S.I.E.T.O
Società Italiana di Ergoftalmologia e Traumatologia Oculare

30°
CONGRESSO
NAZIONALE

Glaucoma e Angio OCT

dott. A. Lucente

Studio Oculistico

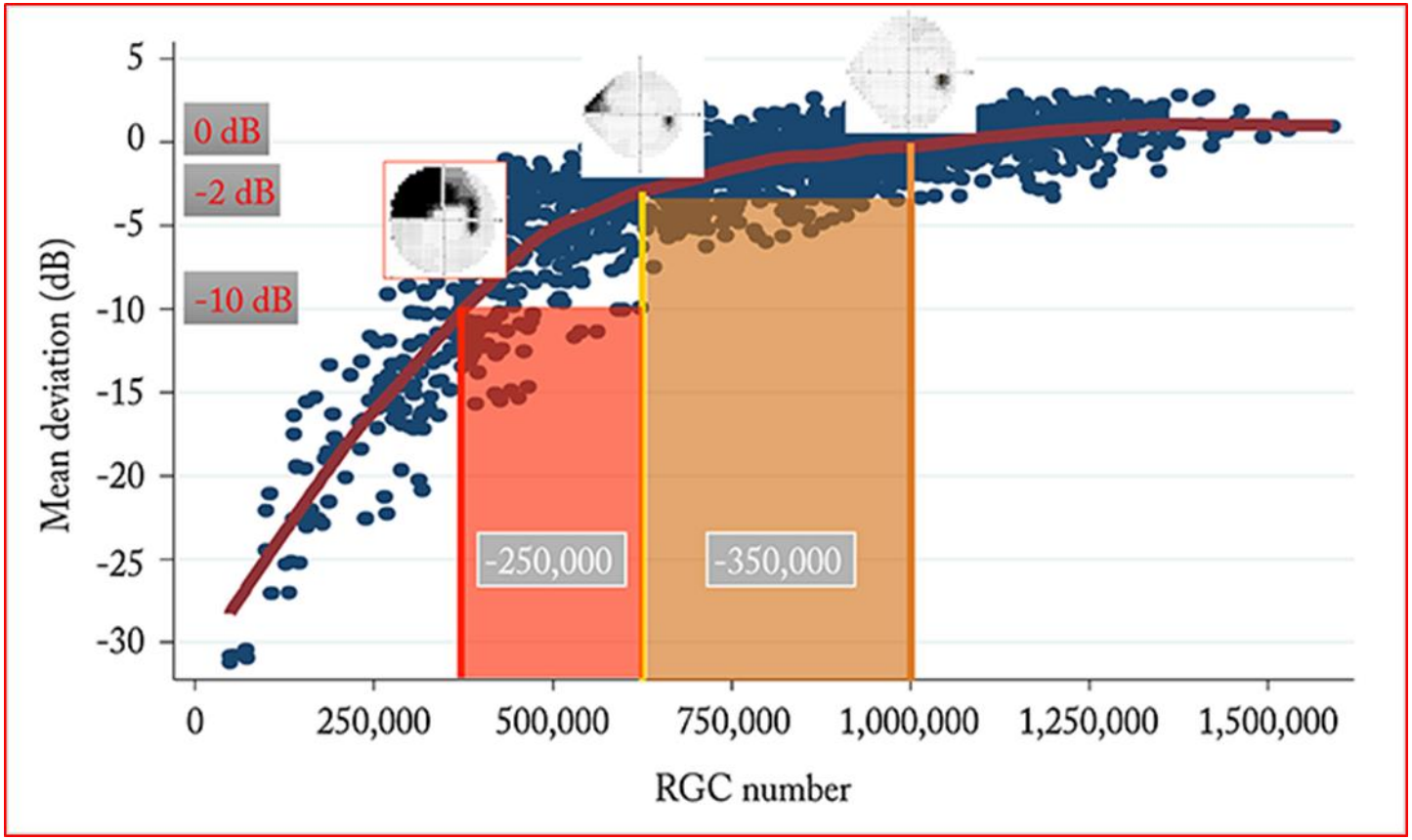
In Oculis Salus

www.amedeolucente.it

Disclosure

Consulting Free

- *Carl Zeiss Meditec*
- *Alpha Intes*
- *Mesofarma*



3 Zone of interest for Glaucoma

Angio-OCT

Peri-Optic Disc Blood Flow

Optic Disc Blood Flow

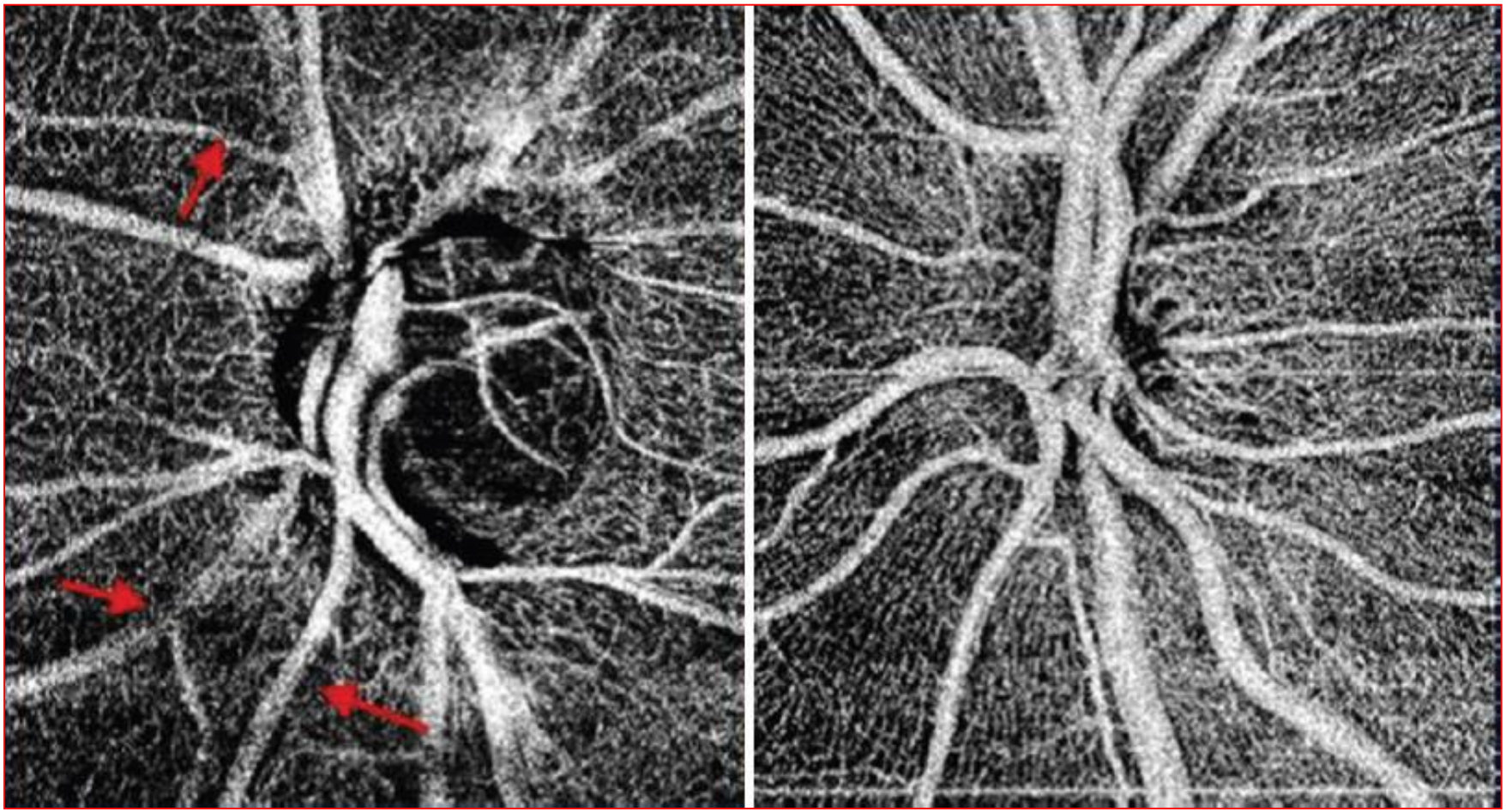
Lamina Cribrosa

Michel Puech
Explore Vision di Parigi

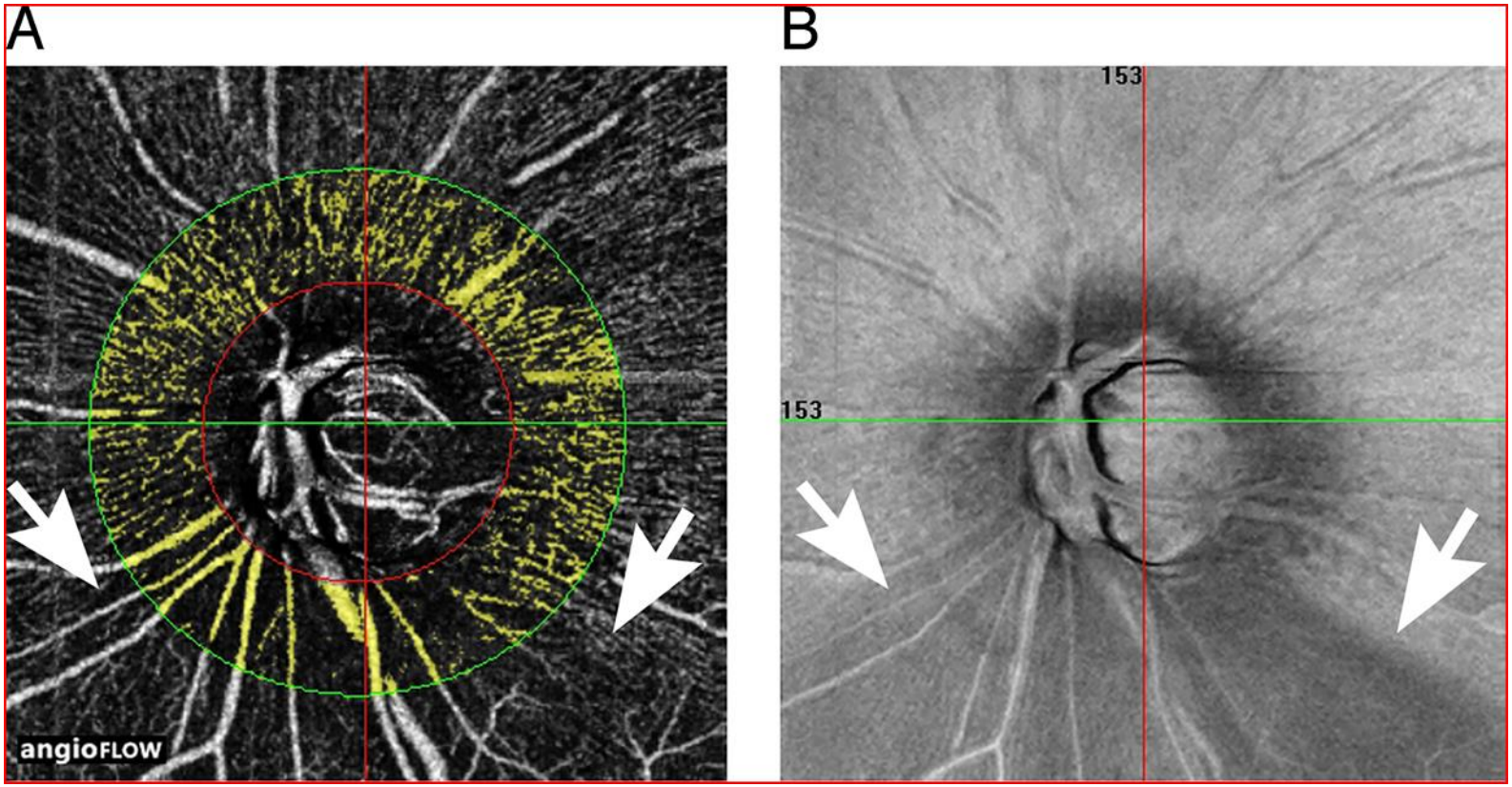
Relationship between **visual field loss** and **RGC numbers.** A normal visual field in a healthy individual has approximately **1 million RGCs**. At a **mean deviation of *-2 dB*,** which equates to an **early field defect**, **RGC number** has decreased by around **350,000 cells**. At ***-10 dB,*** a field defect that can result **in functional impairment** and **quality of life decline**, **RGC number** has **decreased** by **a further 250,000 cells from the RGC number at -2 dB**

by Felipe Medeiros **The Ophthalmologist May 2017**

Optical coherence angiography of the **optic nerve head** of a **glaucomatous disc (left)** and a **healthy disc (right)**. In addition to the general reduction in the visibility of the disc and peripapillary microvasculature in the glaucomatous disc, **focal areas** of **vascular attenuation** are visible **(arrows).** **OCTA images can help our understanding of the pathogenesis of ONH diseases.**



