: 08/08/07 11:57

Destra immagine del fondo

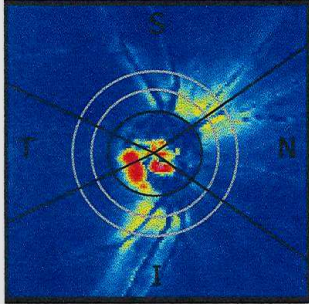


TSNIT Parametri	OD Valore	OS Valore
Media TSNIT	41.6	41.1
Media superiore	45.3	46.5
Media inferiore	43.5	42.8
Dev Stand TSNIT	14.6	13.8
Simmetria oculare	0.83	
NFI	44	55

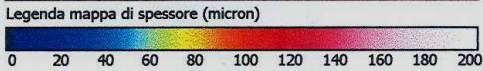
Sinistra immagine del fondo



Destra Mappa di spessore delle fibre nervose



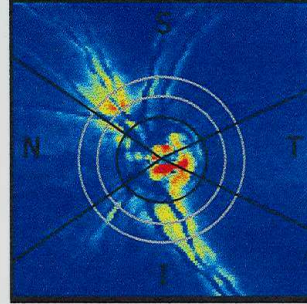
p>=5% p<5% p<2% p<1% p<0.5%



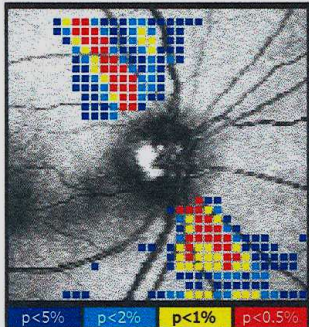
Impressione / Piano:

ccr 00 50g  
foculi x placca  
ipertensione sistolica  
diabete mellito  
tODx15 08/18  
Firma: *GIUSEPPE LAMBERTI*  
OF. ALMOLOGIA  
FERRARA  
Data: 8.08.07.

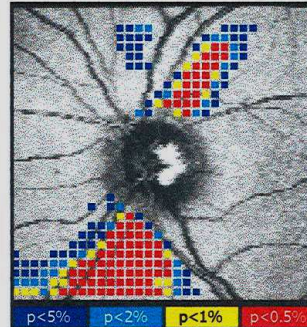
Sinistra Mappa di spessore delle fibre nervose



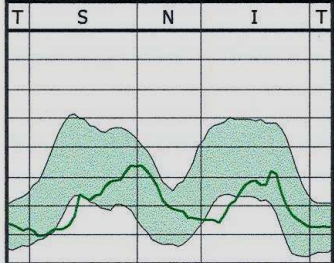
Destra mappa di deviazione



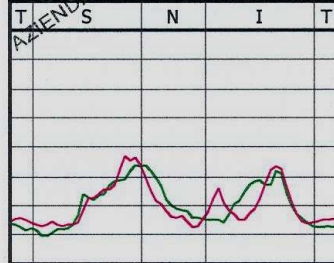
Sinistra mappa di deviazione



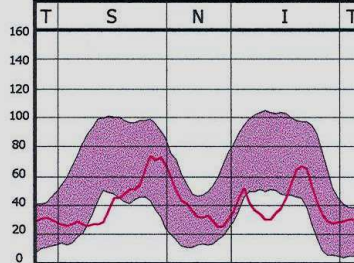
Destra strato fibre nervose



Entrambi strati fibre nervose



Sinistra strato fibre nervose



# RAPPORTO GERARCHICO MORFOFUNZIONALE

## DANNO STRUTTURALE



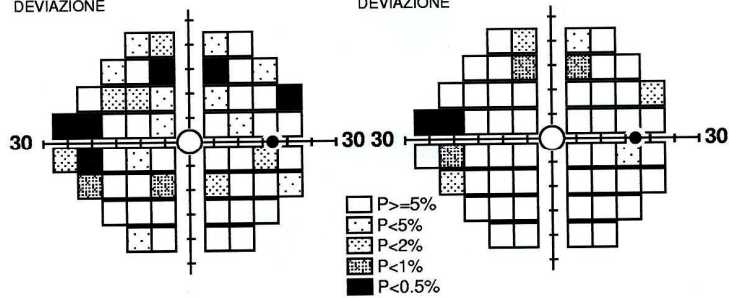
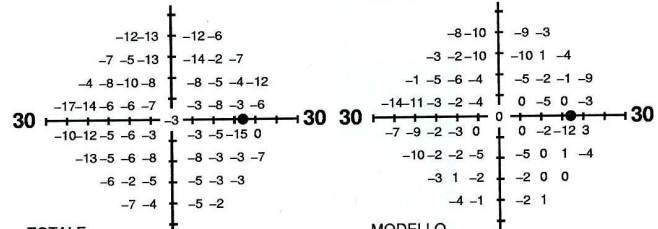
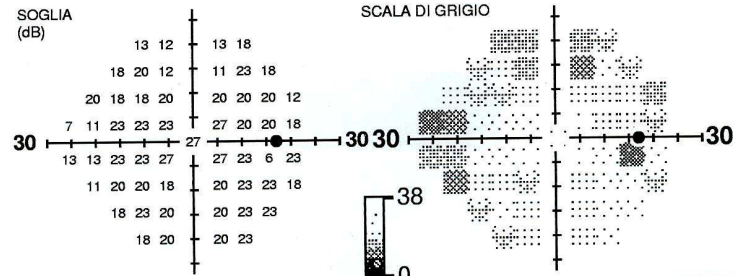
## DANNO FUNZIONALE

DURATA DEL TEST: 5:29  
 PUNTO DI FISSAZIONE: Centrale  
 ERRORI DI FISSAZIONE: 0/10 (0%)  
 ERRORI FALSI POSITIVI: 0/10 (0%)  
 ERRORI FALSI NEGATIVI: 0/6 (0%)

**Soglia 24-2 FDT**  
 VELOCITÀ TEST: NORMALE

DATA: 08-08-2007 14:00

DIAM. PUPILLA:  
 ACUITÀ VISIVA:  
 RX:



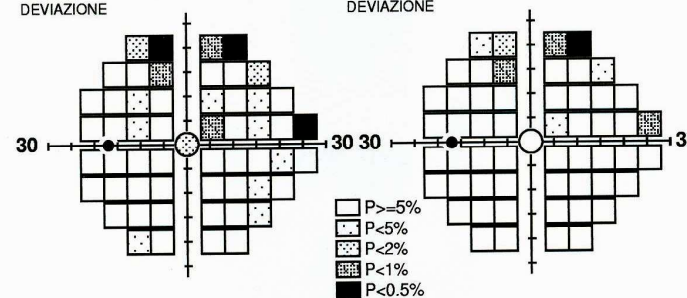
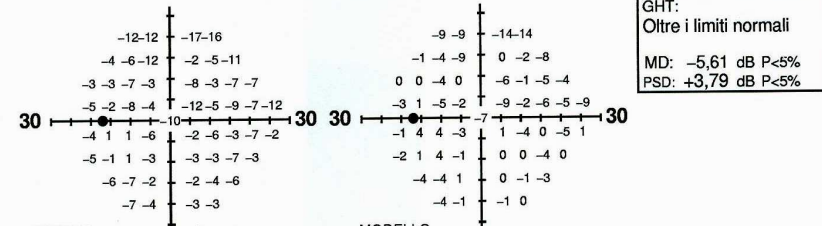
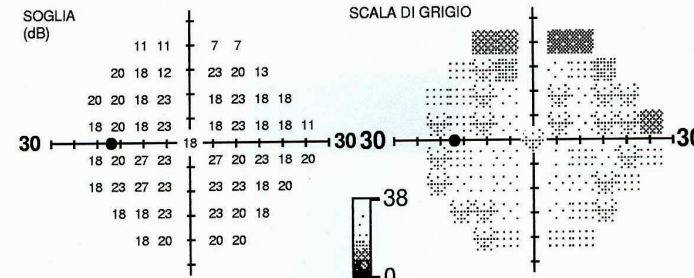
NOTE:

DURATA DEL TEST: 5:34  
 PUNTO DI FISSAZIONE: Centrale  
 ERRORI DI FISSAZIONE: 1/10 (10%)  
 ERRORI FALSI POSITIVI: 0/10 (0%)  
 ERRORI FALSI NEGATIVI: 0/6 (0%)

**Soglia 24-2 FDT**  
 VELOCITÀ TEST: NORMALE

DATA: 08-08-2007 14:00

DIAM. PUPILLA:  
 ACUITÀ VISIVA:  
 RX:



NOTE:

# FENOTIPO E

Servizio Diagnostica Computerizzata del Glaucoma AZ USL FE

Servizio di Diagnostica Computerizzata del Glaucoma AZ USL FE

SW: M02.03.01[0]  
 S06.02.03[0]  
 P06.02.03[0]  
 ID test: 10.20061010795 (1)

Humphrey Matrix con  
 Welch Allyn Frequency Doubling Technology



SW: M02.03.01[0]



GLAUCOMA  
 PREPERIMETRICO



## HRT: Heidelberg retinal tomography

E' una nuova tecnica che esegue ed analizza  
immagini tridimensionali del segmento  
posteriore

Praticamente è un'oftalmoscopia confocale  
L'immagine è acquisita da uno scanner laser  
con lunghezza d'onda di 670 nm

Con l'HRT è possibile ottenere una serie  
di parametri quantitativi relativi  
prevalentemente alla papilla ottica

HRT II Examination results for: poletti I. 24/11/2006 (0) OS Baseline Exam

Contour Color Coordinates Details Parameters Progression Print Export Data Align View

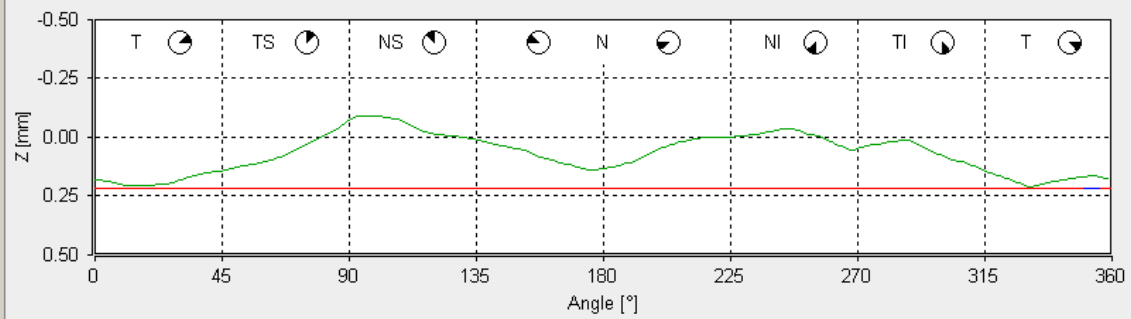
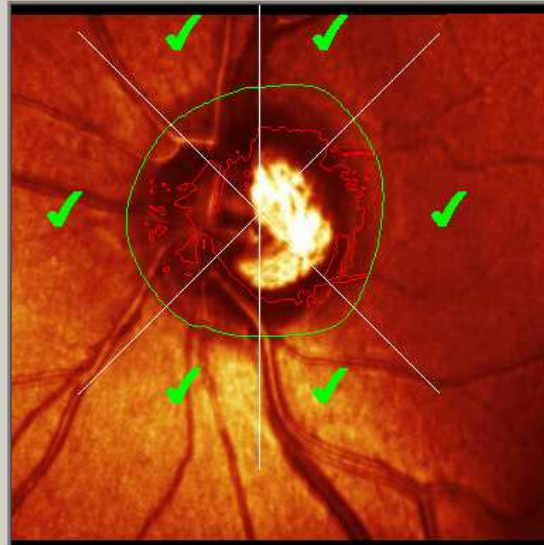
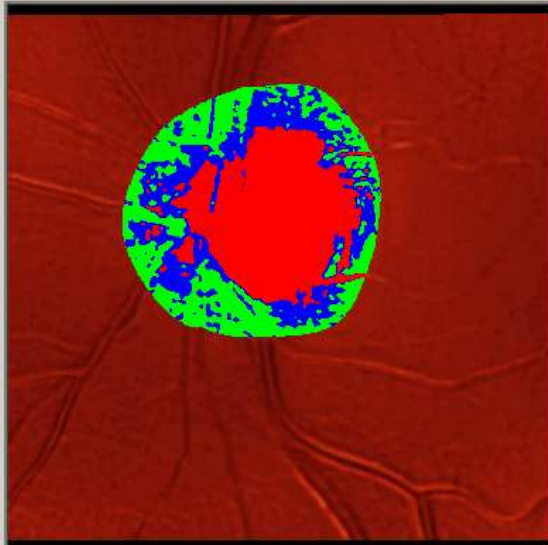
Patient: Std. Dev.: 19 µm Conf. Intvl.: 59 µm

HRT

0



Topo



OS

Lightbox:

Press F1 for help.

Heidelberg Eye Explorer  
 HRT II Regression Analysis: poletti I. 24/11/2006 (0) OS Baseline Exam

Rim Area	global	temporal	tmp/sup	tmp/inf	nasal	nsl/sup	nsl/inf
actual [mm <sup>2</sup> ]	2.089	0.354	0.260	0.224	0.636	0.310	0.305
predicted [mm <sup>2</sup> ]	2.721	0.515	0.358	0.345	0.832	0.325	0.378
low 95.0% CI lim. [mm <sup>2</sup> ]	1.985	0.240	0.223	0.219	0.626	0.238	0.299
low 99.0% CI lim. [mm <sup>2</sup> ]	1.790	0.188	0.191	0.188	0.571	0.216	0.277
low 99.9% CI lim. [mm <sup>2</sup> ]	1.580	0.140	0.159	0.158	0.511	0.192	0.253
actual/disc area [%]	57.4	40.1	52.7	47.3	67.6	75.4	70.0
predicted [%]	74.8	58.3	72.6	72.7	88.4	79.0	86.9
low 95.0% CI lim. [%]	54.6	27.2	45.3	46.1	66.5	58.0	68.8
low 99.0% CI lim. [%]	49.2	21.3	38.7	39.7	60.6	52.6	63.8
low 99.9% CI lim. [%]	43.5	15.9	32.2	33.3	54.3	46.7	58.3

Moorfields regression classification: **within normal limits (\*)**.

Refraction: -3.00 dpt  
 Disc area: 3.64 mm<sup>2</sup>

(\*) Attention: Results are based on normal eyes with refractive error of less than 6 diopters and optic disc sizes between 1.2 mm<sup>2</sup> and 2.8 mm<sup>2</sup>.

Lightbox:

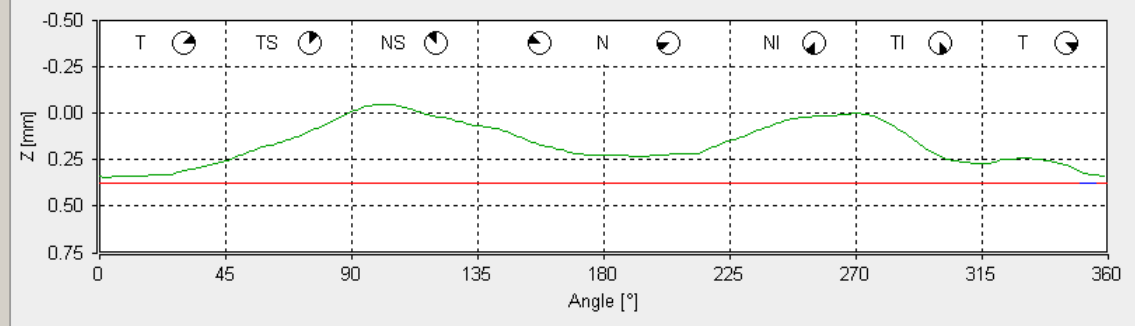
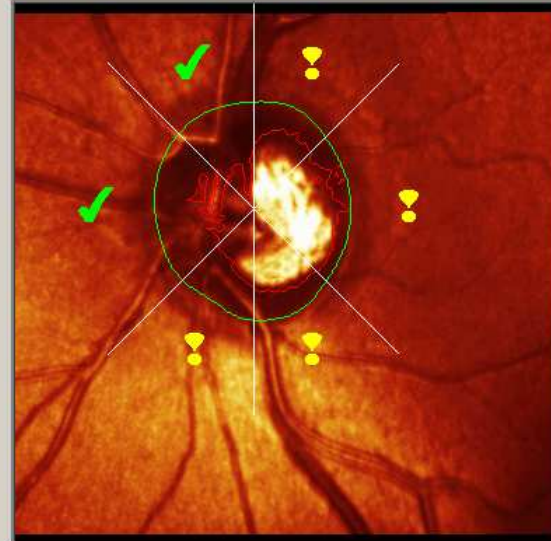
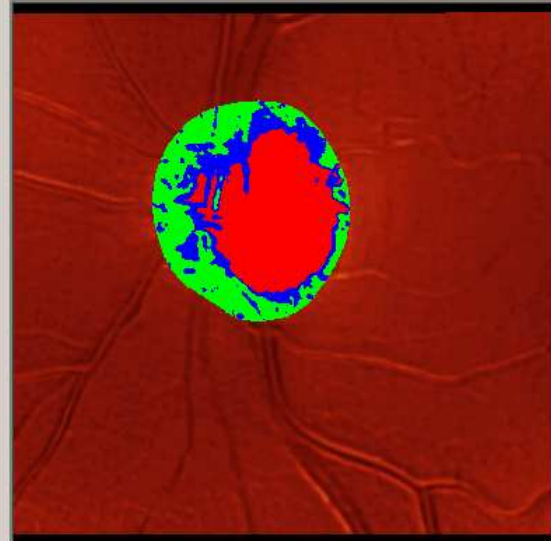
Press F1 for help.

