CONGRESSO S.O.C. 2015, CROTONE

IOLMaster 700
i primi 12 mesi

C. Carbonara *
Roma

* Paid consultant for Carl Zeiss-Meditech

A colpo d’occhio

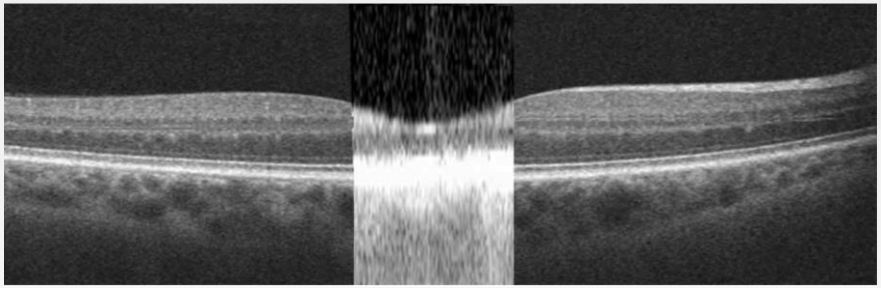
- Nuovo look
- Più grande
- Monitor esterno
- Touchscreen
- Tastiera e mouse
- Richiede controllo calibrazione quotidiano
- HD di backup esterno

Caratteristiche

- Calibrazione molto veloce
- Almeno un ID per paziente
- Chiede sempre se paz. operato di refrattiva
- Richiede sempre refrazione ed acutezza visiva per la Holladay 2

caratteristiche

- Richiede occhio immobile
- Nessun problema con nistagmo

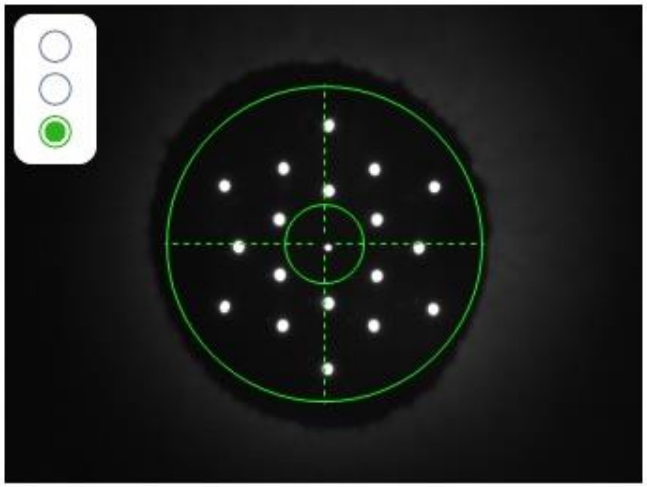


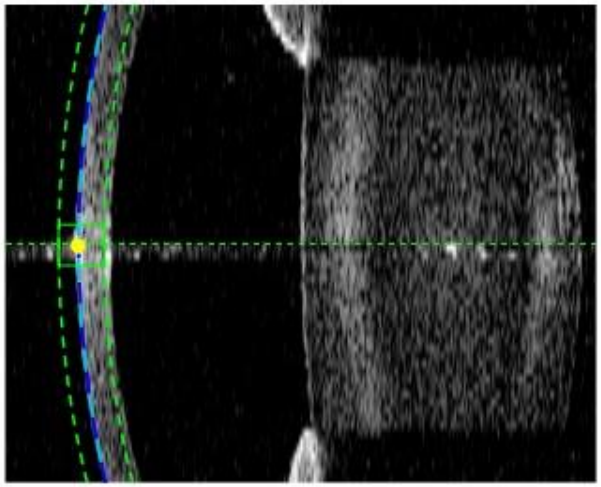
- Oct del S.A. per ottenere perfetto focus sulla cornea
- Analisi fotografica di ogni segmento analizzato
- Swept-source OCT per visualizzare la foveola

72 anni **OD** | OS

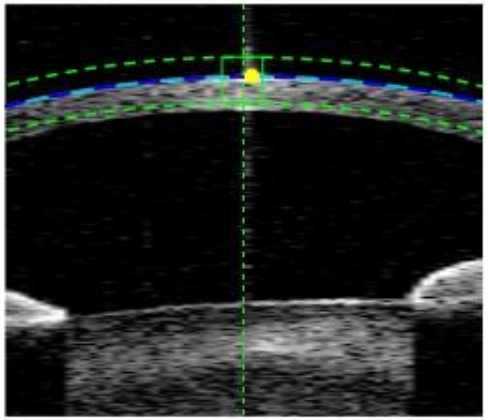
Orientamento preciso

1. Centrare il cursore a croce verde sul riflesso centrale della cornea.
2. Nella modalità automatica, la misurazione viene avviata automaticamente. Nella modalità manuale, la misurazione si avvia premendo il tasto del joystick.



