INTERNATIONAL CONGRESS OF THE
EGYPTIAN
OPHTHALMOLOGICAL SOCIETY

EOS 1902

In collaboration with: MEACO

Biomechanics

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Head Of Refractive surgery unit - Research Institute of Ophthalmology

A. Professor of Ophthalmology

The Speaker Has No Financial Interest

Do we really need biomechanical evaluation?

KC

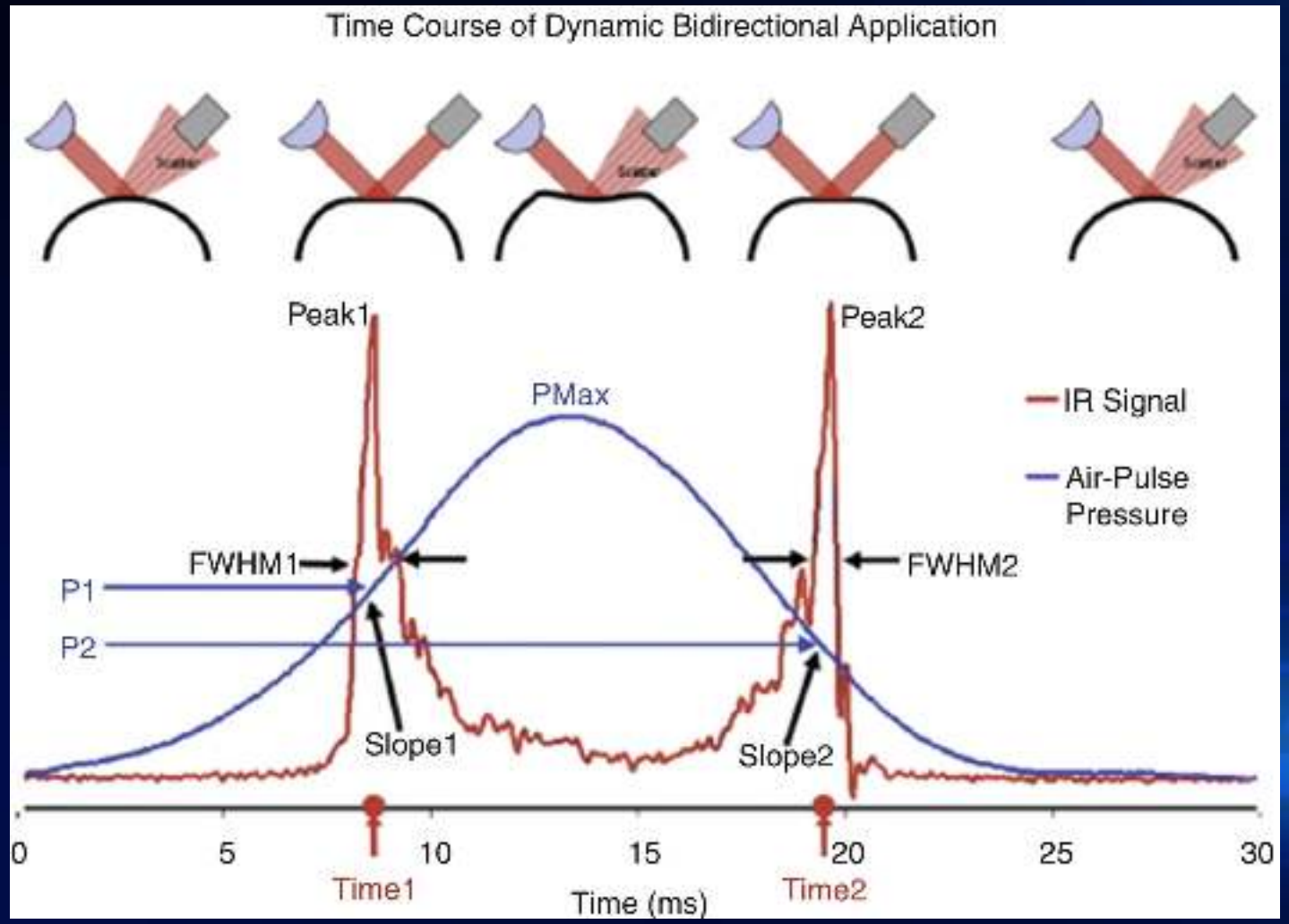
- Progressive, non-inflammatory condition, which produces a thinning and steepening of the cornea.

- Subclinical inflammatory disease.(Increased levels IL-6, TNF-α, and MMP-9).
- Eye rubbing, a proven risk factor for keratoconus.