Start | Disco rimovibile (F:) | Heidelberg Eye Explorer | 2.00

**ARTEFATTO**

Patient: Std. Dev.: 19 µm Conf. Intvl.: 59 µm

HRT  
0 OS



Lightbox:

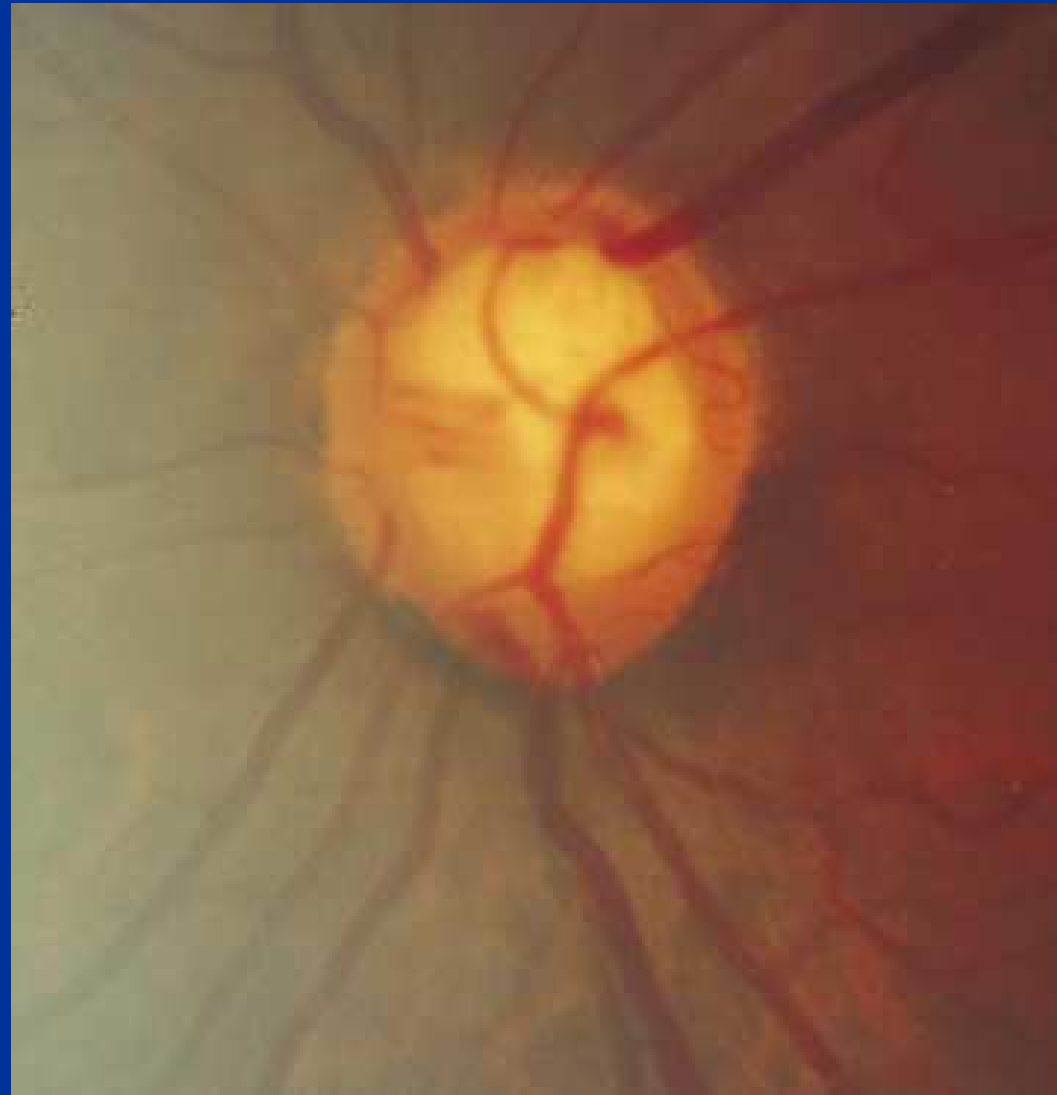


## FENOTIPO ESCAVAZIONE GENERALIZZATA

➤ GDX

➤ HRT ?

➤ OCT



➤ CVC !

➤ CT !

- **29 anni, sesso femminile**
- **Ipotiroidismo diagnosticato da poco tempo**
- **IOP= 22 mmHg OO**
- **C/D vert. 0.7**
- **NO FAM.**



- **Pachimetria corneale centrale**  
**ODX 642 micron OS 638 micron**

**FENOTIPO F**

# OCT: Optical Coherence Tomography



L' OCT è una tecnica diagnostica basata sull'analisi della riflessione di una radiazione semicoerente da parte del tessuto esaminato

DOB: 4/8/1978, ID: NA, Male  
IPOTIROIDISMO, OO 640 MICRON

Scan Type: Fast RNFL Thickness (3.4)  
Scan Date: 5/25/2007  
Scan Length: 10.87 mm

DDN: sabato 8 aprile 1978, Sesso: Femmina, Origine: Bianca

ID: 0533932067

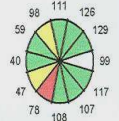
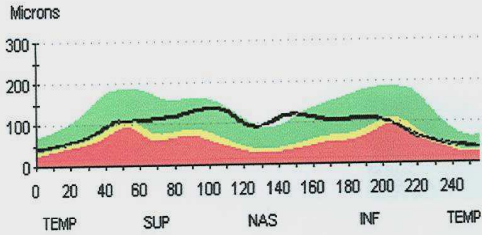
Data di stampa: 23/05/07 13.40

OD Destra

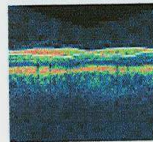
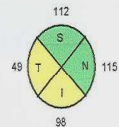
Q: 8 Operator:  
H: 1675 µm V: 1489 µm  
Data: 23/05/07 11:22

OS Sinistra

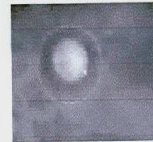
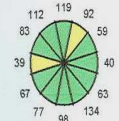
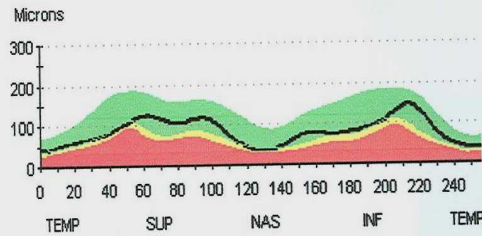
Q: 9 Operator:  
H: 1675 µm V: 1675 µm  
Data: 23/05/07 11:21



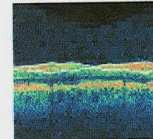
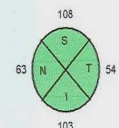
OD



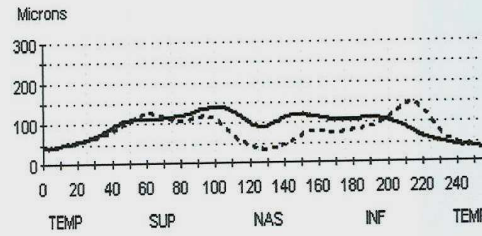
Signal Strength (Max 10) 7



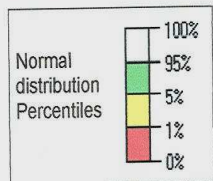
OS



Signal Strength (Max 10) 8

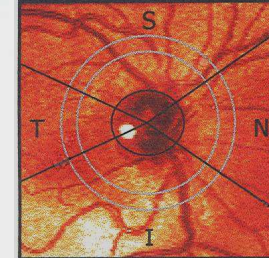


OD	Scans used	1, 2, 3
OS	Scans used	1, 2, 3

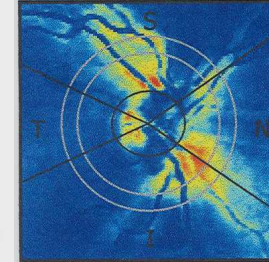


	OD (N=3)	OS (N=3)	OD-OS
lmax/Smax	0.81	1.17	-0.36
Smax/lmax	1.23	0.86	0.38
Smax/Tavg	2.80	2.30	0.49
lmax/Tavg	2.27	2.69	-0.43
Smax/Navg	1.18	1.98	-0.79
Max-Min	104.00	111.00	-7.00
Smax	136.00	124.00	12.00
lmax	110.00	145.00	-35.00
Savg	112.00	108.00	4.00
lavg	98.00	103.00	-5.00
Avg.Thick	93.34	81.90	11.44

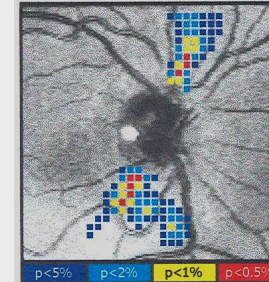
Destra immagine del fondo



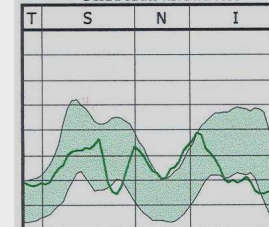
Destra Mappa di spessore delle fibre nervose



Destra mappa di deviazione



Destra strato fibre nervose



TSNIT Parametri	OD Valore	OS Valore
Media TSNIT	48.3	54.0
Media superiore	53.4	67.4
Media inferiore	44.4	59.1
Dev Stand TSNIT	13.8	27.1
Simmetria oculare	0.56	
NFI	25	19

p>=5% p<5% p<2% p<1% p<0.5%

Legenda mappa di spessore (micron)

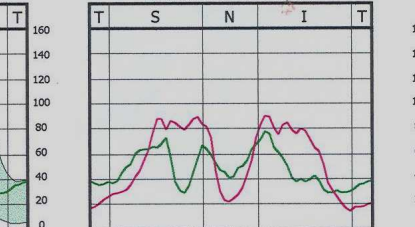


Impressione / Piano:

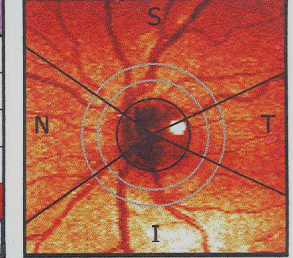


Firma: \_\_\_\_\_ Data: \_\_\_\_\_

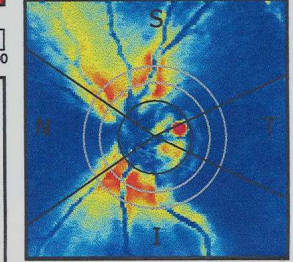
Entrambi strati fibre nervose



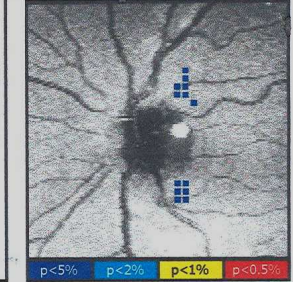
Sinistra immagine del fondo



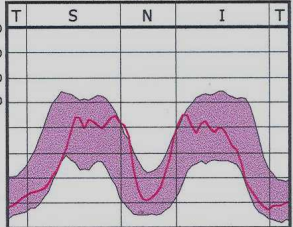
Sinistra Mappa di spessore delle fibre nervose



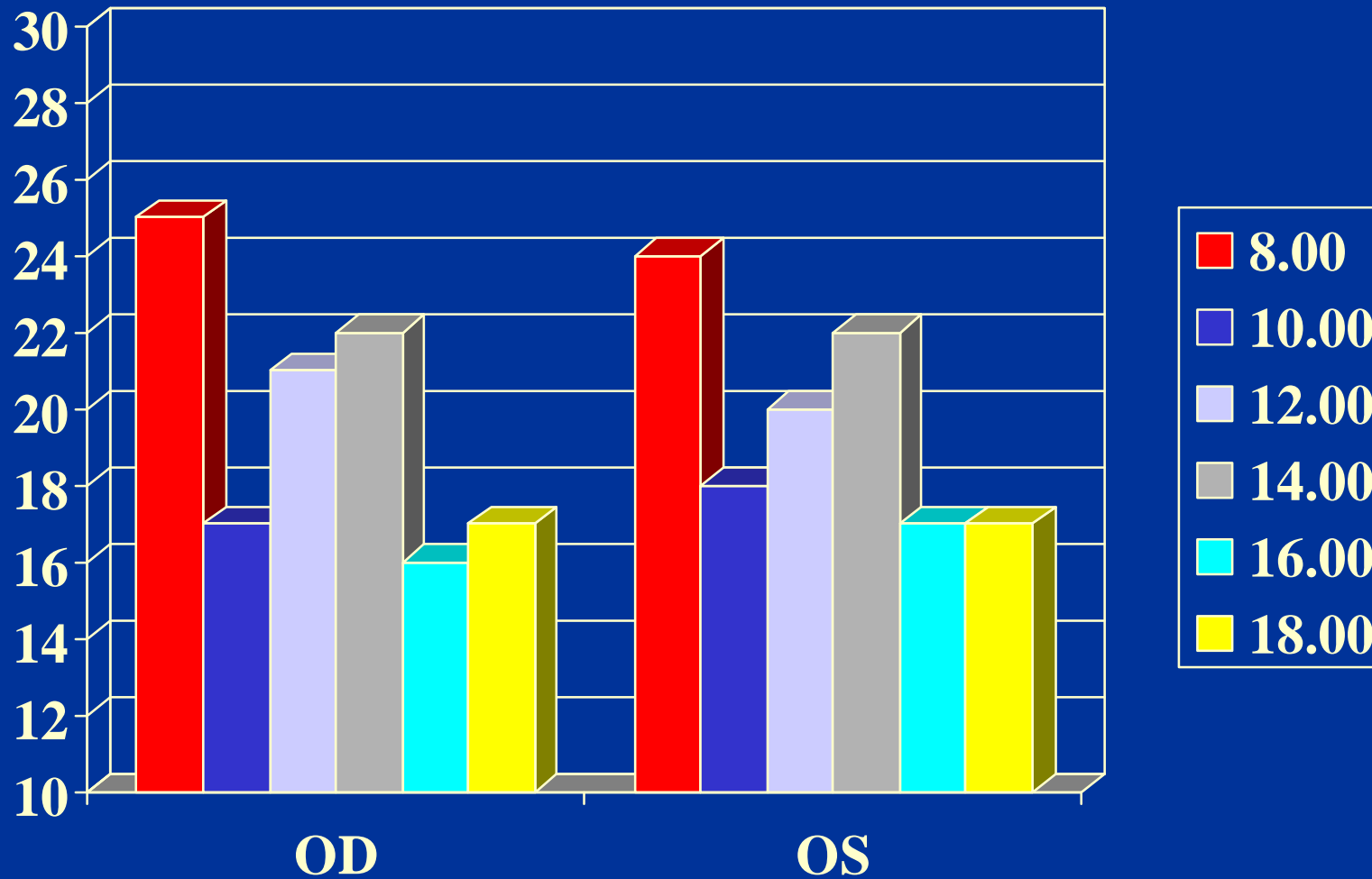
Sinistra mappa di deviazione



Sinistra strato fibre nervose



# CASO FENOTIPO F





**FENOTIPO F**

## FENOTIPO ESCAVAZIONE FOCALE

➤ GDX !!

➤ HRT !!

➤ OCT !!



➤ CVC !

➤ CT!

VIVIANA NARDI

DDN: lunedì 3 gennaio 1955, Sesso: Femmina, Origine: Bianca

ID: 3487397818

Data di stampa: 03/09/08 12.12

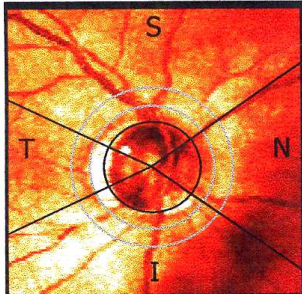
OD Destra

Q: 9 Operatore:  
H: 1954 µm V: 1861 µm  
Data: 03/09/08 12:11

OS Sinistra

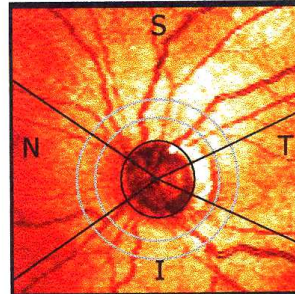
Q: 9 Operatore:  
H: 1489 µm V: 1582 µm  
Data: 03/09/08 12:11

Destra immagine del fondo

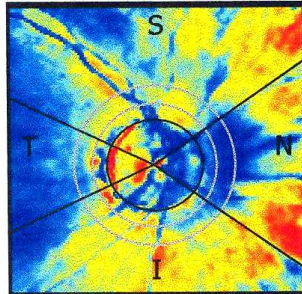


TSNIT Parametri	OD Valore	OS Valore
Media TSNIT	60.9	54.1
Media superiore	67.2	70.0
Media inferiore	71.5	63.8
Dev Stand TSNIT	16.3	22.1
Simmetria oculare	0.69	
NFI	27	24

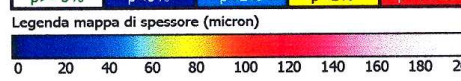
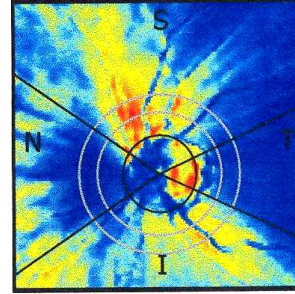
Sinistra immagine del fondo



Destra Mappa di spessore delle fibre nervose



Sinistra Mappa di spessore delle fibre nervose



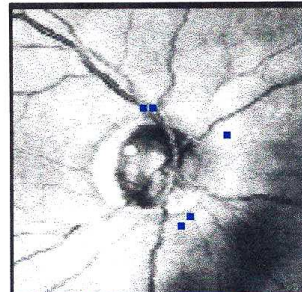
Impressione / Piano:

**BACKSCATTERING  
SCLERALE  
EFFETTO FINESTRA**

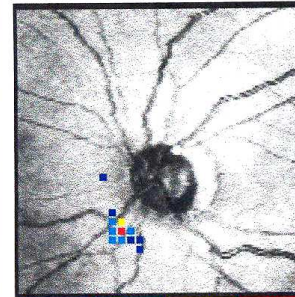
**FN**

Firma: \_\_\_\_\_ Data: \_\_\_\_\_

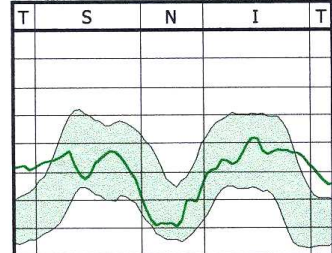
Destra mappa di deviazione



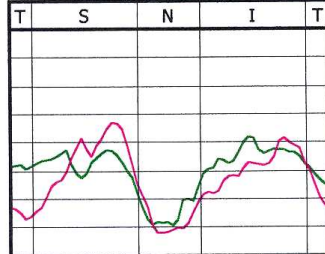
Sinistra mappa di deviazione



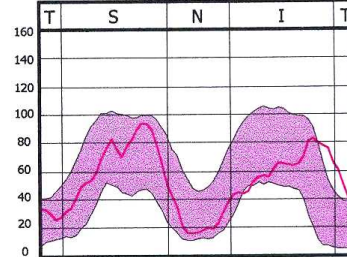
Destra strato fibre nervose



Entrambi strati fibre nervose



Sinistra strato fibre nervose



# Fenotipo S

## ELEVATA QUALITA' DELL'IMMAGINE IN PRESENZA DI ARTEFATTO

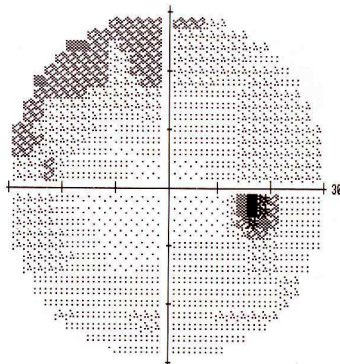
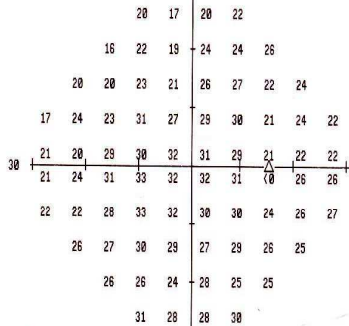
MONITOR FISSAZIONE: GAZE/BLINDSPOT  
 MIRA FISSAZIONE: CENTRALE  
 PERDITA DI FISSAZIONE: 1/18  
 ERRORI FALSI POS: 6 %  
 ERRORI FALSI NEG: 12 %  
 DURATE ESAME: 07:12

STIMOLO: III, BIANCO  
 SFONDO: 31.5 ASB  
 STRATEGIE: SITRA-STANDARD

DIAMETRO PUPILLARE:  
 ACUITA VISIVA:  
 RX: -4.00 DS DC X

DATA: 03-09-2008  
 ORA: 11:00  
 ETÀ: 53

FOVER: 36 DB



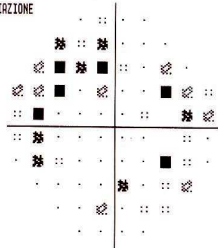
-5	-7	-4	-2						
-11	-5	-8	-3	-3	0				
-7	-9	-6	-9	-4	-2	-6	-4		
-10	-5	-7	0	-4	-2	0	-9	-5	-7
-6	-9	-2	-2	0	-1	-3	-7	-7	
-7	-6	0	0	0	0	-1	-4	-3	
-4	-7	-3	1	-1	-2	-2	-7	-4	-3
-2	-3	0	-2	-5	-2	-4	-5		
-2	-3	-5	-2	-5	-4				
4	0	0	1						

-5	-7	-3	-1						
-11	-5	-8	-3	-2	0				
-7	-9	-6	-8	-3	-2	-6	-3		
-9	-5	-7	0	-4	-2	0	-8	-5	-6
-5	-9	-2	-1	0	-1	-3	-7	-6	
-6	-6	0	1	0	0	-1	-4	-3	
-4	-6	-3	1	0	-2	-1	-6	-3	-3
-2	-3	0	-2	-4	-1	-4	-5		
-1	-3	-5	-1	-4	-4				
5	0	0	1						

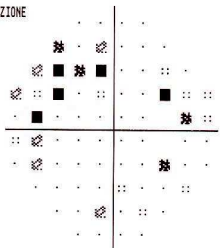
GHT  
 FUORI DAI LIMITI NORMALI

MD -3.23 DB P < 2%  
 PSD 3.33 DB P < 5%

TOTAL  
 DEVIAZIONE



MODELLO  
 DEVIAZIONE



:: < 5%  
 ☼ < 2%  
 ☼ < 1%  
 ■ < 0.5%

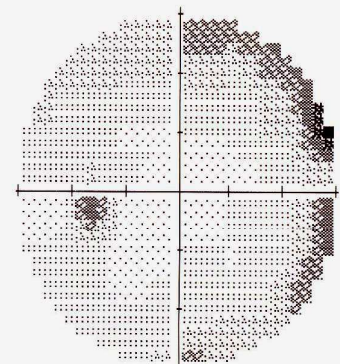
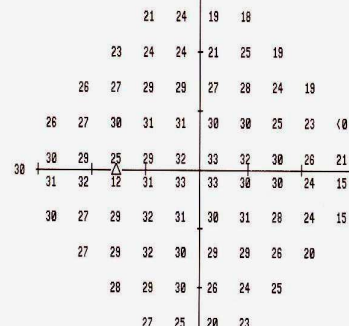
MONITOR FISSAZIONE: GAZE/BLINDSPOT  
 MIRA FISSAZIONE: CENTRALE  
 PERDITA DI FISSAZIONE: 1/18  
 ERRORI FALSI POS: 0 %  
 ERRORI FALSI NEG: 2 %  
 DURATE ESAME: 06:51

STIMOLO: III, BIANCO  
 SFONDO: 31.5 ASB  
 STRATEGIE: SITRA-STANDARD

DIAMETRO PUPILLARE:  
 ACUITA VISIVA:  
 RX: -5.00 DS DC X

DATA: 03-09-2008  
 ORA: 11:10  
 ETÀ: 53

FOVER: 37 DB



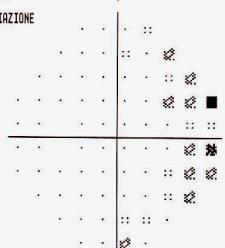
-3	0	-6	-7						
-3	-2	-4	-6	-3	-8				
-2	-1	0	-1	-3	-1	-4	-9		
-2	-2	0	0	-2	-1	-5	-6	-29	
1	0	-3	-1	0	-1	-2	-4	-6	
2	1	-1	0	0	-2	-2	-5	-12	
0	-3	-2	0	-1	-2	-1	-3	-5	-11
-3	-2	1	-2	-2	-2	-4	-8		
-1	0	0	-4	-5	-3				
-2	-3	-8	-4						

-3	0	-6	-7						
-3	-2	-3	-6	-3	-8				
-2	-1	0	-1	-2	-1	-4	-9		
-2	-2	0	0	-2	-1	-5	-6	-28	
1	0	-3	-1	0	-1	-2	-4	-6	
2	1	-1	0	0	-2	-2	-5	-12	
0	-3	-2	0	-1	-2	-1	-3	-5	-11
-3	-2	1	-2	-2	-2	-4	-8		
-1	0	0	-4	-5	-3				
-2	-3	-8	-4						

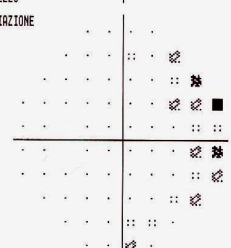
GHT  
 ENTRO I LIMITI NORMALI

MD -2.28 DB P < 5%  
 PSD 3.57 DB P < 2%

TOTAL  
 DEVIAZIONE



MODELLO  
 DEVIAZIONE



:: < 5%  
 ☼ < 2%  
 ☼ < 1%  
 ■ < 0.5%

FN

...med corneal compensation (VCC) technology). However, shortly after the introduction of the GDx VCC, several scans showing atypical retardation patterns (ARP) were observed in some patients. These scans show irregular patches of elevated retardation values that do not match the expected retardation based on the RNFL anatomic features. ARPs seem to result from poor signal-to-noise ratio as a consequence of light scattering in the eye.<sup>8</sup> To compensate for a decrease in signal, the instrument automatically increases the gain to augment the polarization signal, which paradoxically increases the noise from deeper structures such as the sclera. ARPs are more common in older and myopic eyes and in eyes with thin retinal pigment epithelium.<sup>9</sup> ARPs produce artifactual patchy areas of increased RNFL thickness in regions usually associated with decreased thickness, particularly in the temporal and nasal areas of the peripapillary retina.<sup>10</sup>

# The Relationship between Intraocular Pressure and Progressive Retinal Nerve Fiber Layer Loss in Glaucoma

*Felipe A. Medeiros, MD, PhD, Luciana M. Alencar, MD, Linda M. Zangwill, PhD, Pamela A. Sample, PhD, Robert N. Weinreb, MD*

## Enhanced compensation

cation, without requiring hardware changes.<sup>15</sup> In the ECC, a known birefringence bias is introduced into the measurement beam path to shift the measurement of total retardation into a more sensitive region of the curve of detection of polarization of the instrument. The bias retarder is formed by the combination of the variable corneal compensator and cornea. However, instead of completely canceling corneal birefringence, the retarder is adjusted so that the combination has retardance close to 55 nm and slow axis of polarization close to vertical. After image acquisition, the birefringent bias is removed mathematically, point-by-point, to yield the RNFL retardation values that are converted to RNFL thickness (in micrometers) using a fixed conversion factor.

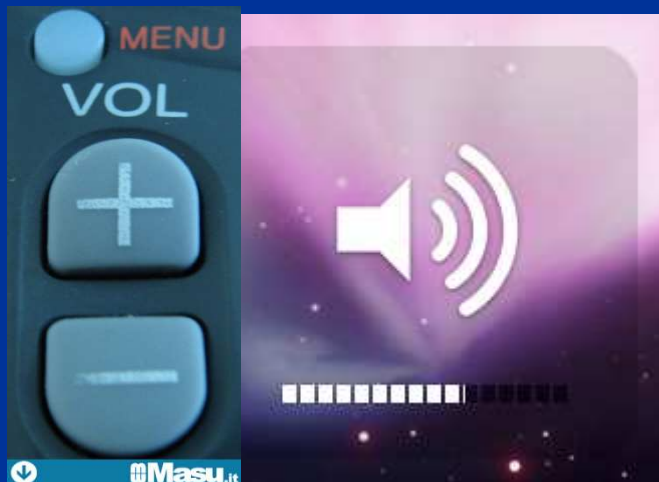


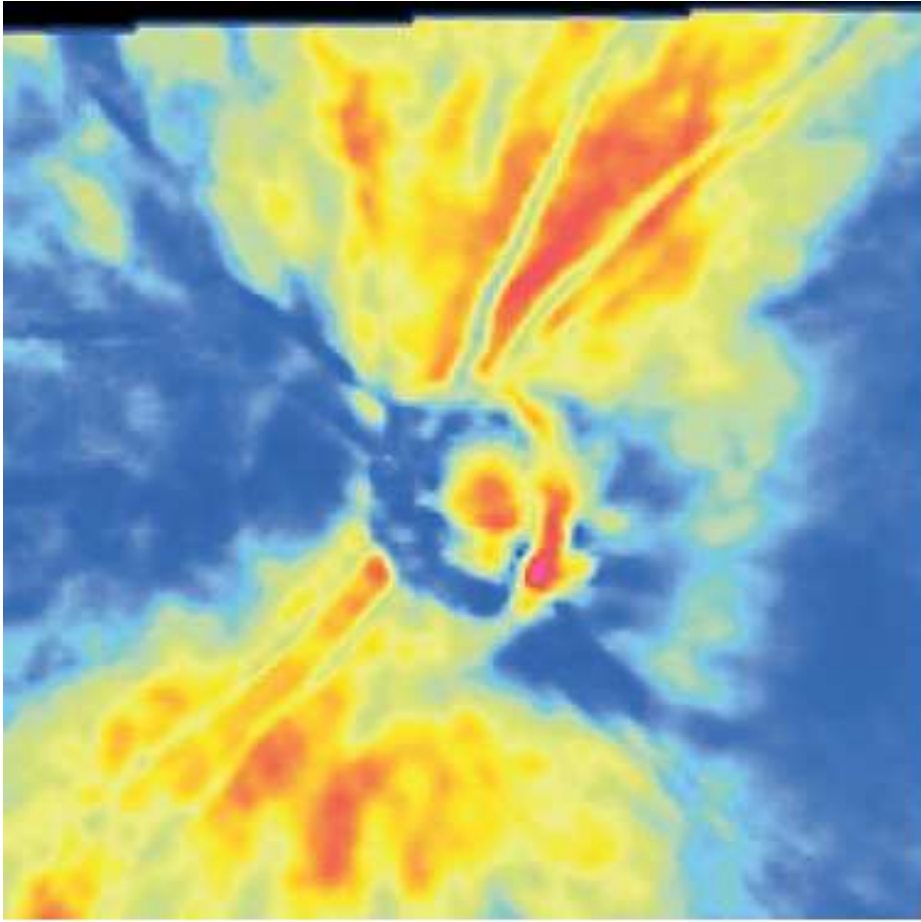
**S/R basso**

**ECC**

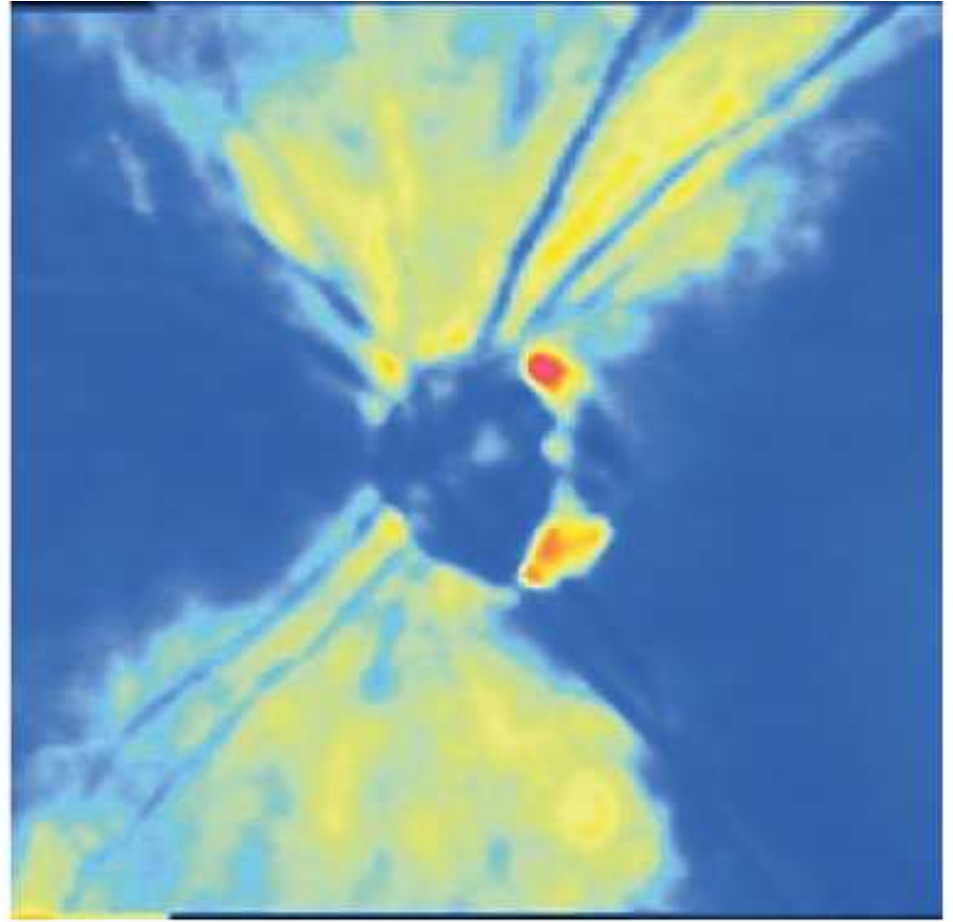


**VCC**





**GDX VCC**

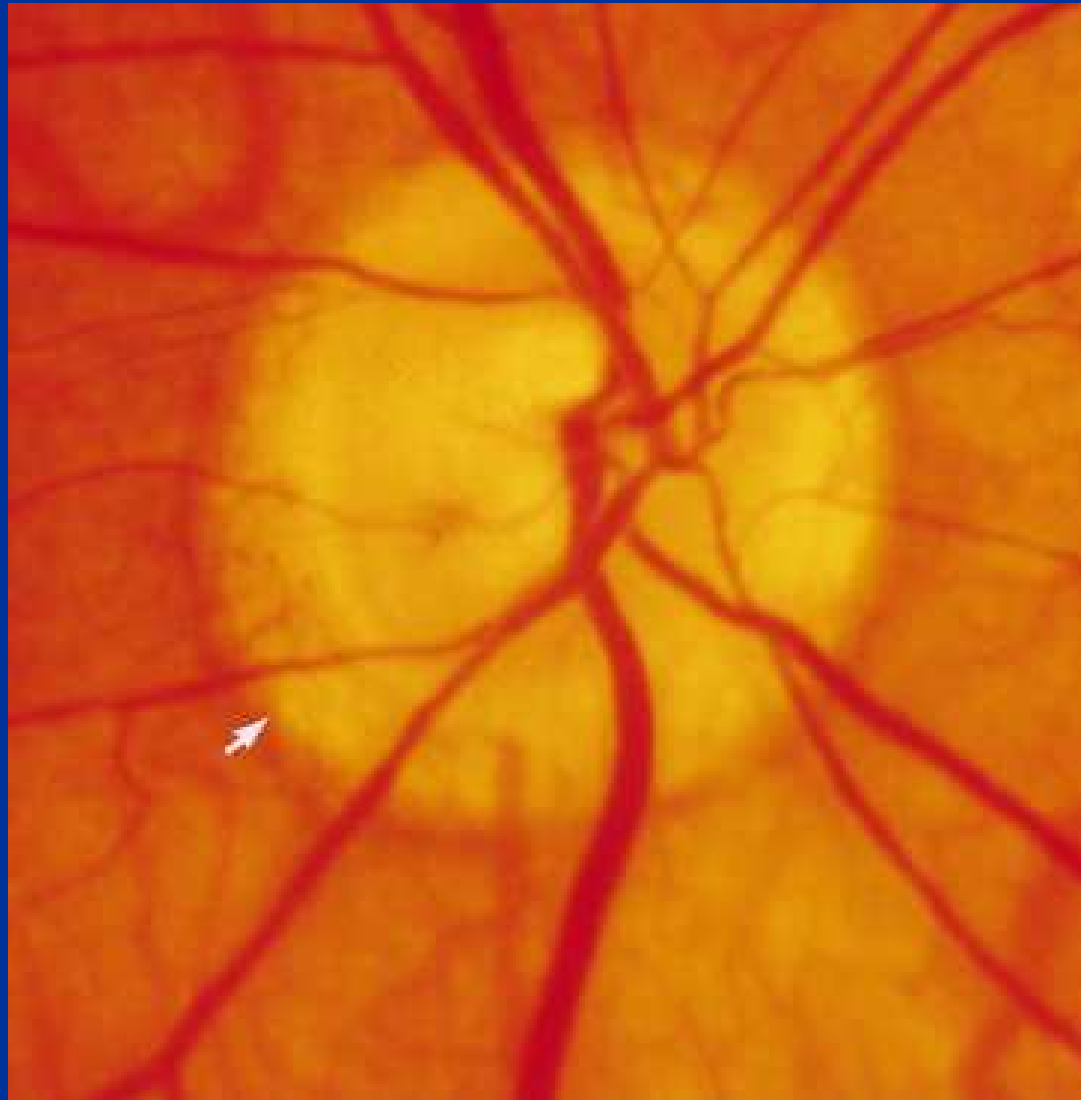


**GDX ECC**

**ENHANCED CORNEAL COMPENSATION**

## FENOTIPO SCLEROTICO SENILE

- GDX ??
- HRT ??
- OCT !