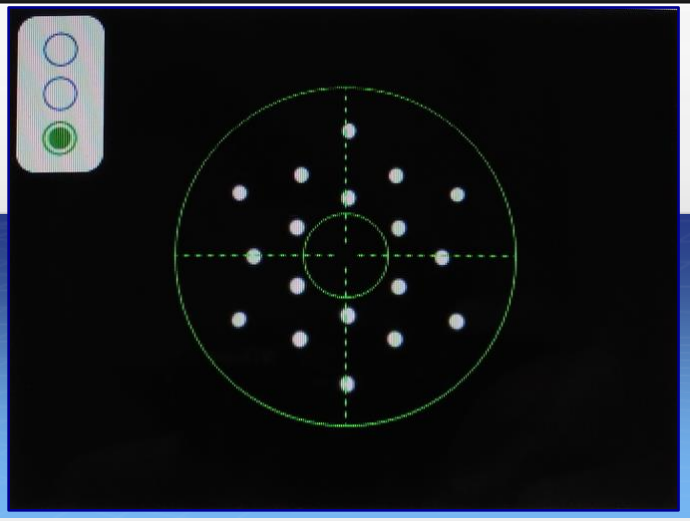


SNR



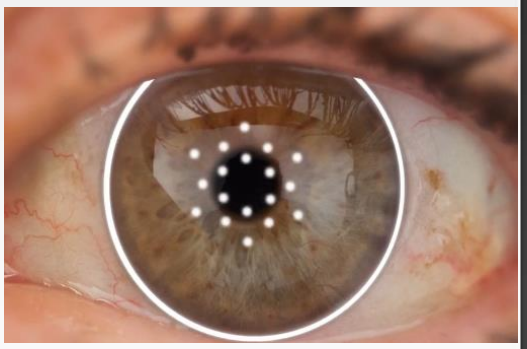
Auto | Manuale

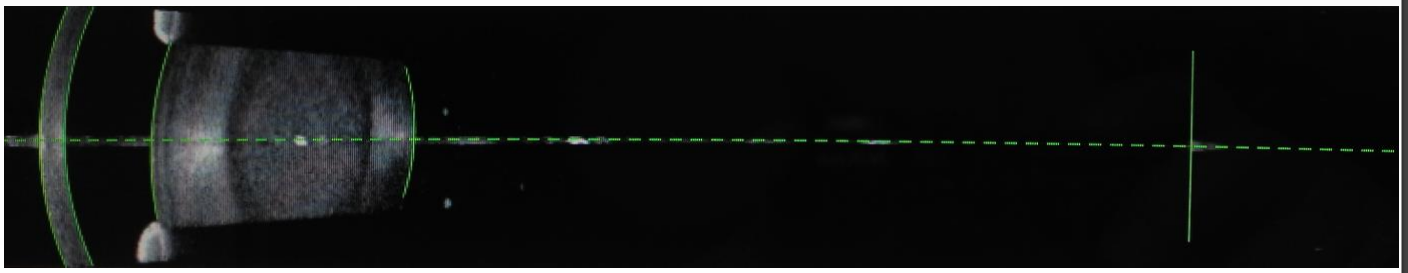
Misure



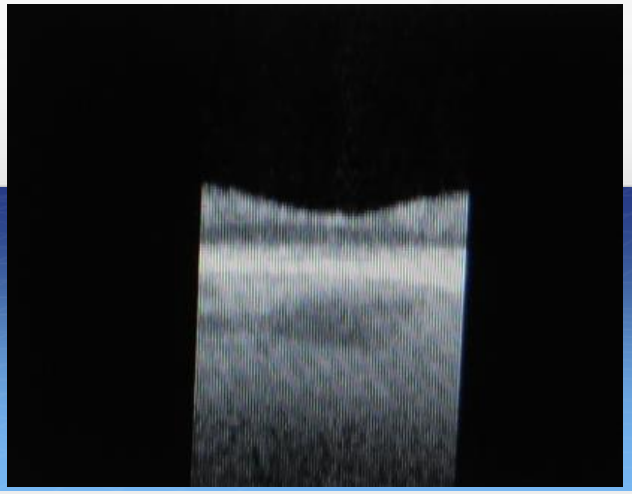
1.5mm
2.5mm
3.2mm

- Nuovo sistema multipunti per misurare la cornea (raggio 7.8mm)
- Rotazione su sei assi per 6 differenti mis. AxL
- Controllo della fissazione
- Misura dello spessore del cristallino
- Pachimetria

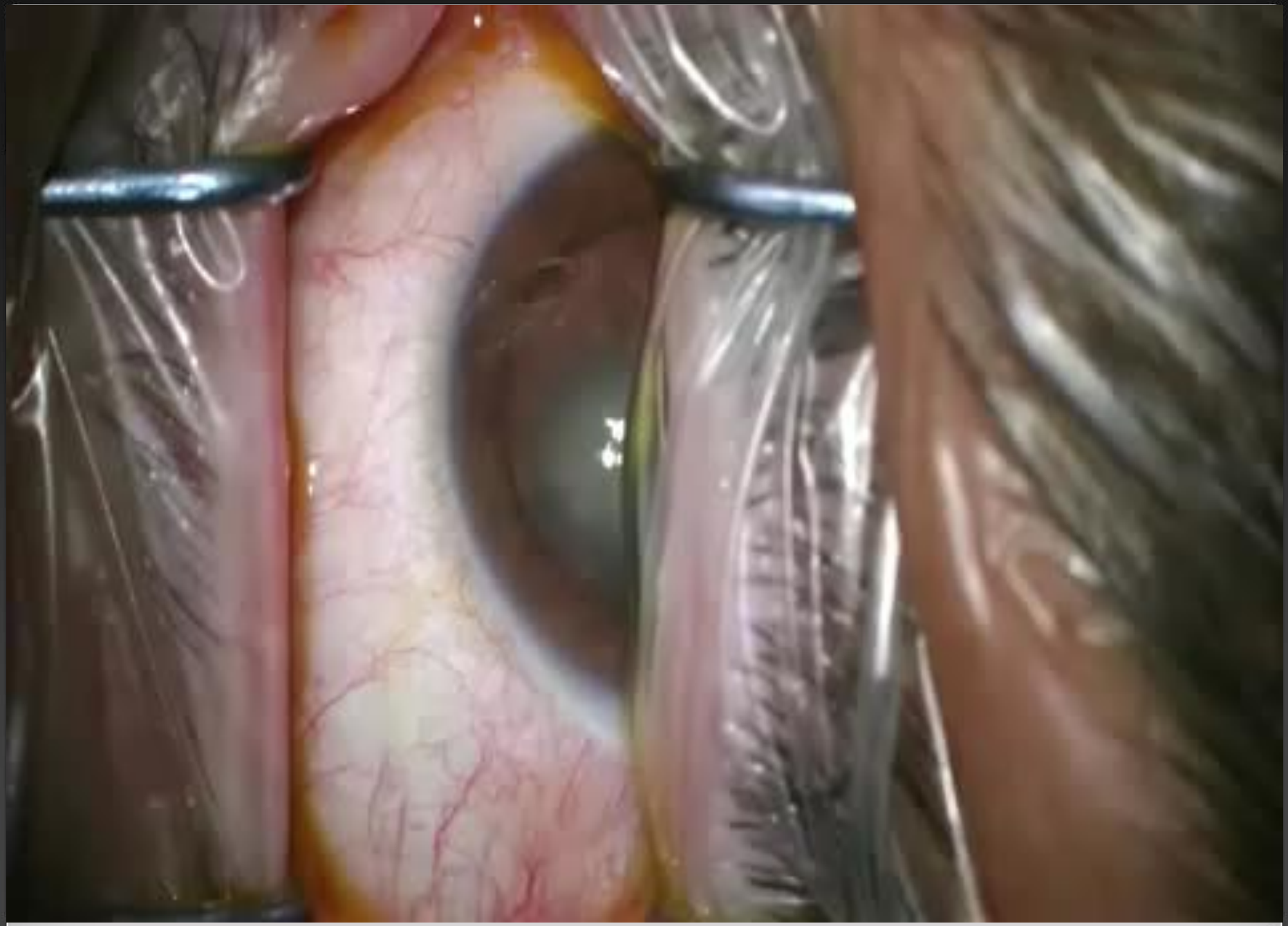




Features



- Bassissima sensibilità al film lacimale scarso
- Misura tutto tranne le cataratte bianche
- Su 400 occhi ha misurato 22 cataratte corticali posteriori non misurabili con gli altri biometri ottici
- Haigis suite software e Holladay 2 formula
- Assistenza per impianto di IOL torica



Patient [redacted]