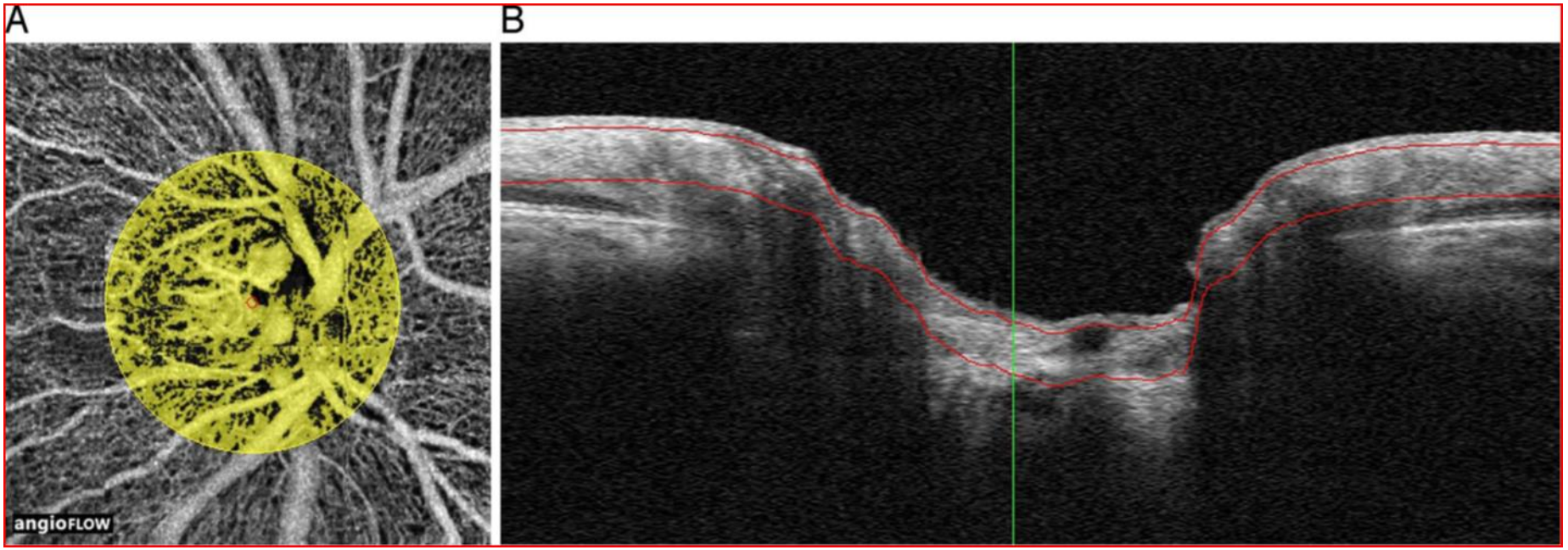
by: Handan Akil © 2017 Journal of Ophthalmic and Vision Research; date of Web Publication 15-Feb-2017



Limit Depth 0 ≤ 80 µm; limit area 700 µm

(A) The highlighted RPC **(Radial Peripapillary Capillary)** of the superficial retina
(B) En face image of the retinal nerve fiber layer defects **(between arrows)** in an eye with **POAG.**

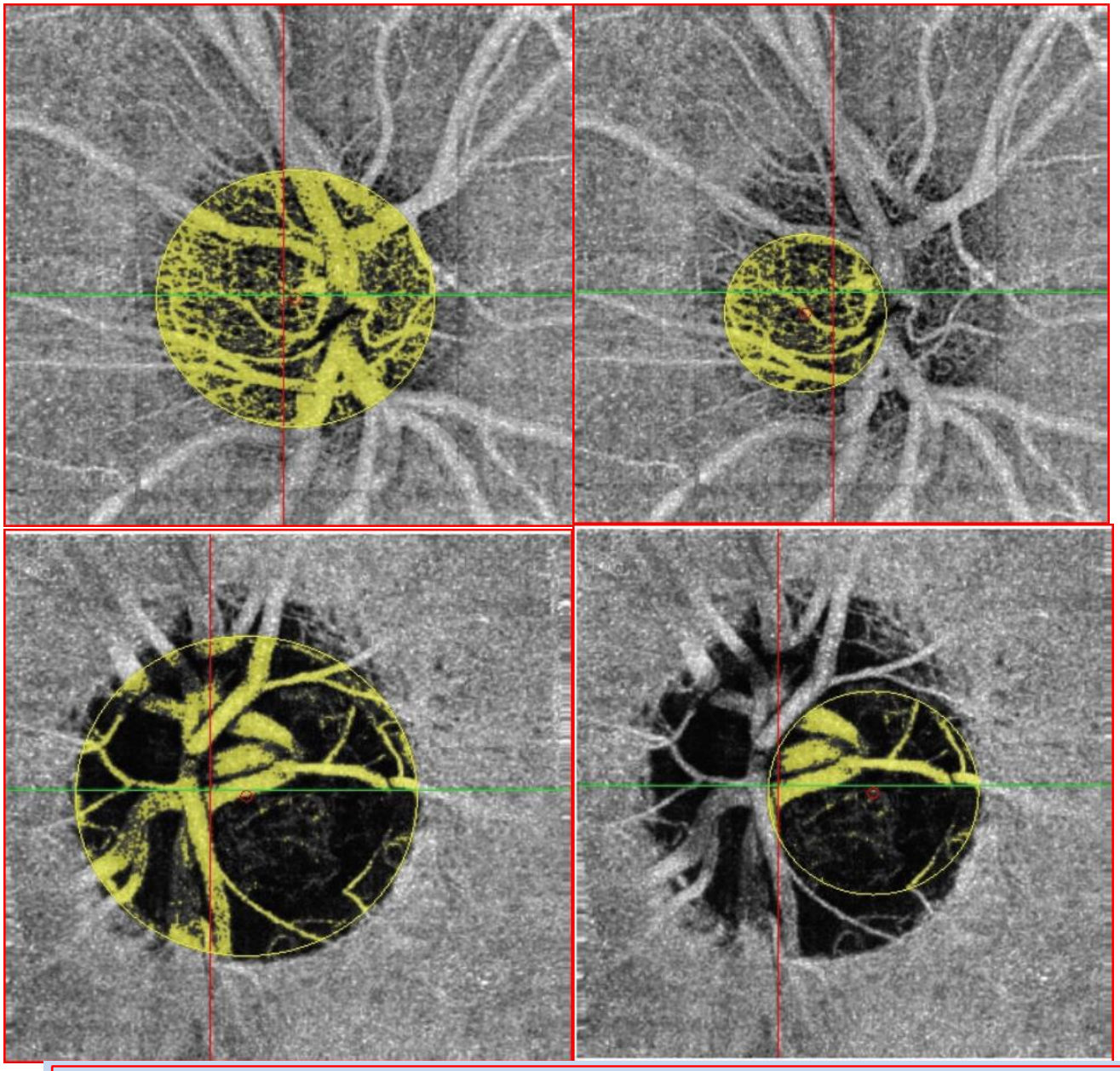
In this image, there is a **defective RPC** between the arrows and a **corresponding** retinal nerve fiber layer defect between the arrows. In this case, the tissue depth is between **0 and 80 µm**, and the highlighted **area is 700 µm from the disc margin** **(size, 4.5mm x4.5 mm)**