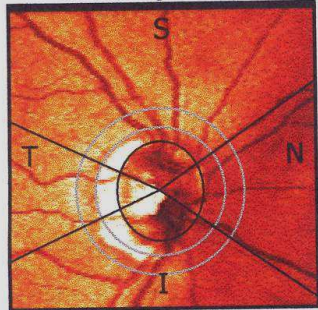


- CVC ?
- CT!!

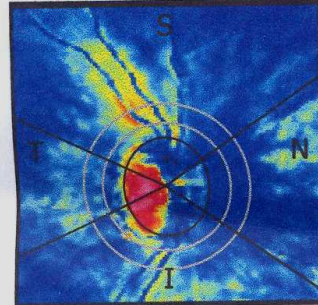
OD Destra

Q: 8 Operatore:  
H: 1675 µm V: 1954 µm  
Data: 14/10/09 11:02

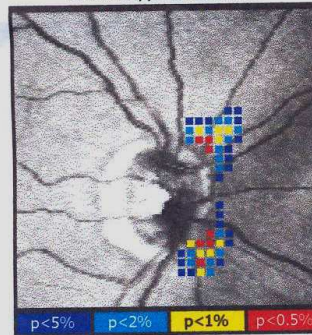
Destra immagine del fondo



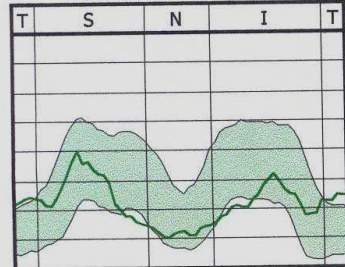
Destra Mappa di spessore delle fibre nervose



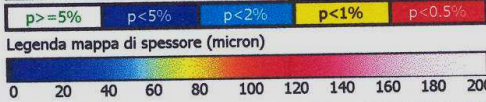
Destra mappa di deviazione



Destra strato fibre nervose



TSNIT	OD	OS
Parametri	Valore	Valore
Media TSNIT	45.2	55.3
Media superiore	54.4	62.7
Media inferiore	46.1	64.5
Dev Stand TSNIT	14.2	21.9
Simmetria oculare	0.85	
NFI	59	38



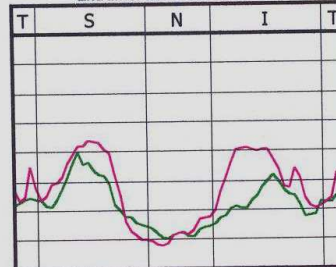
Impressione / Piano:

**FENOTIPO M**

?

Firma: \_\_\_\_\_ Data: \_\_\_\_\_

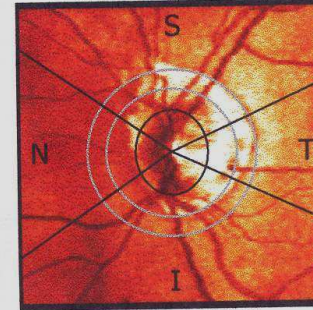
Entrambi strati fibre nervose



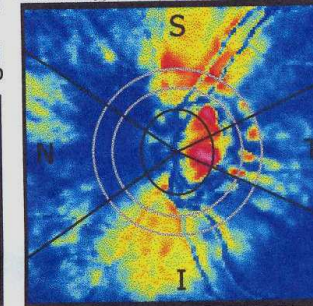
OS Sinistra

Q: 9 Operatore:  
H: 1396 µm V: 1675 µm  
Data: 14/10/09 11:02

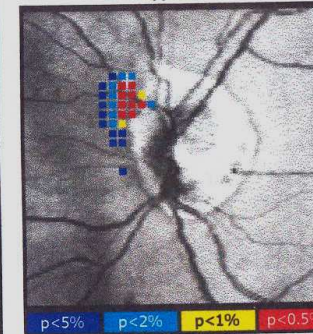
Sinistra immagine del fondo



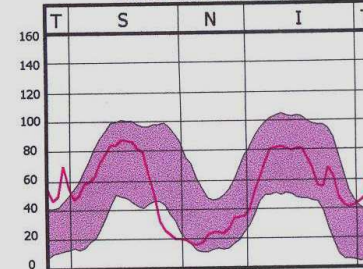
Sinistra Mappa di spessore delle fibre nervose



Sinistra mappa di deviazione



Sinistra strato fibre nervose



# Effect of peripapillary chorioretinal atrophy on GDx parameters in patients with degenerative myopia

Banu Bozkurt MD,<sup>1</sup> Murat Irkeç MD,<sup>1</sup> Sansal Gedik MD,<sup>1</sup> Mehmet Orhan MD,<sup>1</sup> Ugur Erdener MD,<sup>1</sup> Sinan Tatlipinar MD<sup>1</sup> and Ergun Karaagaoglu PhD<sup>2</sup>

Departments of <sup>1</sup>Ophthalmology and <sup>2</sup>Biostatistics, Hacettepe University School Of Medicine, Ankara, Turkey

*Clinical and Experimental Ophthalmology* (2002) 30, 411–414

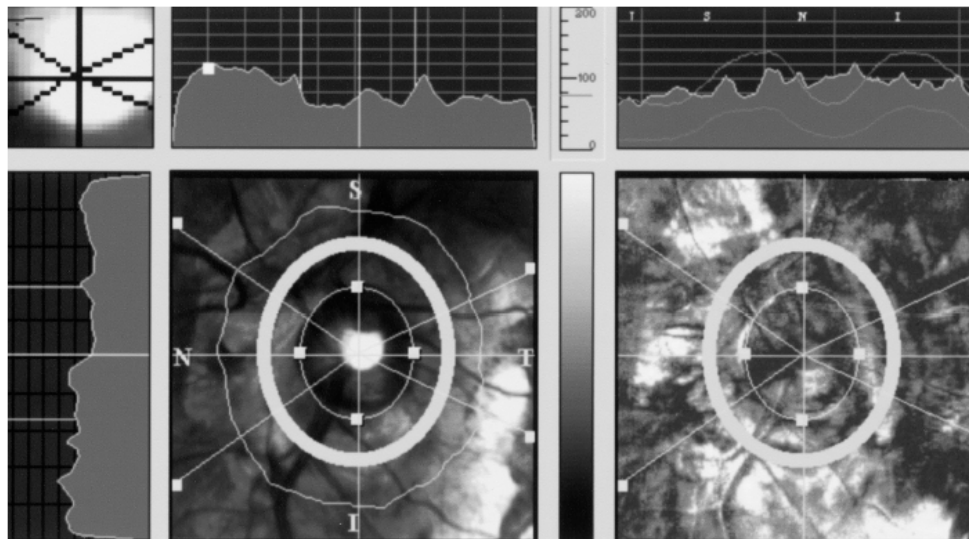


Figure 1. Scanning laser polarimetry of a patient with degenerative myopia demonstrating irregular high spikes in the TSNIT (temporal, superior, nasal, inferior, temporal) graph and an overall increase in retinal nerve fibre layer thickness in all peripapillary quadrants in the colour thickness map.

( $P < 0.05$ ). The TSNIT (temporal, superior, nasal, inferior, temporal) graph showed irregular high spikes with loss of the regular double hump pattern, especially in quadrants with large chorioretinal atrophy and visible sclera.

In the study of Weinreb *et al.* high retardation values were observed in areas of peripapillary atrophy and chorioretinal scars with visible sclera in some eyes.<sup>15</sup> They speculated that those values were artefacts that were related to the high reflectivity of the sclera in these locations.

MONITOR FISSAZIONE: MACCHIA CIECA  
 MIRA FISSAZIONE: CENTRALE  
 PERDITA DI FISSAZIONE: 0/20  
 ERRORI FALSI POS: 1 %  
 ERRORI FALSI NEG: 10 %  
 DURATE ESAME: 08:49

STIMOLO: III, BIANCO  
 SFONDO: 31.5 ASB  
 STRATEGIE: SITA-STANDARD

DIAMETRO PUPILLARE:  
 ACUITA VISIVA:  
 RX: +4.00 DS DC X

DATA: 14-10-2009  
 ORA: 10:02  
 ETÀ: 67

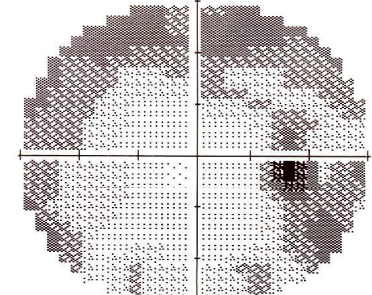
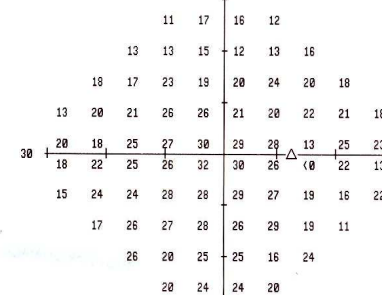
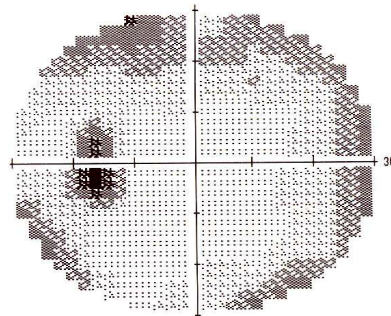
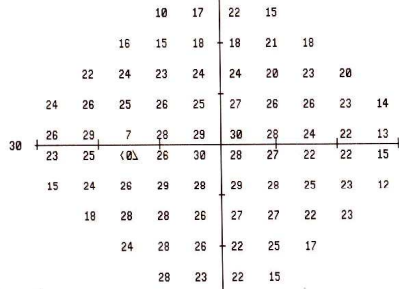
MONITOR FISSAZIONE: GAZE/BLINDSPOT  
 MIRA FISSAZIONE: CENTRALE  
 PERDITA DI FISSAZIONE: 2/22  
 ERRORI FALSI POS: 2 %  
 ERRORI FALSI NEG: 9 %  
 DURATE ESAME: 10:23

STIMOLO: III, BIANCO  
 SFONDO: 31.5 ASB  
 STRATEGIE: SITA-STANDARD

DIAMETRO PUPILLARE:  
 ACUITA VISIVA:  
 RX: +4.25 DS DC X

DATA: 14-10-2009  
 ORA: 09:49  
 ETÀ: 67

FOVER: 35 DB

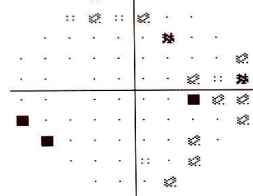
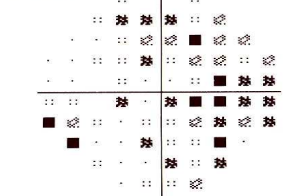


-13	-6	-1	-9						
-9	-11	-9	-5	-8					
-5	-4	-5	-5	-9	-5	-6			
-3	-2	-4	-4	-5	-4	-4	-5	-11	
-2	0	-3	-2	-2	-3	-7	-7	-13	
-6	-4	-5	-2	-4	-5	-9	-7	-11	
-13	-5	-4	-2	-3	-3	-4	-6	-5	-13
-11	-2	-2	-5	-3	-3	-7	-5		
-4	-1	-3	-7	-4	-10				
0	-4	-5	-11						

-11	-4	1	-7						
-7	-9	-6	-6	-3	-5				
-2	-1	-3	-3	-7	-3	-4			
0	1	-2	-2	-3	-1	-2	-3	-9	
0	2	-1	0	0	-1	-5	-5	-10	
-4	-2	-3	0	-2	-3	-7	-5	-9	
-11	-3	-2	0	-1	-1	-1	-3	-3	-11
-9	0	0	-3	-1	-1	-5	-2		
-2	1	-1	-5	-2	-8				
2	-2	-3	-9						

TOTAL  
 DEVIATIONE

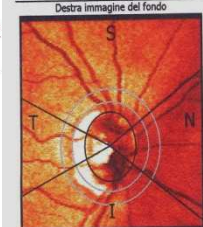
MODELLO  
 DEVIATIONE



● < 5%  
 \* < 2%  
 ✱ < 1%  
 ■ < 0.5%

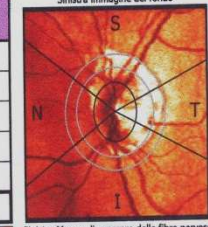
DDN: lunedì 9 febbraio 1942, Sesso: Maschio, Origine: bianca

Q: 8 Operatore:  
 H: 1675 µm V: 1694 µm  
 Data: 14/10/09 11:02

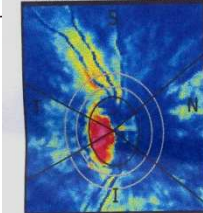


TSNIT	OD	OS
Parametri	Valore	Valore
Media TSNIT	45.2	55.3
Media superiore	54.4	62.7
Media inferiore	46.1	64.5
Dev Stand TSNIT	14.2	21.9
Simmetria oculare	0.85	
NFI	59	38

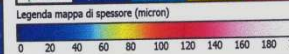
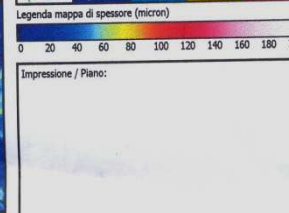
Q: 9 Operatore:  
 H: 1396 µm V: 1475 µm  
 Data: 14/10/09 11:02



Destra Mappa di spessore delle fibre nervose



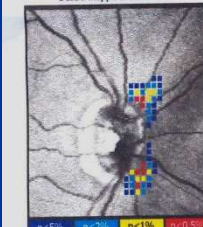
Sinistra Mappa di spessore delle fibre nervose



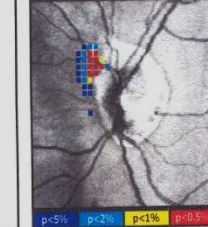
Impressione / Piano:

Firma: \_\_\_\_\_ Data: \_\_\_\_\_

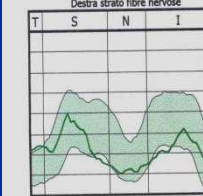
Destra mappa di deviazione



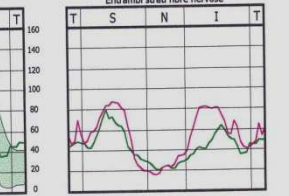
Sinistra mappa di deviazione



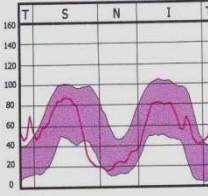
Destra strato fibre nervose



Entrambi strati fibre nervose



Sinistra strato fibre nervose

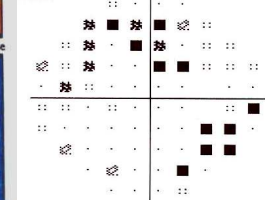


-9	-4	-5	-8						
-10	-11	-8	-12	-10	-6				
-6	-8	-3	-8	-6	-2	-5	-6		
-10	-5	-6	-2	-2	-7	-7	-5	-5	-6
-4	-8	-3	-2	1	0	0	-2	-3	
-6	-5	-3	-3	2	1	-2	-5	-12	
-8	-1	-3	-1	-1	0	-1	-9	-11	-3
-7	-1	-1	0	-2	1	-8	-16		
1	-6	-1	-2	-10	-3				
-4	-1	-1	-5						

