Importancia del análisis aberrométrico en la elección de los anillos Intraestromales



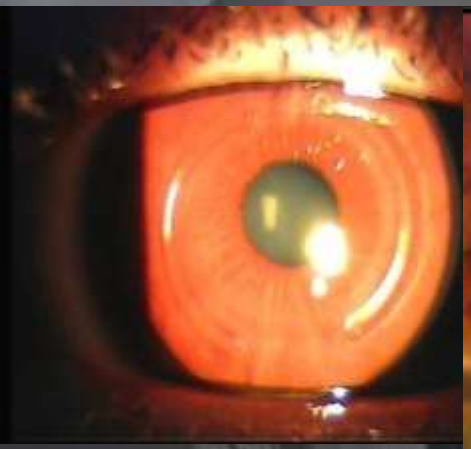
Dr. Carlos Vergés
Dr. Jorge Cazal

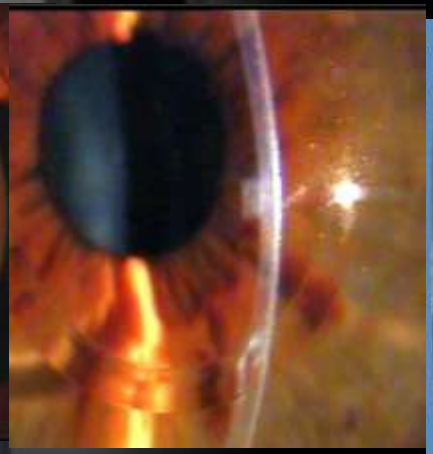
UNIVERSITAT POLITÈCNICA DE CATALUNYA

área OFTALMOLÓGICA avanzada
Dr. Vergés

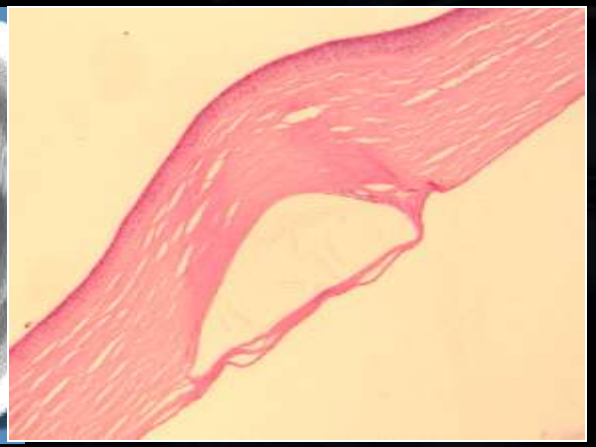
Intrastromal Cornea Inlay

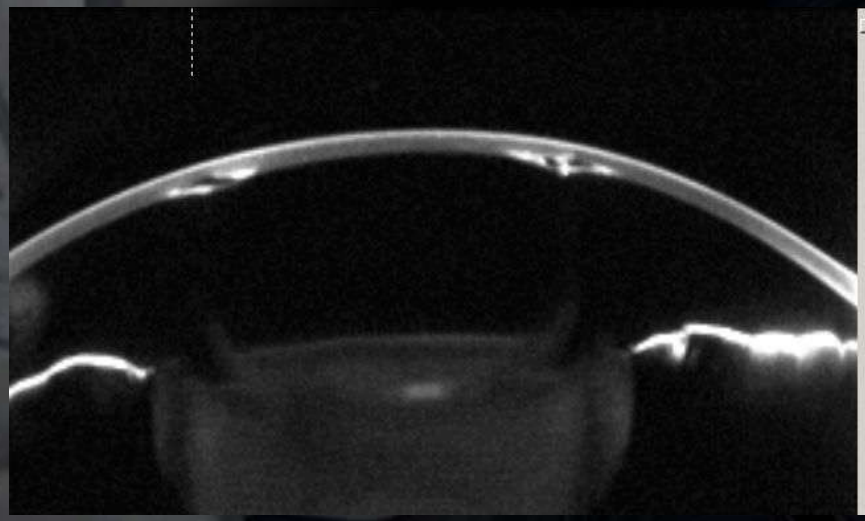
Clinicopathological correlation-Scheimpflug Image correlate well with ICRS position

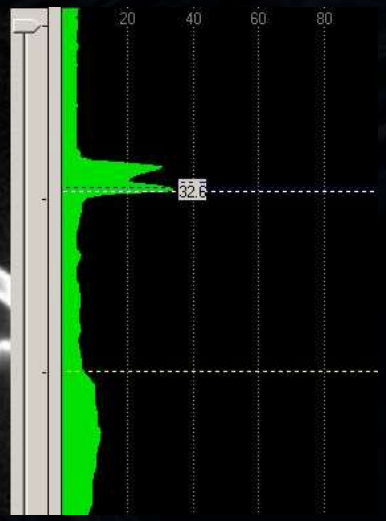












Intrastromal Corneal Ring Segment (ISCRS)

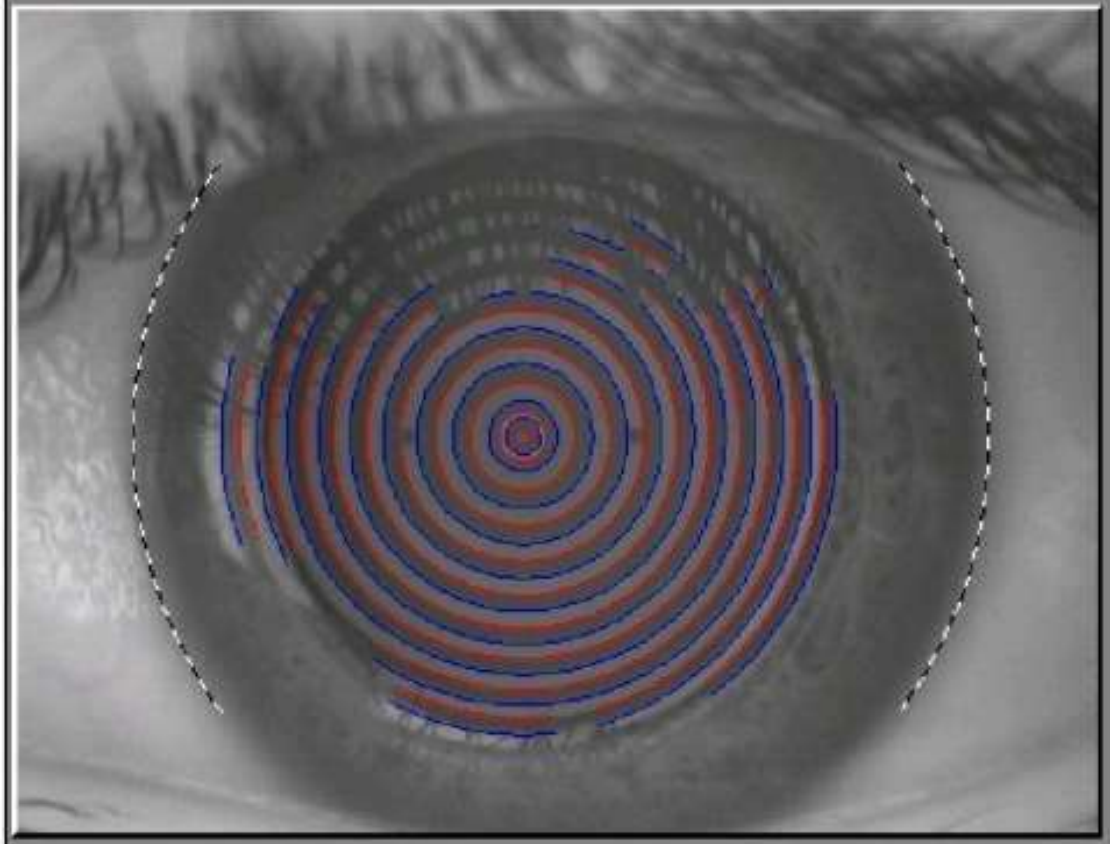
area oftalmologica avanzada
Dr. Vergés

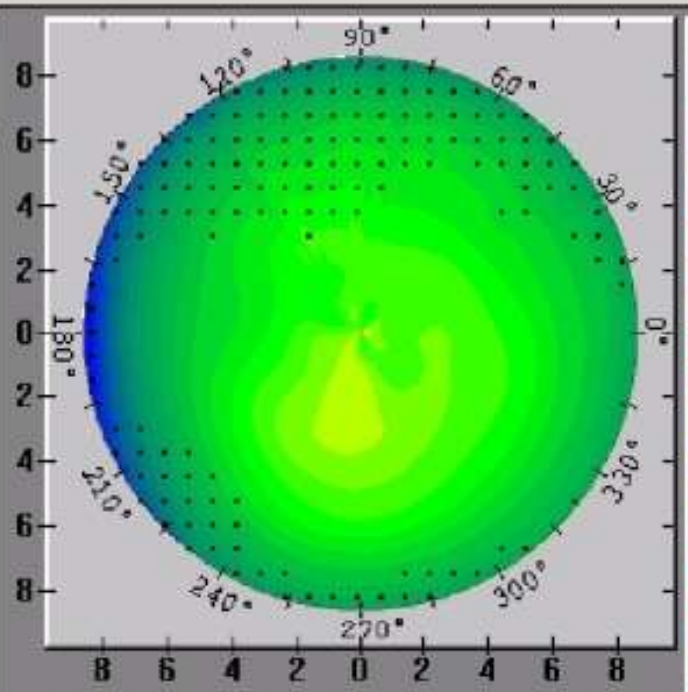
WAVELIGHT - ALLEGRO TOPOLYZER

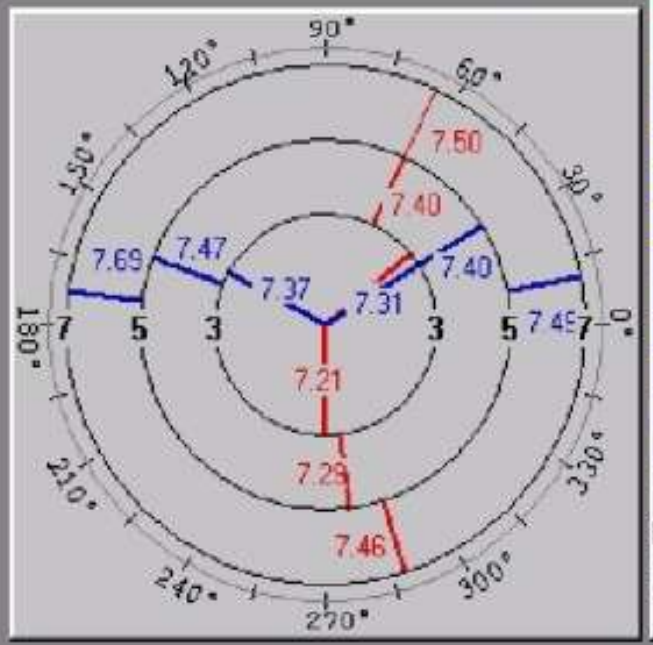
Patient Examination Lens Check Display Settings T-CAT Miscellaneous Print

Name: [redacted] Exm. dat.: 10.11.06

Dat. o.B.: 04.04.78 Eye: Left Exm. time: 16:15



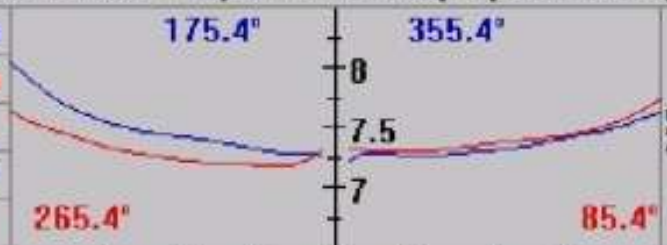






Keratometric data : major meridians perpendicular (d=3mm)