Limit: 50 ≤ 250µm

A) An example of highlighted prelaminar vessels in a **normal eye**. The vascular flow index of the prelaminar area is calculated by measuring the **mean decorrelation** in the column between **50 and 250 µm deep within Elschnig's scleral ring**

B) In the sagittal section image of the same optic **nerve head**, a large part of the *prelaminar region is included between the two red lines* **50 and 250 µm from the disc surface (size, 3x3mm)**



50 glaucoma patients and 30 normal subjects

In the glaucoma group

- **total ONH vessel density** were reduced by **24.7%** (0.412 versus 0.547; $p < 0.0001$)

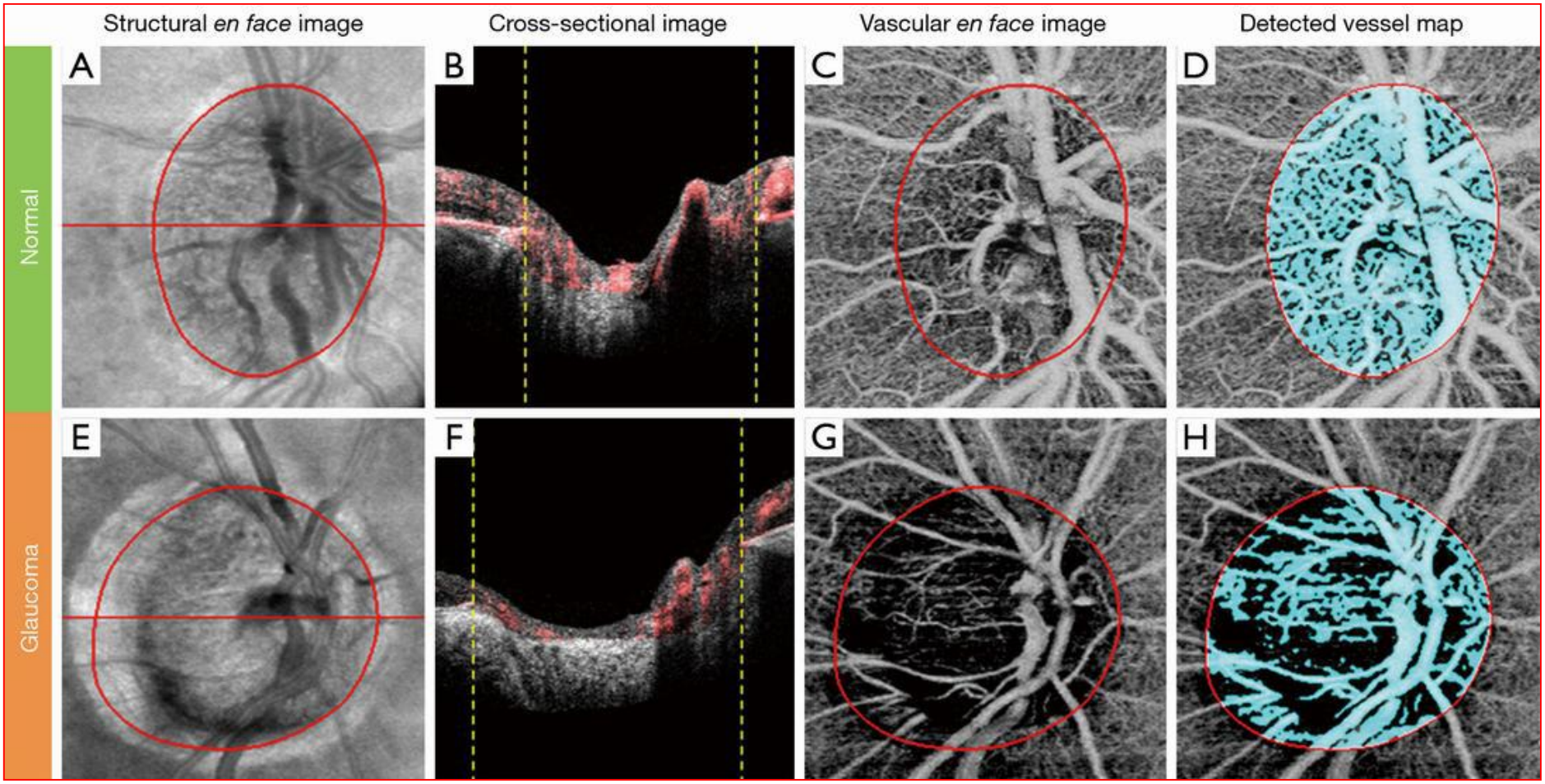
- **temporal ONH vessel density** were reduced by **22.88%** (0.364 versus 0.472; $p = 0.001$).