GHT  
 FUORI DAI LIMITI NORMALI

MD -6.29 DB P < 0.5%  
 PSD 4.29 DB P < 1%

LLLO  
 AZIONE

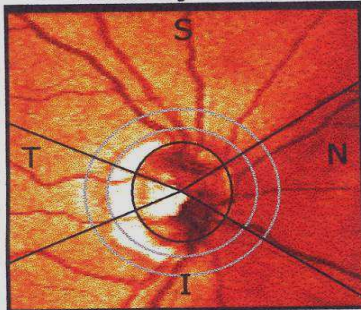


AZIENDA USL FE  
 OSPEDALE SAN CAMILLO  
 CENTRO DIAGNOSI GLAUCOMA  
 COMACCHIO

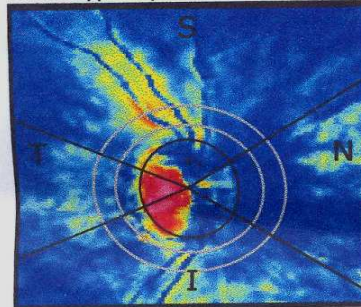
OD Destra

Q: 8 Operatore:  
H: 1675 µm V: 1954 µm  
Data: 14/10/09 11:02

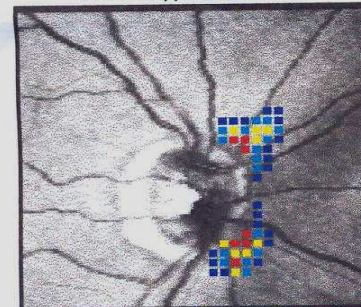
Destra immagine del fondo



Destra Mappa di spessore delle fibre nervose

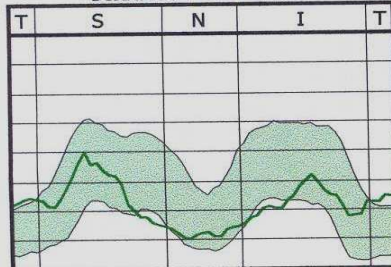


Destra mappa di deviazione



p<5% p<2% p<1% p<0.5%

Destra strato fibre nervose



TSNIT

Parametri	OD Valore	OS Valore
Media TSNIT	45.2	55.3
Media superiore	54.4	62.7
Media inferiore	46.1	64.5
Dev Stand TSNIT	14.2	21.9
Simmetria oculare	0.85	
NFI	59	38

p>=5% p<5% p<2% p<1% p<0.5%

Legenda mappa di spessore (micron)



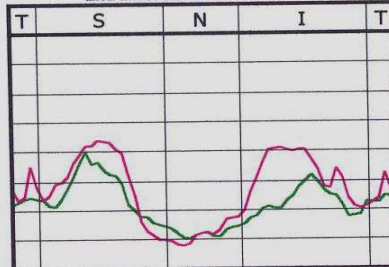
Impressione / Piano:

VP<sub>(i)</sub>

APR

Firma: \_\_\_\_\_ Data: \_\_\_\_\_

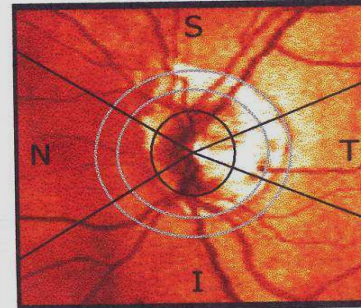
Entrambi strati fibre nervose



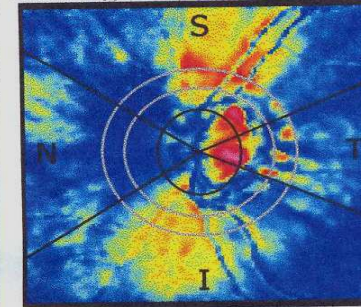
OS Sinistra

Q: 9 Operatore:  
H: 1396 µm V: 1675 µm  
Data: 14/10/09 11:02

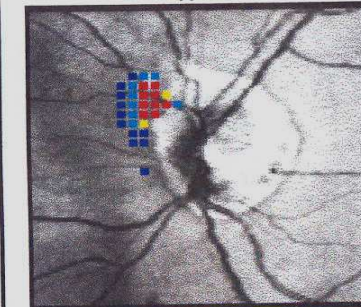
Sinistra immagine del fondo



Sinistra Mappa di spessore delle fibre nervose

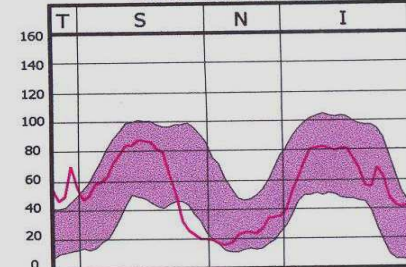


Sinistra mappa di deviazione

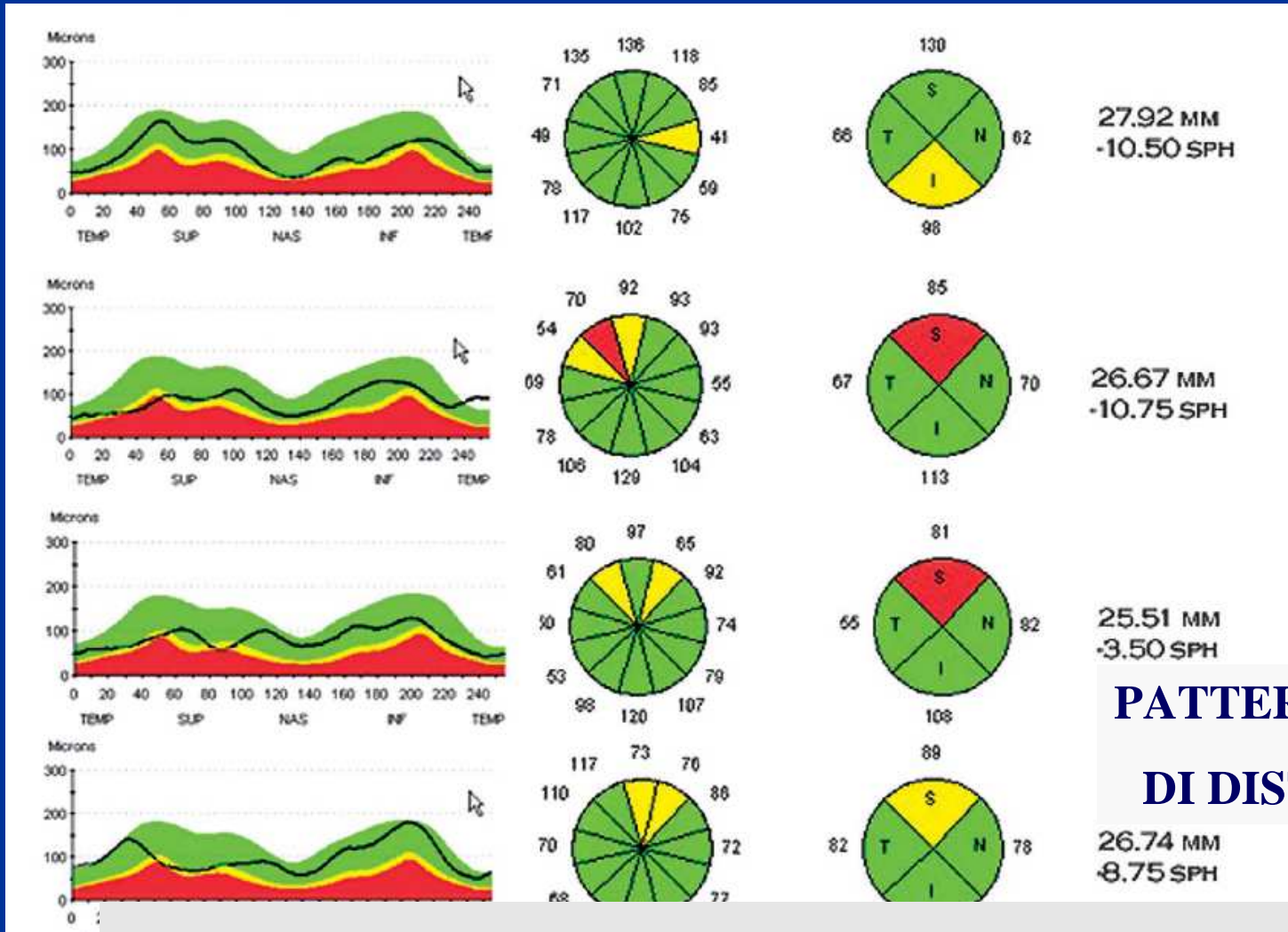


p<5% p<2% p<1% p<0.5%

Sinistra strato fibre nervose



## PATTERN ATIPICO DI RIFRANGENZA



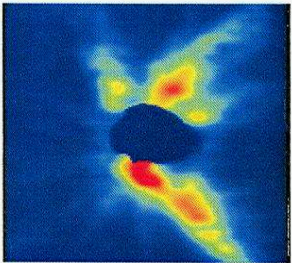
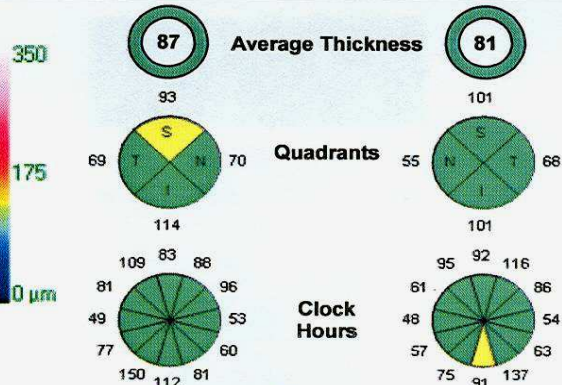
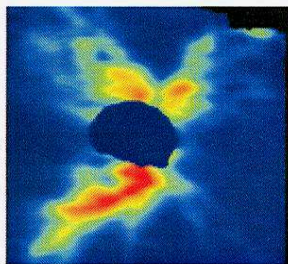
**FP**

**APD**

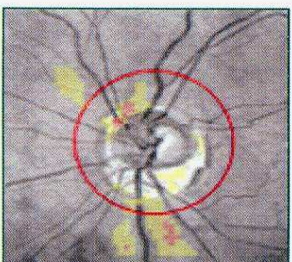
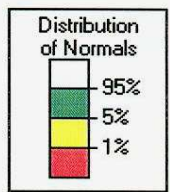
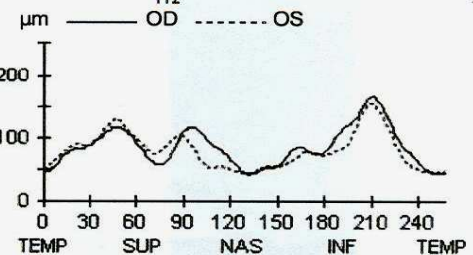
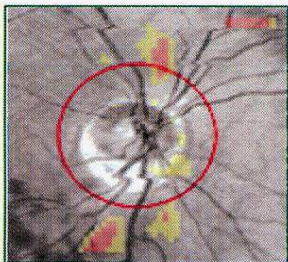
**PATTERN ANOMALO  
DI DISTRIBUZIONE**

The current study suggests that myopes undergoing RNFL analysis by Stratus OCT should ideally be compared with a normative control group that is matched for refractive error and/or axial length. With regard to axial

**RNFL Thickness Map**



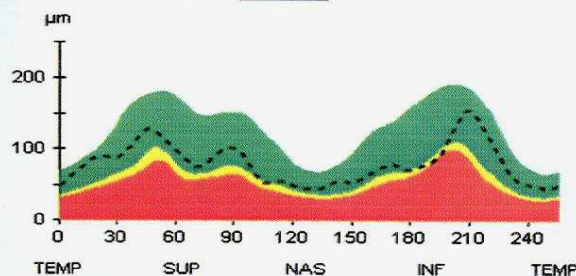
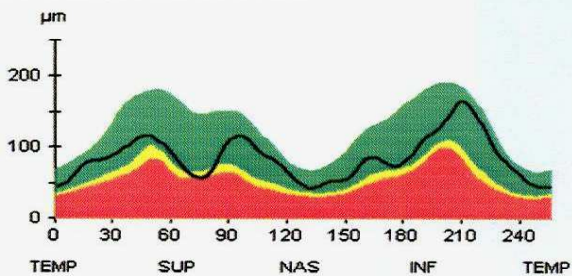
**RNFL Thickness Deviation**



Offset (-0.21; 0.00) mm

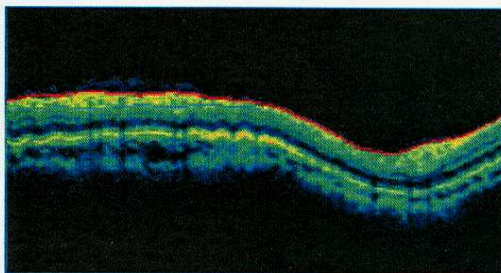
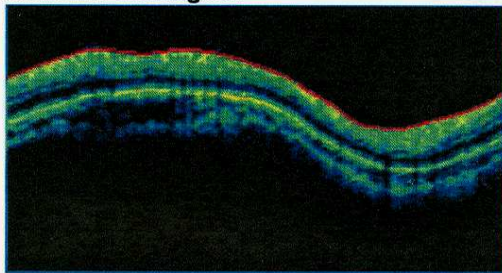
Offset (0.15; -0.09) mm

**RNFL TSNIT Normative Data**



Symmetry **87%**

**Extracted RNFL Tomogram**



Comments

*too m*

Doctor's Signature

*[Handwritten Signature]*

SW Ver: 4.5.1.11  
Copyright 2009  
Carl Zeiss Meditec, Inc  
All Rights Reserved  
Page 1 of 1

**GRAFICO TSNIT  
SPESSORE MEDIO**

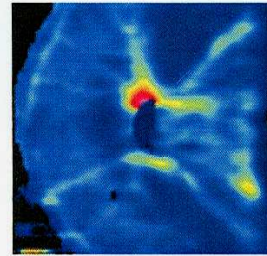
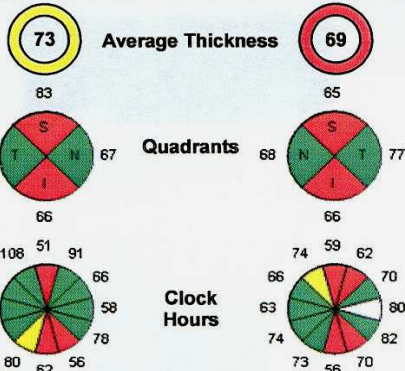
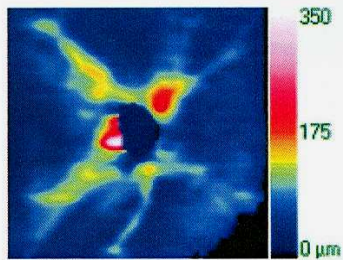
**FP**

**APD**

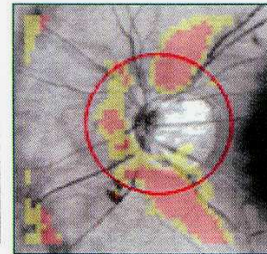
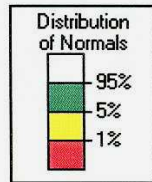
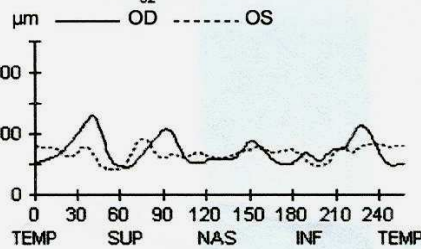
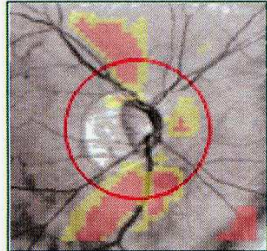
**RNFL Thickness Analysis: Optic Disc Cube 200x200**

OD ● ● OS

**RNFL Thickness Map**



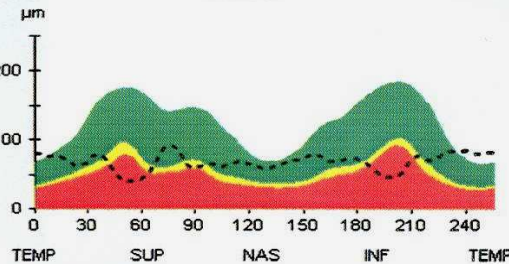
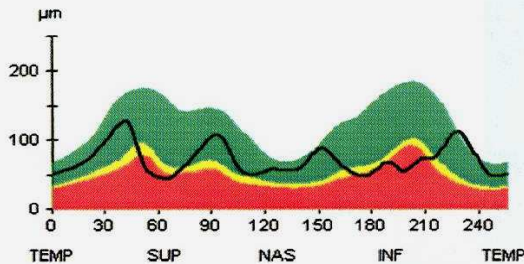
**RNFL Thickness Deviation**



Offset (-0.01; -0.04) mm

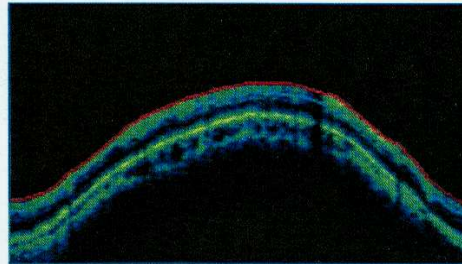
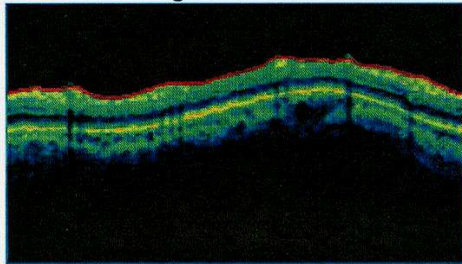
Offset (0.30; 0.16) mm

**RNFL TSNIT Normative Data**



Symmetry **13%**

**Extracted RNFL Tomogram**



Comments

Doctor's Signature

Analysis Altered: 4/30/2010 1:58 PM

SW Ver: 4.5.1.11  
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Page 1 of 1