Rh: 7.36mm
Rv: 7.29mm
Ast.: -0.4D
Axs.: 175.4°
Ecc.: 0.61
Øcor: 11.8





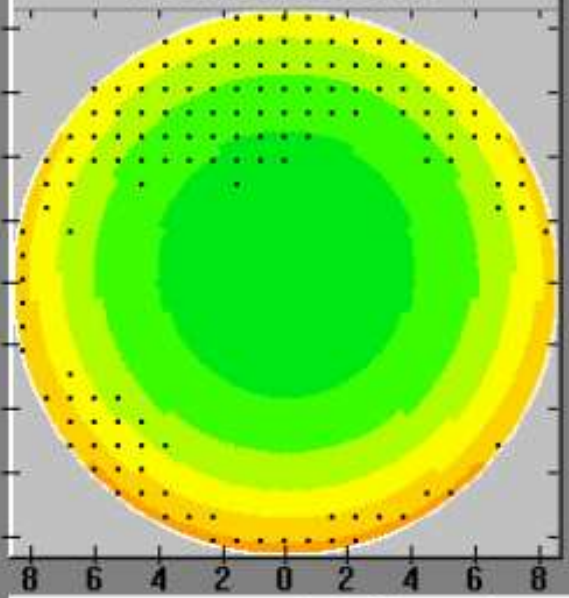
AA:67%

WAVELIGHT - ALLEGRO TOPOLYZER

atient Examination Lens Check Display Settings T-CAT Miscellaneous Prin

Name: [redacted] Exm. dat.: 10.11.06 Pat-ID: 127969

Dat. o.B.: 04.04.78 Eye: Left Exm. time: 16:15 Infotext:



Indices

ISV:	21
IVA:	0.11
KI:	1.03
CKI:	1.01
Rmin:	7.18
IHA:	4.9
IHD:	0.006
ABR:	0.0
AA:	67%

Ecc. at 30°

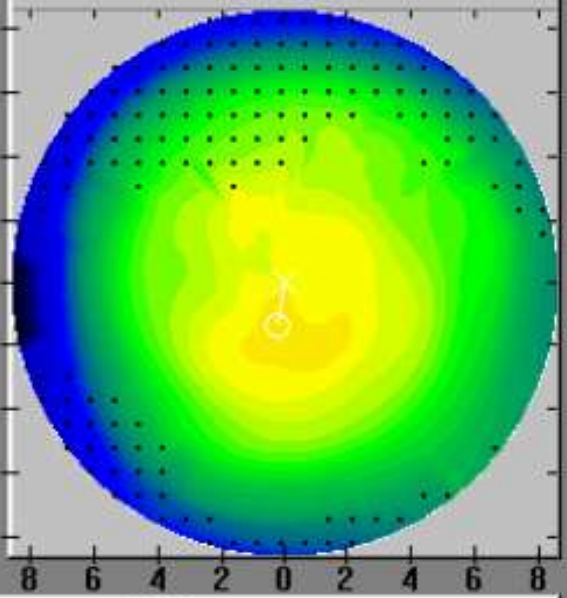


Horizon.: 0.64

Vertical: 0.58

Keratoconus Level Topogr.

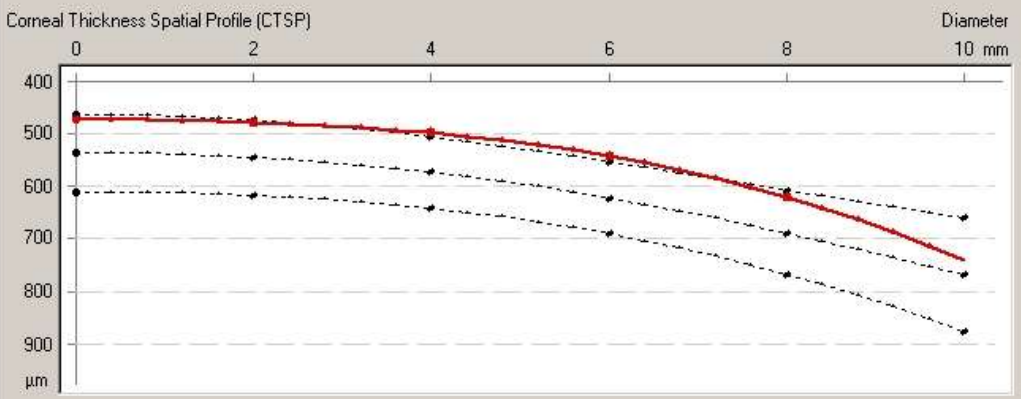
-

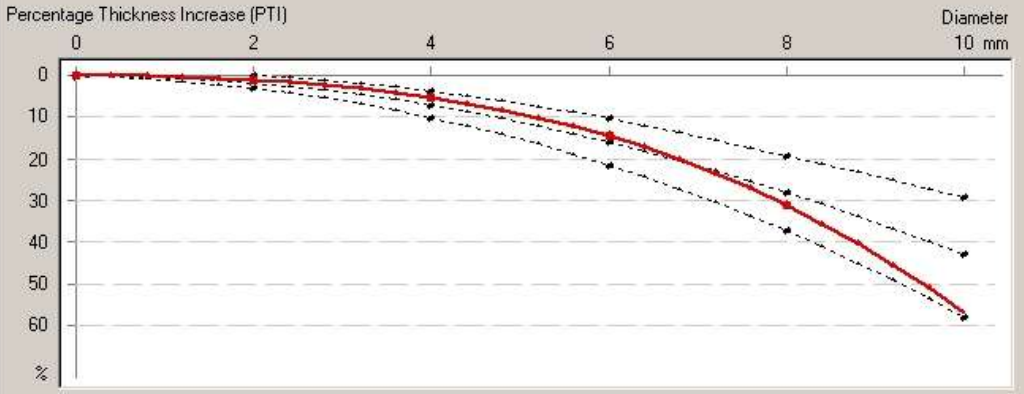


Left (Current)				Progress of Indices	Right		
10.11.06	10.11.06	10.11.06	10.11.06	Date:	10.11.06	10.11.06	10.11.06
20	20	19	21	ISV:	21	22	22
0.11	0.11	0.11	0.11	IVA:	0.10	0.11	0.09
1.03	1.03	1.03	1.03	KI:	1.03	1.04	1.03
1.01	1.01	1.01	1.01	CKI:	1.01	1.02	1.01
7.21	7.25	7.23	7.18	RMin:	7.17	7.14	7.18
3.1	4.5	5.1	4.9	IHA:	0.4	-0.6	-0.6
0.005	0.006	0.006	0.006	IHD:	0.005	0.006	0.003
0.0	0.0	0.0	0.0	ABR:	0.0	0.0	0.0
-	-	-	-	KKS:	-	-	-
63%	58%	67%	67%	AA:	77%	68%	62%

OCULUS - PENTACAM

Mean corneal thickness values on rings concentrically to the thinnest location



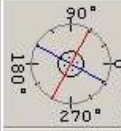


	0 mm	2 mm	4 mm	6 mm	8 mm	10 mm
C. Thickness / µm	473 ± 0	478 ± 1	498 ± 4	541 ± 8	620 ± 19	742 ± 49
Progression / %	0 ± 0	1 ± 0	5 ± 1	14 ± 3	31 ± 7	57 ± 18

Prog.-Index Axis

Min:	0.7	165°
Avg:	0.8	
Max:	1.0	319°

Name:
ID:
Date of Birth: 28/04/1978 Eye: Left
Exam Date: 27/10/2006 Time: 18:27:52
Exam Info:

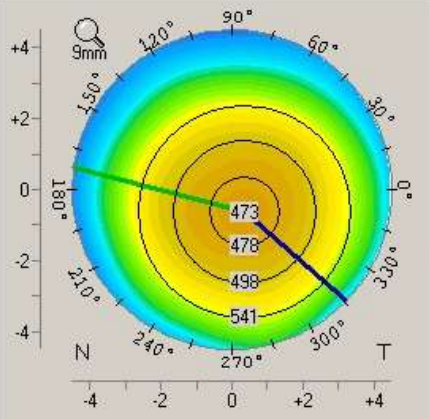


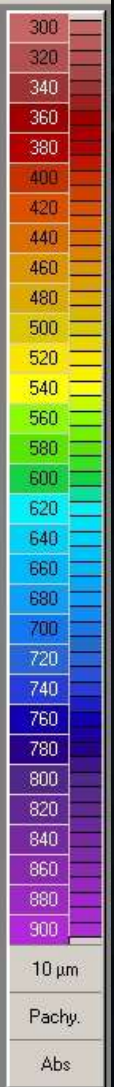
Rh: 7.40 mm Astig: -0.5 D
Rv: 7.32 mm ecc: (30°) 0.49
Axis: (flat) 151.0 ° QS: OK

		Pachy:	x[mm]	y[mm]
Pupil Center:	+	474 µm	+0.21	-0.10
Thinnest Locat.:	O	473 µm	+0.36	-0.64

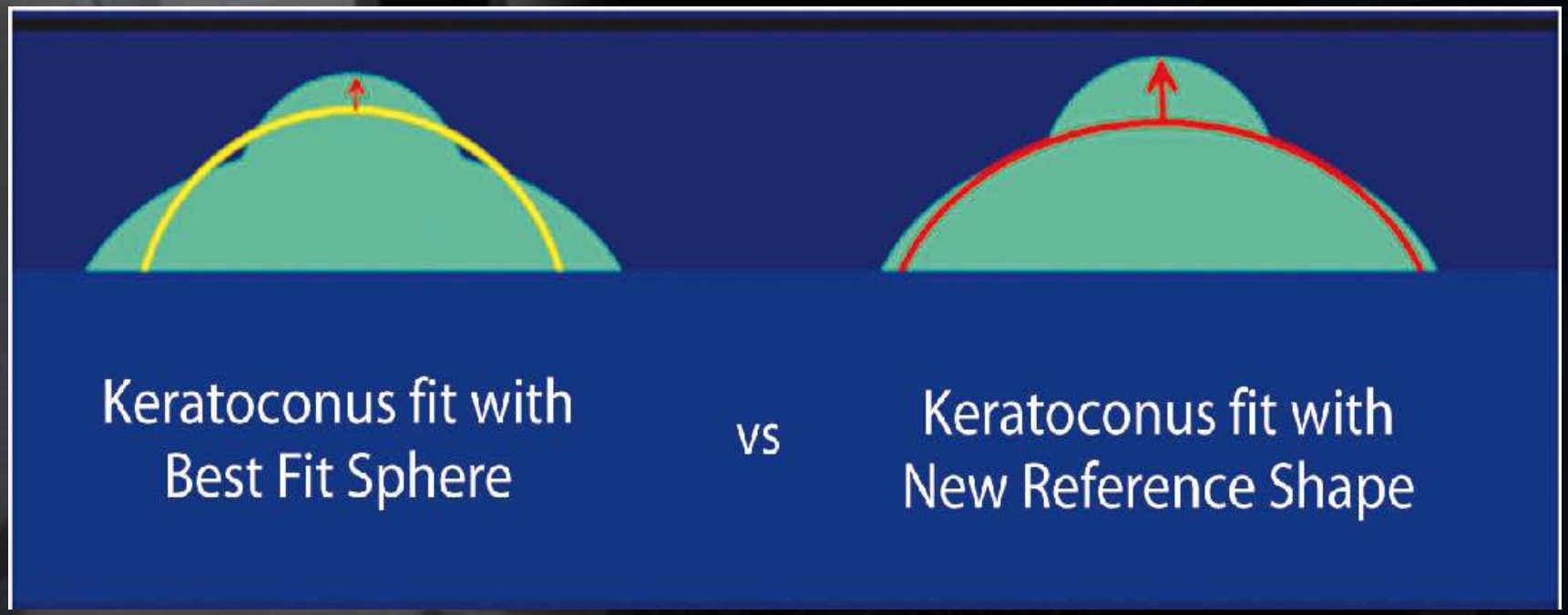
Chamber Volume: 214 mm³ Angle: 48.0 °
A. C. Depth (Int.): 3.40 mm Pupil Dia: 3.27 mm
Enter IOP IOP(cor): Lens Th.:

Corneal Thickness



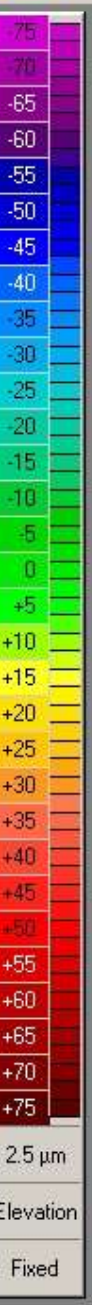


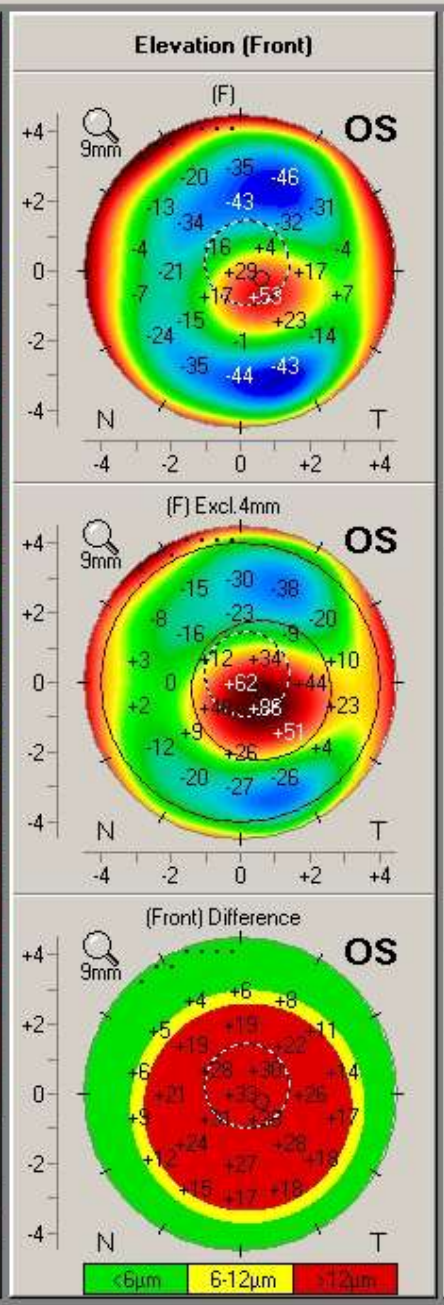
Belin / Ambrósio Enhanced Ectasia Display

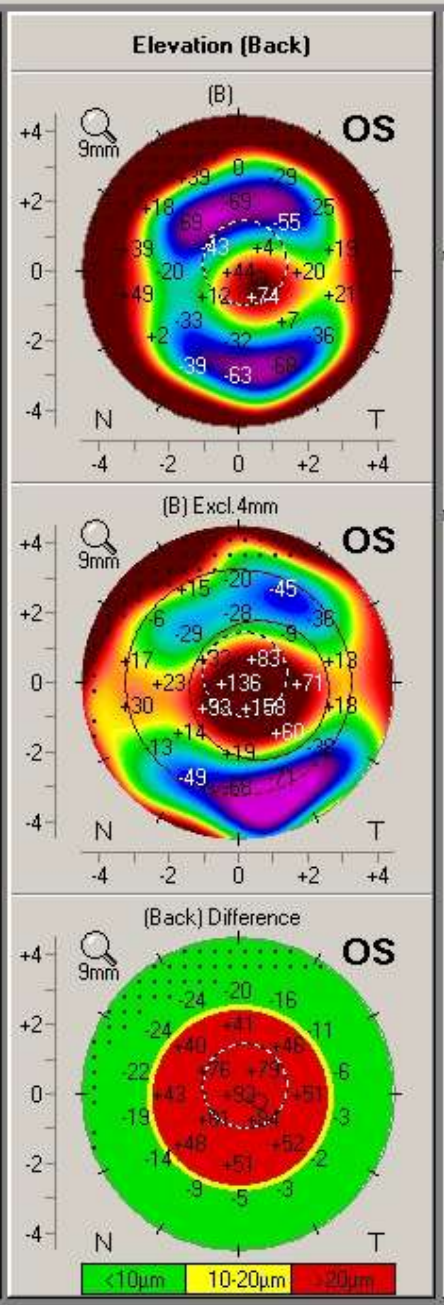


OCULUS - PENTACAM

Belin / Ambrósio Enhanced Ectasia



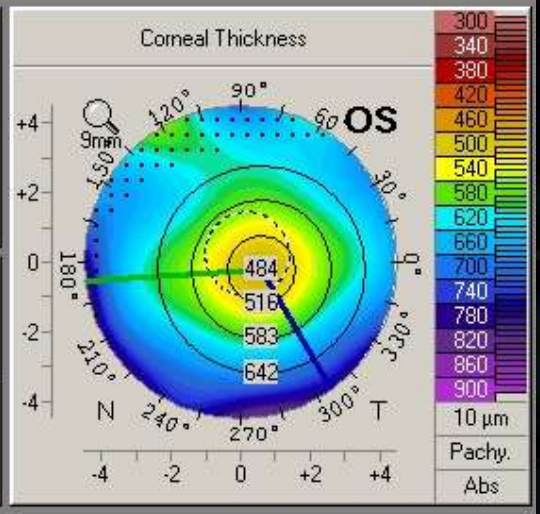




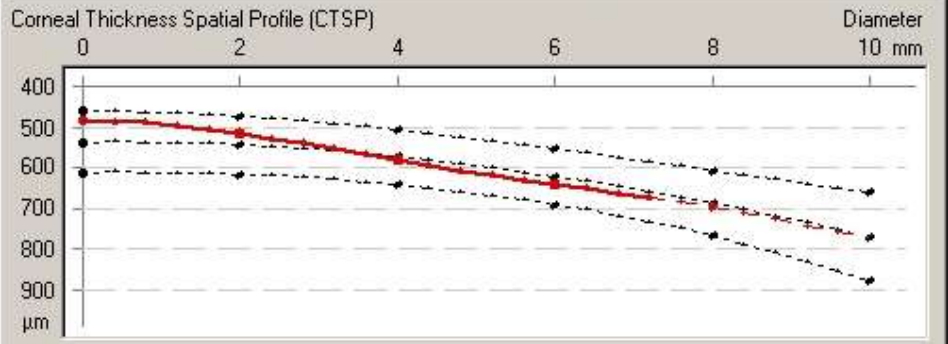
Last Name:
First Name:
ID: 112085
Date of Birth: 06/06/1986 Eye: Left
Exam Date: 21/02/2005 Time: 13:13:50
Exam Info:

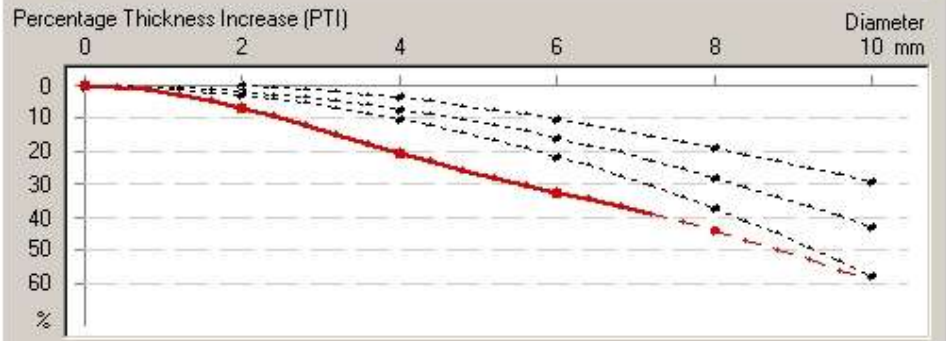
Pachy Apex: 496µm
Pachy Thin. Locat.: 484µm
Dist. Apex-Thin.Loc.: IT 0.63mm

Progression Index:
Avg: 3.01 QS: OK
Min: 2.32 Max: 3.40

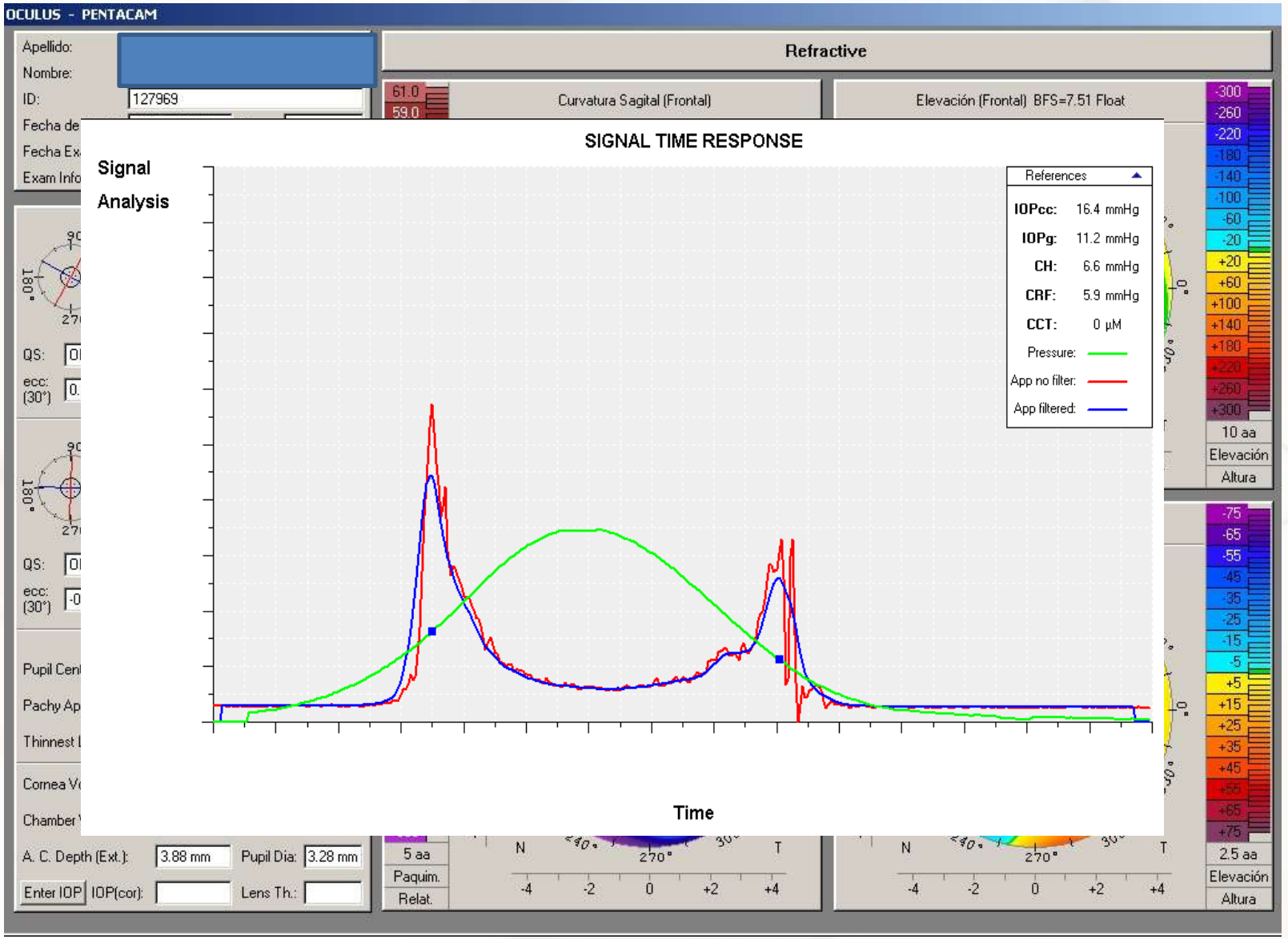


Mean corneal thickness values on rings concentrically to the thinnest location





Histéresis Corneal



Keraring

- 160º-Triangular
- 0.15mm -2.00 a-4.00
- 0.20mm -4.25 a-6.00
- 0.25mm -6.25 a-8.00
- 0.30mm -8.25 a-10.00
- 0.35mm -10.25 a-12.0