Date of birth 02/06/1958 Gender Female
Patient ID sv58

Doctor Surgeon Operator Surgeon

Studio Oculistico
Dott. Claudio Carbonara
Via Alessandro Vessella 7
00199 Roma
0686200243
studio.carbonara@gmail.com

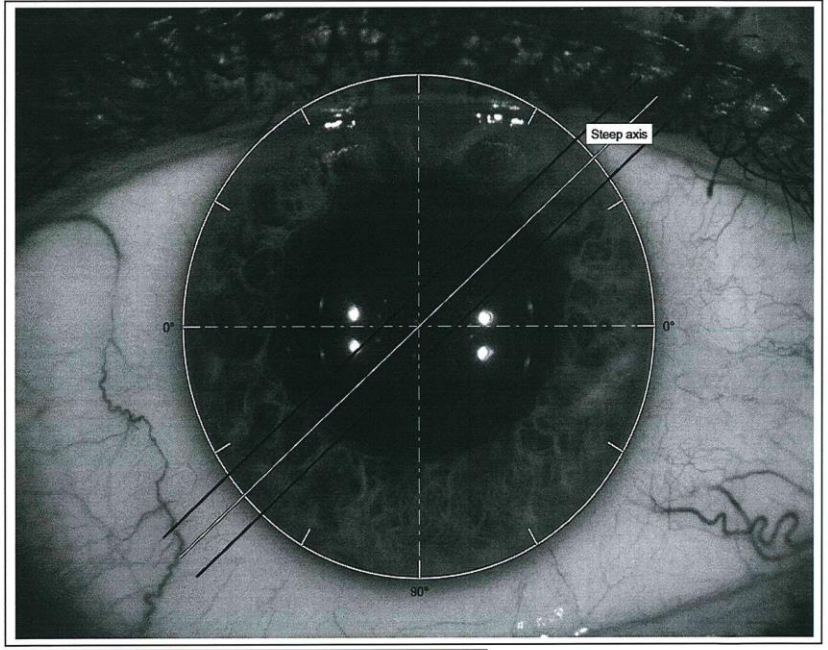
Date of calibration test: 03/03/2015 by: Surgeon Result: OK
Date of measurement: 03/03/2015 n: 1.3375 CVD: 12.00 mm

Please note the information on the following page.

OD right

Reference Image

AL: 28.94 mm	(SD = 11 µm)	SE: 39.31 dpt	
ACD: 3.38 mm	(SD = 7 µm)	K1: 37.88 dpt @ 132°	
LT: 4.62 mm	(SD = 15 µm)	K2: 40.86 dpt @ 42°	
		Δ D: -2.99 dpt @ 132°	
Visual acuity: ---		WTW: 11.6 mm	
LS: Phakic; VS: Vitreous body		Ref: ---	



Comment

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Patient [redacted]

Date of birth 02/06/1958 Gender Female
Patient ID sv58

Doctor Surgeon Operator Surgeon

Studio Oculistico
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0686200243
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Date of calibration test: 03/03/2015 by: Surgeon Result: OK
Date of measurement: 03/03/2015 n: 1.3375 CVD: 12.00 mm

Please note the information on the following page.

OS left

Reference Image

AL: 28.85 mm	(SD = 16 µm)	SE: 40.99 dpt	
ACD: 5.02 mm	(SD = 6 µm)	K1: 39.57 dpt @ 48°	
LT: 0.59 mm (!)	(SD = 14 µm)	K2: 42.52 dpt @ 138°	
		Δ D: -2.96 dpt @ 48°	
Visual acuity: ---		WTW: 11.7 mm	
LS: Pseudophakic; VS: Vitreous body		Ref: ---	

Comment

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Risultati delle misure

- Misure velocissime: 10-15 sec. per occhio
- Almeno 5 misure per ogni segmento analizzato
- Misurazione completa di tutto l'occhio
- Notifica immediata di dati errati
- Stampa completa di tutto ciò che ha misurato

Patient [redacted]

Date of birth 28/02/1958 Gender Male
Patient ID 156027315

Doctor Surgeon Operator Surgeon

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Date of calibration test: 10/03/2015 by: Surgeon Result: OK
Date of measurement: 11/03/2015

OD: Axis length of right eye: 25.62 mm. - Note: long eye.

OD right

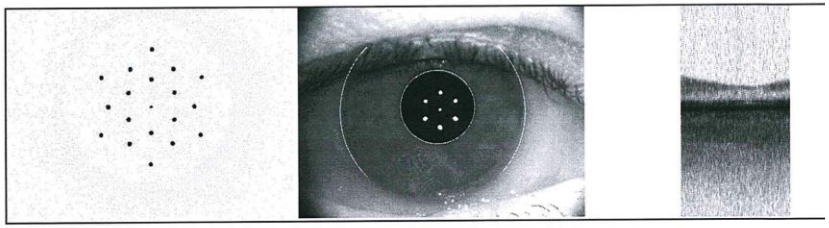
Analysis

Measured values		
AL:	25.62 mm	(SD = 5 µm)
ACD:	4.00 mm	(SD = 7 µm)
LT:	4.24 mm	(SD = 10 µm)

Central corneal thickness		
CCT:	568 µm	(SD = 3 µm)

Keratometry values		
n: 1.3375		
SE:	43.28 dpt	(SD = 3 µm)
K1:	42.85 dpt @ 71°	(SD = 4 µm)
K2:	43.72 dpt @ 161°	(SD = 3 µm)
Δ D:	-0.87 dpt @ 71°	

White-to-white values			
WTW:	12.5 mm	lx: +0.5 mm	ly: +0.1 r
P:	5.0 mm	Px: +0.2 mm	Py: -0.2 r



Comment

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Patient [redacted]

Date of birth 28/02/1958 Gender Male
Patient ID 156027315

Doctor Surgeon Operator Surgeon

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Date of calibration test: 10/03/2015 by: Surgeon Result: OK
Date of measurement: 11/03/2015

OS: Axis length of left eye: 25.43 mm. - Note: long eye.