**VP:**

➤ **GRAFICO TSNT**

➤ **SPESSORE MEDIO**

**TOO =20 mmHg**

**CCT OD 498 MICRON**

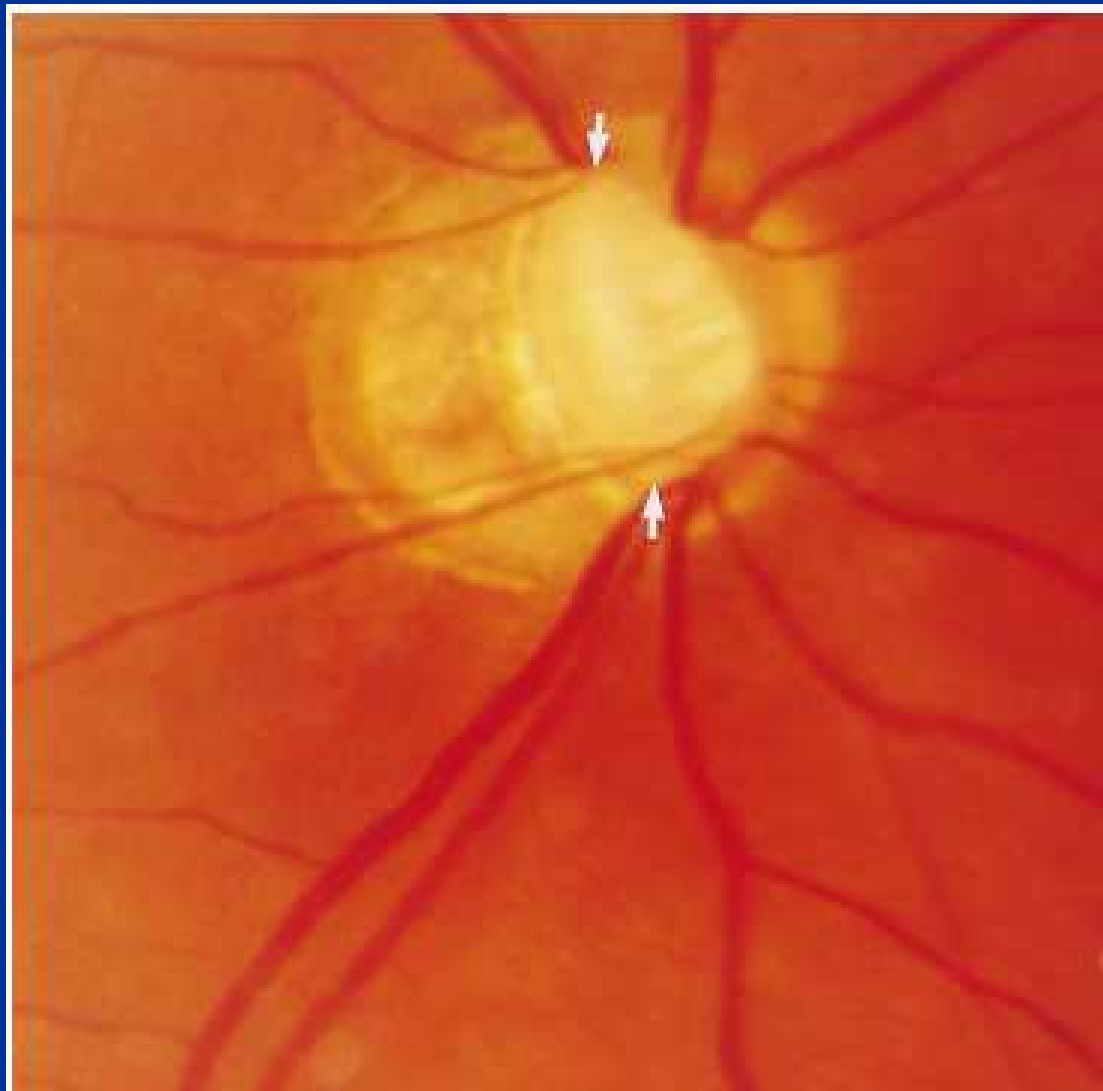
**CCT OS 470 MICRON**

## FENOTIPO MIOPICO

➤ GDX ??

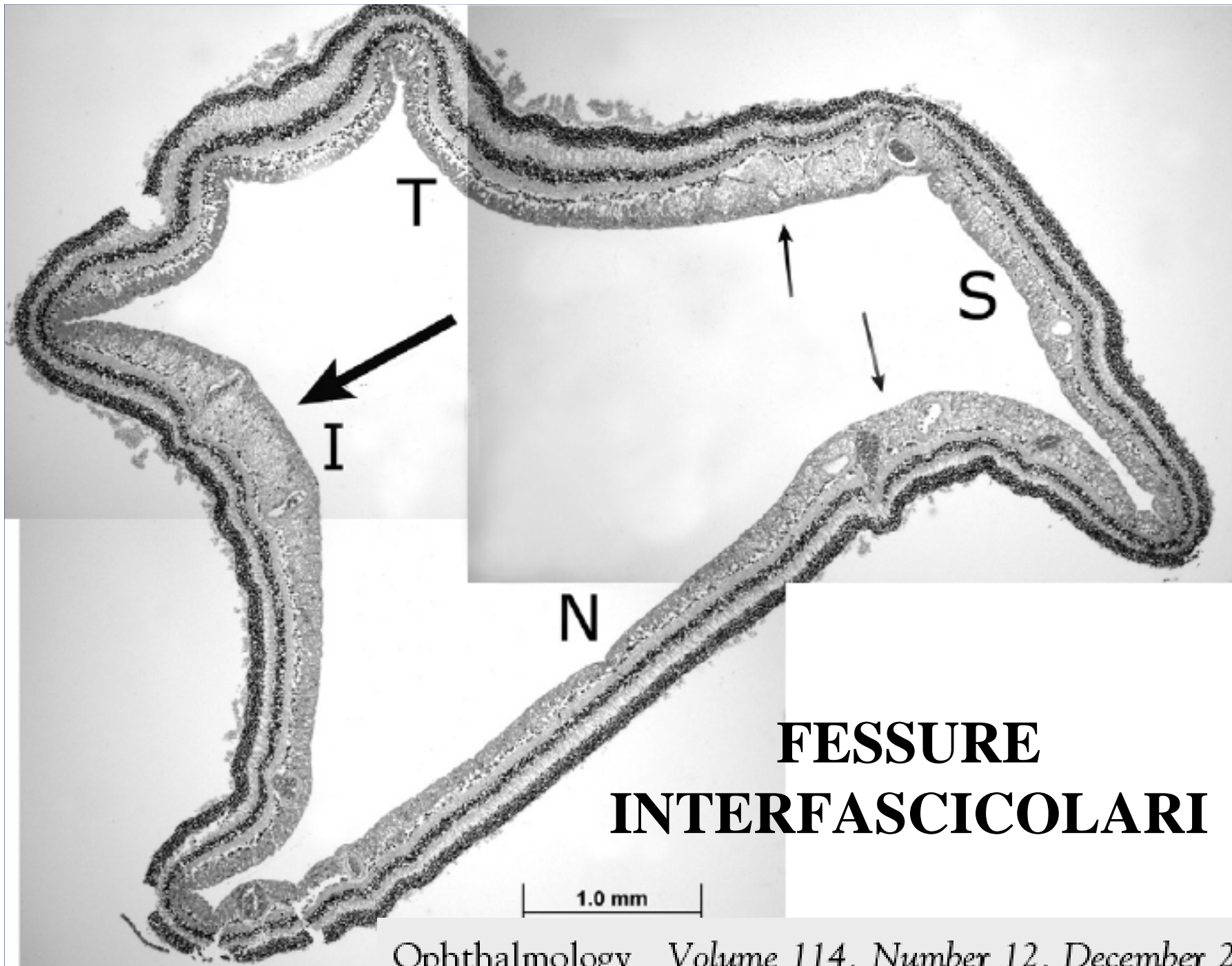
➤ HRT ??

➤ OCT ?

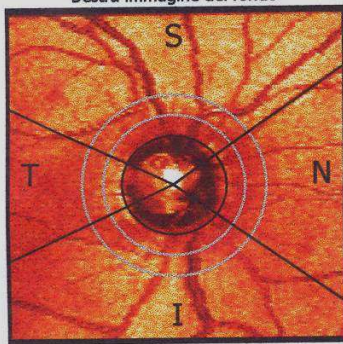


➤ CVC !

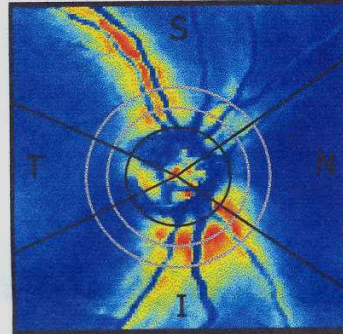
➤ CT !



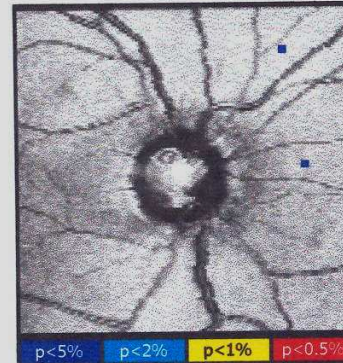
**FESSURE  
INTERFASCICOLARI**



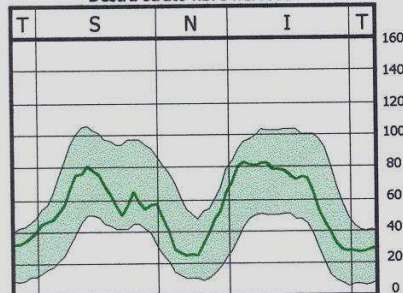
Destra Mappa di spessore delle fibre nervose



Destra mappa di deviazione

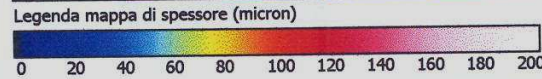


Destra strato fibre nervose



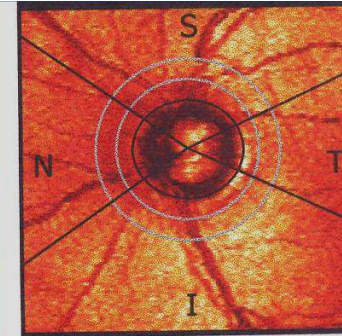
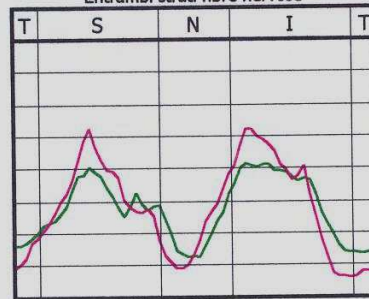
TSNIT	OD	OS
Parametri	Valore	Valore
Media TSNIT	55.3	55.5
Media superiore	63.8	69.7
Media inferiore	65.5	63.0
Dev Stand TSNIT	19.4	29.5
Simmetria oculare	0.93	
NFI	23	15

p>=5% p<5% p<2% p<1% p<0.5%

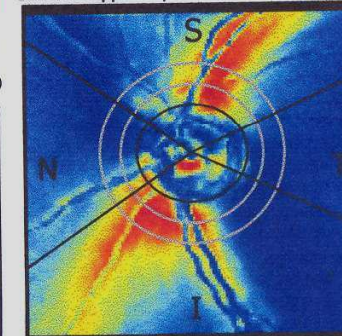


Impressione / Piano:  
**Fenotipo E**  
**TOO= 23**  
**DX DIFFERENZIALE**  
**DIFETTO CUNEIFORME**  
**VS.**  
**FESSURA INTERFASCICOLARE**  
**Triade:**  
 ✓ Forma  
 ✓ Sede  
 ✓ Colore  
 Firma: \_\_\_\_\_

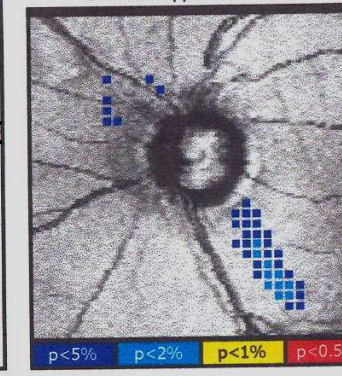
Entrambi strati fibre nervose



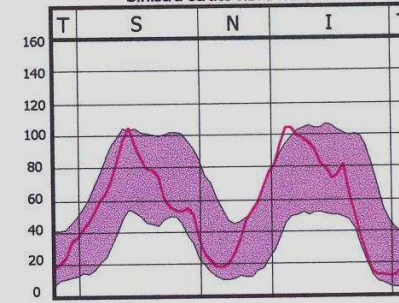
Sinistra Mappa di spessore delle fibre nervose



Sinistra mappa di deviazione



Sinistra strato fibre nervose



OCULISTICA COMAC. (DR. LAMBERTI)

Scheda Specialistica relativa a:	DM	Q.ta	Data Prest.
16 - 207 PACHIMETRIA PER CONSULENZA OFTALMOLOGIC		1	31/03/10
16 - 206 CAMPO VISIVO PER CONSULENZA OFTALMOLOGI		1	31/03/10
16 - 208 GDX PER CONSULENZA OFTALMOLOGICA		1	31/03/10

**ACCERTAMENTI EFFETTUATI**

ESEGUITO CV OO

ESEGUITO GDX OO

**ESAME OBIETTIVO**

pachimetria corneale centrale OO **625 MICRON**

CVC OO NELLA NORMA

GDX OO INDICI E VALORI POLARIMETRICI NELLA NORMA , OS FESSURA INTERFASCICOLARE ALLA MAPPA DI DEVIAZIONE

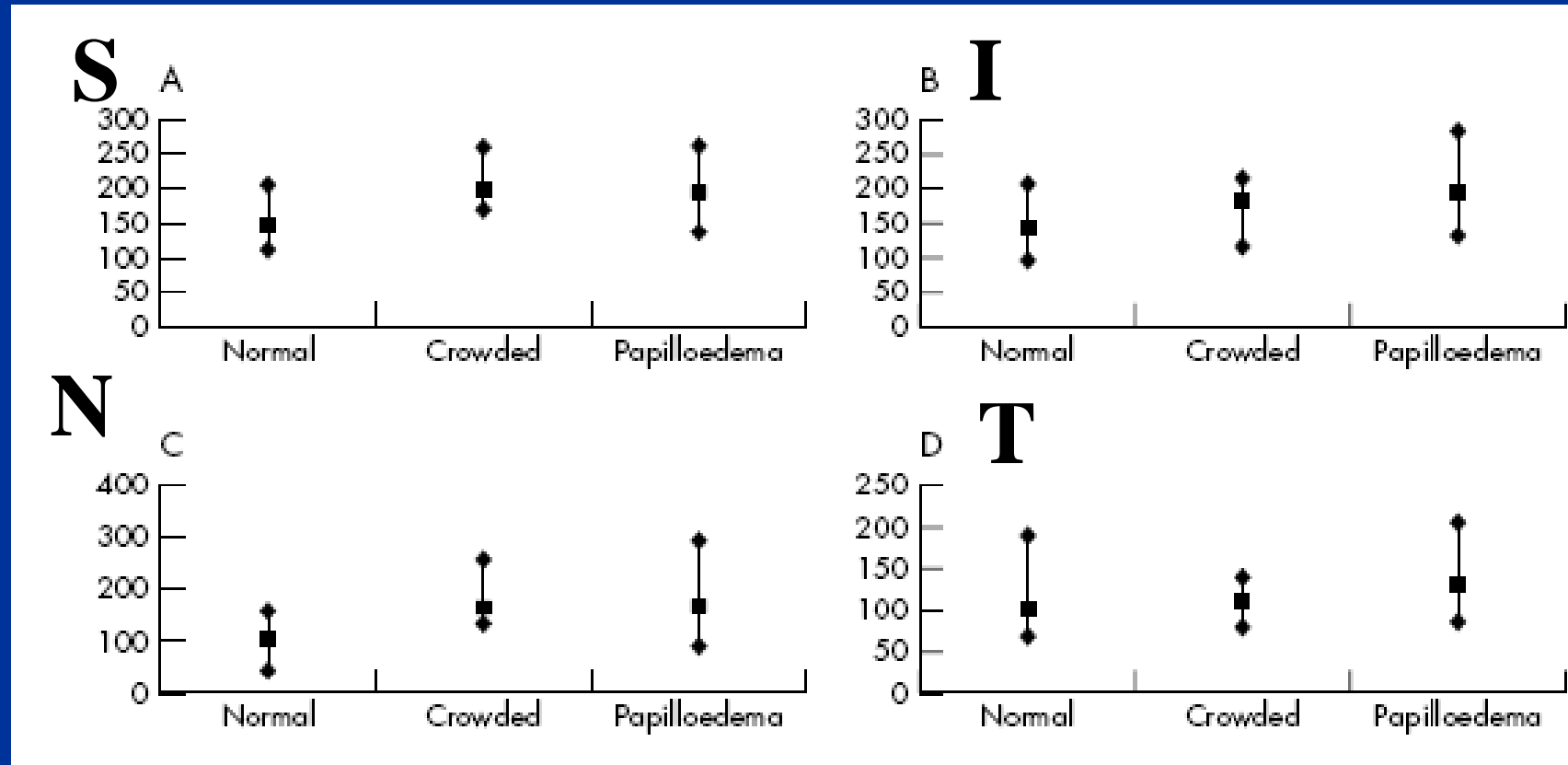
➤ **Fenotipo E**

➤ **FESSURA INTERFASCICOLARE**

➤ **PSEUDOIPERTONO**

# FENOTIPO NE

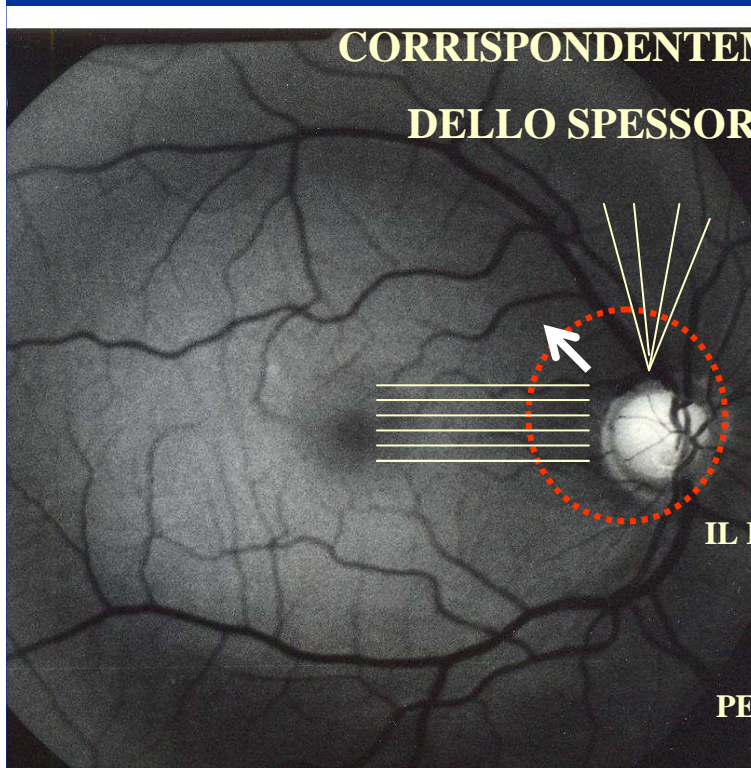
## PAPILLA OTTICA NON ESCAVATA-AFFOLLAMENTO ASSONALE



# Effect of Signal Strength and Improper Alignment on the Variability of Stratus Optical Coherence Tomography Retinal Nerve Fiber Layer Thickness Measurements