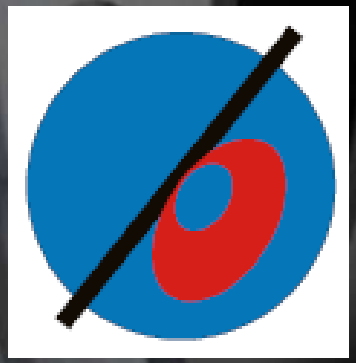


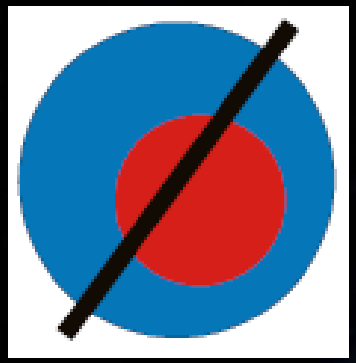


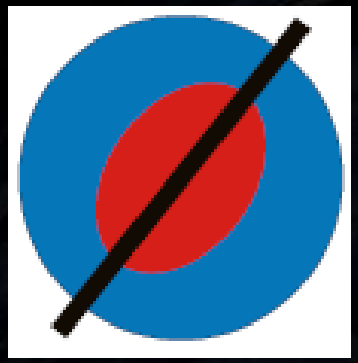
KeraRing

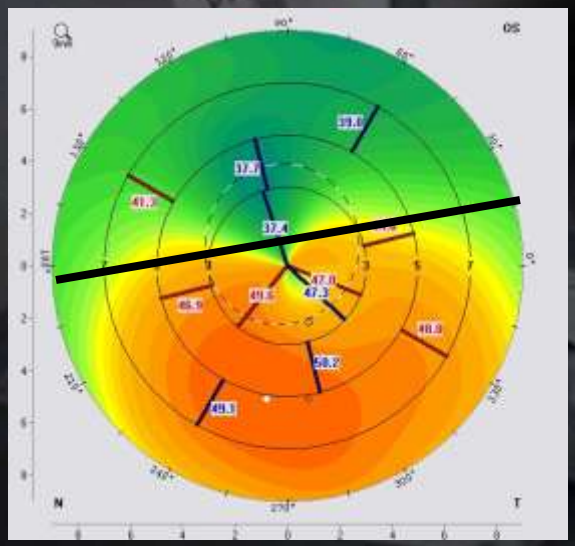


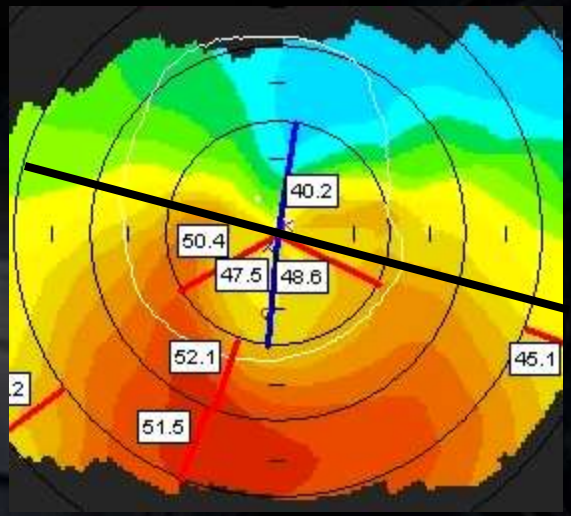
TOPOGRAPHIC PATTERNS

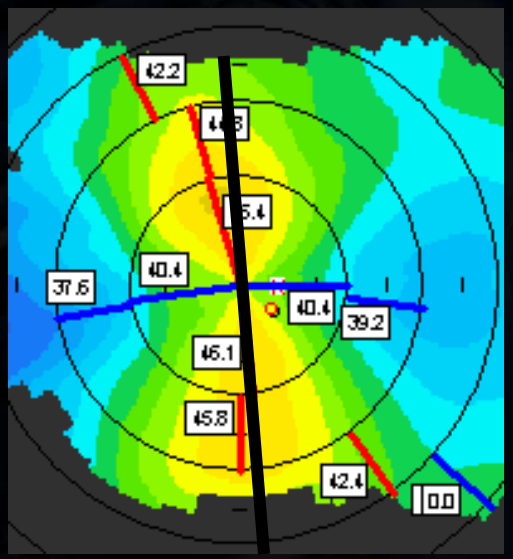










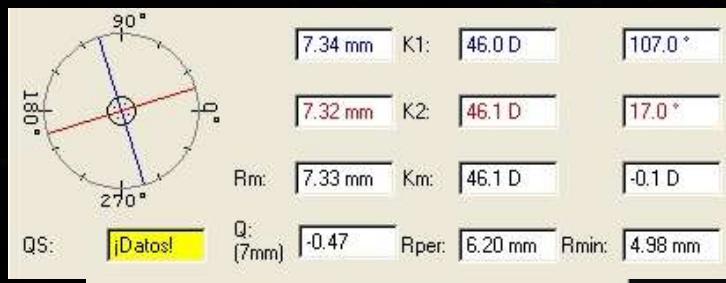


Checking K readings in ectatic area and choosing 160 arc thickness segment

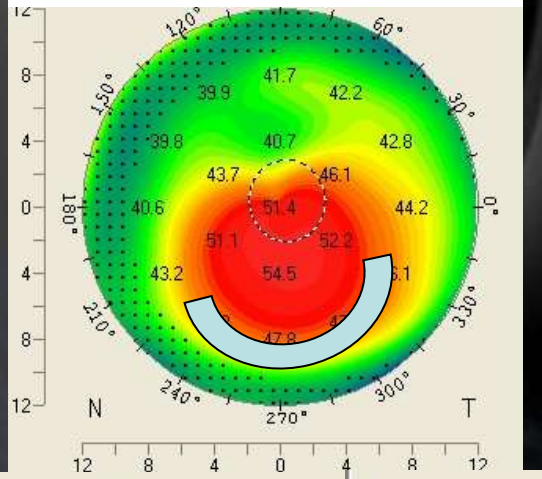
	PACH. > 500 MICRONS	PACH. < 500 MICRONS
QUERATOMETRY >55 DP	300	250
QUERATOMETRY <55 DP	250	200

ASIMETRIC QUERATOCONO
SAME AXIS COMATIC AND TOPOGRAPHIC



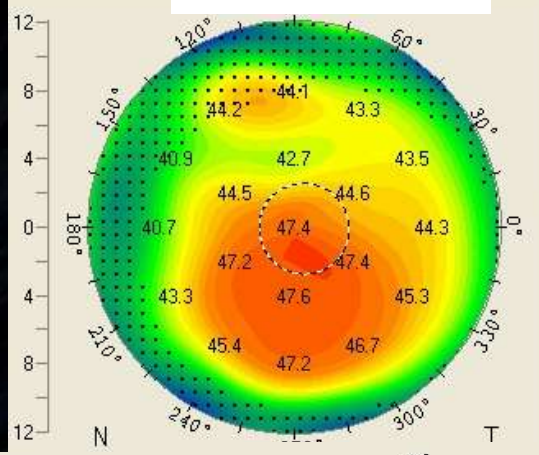


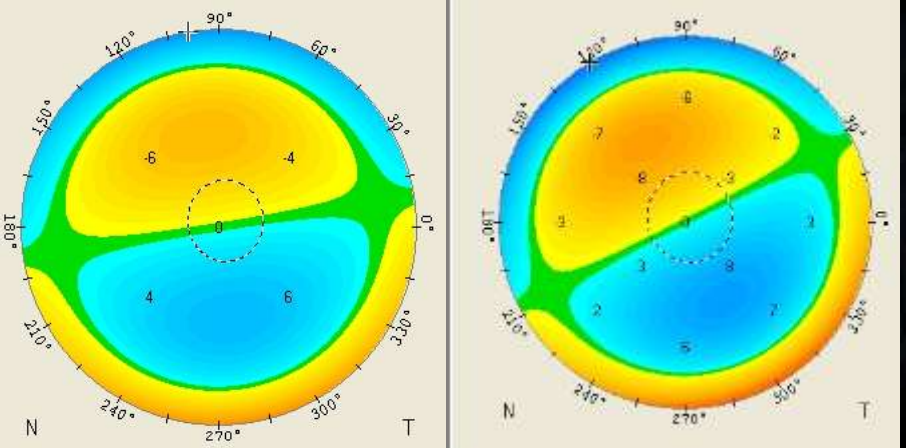
-6-1.5x95...0.6dif

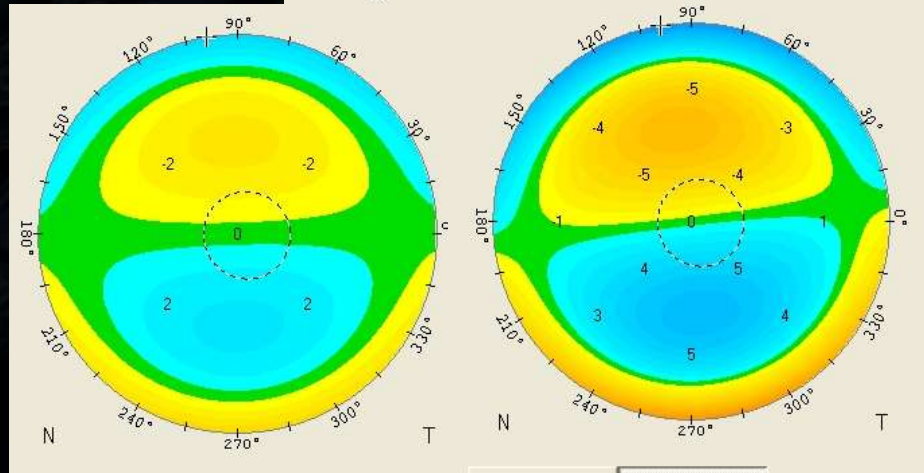


250 µm
and 160º of arc

-1.75...0.9







OCULUS - PENTACAM

Last Name:	
First Name:	
ID:	112085
Date of Birth:	06/06/1986
Eye:	Left
Exam Date:	21/02/2005
Time:	13:13:50
Exam Info:	

Cornea Front

Rh:	6.90 mm	K1:	48.9 D
Rv:	6.24 mm	K2:	54.1 D
Rm:	6.57 mm	Km:	51.4 D
QS:	OK	Axis: (flt.)	156.0 °
Astig:	-5.2 D		
ecc: (30°)	1.52	Rper:	8.08 mm
Rmin:	5.24 mm		

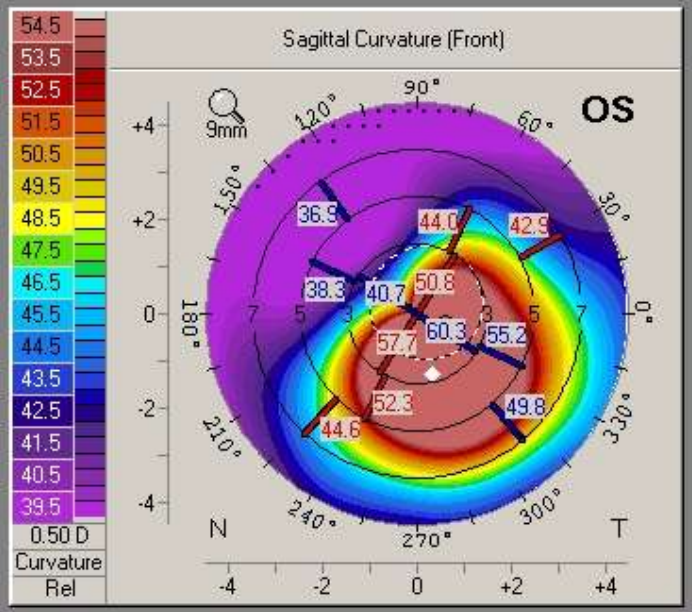
Cornea Back

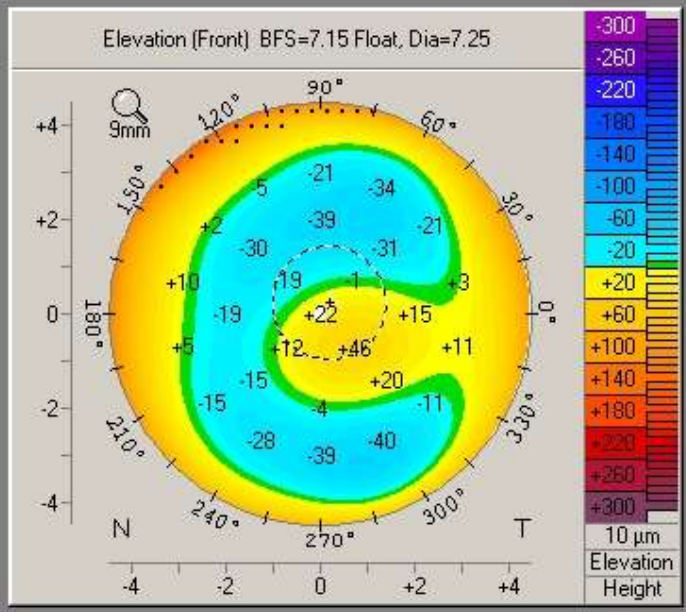
Rh:	5.51 mm	K1:	-7.3 D
Rv:	4.78 mm	K2:	-8.4 D
Rm:	5.15 mm	Km:	-7.8 D
QS:	Model	Axis: (flt.)	170.1 °
Astig:	+1.1 D		
ecc: (30°)	1.64	Rper:	6.55 mm
Rmin:	3.50 mm		