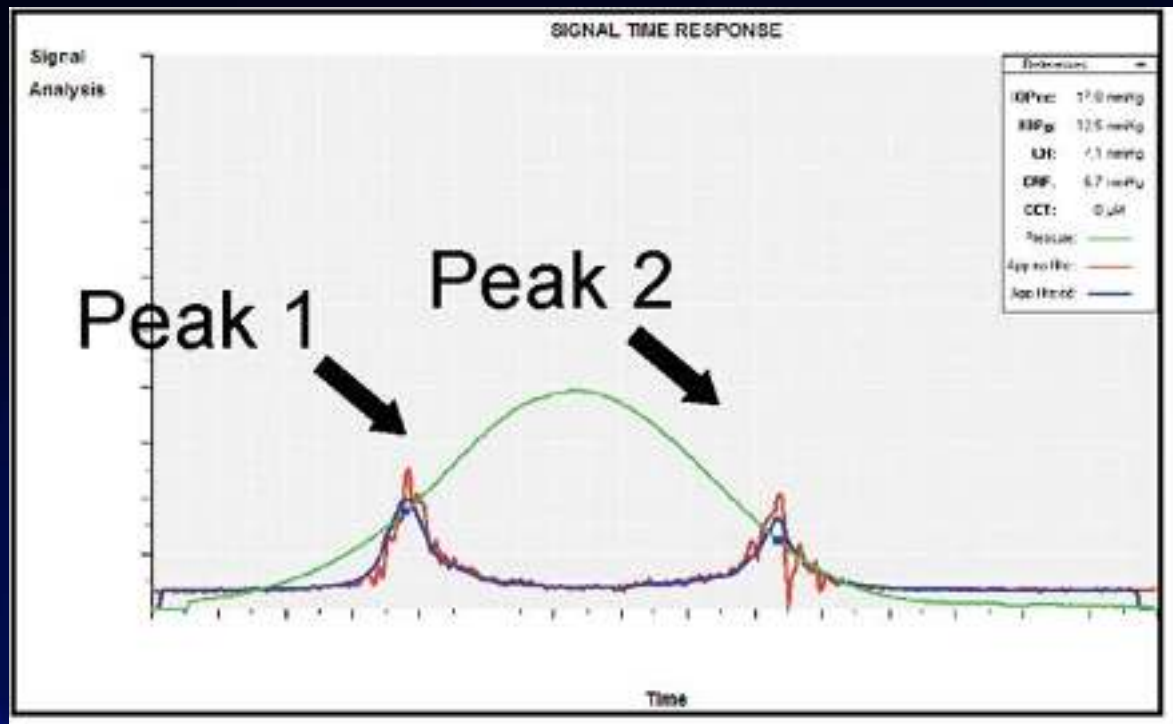
KC and Post LVC Ectasia

- Biomechanical Failure!!

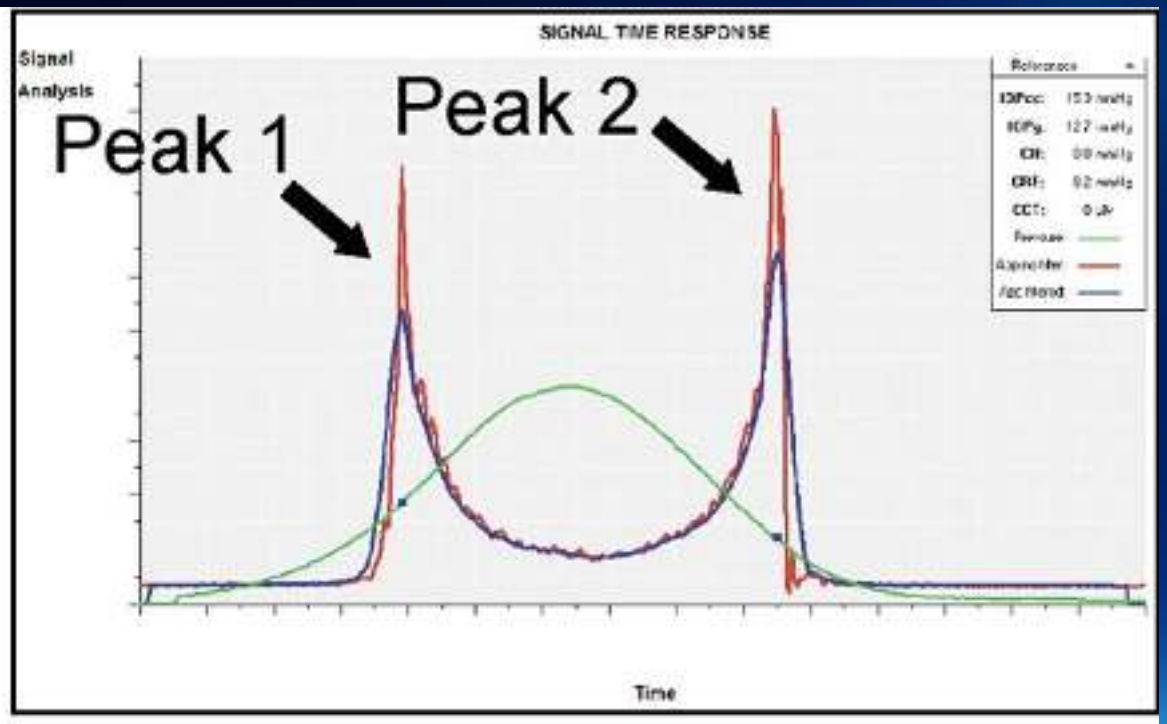
Ocular Response analyzer (ORA)



Roberts CJ. Concepts and misconceptions in corneal biomechanics. J Cataract Refract Surg. 2014;40:862–9.