OS left

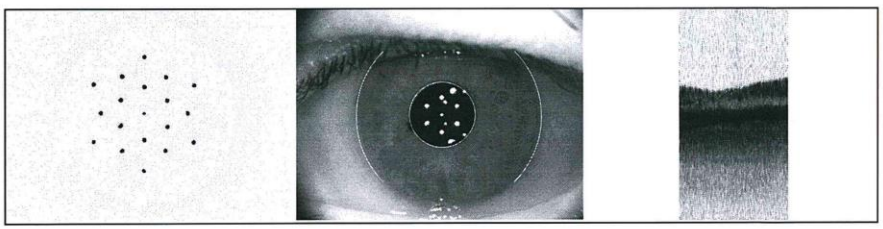
Analysis

Measured values		
AL:	25.43 mm	(SD = 6 µm)
ACD:	5.27 mm (!)	(SD = 19 µm)
LT:	---	

Central corneal thickness		
CCT:	565 µm	(SD = 3 µm)

Keratometry values		
n: 1.3375		
SE:	43.22 dpt	(SD = 3 µm)
K1:	42.94 dpt @ 154°	(SD = 8 µm)
K2:	43.50 dpt @ 64°	(SD = 4 µm)
Δ D:	-0.56 dpt @ 154°	

White-to-white values			
WTW:	12.5 mm	lx: -0.5 mm	ly: +0.1 mm
P:	4.4 mm	Px: +0.0 mm	Py: +0.0 mm



Comment

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Patient [redacted]

Date of birth 12/02/1966 Gender Female
Patient ID pmc66

Doctor Surgeon Operator Surgeon

Studio Oculistico
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0686200243
studio.carbonara@gmail.com

Date of calibration test: 14/01/2015 by: Surgeon Result: OK
Date of measurement: 14/01/2015

Axis length of the right eye is 0.49 mm shorter than axis length of the left eye. - Note: re-check measured values.
OD: Axis length of right eye: 26.26 mm. - Note: long eye.

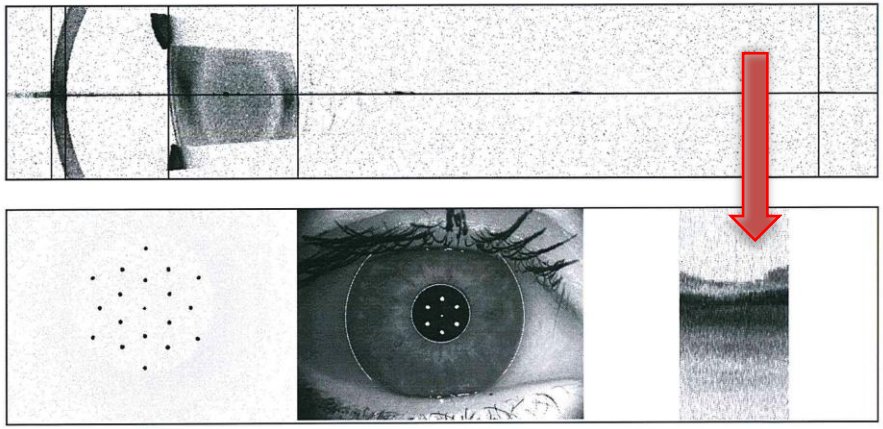
OD right — Analysis

Measured values		
AL:	26.26 mm	(SD = 5 µm)
ACD:	3.91 mm	(SD = 6 µm)
LT:	4.36 mm	(SD = 9 µm)

Central corneal thickness		
CCT:	446 µm	(SD = 3 µm)

Keratometry values		
n: 1.3375		
SE:	41.19 dpt	(SD = 4 µm)
K1:	40.92 dpt @ 169°	(SD = 7 µm)
K2:	41.47 dpt @ 79°	(SD = 8 µm)
Δ D:	-0.55 dpt @ 169°	

White-to-white values			
WTW:	12.1 mm	lx: +0.5 mm	ly: +0.1 mm
P:	3.9 mm	Px: +0.1 mm	Py: -0.1 mm



Comment

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Patient [redacted]

Date of birth 12/02/1966 Gender Female
Patient ID pmc66

Doctor Surgeon Operator Surgeon

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Date of calibration test: 14/01/2015 by: Surgeon Result: OK
Date of measurement: 14/01/2015

Axis length of the right eye is 0.49 mm shorter than axis length of the left eye. - Note: re-check measured values.
OS: Axis length of left eye: 25.77 mm. - Note: long eye.

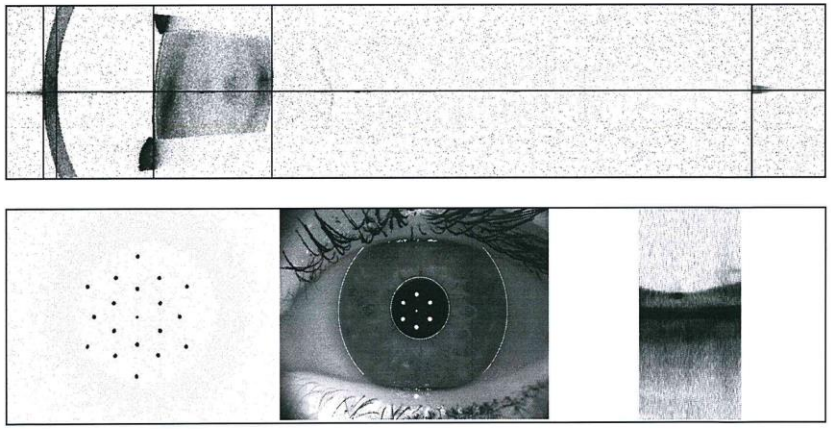
OS left — Analysis

Measured values		
AL:	25.77 mm	(SD = 5 µm)
ACD:	3.93 mm	(SD = 6 µm)
LT:	4.25 mm	(SD = 8 µm)

Central corneal thickness		
CCT:	439 µm	(SD = 3 µm)

Keratometry values		
n: 1.3375		
SE:	41.20 dpt	(SD = 2 µm)
K1:	40.99 dpt @ 36°	(SD = 2 µm)
K2:	41.41 dpt @ 126°	(SD = 4 µm)
Δ D:	-0.42 dpt @ 36°	

White-to-white values			
WTW:	12.2 mm	lx: -0.5 mm	ly: +0.0 mm
P:	4.2 mm	Px: -0.3 mm	Py: -0.2 mm



Comment

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Patient [redacted]

Date of birth 28/02/1958 Gender Male
Patient ID 156027315

Doctor Surgeon Operator Surgeon

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Date of calibration test: 10/03/2015 by: Surgeon Result: OK
Date of measurement: 11/03/2015

OD: Axis length of right eye: 25.62 mm. - Note: long eye.
OS: Axis length of left eye: 25.43 mm. - Note: long eye.