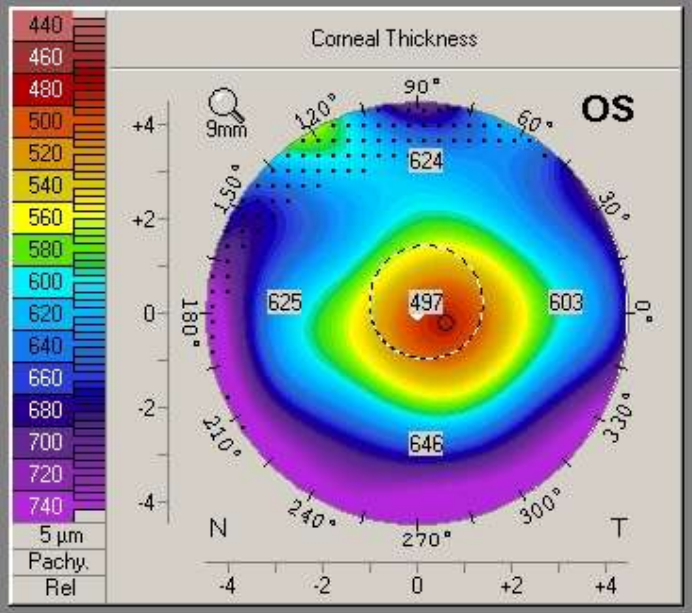
	Pachy:	x[mm]	y[mm]
Pupil Center:	497 µm	+0.19	+0.24
Pachy Apex :	496 µm	0.00	0.00
Thinnest Locat.:	484 µm	+0.60	-0.20
K Max. (Front):	64.4 D	+0.33	-1.27

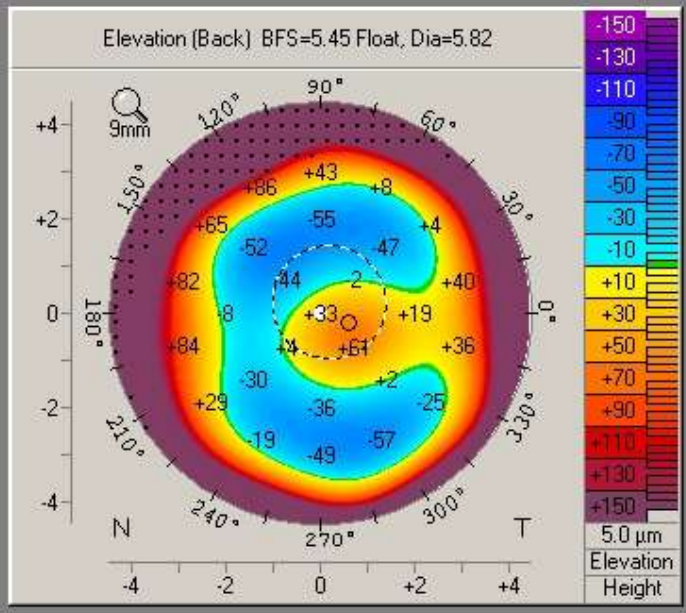
Cornea Volume:	62.6 mm³	KPD:	+3.2 D
Chamber Volume:	206 mm³	Angle:	46.9 °
A. C. Depth (Int.):	3.65 mm	Pupil Dia:	2.42 mm
Enter IOP	IOP(cor):		Lens Th.:

Refractive

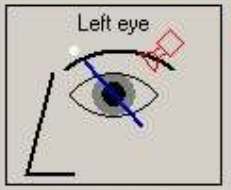




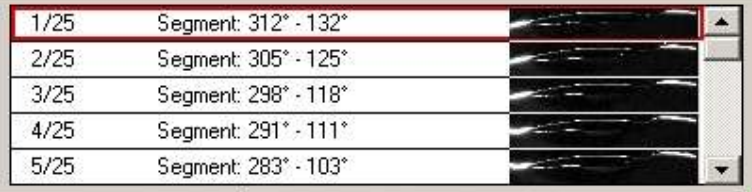




OCULUS - PENTACAM

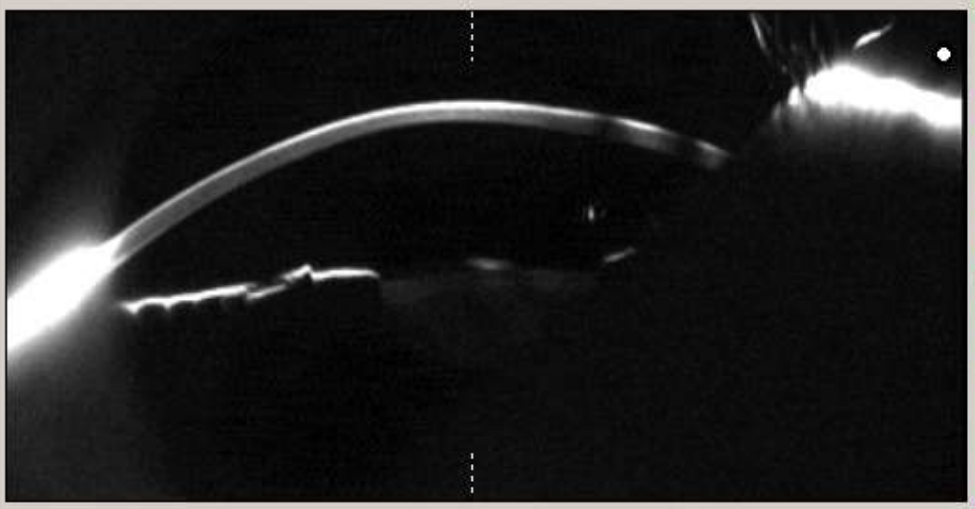


1/25	Segment: 312° - 132°
2/25	Segment: 305° - 125°
3/25	Segment: 298° - 118°
4/25	Segment: 291° - 111°
5/25	Segment: 283° - 103°



Contrast Normal

Adjust Image





Last Name:	
First Name:	
ID:	112085
Date of Birth:	06/06/1986
Eye:	Left
Exam Date:	21/02/2005
Time:	13:13:50



Rh:	6.90 mm	Astig:	-5.2 D
Rv:	6.24 mm	ecc: (30°)	1.52
Axis: (flat)	156.0 °	QS:	Model !

		Pachy:	x[mm]	y[mm]
Pupil Center:	+	497 µm	+0.19	+0.24
Thinnest Locat.:	○	484 µm	+0.60	-0.20

Chamber Volume:	206 mm³	Angle:	46.9 °
A. C. Depth (Int.):	3.65 mm	Pupil Dia:	2.42 mm
Enter IOP	IOP(cor):	Lens Th.:	

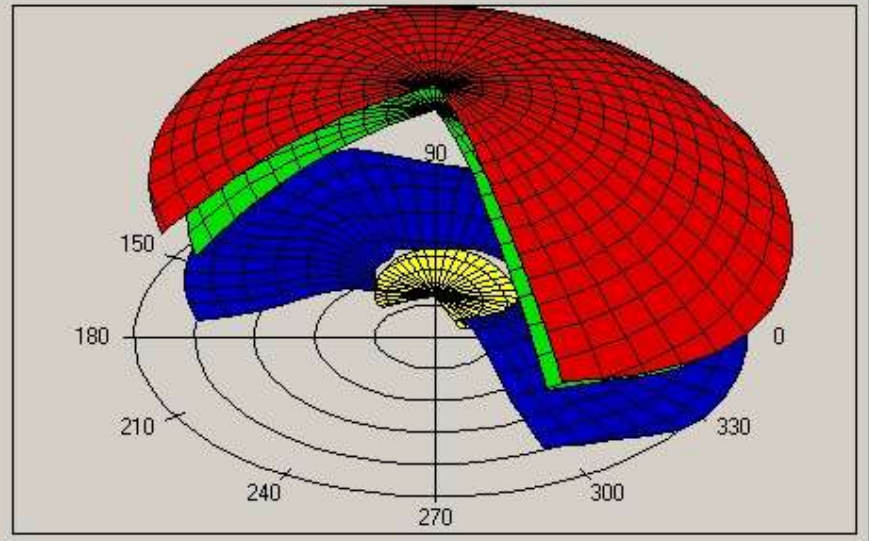
	Show	Fill
Cornea Front	☑	☑
Cornea Back	☑	☑
Iris	☑	☑
Lens Front	☑	☑
Lens Back	☐	☑
Scale	☑	☑

Cutout Width: 90°

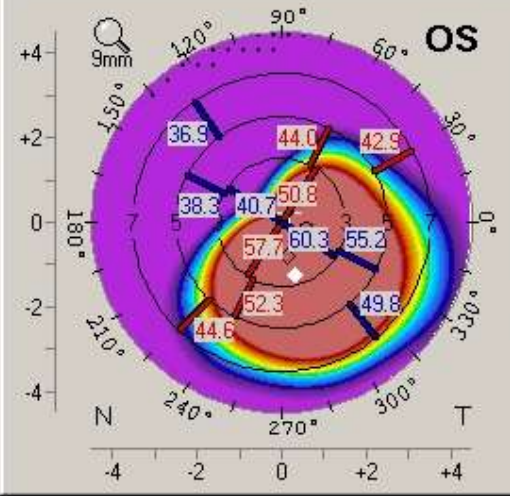
Cutout Pos: 250°

Normalize

Animate



Sagittal Curvature (Front)



51.3
51.0
50.7
50.5
50.2
50.0
49.7
49.5
49.3
49.0
48.8
48.5
48.2
48.0
47.7
47.5
47.2
47.0
46.8
46.5
46.3
46.0
45.7
45.5
45.2
45.0
44.7
44.5
44.3
44.0
43.8

0.25 D

Curvature

Rel

OCULUS - PENTACAM -2, -5 @ 120º: 0.3 160 ARC 150/250 µm

Last Name:	
First Name:	
ID:	112085
Date of Birth:	06/06/1986 Eye: Left
Exam Date:	21/02/2005 Time: 13:13:50
Exam Info:	

Cornea Front

Rh:	6.90 mm	K1:	48.9 D
Rv:	6.24 mm	K2:	54.1 D
Rm:	6.57 mm	Km:	51.4 D
QS:	OK	Axis: (flt.)	156.0 °
		Astig:	-5.2 D
ecc: (30°)	1.52	Rper:	8.08 mm
		Rmin:	5.24 mm

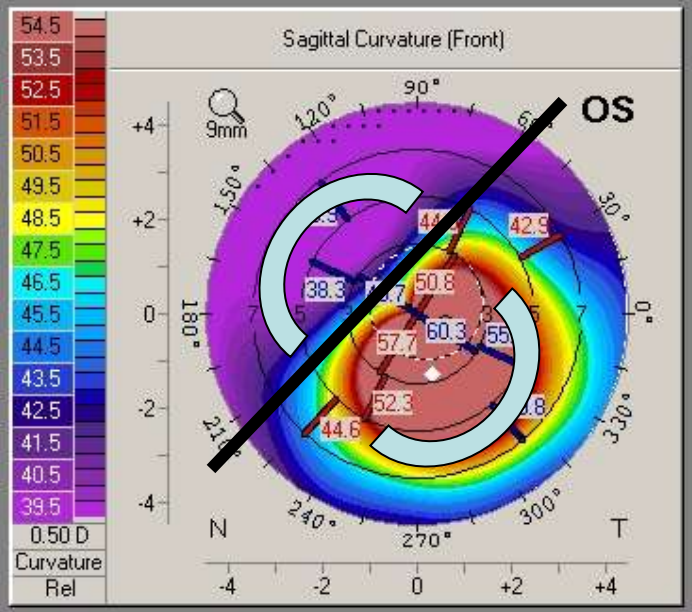
Cornea Back

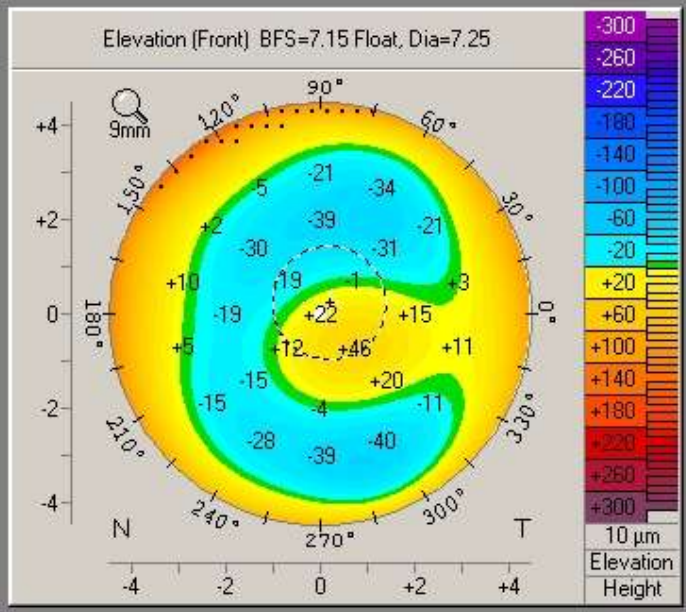
Rh:	5.51 mm	K1:	-7.3 D
Rv:	4.78 mm	K2:	-8.4 D
Rm:	5.15 mm	Km:	-7.8 D
QS:	Model	Axis: (flt.)	170.1 °
		Astig:	+1.1 D
ecc: (30°)	1.64	Rper:	6.55 mm
		Rmin:	3.50 mm