GIANMARCO VIZZERI, CHRISTOPHER BOWD, FELIPE A. MEDEIROS, ROBERT N. WEINREB, AND LINDA M. ZANGWILL

**ALLONTANANDOSI DAL MARGINE PAPILLARE AFFOLLATO DI FIBRE  
LA DENSITA' DELLE FIBRE ASSONALI (PER UNITA' DI SUPERFICIE) DIMINUISCE E  
CORRISPONDENTEMENTE DIMINUISCE IL VALORE MISURATO  
DELLO SPESSORE SETTORIALE DELLE FIBRE NERVOSE**

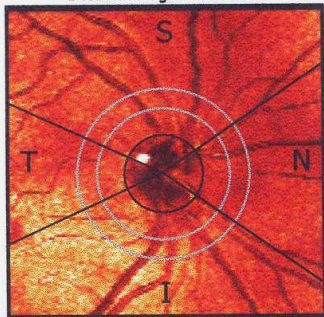


**IL FENOMENO DELLA RAREFAZIONE DELLE FIBRE RISULTA MASSIMO  
NEI SETTORI VERTICALI (SUP. E INF.) E NEL SETTORE NASALE ,  
MINIMO O ASSENTE NEL SETTORE TEMPORALE  
PER LA PRESENZA DEL FASCIO PAPPILLOMACULARE A DISPOSIZIONE  
ORIZZONTALE**

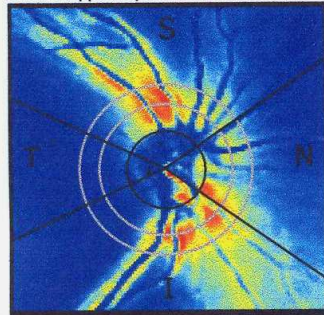
OD Destra

Q: 10 Operatore:  
H: 1489 µm V: 1489 µm  
Data: 28/04/10 14:09

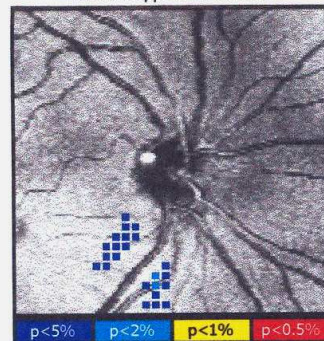
Destra immagine del fondo



Destra Mappa di spessore delle fibre nervose

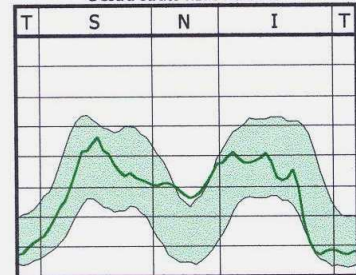


Destra mappa di deviazione



p<5% p<2% p<1% p<0.5%

Destra strato fibre nervose



TSNIT	OD	OS
Parametri	Valore	Valore
Media TSNIT	56.4	50.7
Media superiore	68.4	53.1
Media inferiore	58.4	62.2
Dev Stand TSNIT	24.2	22.2
Simmetria oculare	0.76	
NFI	7	21

p>=5% p<5% p<2% p<1% p<0.5%

Legenda mappa di spessore (micron)



Impressione / Piano:

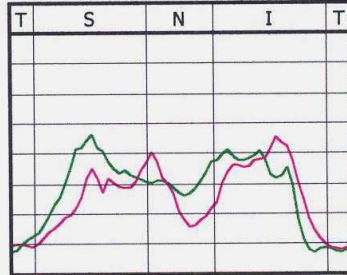
**Fenotipo NE**

**Fessure**

**interfascicolari?**

Firma: \_\_\_\_\_ Data: \_\_\_\_\_

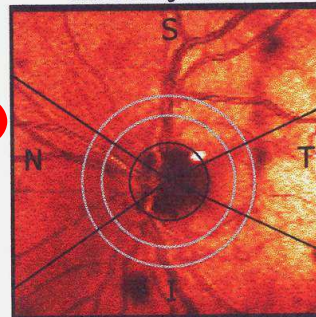
Entrambi strati fibre nervose



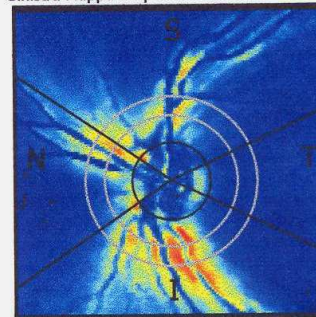
OS Sinistra

Q: 9 Operatore:  
H: 1489 µm V: 1489 µm  
Data: 28/04/10 14:09

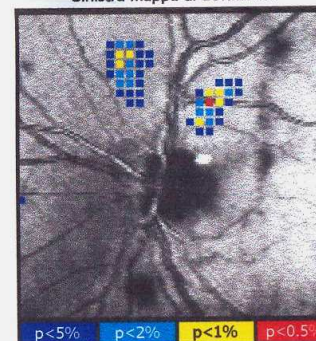
Sinistra immagine del fondo



Sinistra Mappa di spessore delle fibre nervose

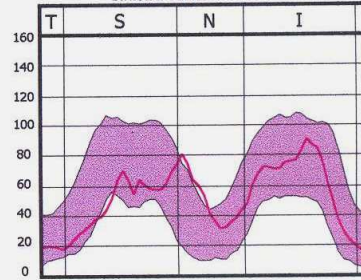


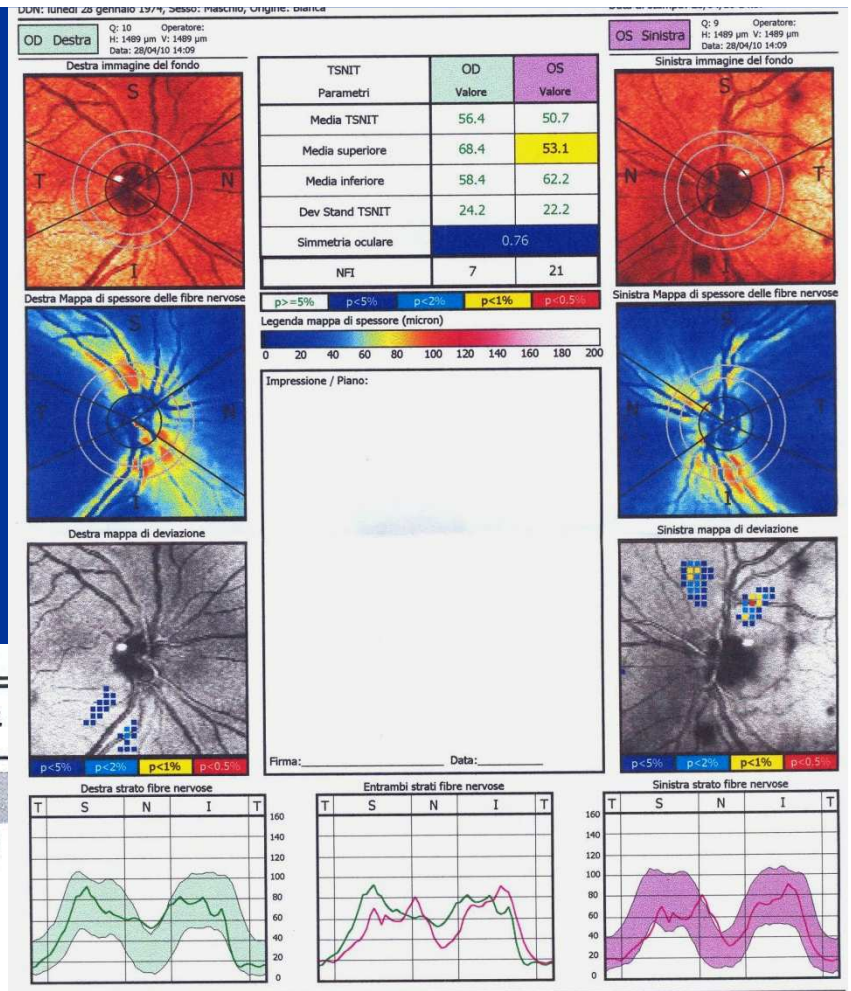
Sinistra mappa di deviazione



p<5% p<2% p<1% p<0.5%

Sinistra strato fibre nervose





ES. TICKET. PAGANTE CON

OCULISTICA COMAC. (DR

Referto relativo a:

16 - 107 OFTALMOSCOPIA A SCANSIONE LASER (GDX)

**MOTIVO DELLA VISITA - ANAMNESI**

FAMILIARITA' PER GLAUCOMA

**ESAME OBIETTIVO**

PACHIMETRIA CORNEALE CENTRALE OO 560 MICRON

CONTROLLO TONO ODX 23 mmHg, OS 25 mmHg ORE 14

GDX :OS DIFETTI FOCALI E RIDUZIONE DELLO SPESSORE SUPERIORE

**DIAGNOSI CONCLUSIONI**

OO DIFETTI MORFOMETRICI IN PAZIENTE CON FAMILIARITA' E RISCHIO TONOMETRICO ACCERTATO

**TERAPIA FARMACOLOGICA**

INIZIARE TERAPIA IPOTONIZZANTE

Medico Refertante  
GIUSEPPE LAMBERTI

# NE

➤ GDX ?! (FN)

➤ HRT ??

➤ OCT ?! (FN)

➤ CVC !?

➤ CT !



FENOTIPO NE

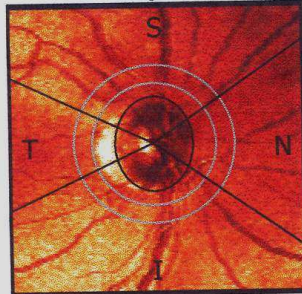


PAPILLA OTTICA NON ESCAVATA-AFFOLLAMENTO ASSONALE

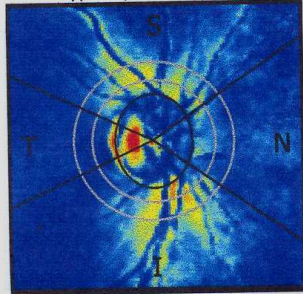
OD Destra

Q: 9 Operatore:  
H: 1582 µm V: 1954 µm  
Data: 31/03/10 09:04

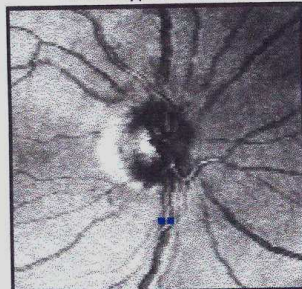
Destra immagine del fondo



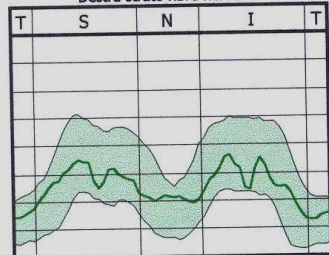
Destra Mappa di spessore delle fibre nervose



Destra mappa di deviazione



Destra strato fibre nervose



TSNIT	OD	OS
Parametri	Valore	Valore
Media TSNIT	50.6	27.9
Media superiore	60.0	32.6
Media inferiore	54.4	31.6
Dev Stand TSNIT	13.1	7.4
Simmetria oculare	0.80	
NFI	26	94

p>=5% p<5% p<2% p<1% p<0.5%

Legenda mappa di spessore (micron)



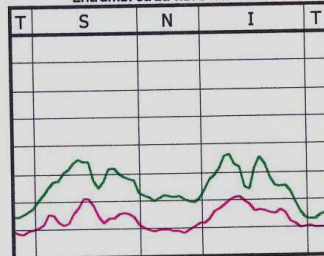
Impressione / Piano:

# Fenotipo E

## inversione del rapporto gerarchico morfofunzionale da artefatto EPR

Firma: \_\_\_\_\_ Data: \_\_\_\_\_

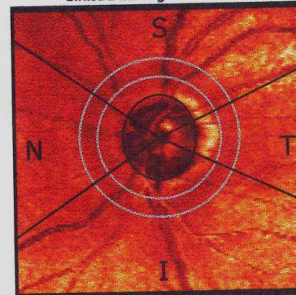
Entrambi strati fibre nervose



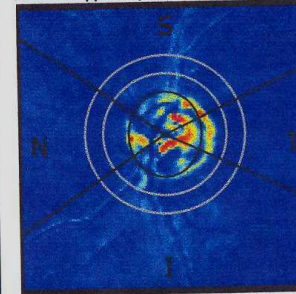
OS Sinistra

Q: 9 Operatore:  
H: 1489 µm V: 1768 µm  
Data: 31/03/10 09:03

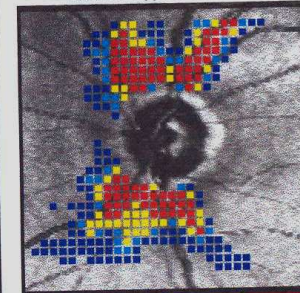
Sinistra immagine del fondo



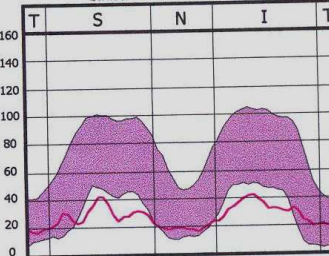
Sinistra Mappa di spessore delle fibre nervose



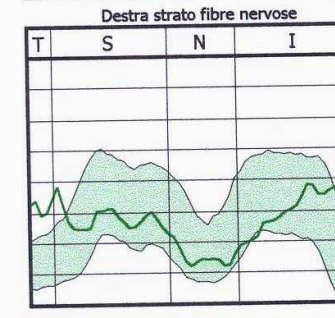
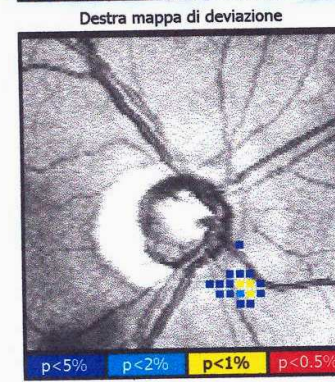
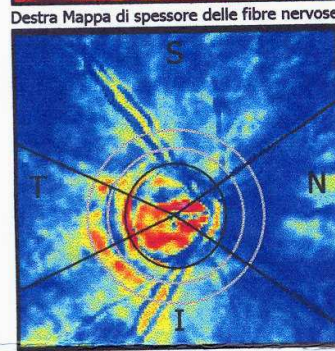
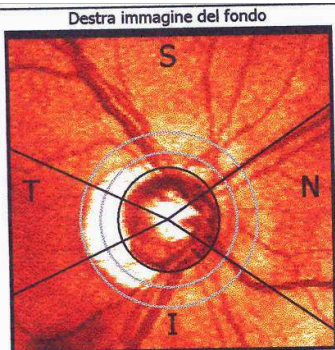
Sinistra mappa di deviazione



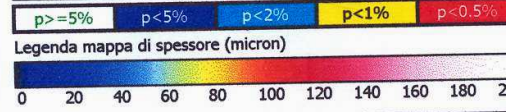
Sinistra strato fibre nervose







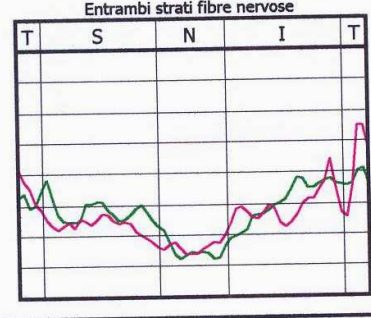
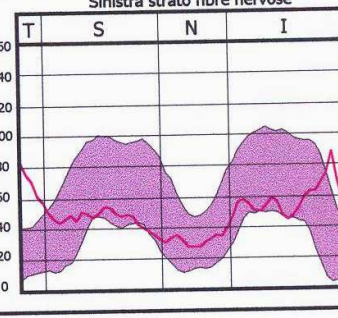
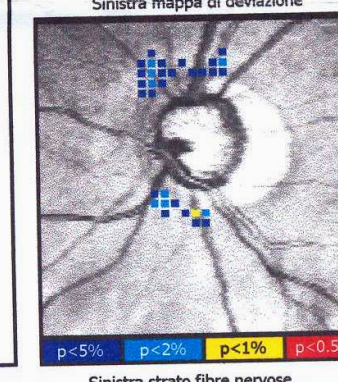
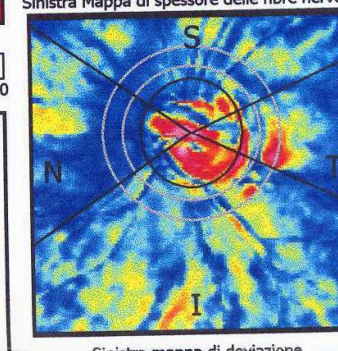
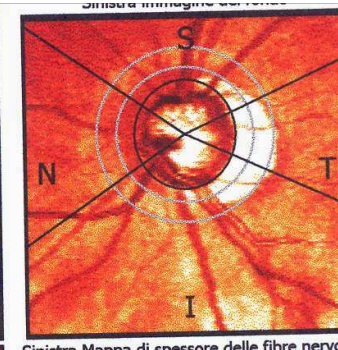
TSNIT	OD	OS
Parametri	Valore	Valore
Media TSNIT	56.0	53.9
Media superiore	57.9	48.8
Media inferiore	62.4	59.0
Dev Stand TSNIT	16.0	17.9
Simmetria oculare	0.74	
NFI	55	63