Measured values

OD right	OS left
LS: Phakic; VS: Vitreous body	LS: Pseudophakic; VS: Vitreous body
AL: 25.62 mm (SD = 5 µm)	**AL: 25.43 mm** (SD = 6 µm)
ACD: 4.00 mm (SD = 7 µm)	**ACD: 5.27 mm (!)** (SD = 19 µm)
LT: 4.24 mm (SD = 10 µm)	**LT: ---**

AL	ACD	LT	AL	ACD	LT
25.61 mm	4.00 mm	4.24 mm	25.43 mm	---	---
25.62 mm	3.99 mm	4.24 mm	25.43 mm	5.27 mm	0.83 mm
25.62 mm	4.00 mm	4.23 mm	25.43 mm	---	---
25.62 mm	4.01 mm	4.24 mm	25.43 mm	---	---
25.62 mm	4.01 mm	4.23 mm	25.43 mm	---	---
25.62 mm	4.00 mm	4.24 mm	25.44 mm	---	---

Keratometry values

n: 1.3375

SE: 43.28 dpt (SD = 3 µm)	**SE: 43.22 dpt** (SD = 3 µm)
K1: 42.85 dpt @ 71° (SD = 4 µm)	**K1: 42.94 dpt @ 154°** (SD = 8 µm)
K2: 43.72 dpt @ 161° (SD = 3 µm)	**K2: 43.50 dpt @ 64°** (SD = 4 µm)
Δ D: -0.87 dpt @ 71°	**Δ D: -0.56 dpt @ 154°**
R: 7.79 mm SE: 43.30 dpt	R: 7.81 mm SE: 43.20 dpt
Δ D: -0.85 dpt @ 70°	Δ D: -0.63 dpt @ 158°
R: 7.80 mm SE: 43.28 dpt	R: 7.81 mm SE: 43.23 dpt
Δ D: -0.88 dpt @ 71°	Δ D: -0.55 dpt @ 154°
R: 7.80 mm SE: 43.26 dpt	R: 7.81 mm SE: 43.23 dpt
Δ D: -0.87 dpt @ 72°	Δ D: -0.50 dpt @ 150°

Central corneal thickness

CCT: 568 µm (SD = 3 µm)	**CCT: 565 µm** (SD = 3 µm)
565 µm 568 µm 568 µm	565 µm 568 µm 565 µm
570 µm 567 µm 567 µm	563 µm 563 µm 567 µm

White-to-white values

WTW: 12.5 mm lx: +0.5 mm ly: +0.1 mm	WTW: 12.5 mm lx: -0.5 mm ly: +0.1 mm
P: 5.0 mm Px: +0.2 mm Py: -0.2 mm	P: 4.4 mm Px: +0.0 mm Py: +0.0 mm

Reference Image

---	---

Comment

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Patient [redacted]

Date of birth 28/02/1958 Gender Male
Patient ID 156027315

Doctor Surgeon Operator Surgeon

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Date of calibration test: 10/03/2015 by: Surgeon Result: OK
Date of measurement: 11/03/2015 n: 1.3375 CVD: 12.00 mm
Target refraction: plano IOL: **AMO Tecnis 1 ZCB00 (Other)**

OD: Axis length of right eye: 25.62 mm. - Note: long eye.
OS: Axis length of left eye: 25.43 mm. - Note: long eye.

IOL calculation (Multiformula)

OD right	OS left
AL: 25.62 mm (SD = 5 µm)	AL: 25.43 mm (SD = 6 µm)
ACD: 4.00 mm (SD = 7 µm)	ACD: 5.27 mm (!) (SD = 19 µm)
LT: 4.24 mm (SD = 10 µm)	LT: ---
SE: 43.28 dpt	SE: 43.22 dpt
K1: 42.85 dpt @ 71°	K1: 42.94 dpt @ 154°
K2: 43.72 dpt @ 161° WTW: 12.5 mm	K2: 43.50 dpt @ 64° WTW: 12.5 mm
Δ D: -0.87 dpt @ 71° Visual acuity: ---	Δ D: -0.56 dpt @ 154° Visual acuity: ---
SIA: --- LVC: ---	SIA: --- LVC: ---
Ref: ---	Ref: ---
LS: Phakic; VS: Vitreous body	LS: Pseudophakic; [redacted]

Haigis Suite

A0: -1.302 A1: +0.210 A2: +0.251

IOL (D)	Ref (D)
+16.50	-0.65
+16.00	-0.32
+15.50	**+0.01**
+15.00	+0.34
+14.50	+0.66

Holladay 2

ACD: +5.786

IOL (D)	Ref (D)
+16.00	-0.47
+15.50	-0.16
+15.00	**+0.16**
+14.50	+0.46
+14.00	+0.77

SRK/T

A-Const: 119.30

IOL (D)	Ref (D)
+16.00	-0.55
+15.50	-0.23
+15.00	**+0.09**
+14.50	+0.41
+14.00	+0.72

Hoffer® Q

pACD: +5.80

IOL (D)	Ref (D)
+16.00	-0.71
+15.50	-0.39
+15.00	**-0.07**
+14.50	+0.24
+14.00	+0.55

SRK/T

A-Const: 119.30

IOL (D)	Ref (D)
+17.00	-0.78
+16.50	-0.46
+16.00	**-0.13**
+15.50	+0.19
+15.00	+0.51

Hoffer® Q

pACD: +5.80

IOL (D)	Ref (D)
+16.50	-0.59
+16.00	-0.27
+15.50	**+0.05**
+15.00	+0.36
+14.50	+0.68

Comment

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IOLMaster 700 vs IOLMaster 500 misure a confronto

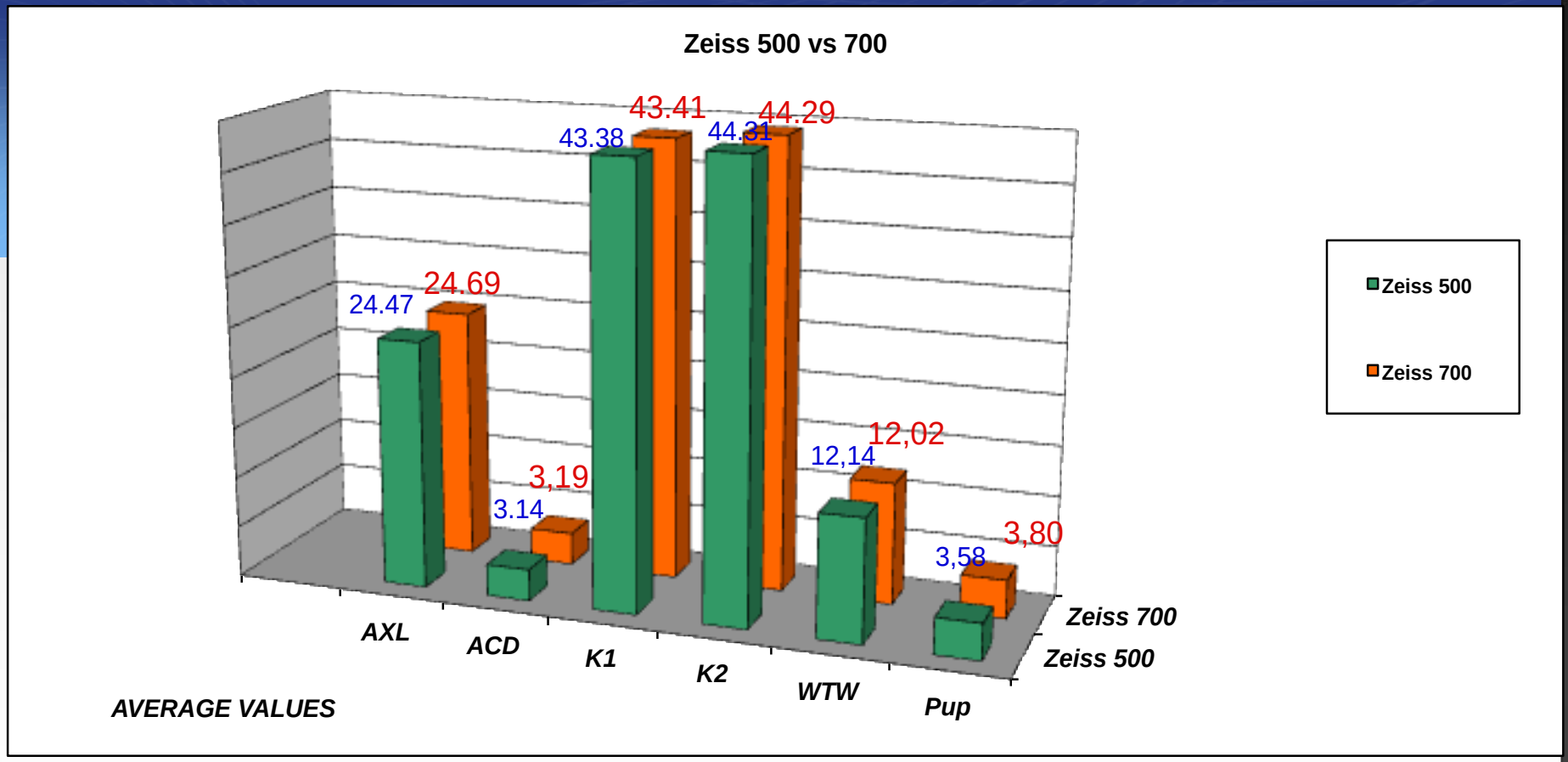
- Data su 140 occhi
- Uomini 59
- Donne 81
- Età media 71 anni (max 89, min 50)