Keratoconic cornea



Normal cornea

Glass DH. Characterization of the biomechanical properties of the in vivo human cornea. PhD Dissertation, The Ohio State University; 2008.

CorVis ST
Corneal Visualization Scheimpflug Technology

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DCR

(UHS) Scheimpflug camera angled at 45° towards the apex of the cornea

140 cross-sectional images in 30 ms

4,330 frames per second

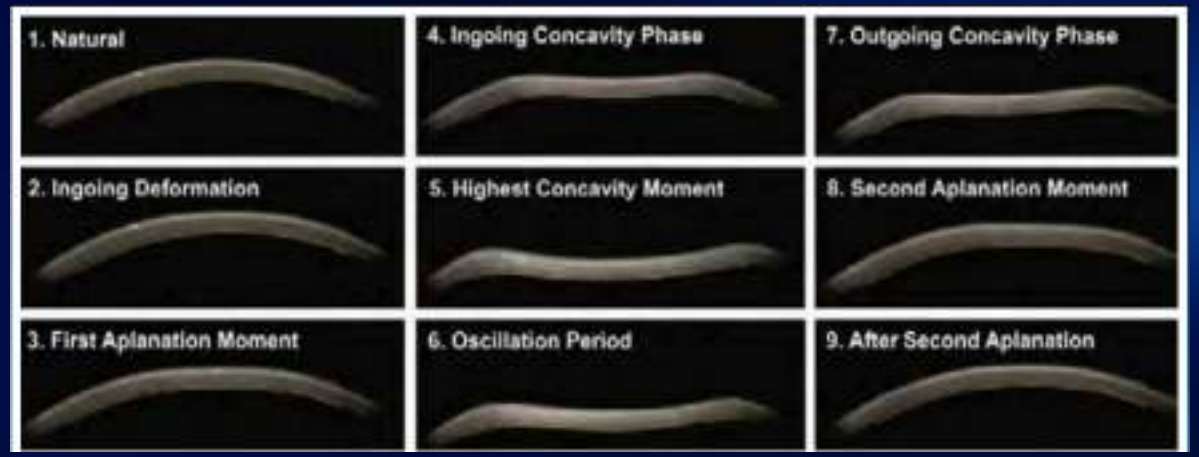
8 mm horizontal coverage

Air puff

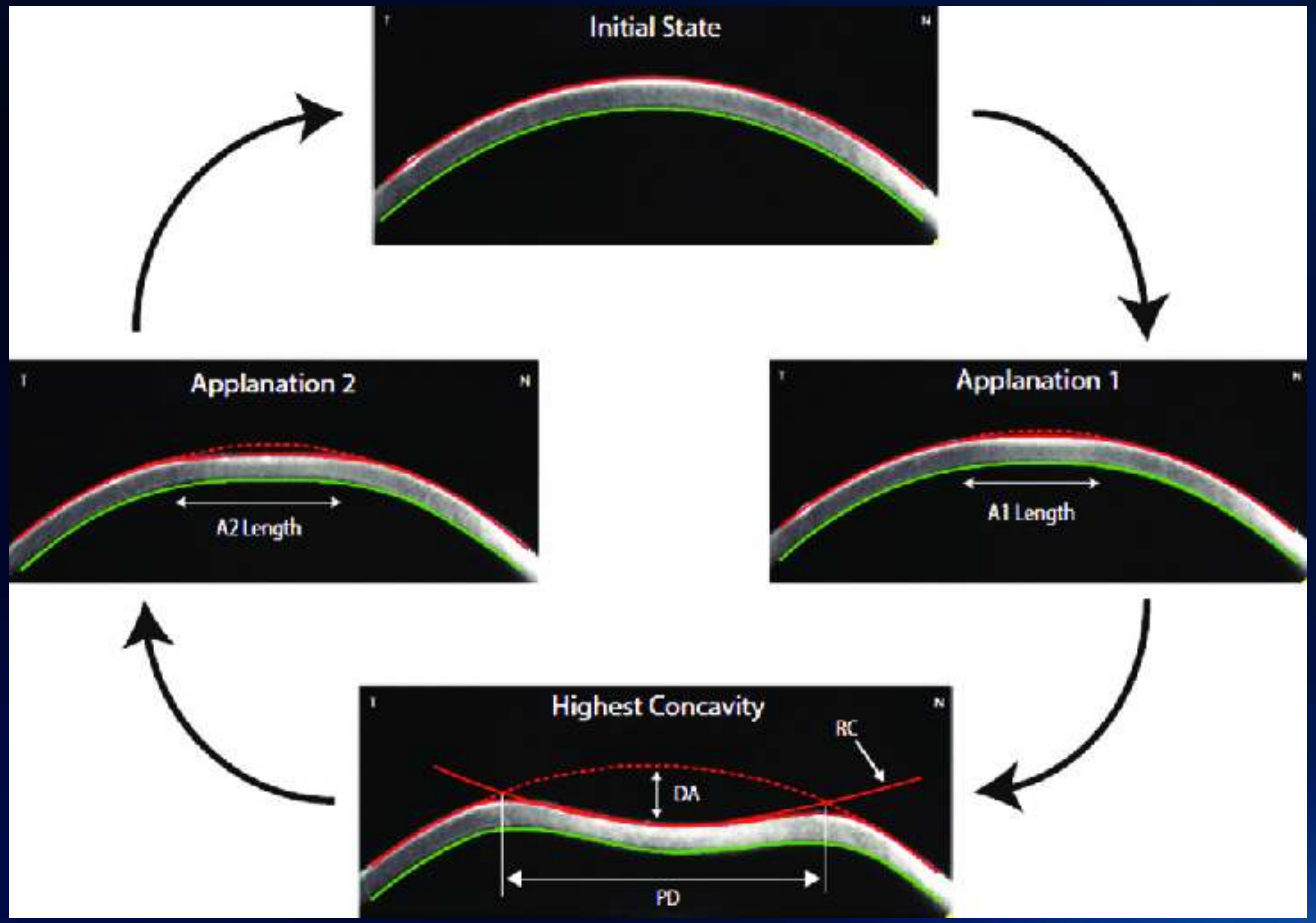
60 mmHg

3.05 mm

Corneal Deformation




Eye: Left (OS)
OCULUS
0.00 ms



Scheimpflug images of the corneal deformation response on Corvis ST showing the biomechanical parameters derived at each stage. The fixed air puff causes the cornea to flatten (applanation point A1) and then move inwards to reach the point of highest concavity where the deformation amplitude (DA in mm), peak distance (PD in mm), and the radius of curvature (RC in mm) are measured. As the cornea begins to assume its normal, convex shape, it passes through the second applanation point (A2)

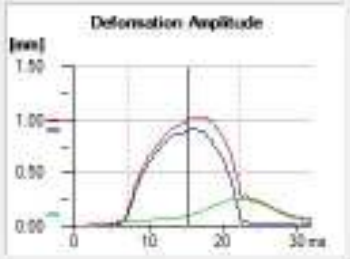

Eye: Left (OS)
Exam. Date: 22.07.2019 13:12:02
OCULUS
0.00 ms

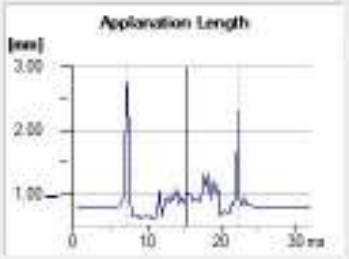

Eye: Left (OS)
Exam. Date: 06.02.2023 13:43:45
OCULUS
0.00 ms

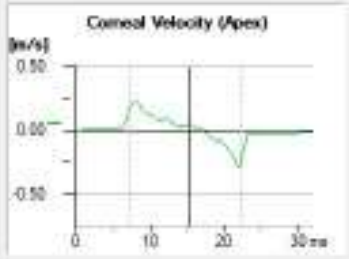
OCULUS Corvis® ST - Dynamic Corneal Response

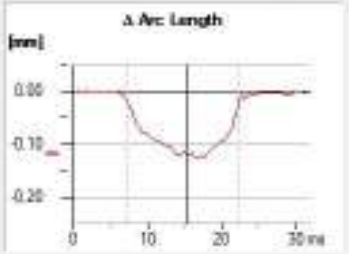
[redacted]

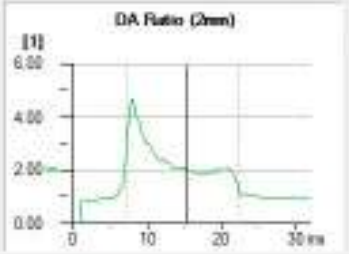
ID:	Unilat KC	Date of birth:	28.05.1990	Age:	31
Time:	12:51:20	Eye:	Right (OD)		
		QS:	OK		