Significant correlations were found between **temporal and total ONH vessel density and**

- ***RNFL***
- ***GCC***
- ***VF MD*** *mean deviation* -
- ***Visual field index***.

Total **(a)** and temporal **(b)** ONH acquisition in a **normal** patient.
Total **(c)** and temporal **(d)** ONH acquisition in a **glaucoma** patient

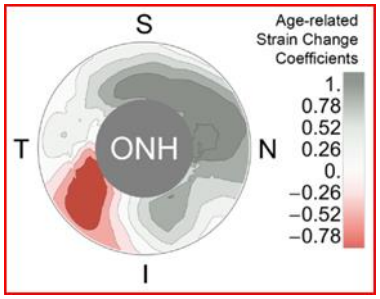
by: Pierre-Maxime Lévêque et al. Journal of Ophthalmology 2016

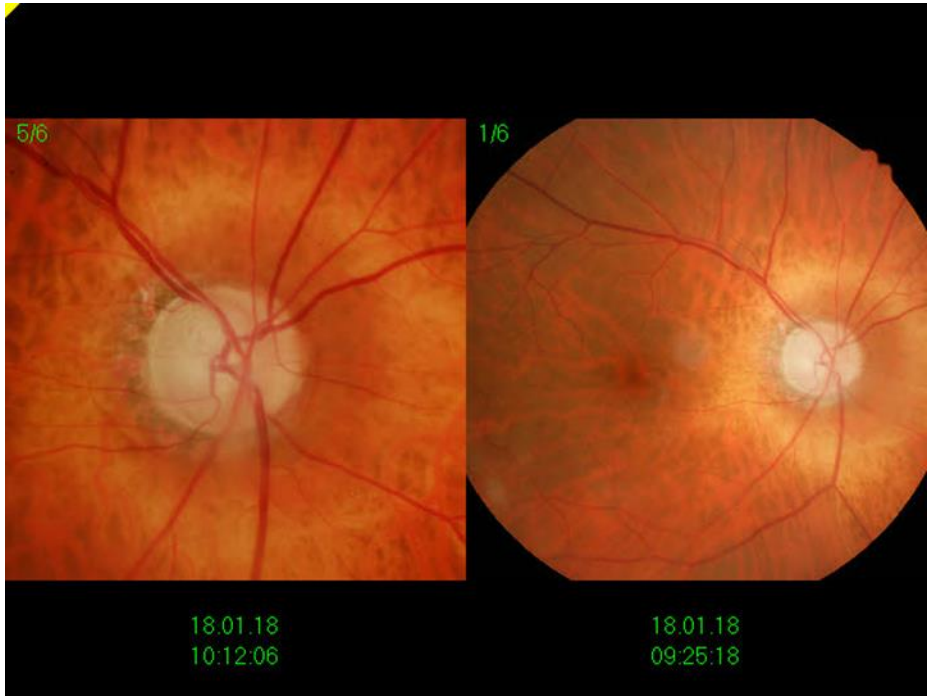


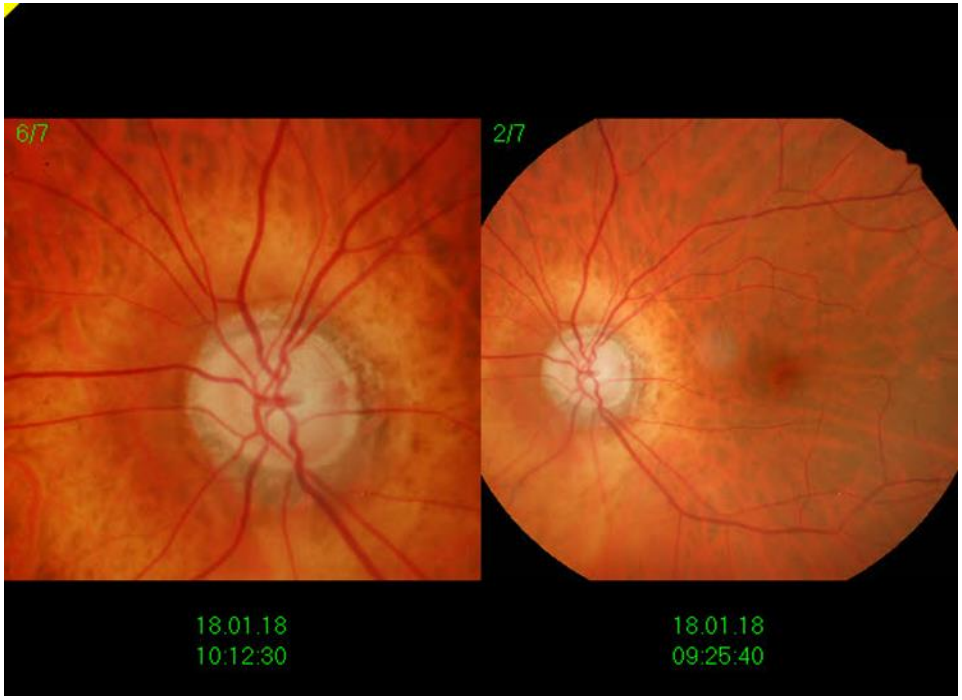
An example result of the vascular en face image of pre-laminar tissue (preLC) of a normal (A-D) and a glaucomatous eyes (E-H). (A,E) Show the structural en face images; (B,F) display the cross-sectional structural images sampled at the horizontal red lines in (A) and (E) superimposed with blood flow signals from preLC, and vertical yellow dashed lines indicate the optic disc margin by detecting the end of Brush's membrane; (C,G) are the vascular en face images from preLC; (D,H) present the detected blood vessel maps from preLC. by Chieh-Li Chen

Stress /Strain and IOP and finite elements

SL♂78 aa Glaucoma peripapillare







Uno studio biomeccanico del danno strutturale e sulla deformabilità sclerale (Strain) è condotto da anni da Claude Burgoyne (Portland Oregon, USA). Da oltre un decennio Burgoyne studia gli effetti della IOP sulla sclera e, in particolar modo, sulla regione peripapillare

Bruno L., Fazio M. A., Poggialini A., Lucente A. Identificazione dei Meccanismi di Danneggiamento dei Tessuti dell'Occhio Mediante Analisi Numeriche e Sperimentali. Atti del convegno "9° Congresso Internaz. SOI 2011.