IOLMaster 700 vs IOLMaster 500 misure a confronto

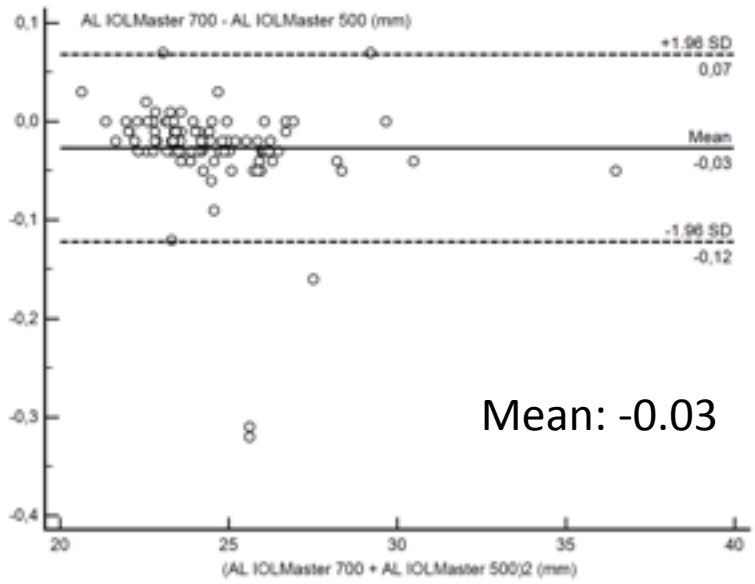
- AxL differenza media: 0.036mm
- AxL differenza massima: 0.71mm
- ACD differenza media: 0.108mm
- ACD differenza massima: 0.50mm
- K1 differenza media: 0.158D
- K1 differenza massima: 1.18D

IOLMaster 700 vs IOLMaster 500 misure a confronto

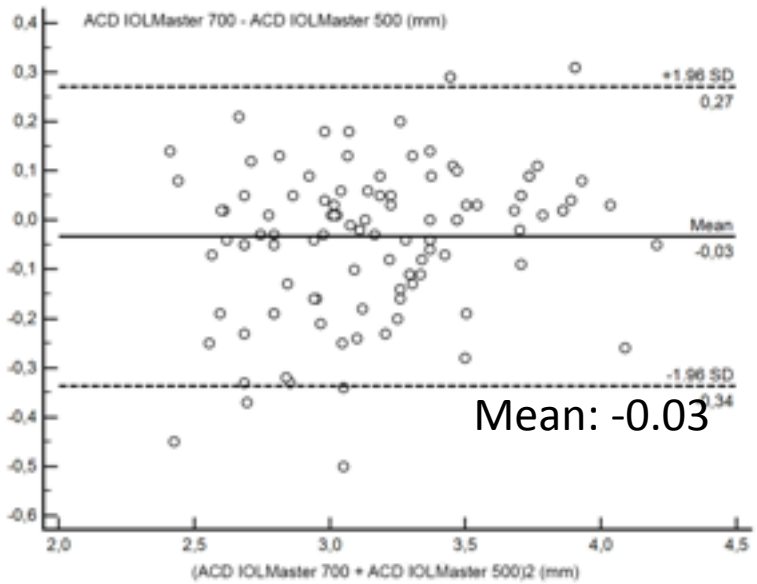
- K2 differenza media: 0.161D
- K2 differenza massima: 1.26D
- WTW differenza media: 0.155mm
- WTW differenza massima: 1.2mm
- Pupil diameter differenza media: 0.323mm
- Pupil diameter differenza massima: 1.3mm


Zeiss 500 vs 700
43.41
44.29
43.38
44.31
24.69
24.47
3,19
3.14
12,02
12,14
3,80
3,58
AXL
ACD
K1
K2
WTW
Pup
Zeiss 700
Zeiss 500
Zeiss 500
Zeiss 700
AVERAGE VALUES