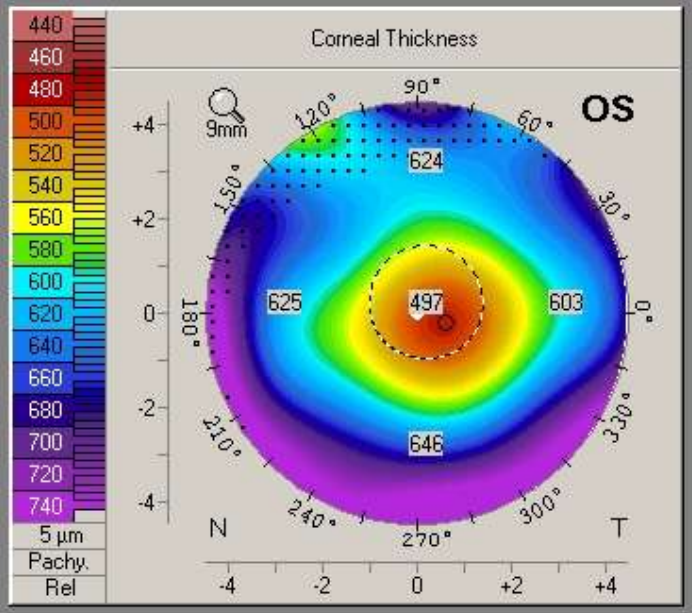
	Pachy:	x[mm]	y[mm]
Pupil Center:	497 µm	+0.19	+0.24
Pachy Apex :	496 µm	0.00	0.00
Thinnest Locat.:	484 µm	+0.60	-0.20
K Max. (Front):	64.4 D	+0.33	-1.27

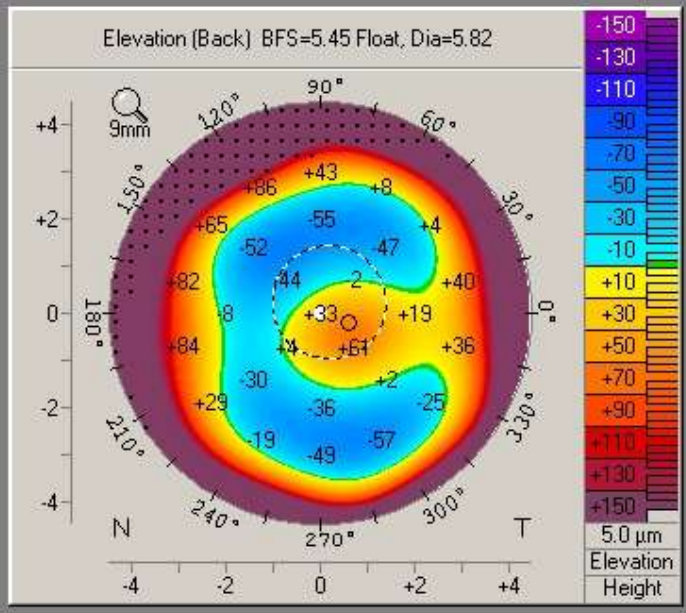
Cornea Volume:	62.6 mm³	KPD:	+3.2 D
Chamber Volume:	206 mm³	Angle:	46.9 °
A. C. Depth (Int.):	3.65 mm	Pupil Dia:	2.42 mm
Enter IOP	IOP(cor):	Lens Th.:	

Refractive

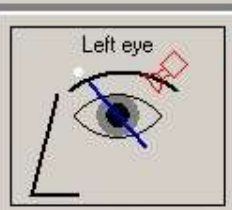








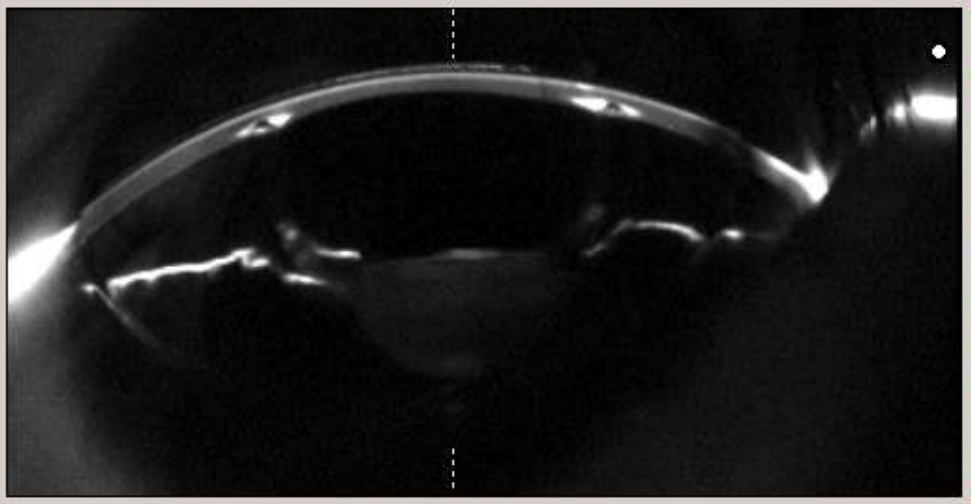
OCULUS - PENTACAM -3, -13 @ 10º: 0.2

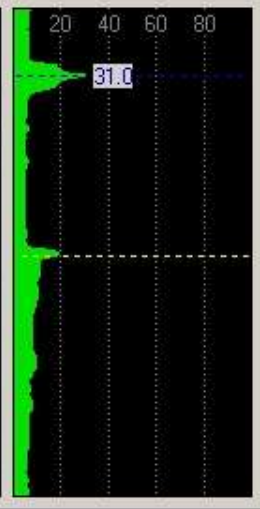


1/25	Segment: 312° - 132°
2/25	Segment: 305° - 125°
3/25	Segment: 298° - 118°
4/25	Segment: 290° - 110°
5/25	Segment: 283° - 103°

Contrast Normal

Adjust Image





Last Name:	
First Name:	
ID:	122085
Date of Birth:	28/06/1986
Eye:	Left
Exam Date:	26/10/2005
Time:	10:01:17



Rh:	6.89 mm	Astig:	-13.4 D
Rv:	5.41 mm	ecc: (30°)	1.33
Axis: (flat)	0.8 °	QS:	Data !

	Pachy:	x[mm]	y[mm]
Pupil Center: +	759 µm	+0.19	+0.36
Thinnest Locat.: ○	603 µm	+2.63	-1.48

Chamber Volume:	213 mm³	Angle:	44.7 °
A. C. Depth (Int.):	3.49 mm	Pupil Dia:	2.63 mm
Enter IOP	IOP(cor):	Lens Th.:	2.96 mm

53.8
53.5
53.2
53.0
52.7
52.5
52.2
52.0
51.8
51.5
51.3
51.0
50.7
50.5
50.2
50.0
49.7
49.5
49.3
49.0
48.8
48.5
48.2
48.0
47.7
47.5
47.2
47.0
46.8
46.5
46.3

0.25 D

Curvature

Rel

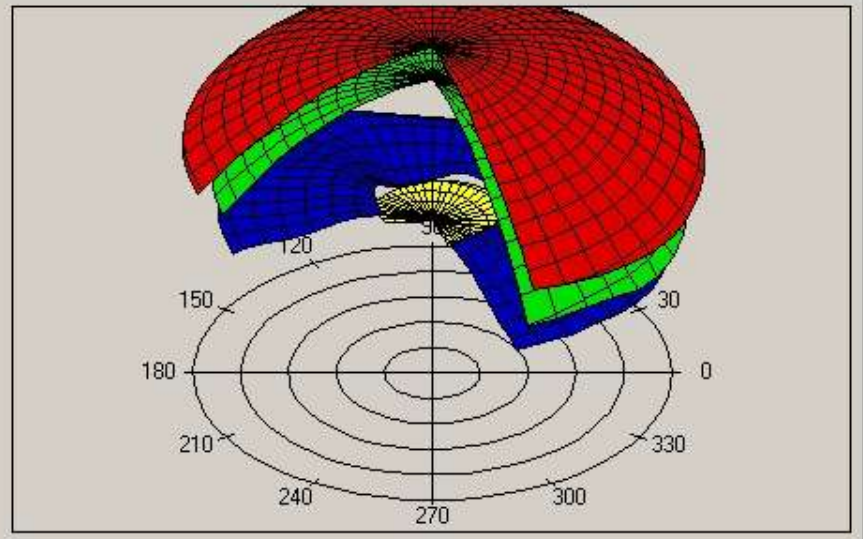
	Show	Fill
Cornea Front	☑	☑
Cornea Back	☑	☑
Iris	☑	☑
Lens Front	☑	☑
Lens Back	☐	☑
Scale	☑	☑

Cutout Width: 90°

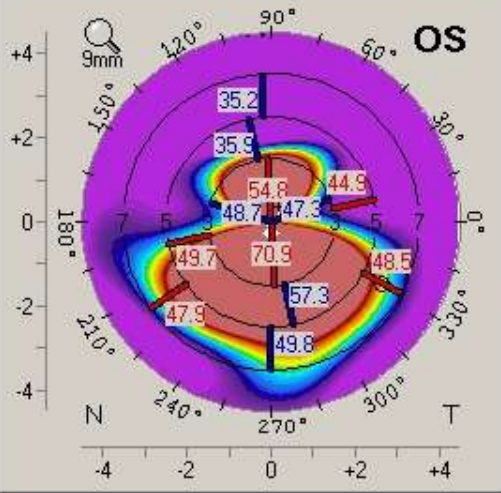
Cutout Pos: 250°

Normalize

Animate



Sagittal Curvature (Front)



OCULUS - PENTACAM

200 µm 90 / 160 arc (30º)

Last Name:	
First Name:	
ID:	112085
Date of Birth:	06/06/1986 Eye: Left
Exam Date:	21/02/2005 Time: 13:13:50
Exam Info:	

Cornea Front

Rh:	6.90 mm	K1:	48.9 D
Rv:	6.24 mm	K2:	54.1 D
Rm:	6.57 mm	Km:	51.4 D
QS:	OK	Axis: (flt.)	156.0 °
		Astig:	-5.2 D
ecc: (30°)	1.52	Rper:	8.08 mm
		Rmin:	5.24 mm