Massimo A. Fazio, Rafael Grytz, L. Bruno, Michael J. A. Girard, Stuart Gardiner, Christopher A. Girkin, J. Crawford Downs. Regional Variations in Mechanical Strain in the Posterior Human Sclera. Investigative Ophthalmology & Visual Science, August 2012, Vol. 53, No. 9.

[redacted]

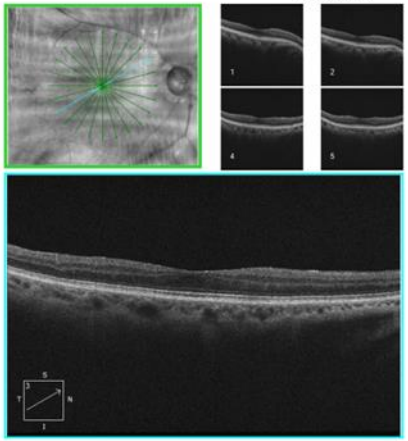
ID: 1940.1120.AD74.8146.B Data esame: 18/01/2018
Data di nascita: 20/11/1940 Ora dell'esame: 09:43
Sesso: Unknown Numero di serie: 5000-6254
Tecnico: Angio, Cirrus Intensità segnale: 7/10

Studio Oculistico A. Lucente

ZEISS

Immagini ad alta definizione: HD Radial OD ● ○ OS

Lunghezza: 6 mm



Commenti

Firma del medico

CIRRUS ANGIO
SW Ver: 10.0.0.14618

Pagina 1 di 1

Nome: [redacted]

ID: [redacted]B Data esame: 18/01/2018
Data di nascita: 20/11/1940 Ora dell'esame: 09:43
Sesso: Unknown Numero di serie: 5000-6254
Tecnico: Angio, Cirrus Intensità segnale: 6/10

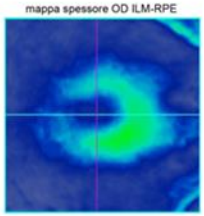
	OD	OS
Data esame:	18/01/2018	18/01/2018
Ora dell'esame:	09:43	09:47
Numero di serie:	5000-6254	5000-6254
Intensità segnale:	6/10	7/10

Studio Oculistico A. Lucente

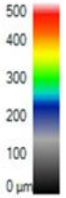
ZEISS

Spessore maculare OU: Macular Cube 512x128 OD ● ● OS

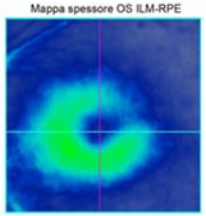
mappa spessore OD ILM-RPE



Fovea: 242, 64

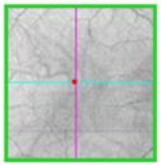


Mappa spessore OS ILM-RPE

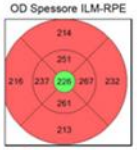


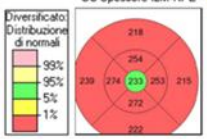
Fovea: 247, 75

Fondo OD OCT



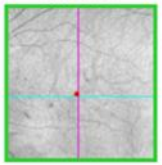
OD Spessore ILM-RPE





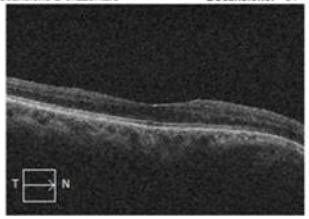
OS Spessore ILM-RPE

Fondo OS OCT

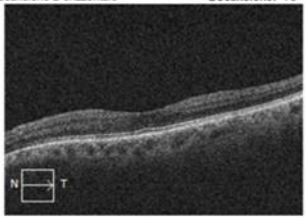


ILM - RPE	OD	OS
Spessore Campo secondario cent. (µm)	226	233
Volume (mm³)	8,1	8,2
Medio Spessore (µm)	224	227

Scansione B orizzontale **BScansione:** 64



Scansione B orizzontale **BScansione:** 75



Commenti

Firma del medico

CIRRUS ANGIO
SW Ver: 10.0.0.14618

Pagina 1 di 1

[redacted]

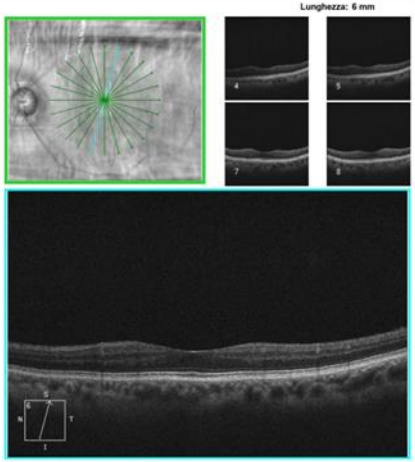
Data esame: 18/01/2018
Data di nascita: 20/11/1940 Ora dell'esame: 09:48
Sesso: Unknown Numero di serie: 5000-6254
Tecnico: Angio, Cirrus Intensità segnale: 6/10

Studio Oculistico A. Lucente

ZEISS

Immagini ad alta definizione: HD Radial OD ○ ● OS

Lunghezza: 6 mm



Commenti

Firma del medico

CIRRUS ANGIO
SW Ver: 10.0.0.14618

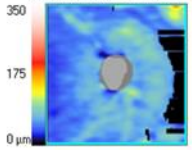
Pagina 1 di 1

Nome: [redacted]