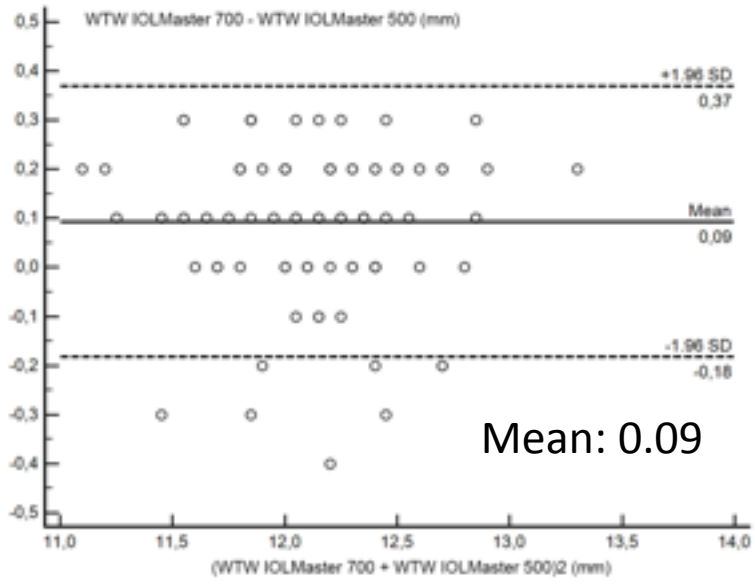
BLAND-ALTMAN PLOT



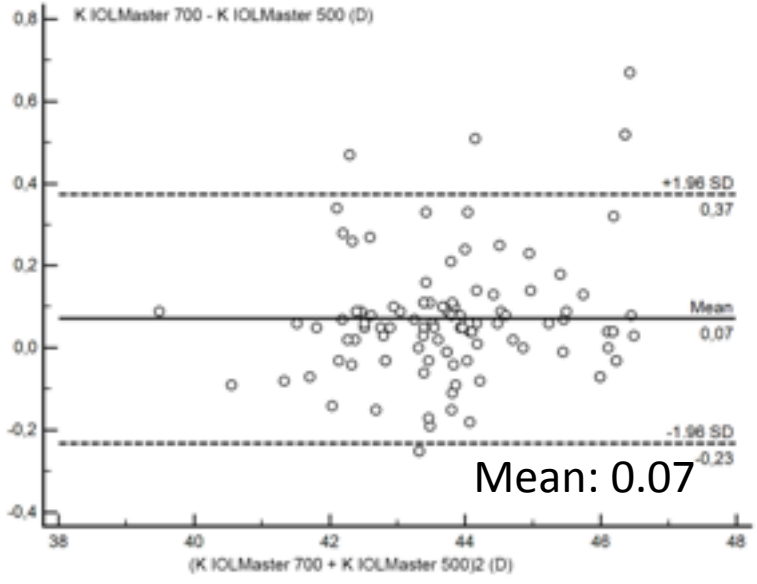
Mean: -0.03



Mean: -0.03

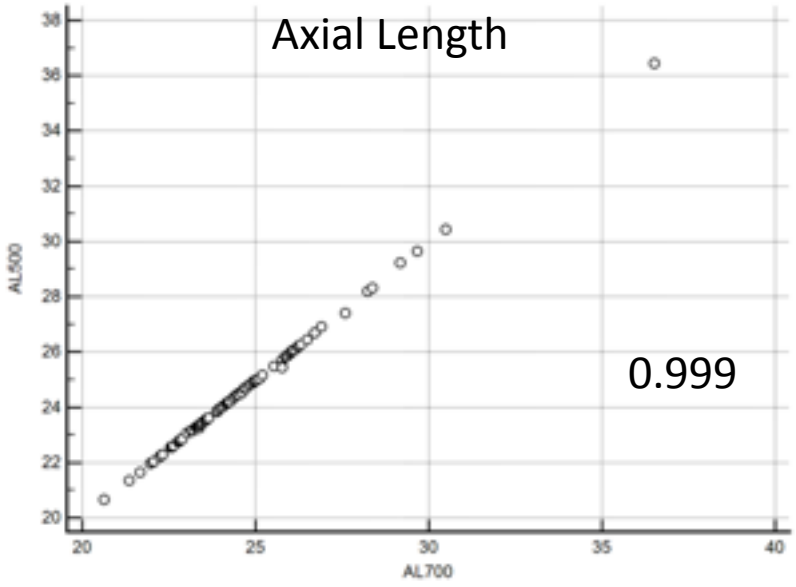


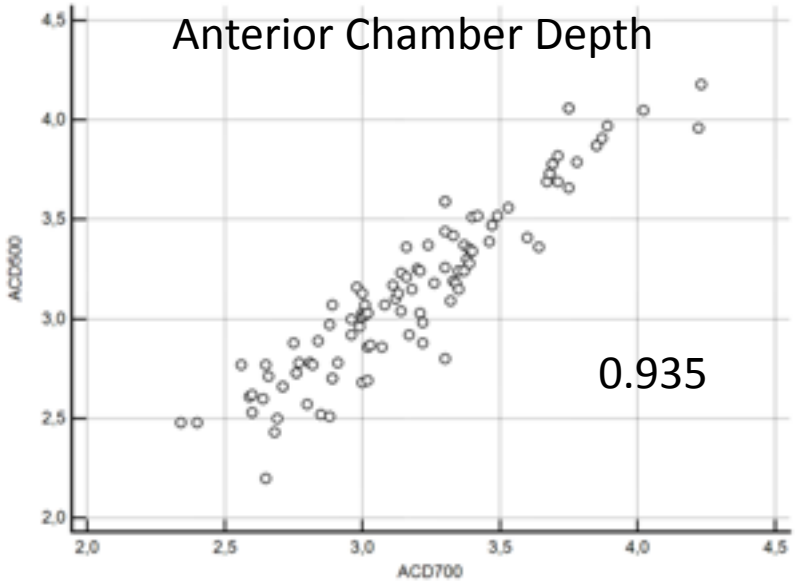
Mean: 0.09

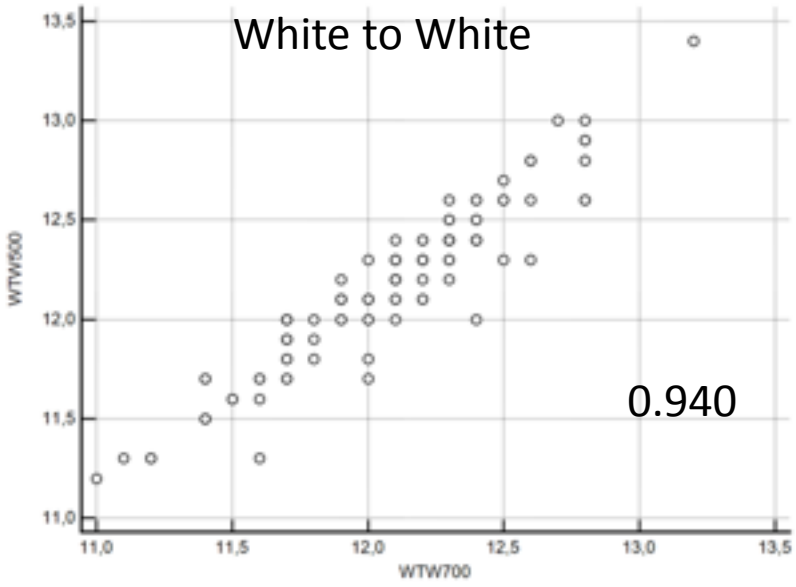


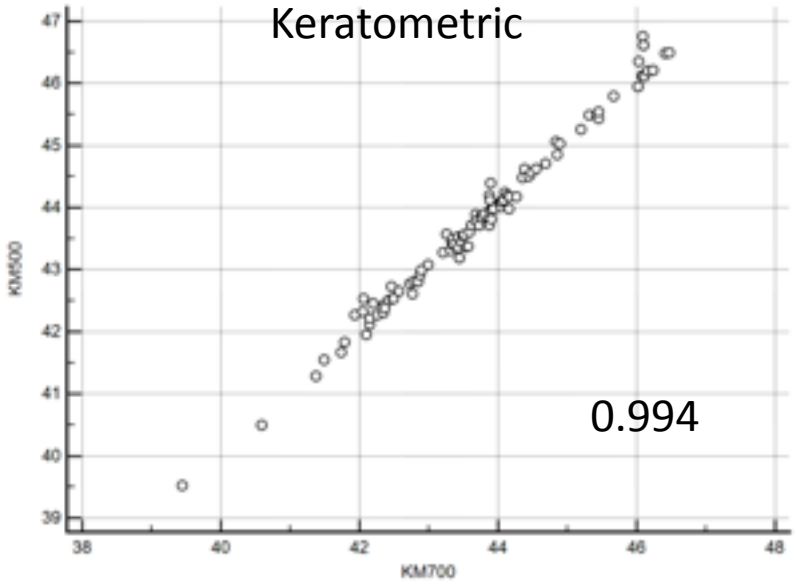
Mean: 0.07

Correlation









IOL power calculation

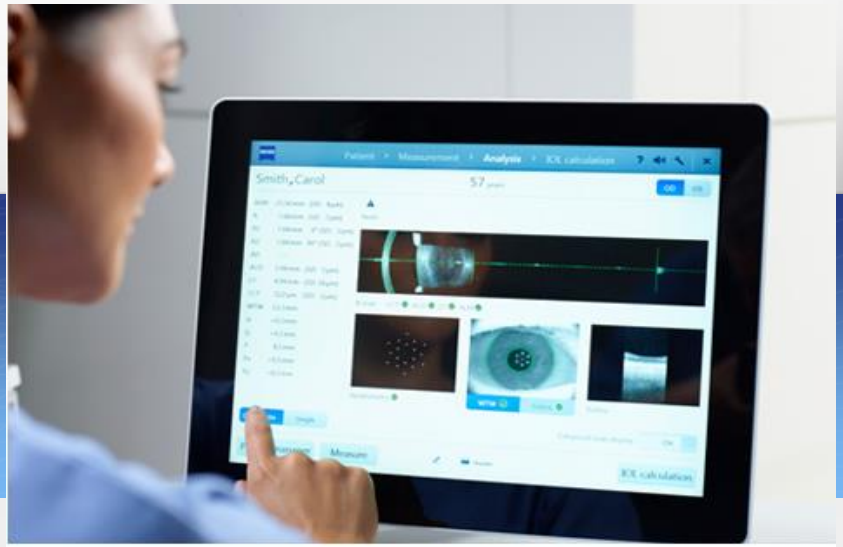
- Calcolo multiformula: 4 formule per ogni IOL
- Lo schermo mostra un occhio per volta ma la stampa è di entrambi gli occhi sulla stessa pagina

Calcolo basato sul database di IOL

Esclusione automatica di alcune IOL

Impossibile eseguire calcoli per IOL inesistenti

Acquisizione dei dati



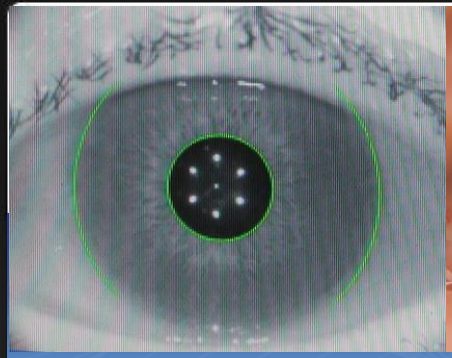
- Non più di 15 sec per misurare un occhio
- Bassissima standard deviation
- Misure praticamente identiche a quelle degli altri biometri
- Solo un caso sui primi 214 non misurabile