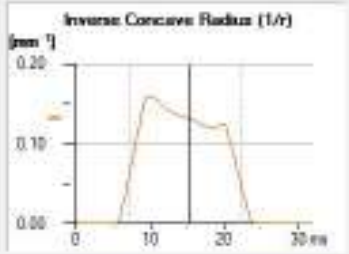


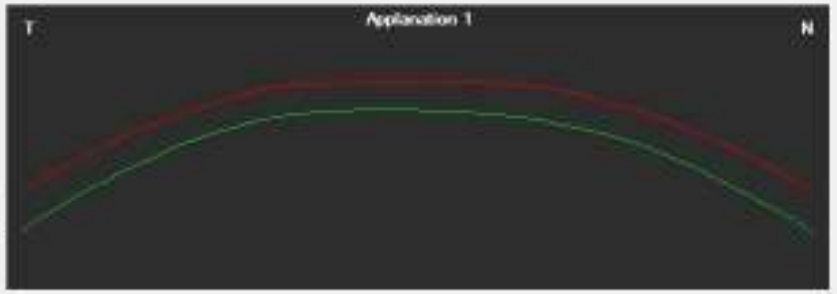










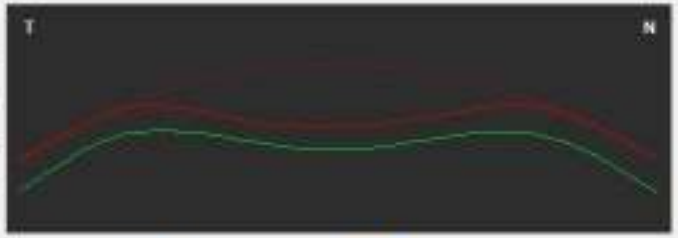


	Length	Velocity	IOP	
Applanation 1	2.72 mm	0.15 m/s	IOPnct (no corr.):	12.5 mmHg
Applanation 2	1.93 mm	-0.26 m/s	bIOP:	13.4 mmHg
	Peak Distance	**Radius**	**Deform. Amplitude**	**Pachymetry**
Highest Concavity	5.14 mm	8.55 mm	1.03 mm	CCT: 519 µm