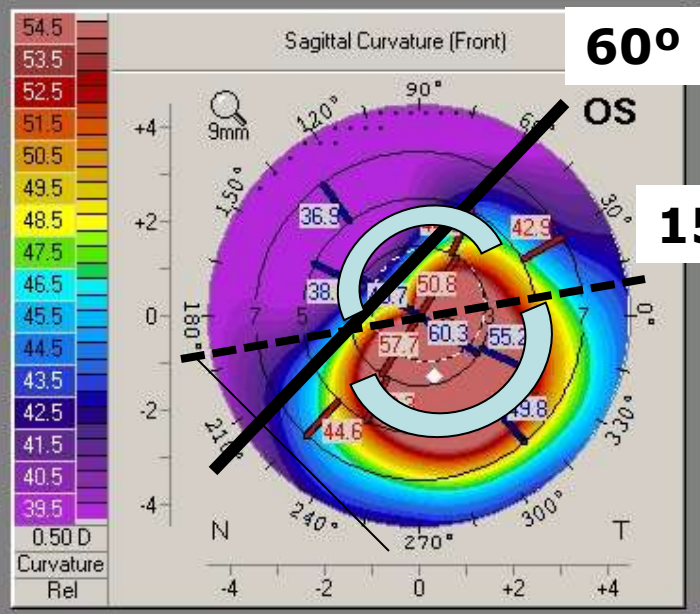
Cornea Back

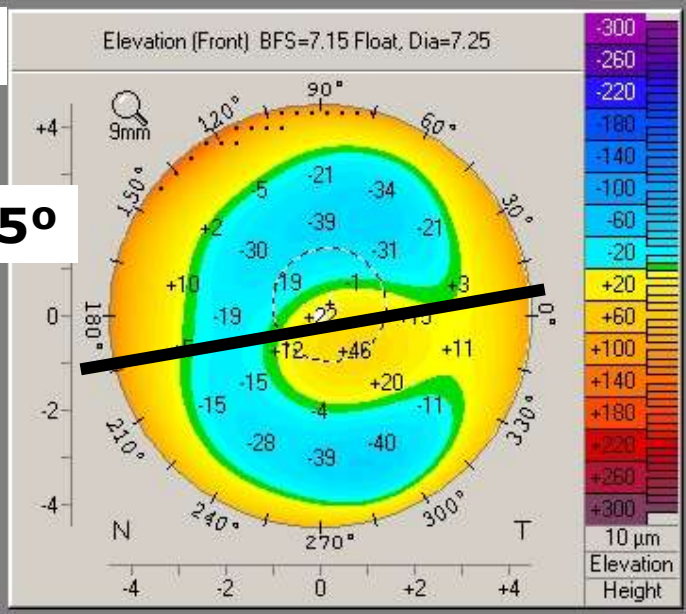
Rh:	5.51 mm	K1:	-7.3 D
Rv:	4.78 mm	K2:	-8.4 D
Rm:	5.15 mm	Km:	-7.8 D
QS:	Model	Axis: (flt.)	170.1 °
		Astig:	+1.1 D
ecc: (30°)	1.64	Rper:	6.55 mm
		Rmin:	3.50 mm

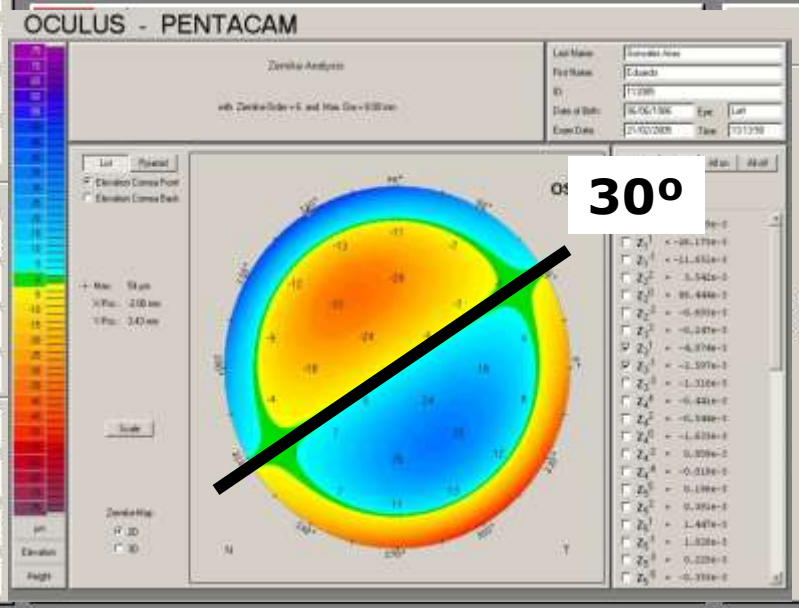
	Pachy:	x[mm]	y[mm]
Pupil Center:	497 µm	+0.19	+0.24
Pachy Apex :	496 µm	0.00	0.00
Thinnest Locat.:	484 µm	+0.60	-0.20
K Max. (Front):	64.4 D	+0.33	-1.27

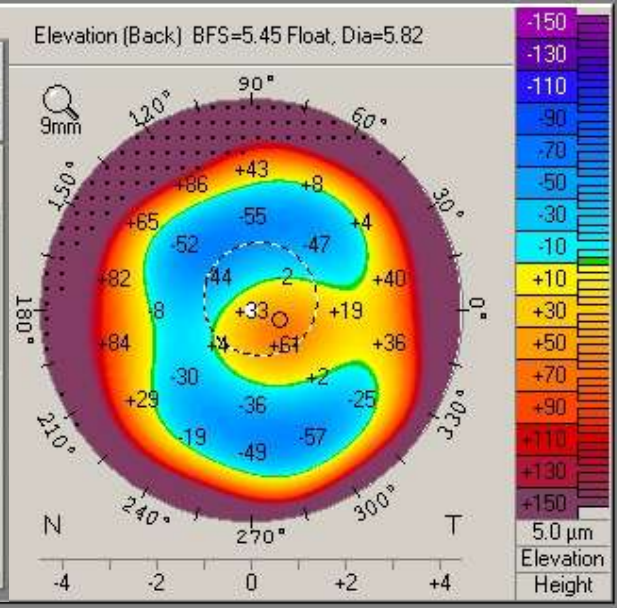
Cornea Volume:	62.6 mm³	KPD:	+3.2 D
Chamber Volume:	206 mm³	Angle:	46.9 °
A. C. Depth (Int.):	3.65 mm	Pupil Dia:	2.42 mm
Enter IOP	IOP(cor):	Lens Th.:	

Refractive

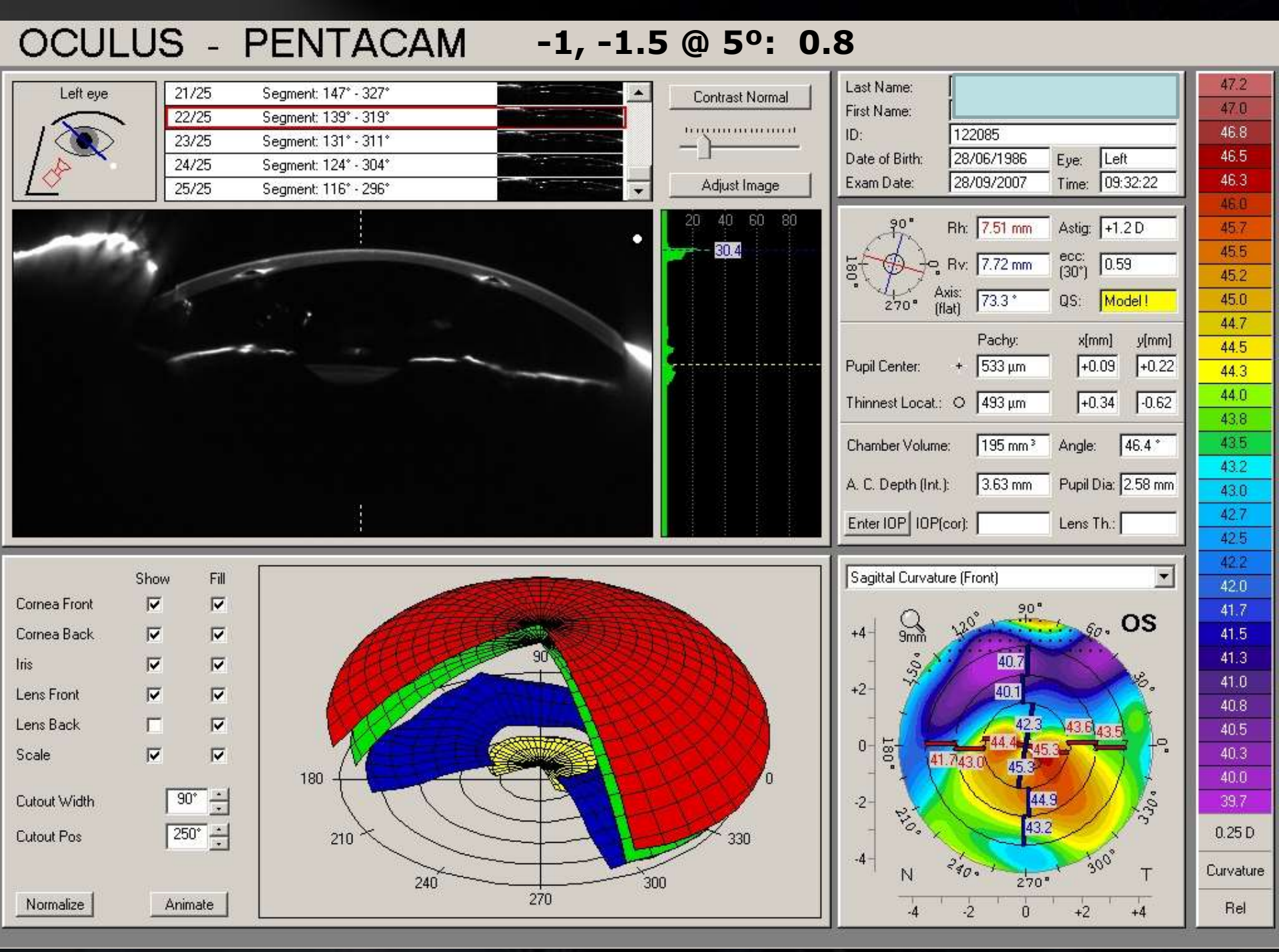








OCULUS - PENTACAM -1, -1.5 @ 5º: 0.8



OCULUS - PENTACAM

Last Name:			
First Name:			
ID:	122085		
Date of Birth:	28/06/1986	Eye:	Left
Exam Date:	28/09/2007	Time:	09:32:22
Exam Info:			

Cornea Front

Rh:	7.51 mm	K2:	44.9 D
Rv:	7.72 mm	K1:	43.7 D
Rm:	7.62 mm	Km:	44.3 D
QS: OK	Axis: (flt.) 73.3 °	Astig:	+1.2 D
ecc: (30°) 0.59	Rper: 7.85 mm	Rmin:	7.25 mm

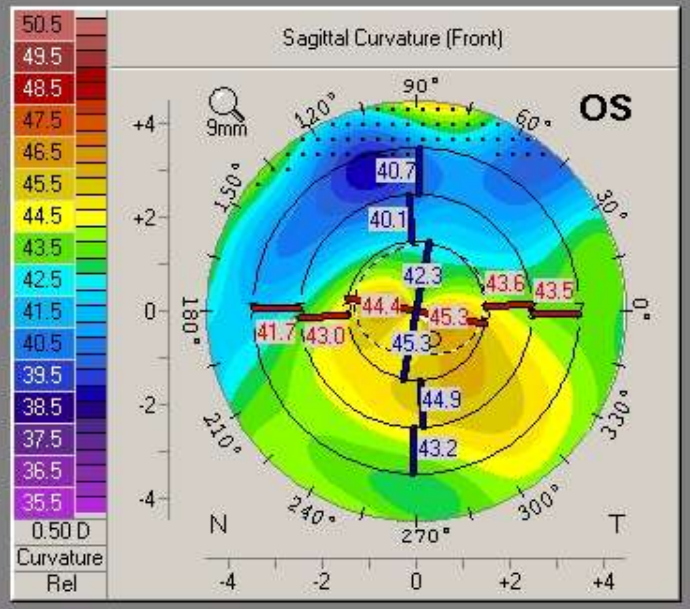
Cornea Back

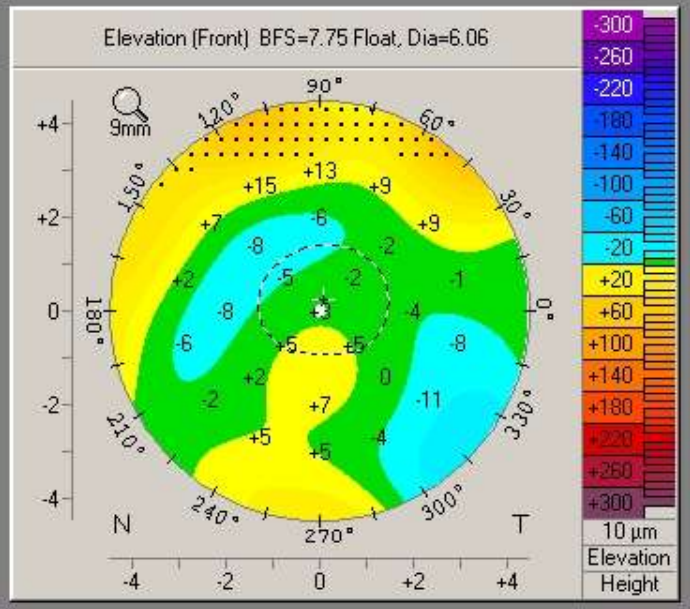
Rh:	5.63 mm	K1:	-7.1 D
Rv:	5.26 mm	K2:	-7.6 D
Rm:	5.44 mm	Km:	-7.3 D
QS: Model	Axis: (flt.) 4.9 °	Astig:	+0.5 D
ecc: (30°) 1.22	Rper: 6.22 mm	Rmin:	3.96 mm