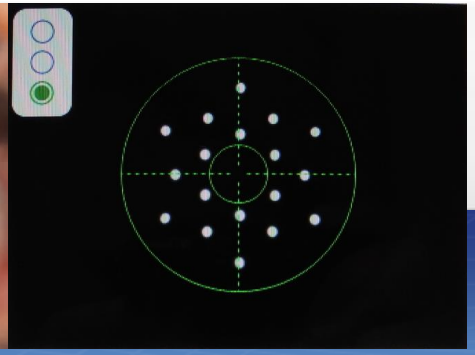
Miglioramenti richiesti nelle future versioni

- Possibilità di stampare il manuale di istruzioni
- Possibilità di esportare il database pazienti sul HIC software (risolto)

- Connessione in rete (risolto)

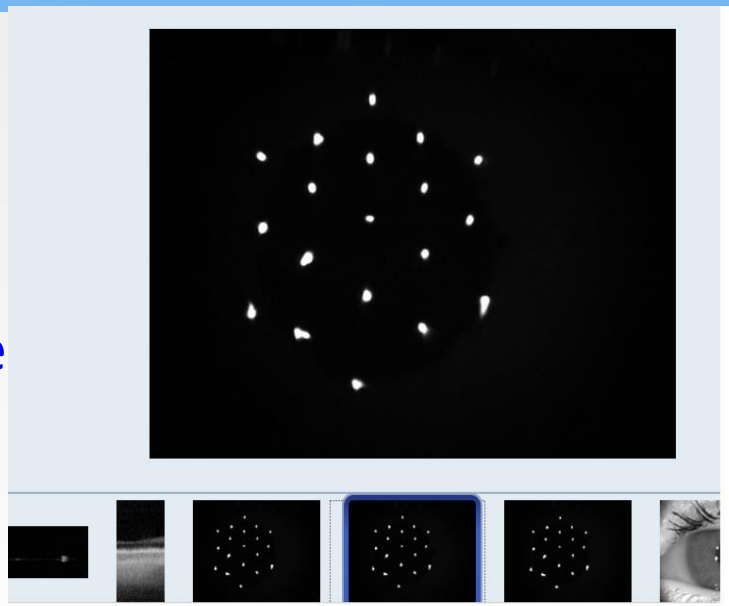
- Localizzazione del software (risolto)





Problemi nelle misurazioni

- Keratono
- Pessimo film lacrimale
- Superficie irregolare corneale
- Cataratta totale



riassumendo

- Uno strumento con una marcia in più
- L'unico con il Swept-OCT per vedere la fovea
- Haigis suite software (Haigis, Haigis L, Haigis T)
- Holladay II formula di serie al posto di Holladay 1
- Nessuna difficoltà a misurare le cataratte corticali posteriori
- Non passa solo sulle cataratte bianche
- Tutti i dati salvati anche su hard disk esterno

Grazie per la gentile attenzione

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