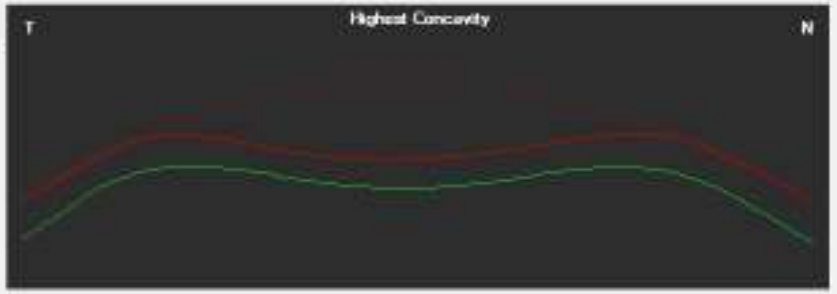
Applanation 1

Highest Concavity

Applanation 2



15.25 ms



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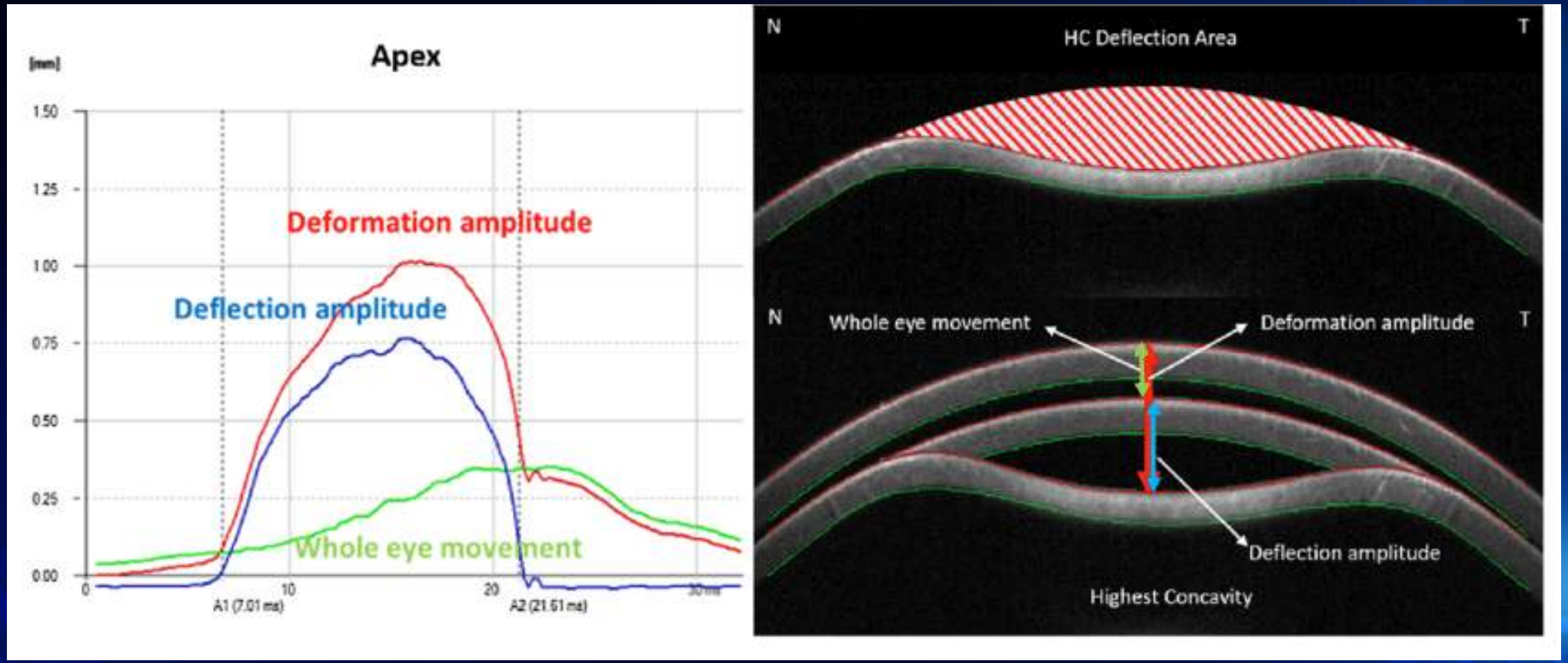