			OD	OS	
ID:	1940.1120.AD74.8146.B	Data esame:	18/01/2018	18/01/2018	Studio Oculistico A. Lucente
Data di nascita:	20/11/1940	Ora dell'esame:	09:44	09:51	
Sesso:	Unknown	Numero di serie:	5000-6254	5000-6254	
Tecnico:	Angio, Cirrus	Intensità segnale:	7/10	5/10	

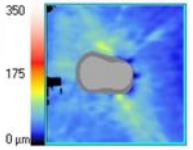
Analisi RNFL e ONH OU:Optic Disc Cube 200x200 — OD ● ● OS

Mappa dello spessore RNFL

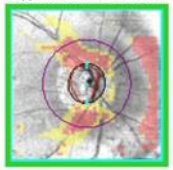


	OD	OS
Spessore RNFL medio	69 µm	69 µm
Simmetria RNFL	34%	
Area della rima	0,62 mm²	1,13 mm²
Area del disco	1,77 mm²	3,85 mm²
Rapporto C/D medio	0,81	0,83
Rapporto C/D verticale	0,87	0,72
Volume di escavazione	0,337 mm³	0,428 mm³

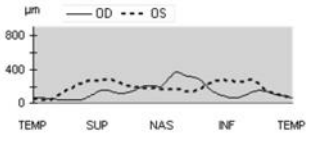
Mappa dello spessore RNFL



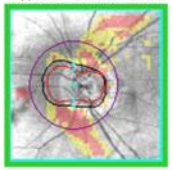
Mappa della deviazione RNFL



Spessore della rima neurale



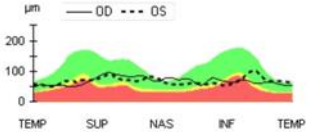
Mappa della deviazione RNFL



Centro del disco(-0,03,0,09)mm

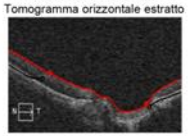
Tomogramma orizzontale estratto

Spessore RNFL

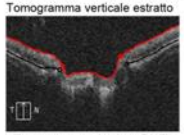


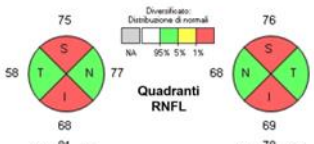
Centro del disco(-0,51,0,03)mm

Tomogramma orizzontale estratto

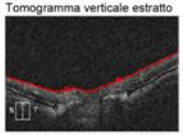


Tomogramma verticale estratto

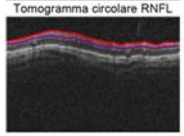


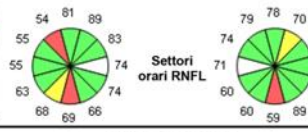


Tomogramma verticale estratto

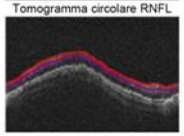


Tomogramma circolare RNFL





Tomogramma circolare RNFL



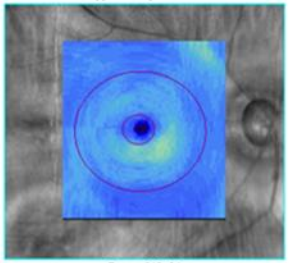
Commenti	Firma del medico

Nome: [redacted]

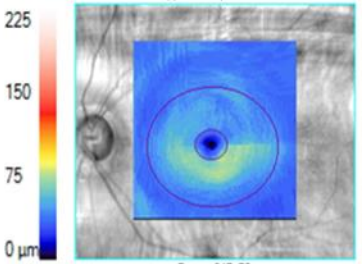
			OD	OS	
ID:	1940.1120.AD74.8146.B	Data esame:	18/01/2018	18/01/2018	Studio Oculistico A. Lucente
Data di nascita:	20/11/1940	Ora dell'esame:	09:43	09:47	
Sesso:	Unknown	Numero di serie:	5000-6254	5000-6254	
Tecnico:	Angio, Cirrus	Intensità segnale:	6/10	7/10	

Analisi cellula gangliare: Macular Cube 512x128 — OD ● ● OS

Mappa dello spessore OD



Fovea: 242, 64

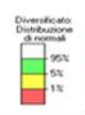


Mappa dello spessore OS

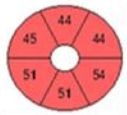
Fovea: 247, 75

Mappa di deviazione OD

Settori OD



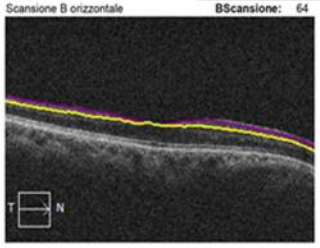
Settori OS



Mappa di deviazione OS

	OD µm	OS µm
Spessore GCL medio	46	48
Spessore GCL minimo	41	41

Scansione B orizzontale — **BScansione:** 64



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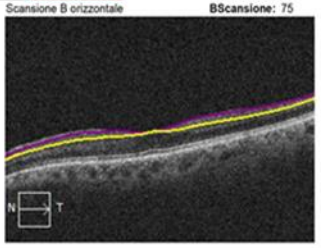


Commenti	Firma del medico

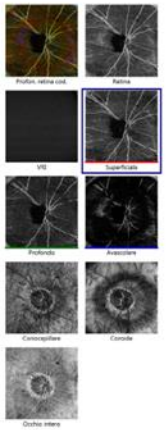
Nome: [redacted]
ID: [redacted]
Data di nascita: 20/11/1940
Sesso: Unknown
Tecnico: Angio, Cirrus

OD
Data esame: 18/01/2018
Ora dell'esame: 09:46
Numero di serie: 5000-6254
Intensità segnale: 7/10

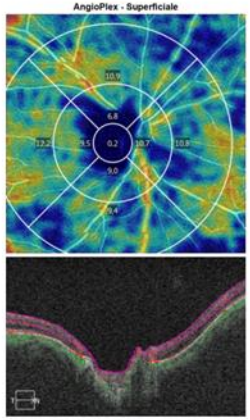
Studio Oculistico A. Lucente

Analisi dell'angiografia : Angiography 6x6 mm

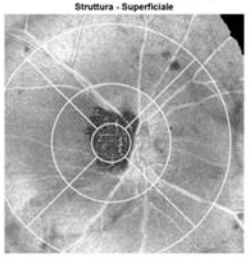
OD ● ○ OS



AngioPlex - Superficiale



Struttura - Superficiale



Sovrapposizioni
Struttura - Nessuno
AngioPlex - Vaso Mappa

AngioPlex Metrix

ETDRS - Vaso

Regione	Densità
Centrale	0,2 mm⁻¹
Interna	9,0 mm⁻¹
Esterna	10,8 mm⁻¹
Completo	10,1 mm⁻¹