Impressione / Piano:

**Fenotipo E +**  
**DISTROFIA EPR**  
**FALSI NEGATIVI**

Firma: \_\_\_\_\_ Data: \_\_\_\_\_





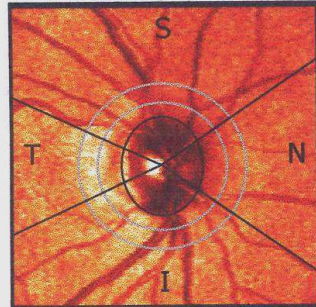
OD Destra

Q: 8 Operatore:  
H: 1582 µm V: 1954 µm  
Data: 07/04/10 12:11

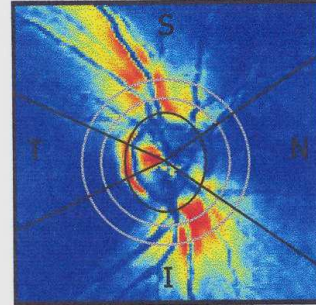
OS Sinistra

Q: 8 Operatore:  
H: 1582 µm V: 1954 µm  
Data: 07/04/10 12:12

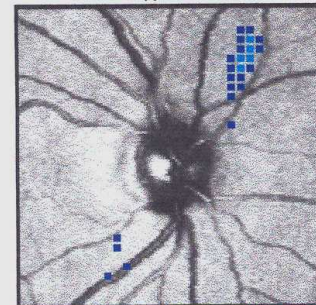
Destra immagine del fondo



Destra Mappa di spessore delle fibre nervose

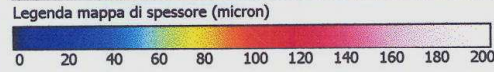


Destra mappa di deviazione



TSNIT Parametri	OD Valore	OS Valore
Media TSNIT	53.2	50.2
Media superiore	66.7	60.4
Media inferiore	60.0	62.9
Dev Stand TSNIT	24.2	22.1
Simmetria oculare	0.78	
NFI	20	29

p>=5% p<5% p<2% p<1% p<0.5%

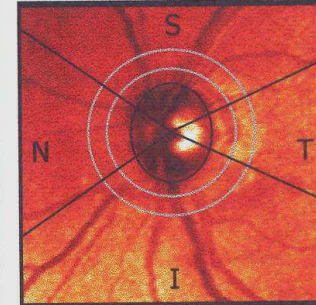


Impressione / Piano:

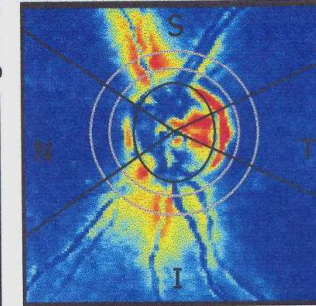
**Fenotipo E +  
DISTROFIA EPR  
FALSI NEGATIVI**

Firma: \_\_\_\_\_ Data: \_\_\_\_\_

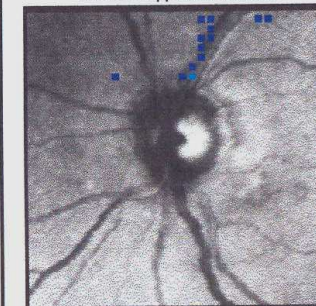
Sinistra immagine del fondo



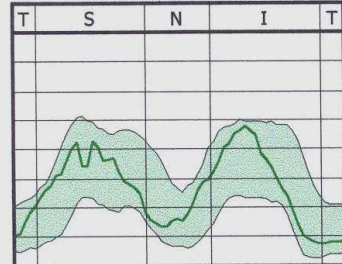
Sinistra Mappa di spessore delle fibre nervose



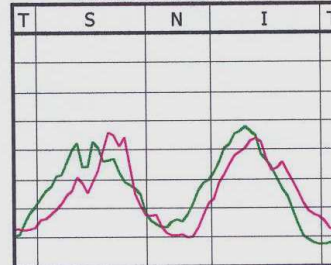
Sinistra mappa di deviazione



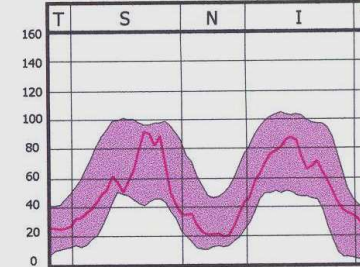
Destra strato fibre nervose



Entrambi strati fibre nervose



Sinistra strato fibre nervose



CENTRALE 30-2 TEST DI SUGLIA

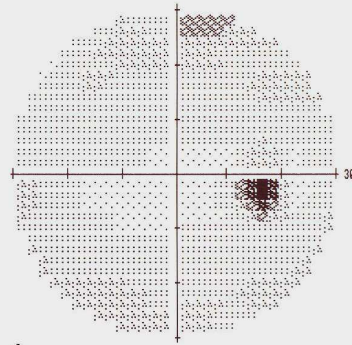
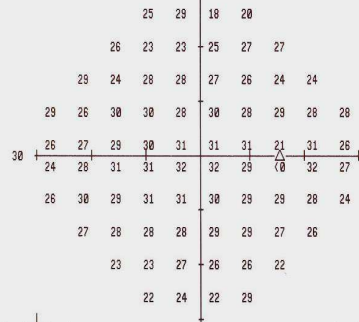
MONITOR FISSAZIONE: GAZE/BLINDSPOT  
MIRA FISSAZIONE: CENTRALE  
PERDITA DI FISSAZIONE: 1/18  
ERRORI FALSI POS: 1 %  
ERRORI FALSI NEG: 4 %  
DURATE ESAME: 07:48

STIMOLO: III, BIANCO  
SFONDO: 31.5 ASB  
STRATEGIE: SITA-STANDARD

DIAMETRO PUPILLARE:  
ACUITA VISIVA:  
RX: +5.00 DS DC X

DATA: 07-04-2010  
ORA: 11:58  
ETA: 69

FOVER: 34 DB



2	6	-5	-2
0	-3	-3	-1
2	-4	0	0
4	-2	0	0
0	-2	-1	-2
-2	-1	1	-1
1	1	-1	0
0	-1	-3	-2
-4	-5	-2	-4
-4	-4	-5	1

2	5	-5	-2
0	-4	-3	-1
2	-4	-1	-1
3	-2	0	-1
0	-2	-1	-2
-2	-2	0	-1
0	1	-1	0
0	-1	-3	-3
-5	-6	-3	-4
-4	-4	-5	1

GHT  
ENTRO LIMITI NORMALI

MD -1.19 DB  
PSD 2.06 DB

MODELLO  
DEVIAZIONE

:: < 5%  
⊗ < 2%  
⊠ < 1%  
■ < 0.5%

AZIENDA USL FE  
OSPEDALE SAN CAMILLO  
CENTRO DIAGNOSI GLAUCOMA  
CONACCHIO

MONITOR FISSAZIONE: GAZE/BLINDSPOT

MIRA FISSAZIONE: CENTRALE  
PERDITA DI FISSAZIONE: 1/19  
ERRORI FALSI POS: 0 %  
ERRORI FALSI NEG: 7 %  
DURATE ESAME: 07:57

STIMOLO: III, BIANCO

SFONDO: 31.5 ASB  
STRATEGIE: SITA-STANDARD

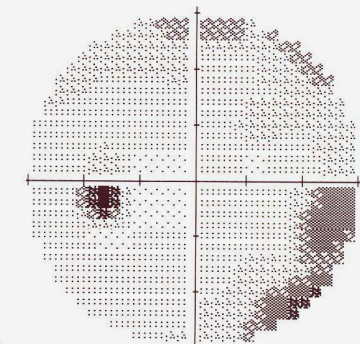
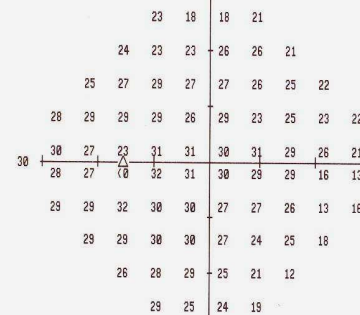
DIAMETRO PUPILLARE:

ACUITA VISIVA:  
RX: +5.00 DS DC X

DATA: 07-04-2010

ORA: 12:09  
ETA: 69

FOVER: 34 DB



1	-5	-6	-2
-1	-2	-3	0
-2	0	1	-1
1	2	0	-1
2	-2	0	0
0	-2	1	-1
1	-1	2	-1
0	0	0	-1
-2	-1	0	-4
1	-3	-3	-7

1	-5	-6	-2
-1	-3	-3	0
-2	0	1	-1
1	2	0	-1
2	-2	0	0
0	-2	1	-1
0	-1	2	-1
0	0	0	-1
-2	-1	0	-4
1	-3	-3	-7

GHT  
FUORI DAI LIMITI NORMALI

MD -2.69 DB P < 5%  
PSD 3.90 DB P < 1%

TOTAL  
DEVIAZIONE

MODELLO  
DEVIAZIONE

:: < 5%  
⊗ < 2%  
⊠ < 1%  
■ < 0.5%

AZIENDA USL FE  
OSPEDALE SAN CAMILLO  
CENTRO DIAGNOSI GLAUCOMA  
CONACCHIO

OCULISTICA COMAC. (DR. LAMBERTI)

Scheda Specialistica relativa a:	DM	Q.ta	Data Prest.
16 - 206 CAMPO VISIVO PER CONSULENZA OFTALMOLOGI		1	07/04/10
16 - 205 VISITA OCULISTICA DI CONSULENZA OFTALMOLO		1	07/04/10
16 - 208 GDX PER CONSULENZA OFTALMOLOGICA		1	07/04/10
16 - 207 PACHIMETRIA PER CONSULENZA OFTALMOLOGIC		1	07/04/10

**ACCERTAMENTI EFFETTUATI**

eseguito gdx oo

eseguito cv oo

OFTALMOTONO OO 24 mmHg ORE 12.30

**ESAME OBIETTIVO**

CVC OS DIFETTO ARCIFORME INFERIORE + SALTO NASALE DI RONNE  
ODX NELLA NORMA

GDX OO OS DIFETTO FASCICOLARE SUPERIORE MASCHERATO DA UNA SOVRASTIMA DELLO  
SPESSORE POLARIMETRICO (ARTEFATTO DA DISTROFIA EPR DIFFUSA )

PACHIMETRIA CORNEALE CENTRALE OO 560 MICRON

**DIAGNOSI CONCLUSIONI**

OO SINDROME DA DISPERSIONE PIGMENTARIA

OO GLAUCOMA PIGMENTARIO INIZIALE AD ESORDIO ASIMMETRICO (OS)

**TERAPIA FARMACOLOGICA**

SUGGERISCO TERAPIA IPOTONIZZANTE IN OO

Karl R. Popper  
**THE LOGIC  
OF SCIENTIFIC  
DISCOVERY**



HARPER TORCHBOOKS 1837

Karl Popper (1902 – 1994), austriaco,  
è stato l'epistemologo e filosofo della scienza  
più importante del XX secolo



Il principio di falsificabilità  
è pretestuoso pensare di possedere un principio di verifica,  
per il solo fatto che abbiamo cominciato ad osservare la natura.  
La nostra osservazione infatti non è mai pura, mai perfetta,  
e necessita di continui controlli e miglioramenti.

**La falsificabilità è il criterio  
di demarcazione tra scienza e non scienza:  
una teoria è scientifica  
se e solo se essa è falsificabile.**

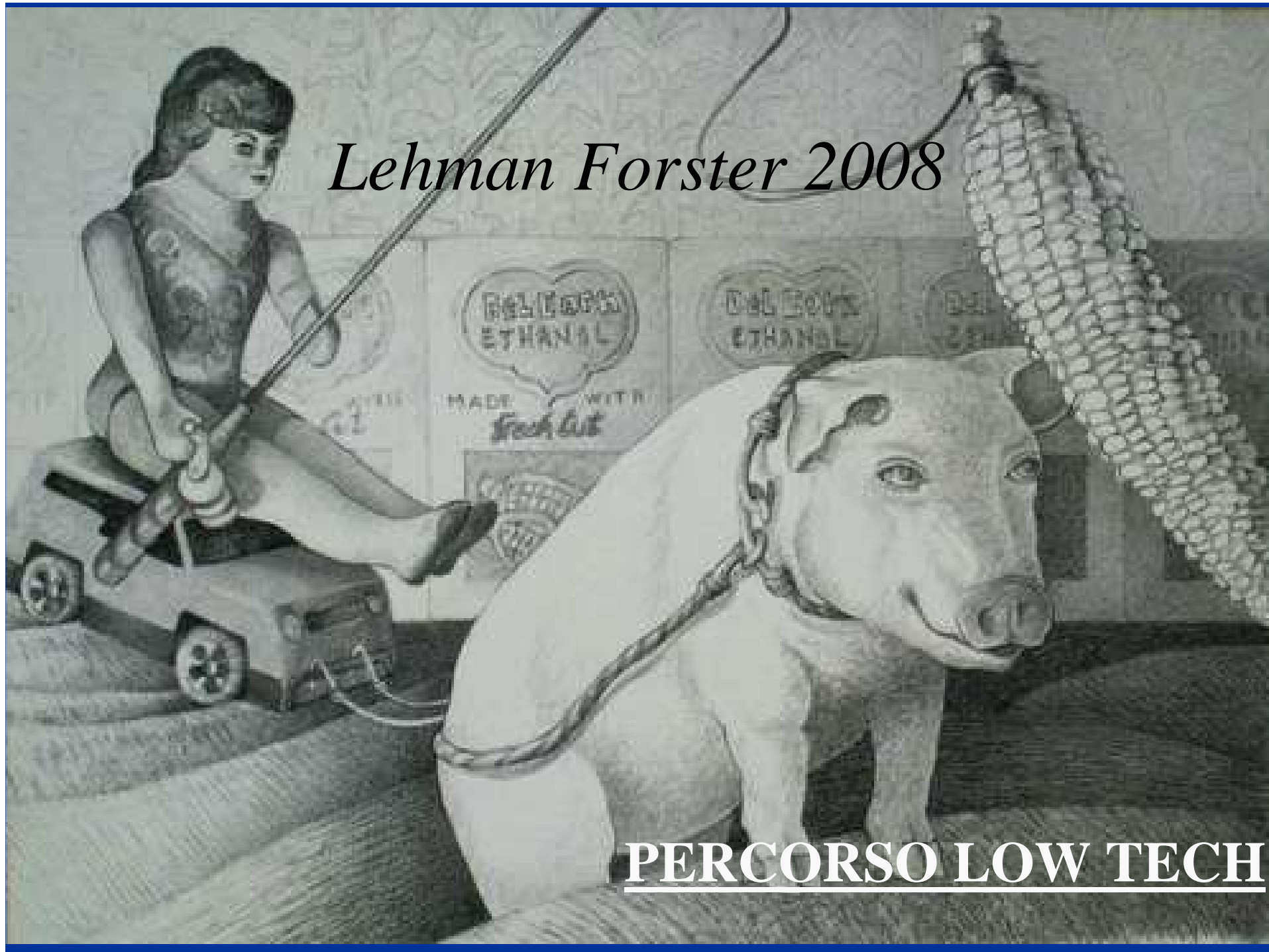
*Karl Popper*

➤ HIGH TECH

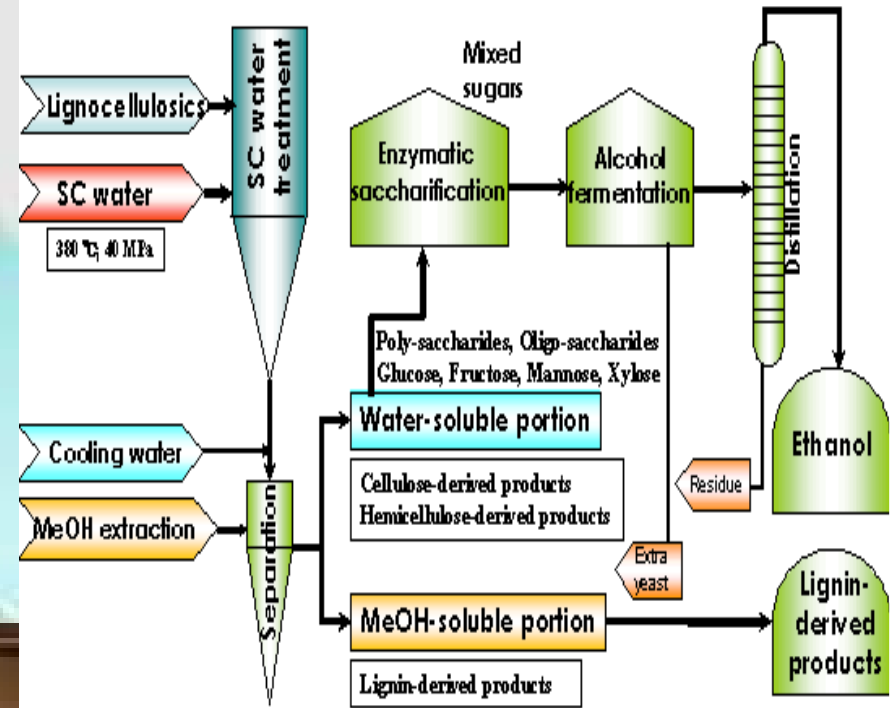
➤ LOW TECH



*Lehman Forster 2008*



**PERCORSO LOW TECH**



# PERCORSO HIGH TECH

EVITARE  
INGORGO  
CONFUSIONE!