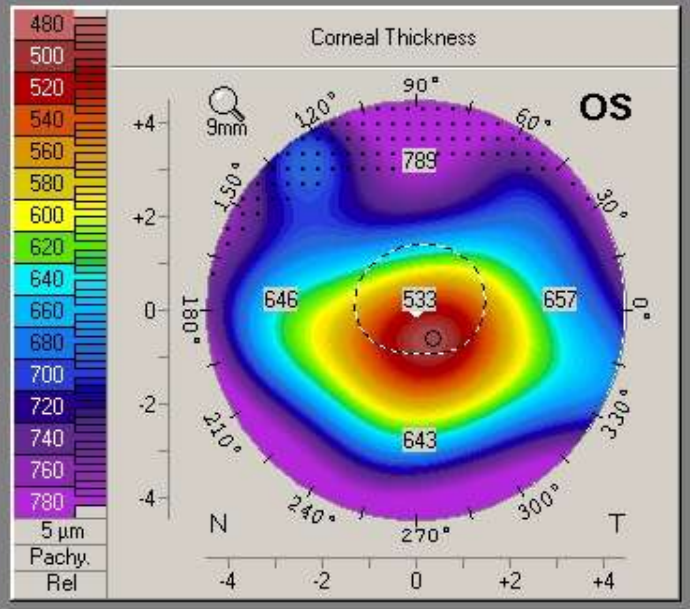
	Pachy:	x[mm]	y[mm]
Pupil Center:	533 µm	+0.09	+0.22
Pachy Apex :	518 µm	0.00	0.00
Thinnest Locat.:	493 µm	+0.34	-0.62
K Max. (Front):	46.5 D	+0.21	-0.07

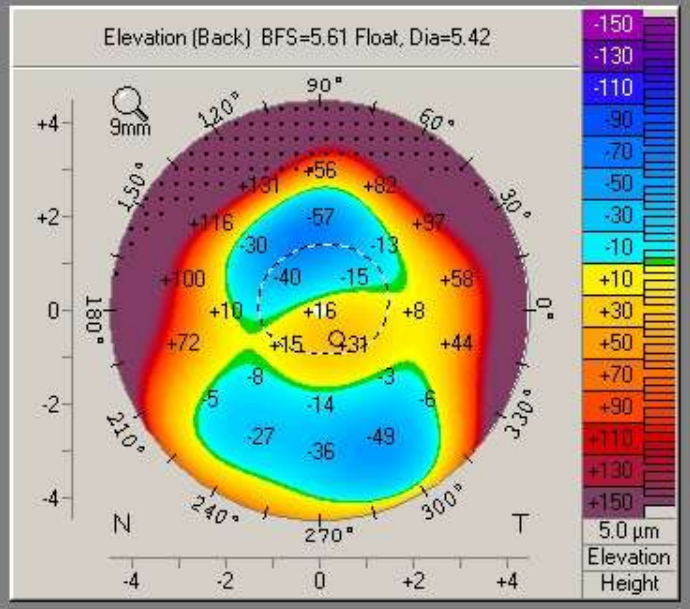
Cornea Volume:	66.7 mm³	KPD:	+3.5 D
Chamber Volume:	195 mm³	Angle:	46.4 °
A. C. Depth (Int.):	3.63 mm	Pupil Dia:	2.58 mm
Enter IOP	IOP(cor):	Lens Th.:	

Refractive

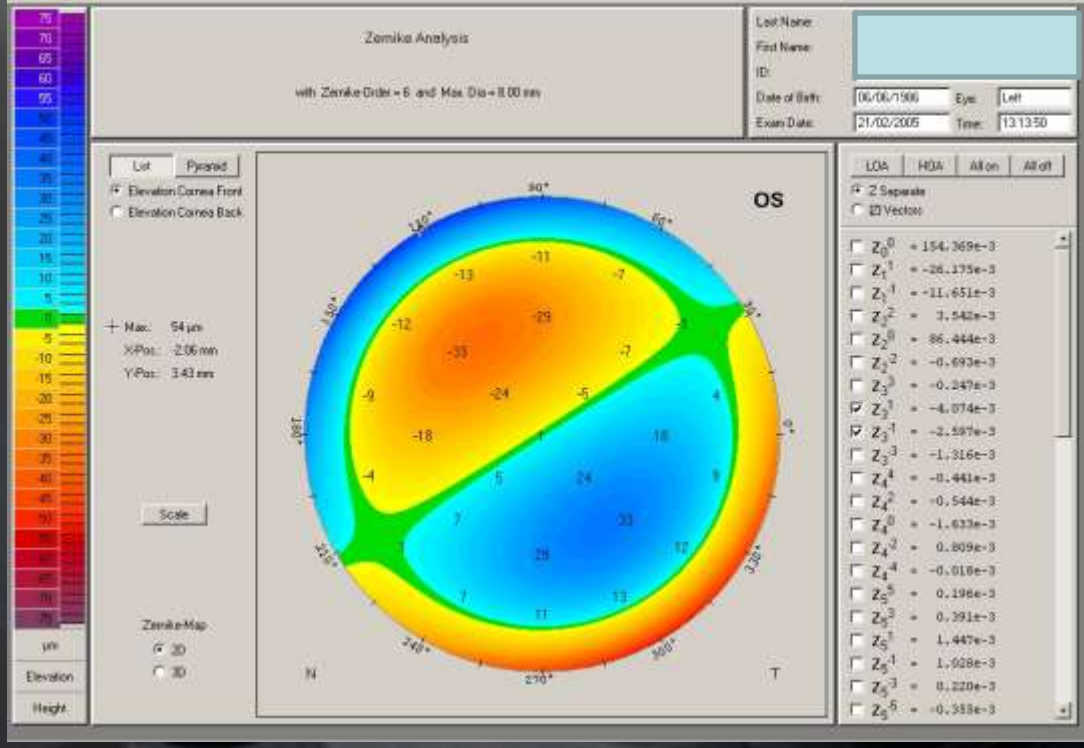




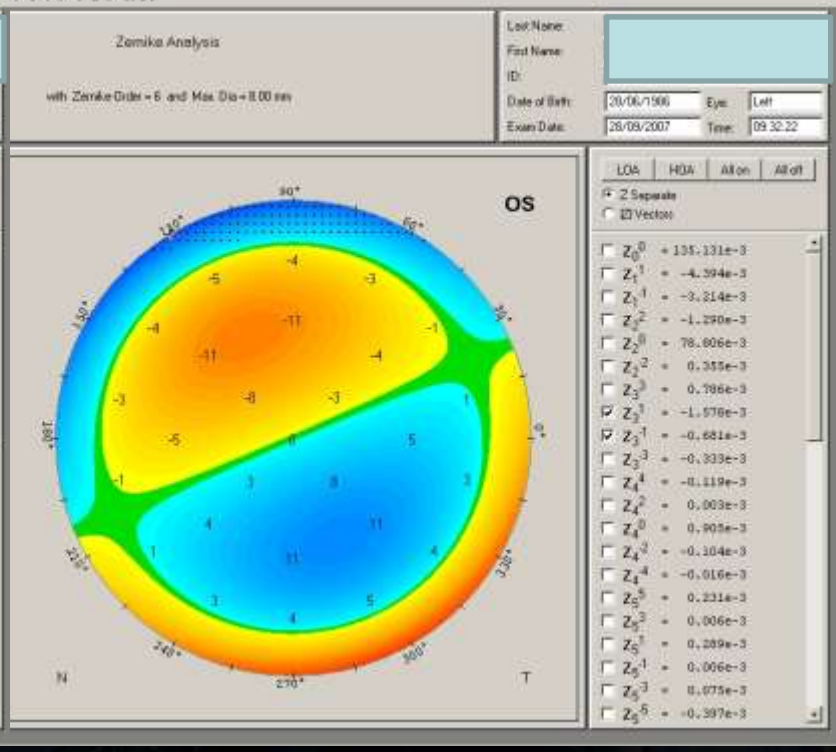




OCULUS - PENTACAM

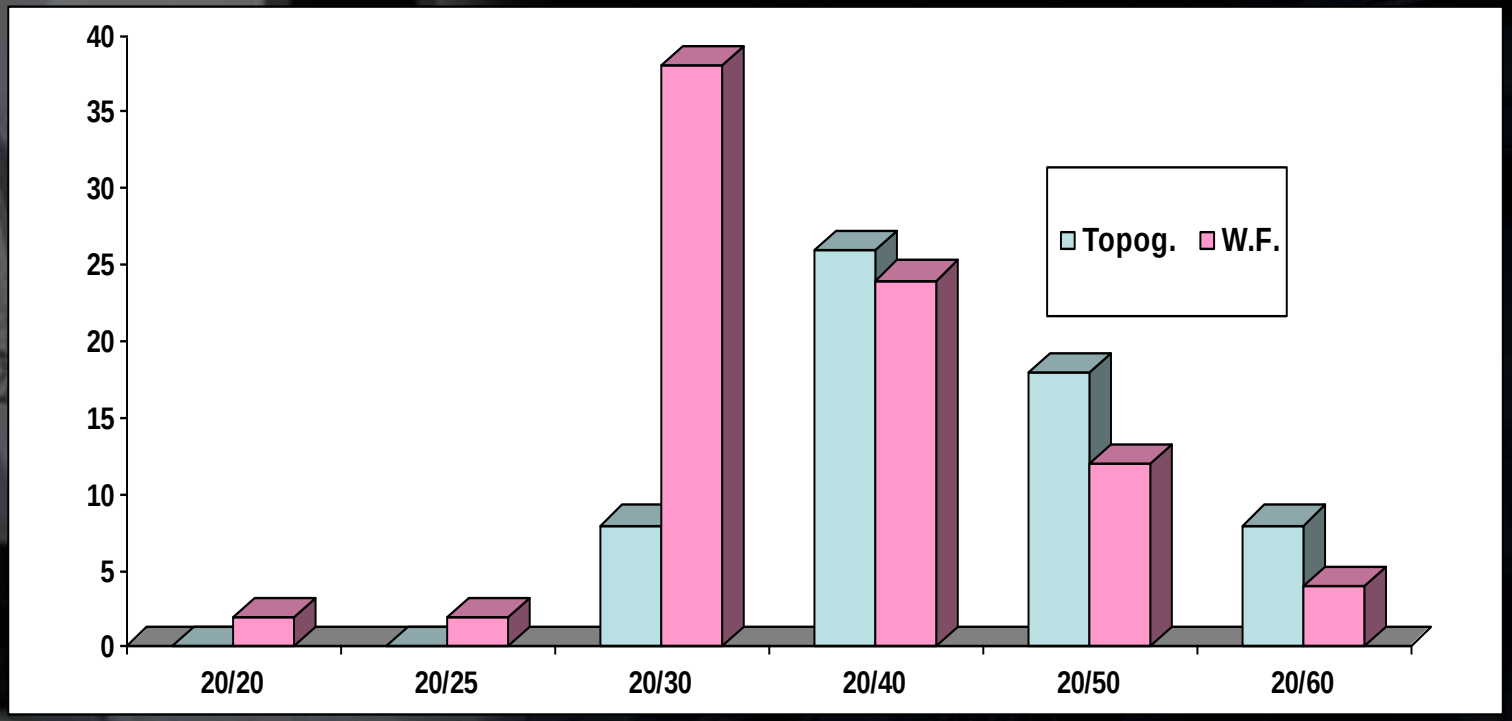


NTACAM



Safety Analysis. BCVA

N: 24



P > 0.02

Safety Analysis
BCVA Gained/Lost

N: 24



P> 0.04

CONCLUSIONS

- If you want to implant intra-stromal ring is mandatory the anterior and posterior face of the cornea, the pachimetry and a software that provide date to analyze the **aberrations**.
- We need more experience to analyze results and adjust our protocols.