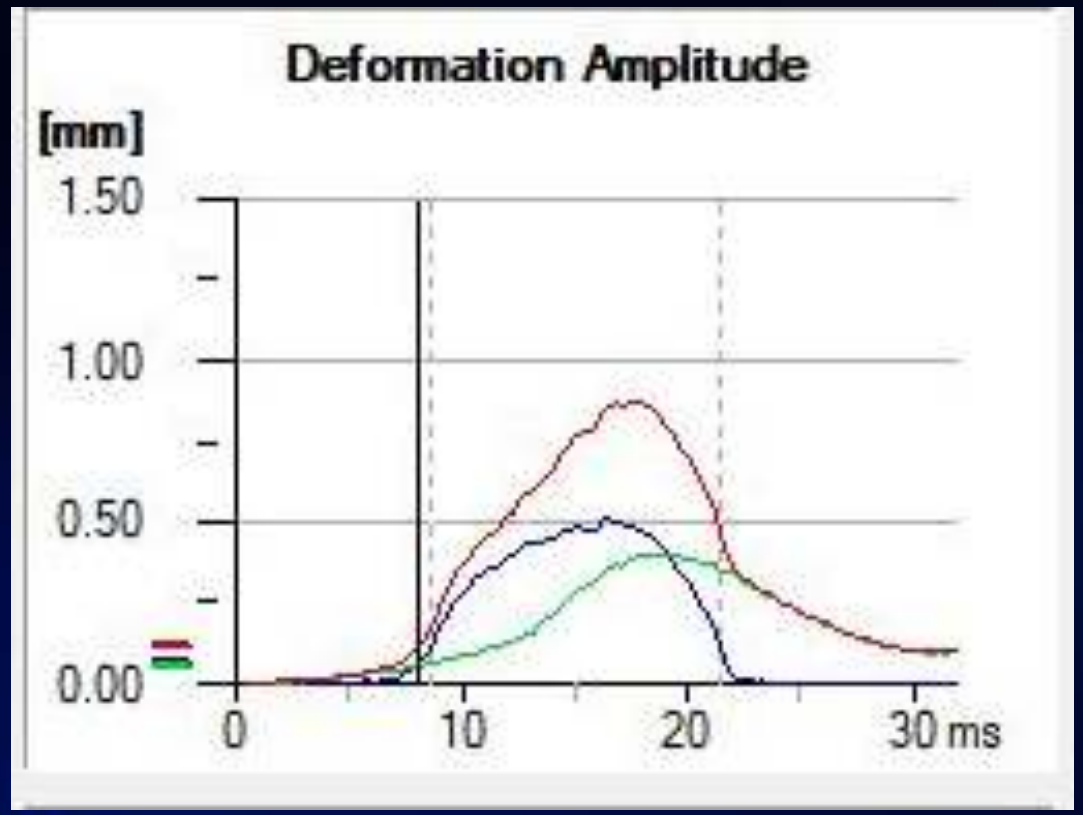
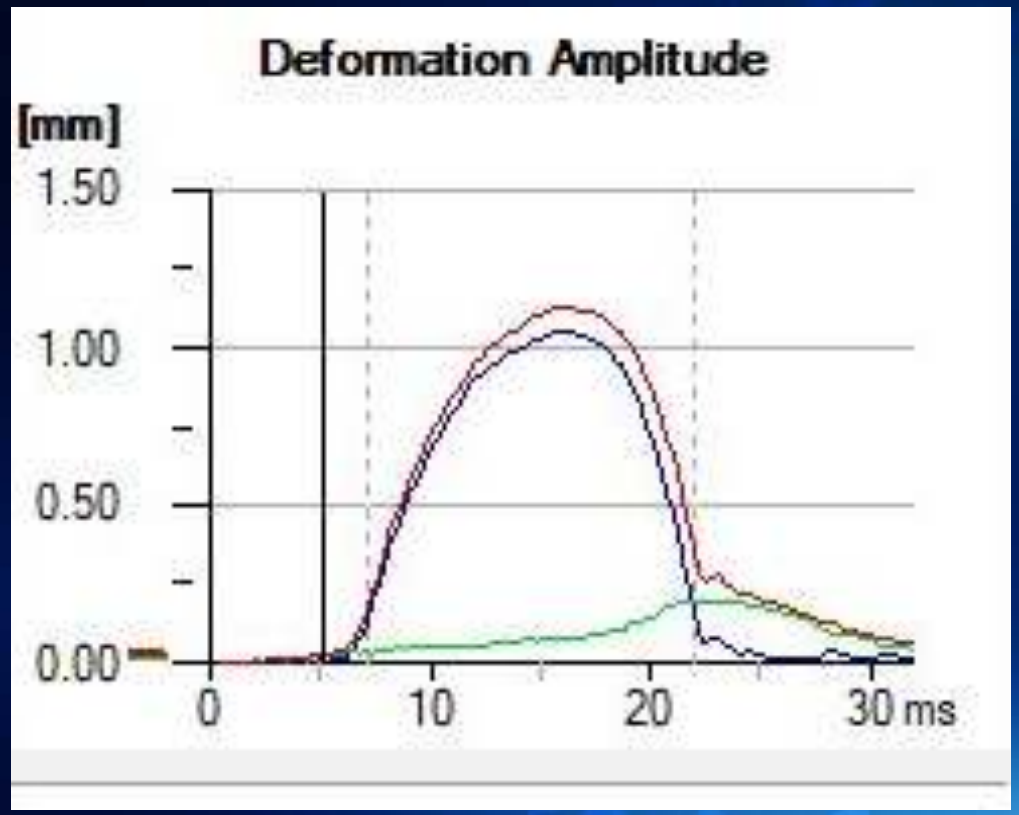
35582 Wetzlar
Tel: (0641) 20 05-0
Fax: (0641) 20 05-255
www.oculus.de