FAZ

Area	0,07 mm²
Perimetro	1,18 mm
Circolarità	0,66

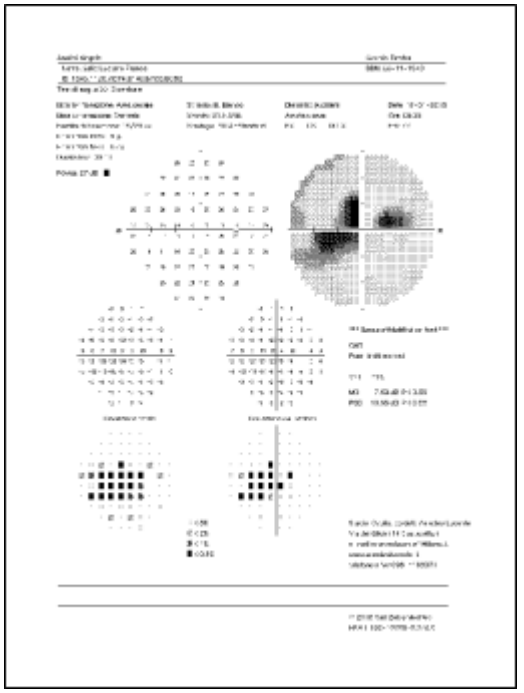
Segmento: 175 Parte sup.: ILM Parte inf.: IPL

Commenti

Analisi modificata: 18/01/2018 09:55

Firma del medico

CIRRUS ANGIO
SW Ver: 10.0.0.14618



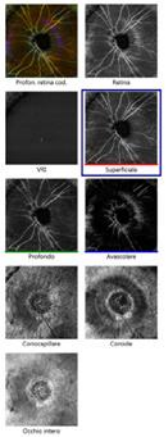
Nome: [redacted]
ID: [redacted]
Data di nascita: 20/11/1940
Sesso: Unknown
Tecnico: Angio, Cirrus

OS
Data esame: 18/01/2018
Ora dell'esame: 09:53
Numero di serie: 5000-6254
Intensità segnale: 5/10

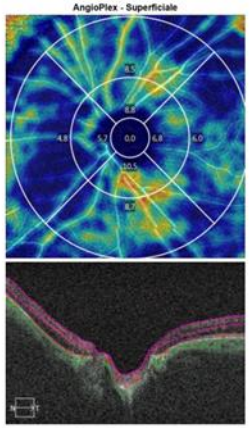
Studio Oculistico A. Lucente

Analisi dell'angiografia : Angiography 6x6 mm

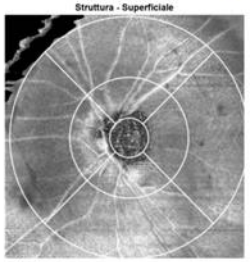
OD ○ | ● OS



AngioPlex - Superficiale



Struttura - Superficiale



Sovrapposizioni
Struttura - Nessuno
AngioPlex - Vaso Mappa

AngioPlex Metrix

ETDRS - Vaso

Regione	Densità
Centrale	0,0 mm⁻¹
Interna	8,0 mm⁻¹
Esterna	7,0 mm⁻¹
Completo	7,0 mm⁻¹

FAZ

Area	-
Perimetro	-
Circolarità	-

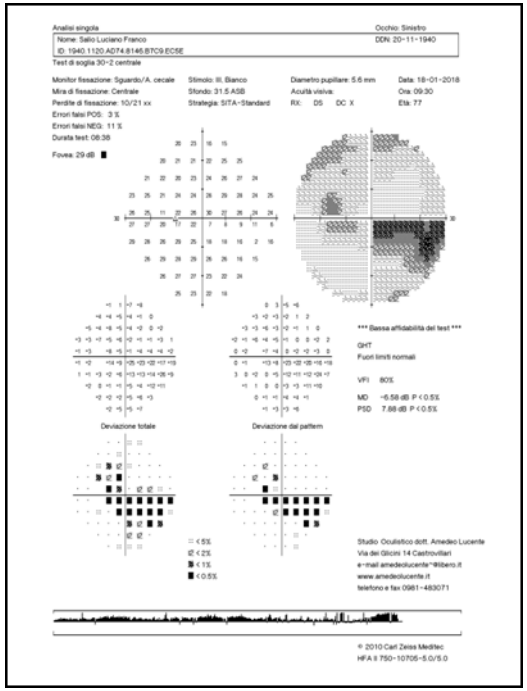
Segmento: 175 Parte sup.: ILM Parte inf.: IPL

Commenti

Analisi modificata: 18/01/2018 09:56

Firma del medico

CIRRUS ANGIO
SW Ver: 10.0.0.14618



REVIEW

Optical coherence tomography angiography in glaucoma: a mini-review

Kelvin H. Wan , Christopher K. Leung

Department of Ophthalmology, Tuen Mun Eye Center and Tuen Mun Hospital, Hong Kong, China
Department of Ophthalmology and Visual Sciences, The Chinese University of Hong Kong, Hong Kong, China

OCT-A abnormality in glaucoma: primary damage or secondary change?

Summary

Vascular abnormalities detected by OCT-A have been consistently observed in glaucoma. However, **it remains unclear whether OCT-A provides additional diagnostic information for the detection of glaucoma compared with conventional OCT measurements such as circumpapillary RNFL thickness, neuroretinal rim width, and ganglion cell inner plexiform form layer thickness**.

F1000 Research 2017, 6(F1000 Faculty Rev):1686 Last updated: 02 OCT 2017

S.I.E.T.O
Società Italiana di Ergoftalmologia e Traumatologia Oculare

30°
CONGRESSO
NAZIONALE

Thank you for your kind attention!

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