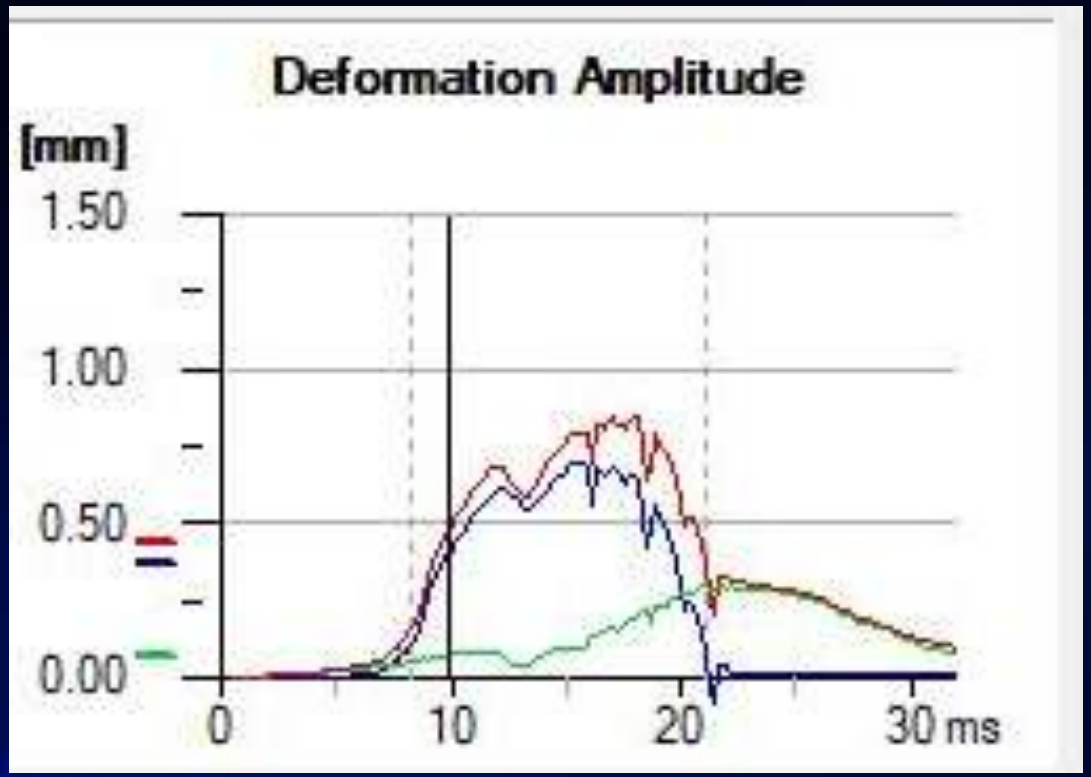
OCULUS

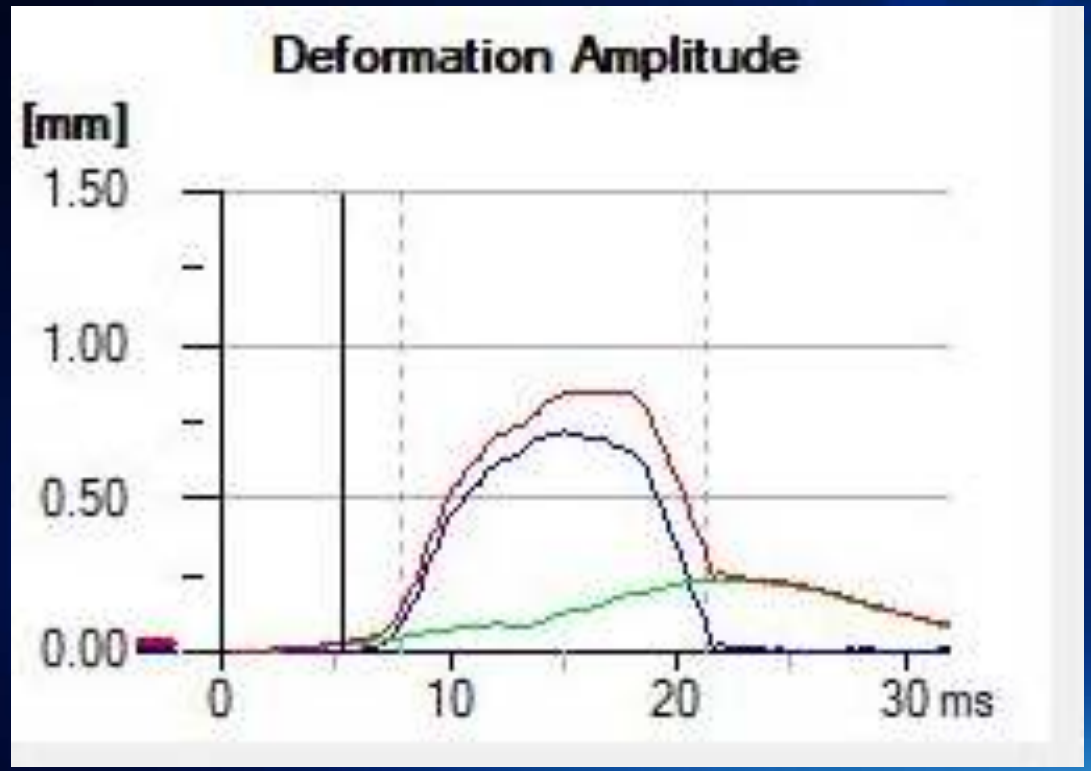
EOS 2
EGYPTIAN

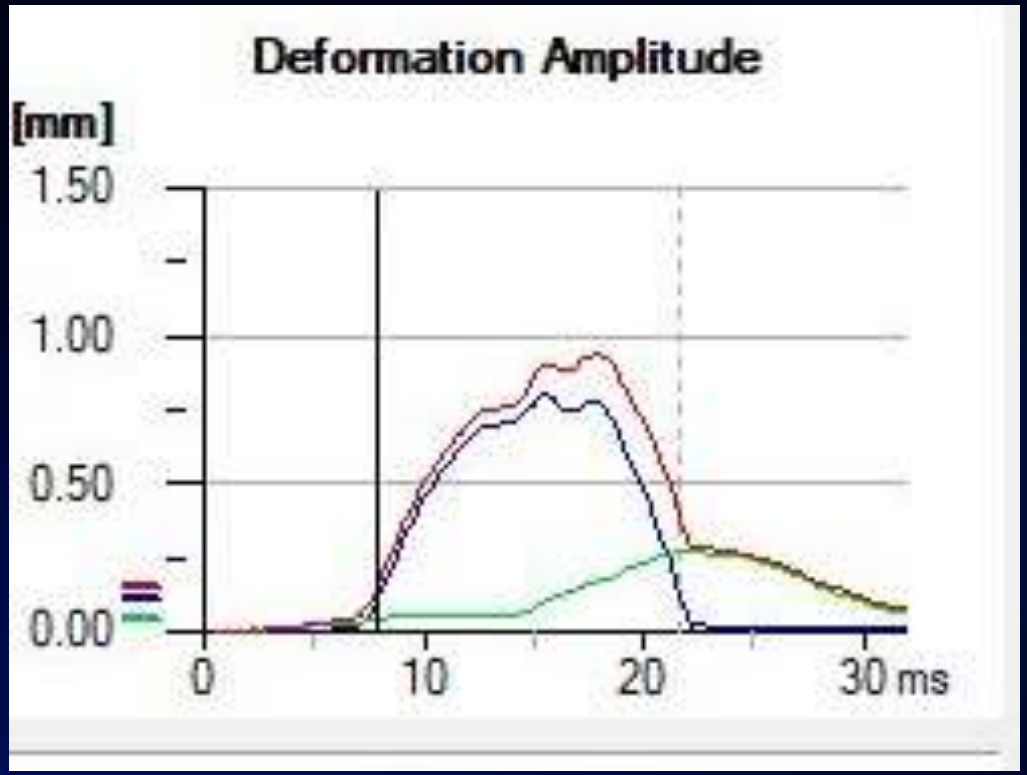

Apex
[mm]
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Deformation amplitude
Deflection amplitude
Whole eye movement
0
10
20
A1 (7.01 ms)
A2 (21.61 ms)
N
HC Deflection Area
T
N
Whole eye movement
Deformation amplitude
T
Deflection amplitude
Highest Concavity

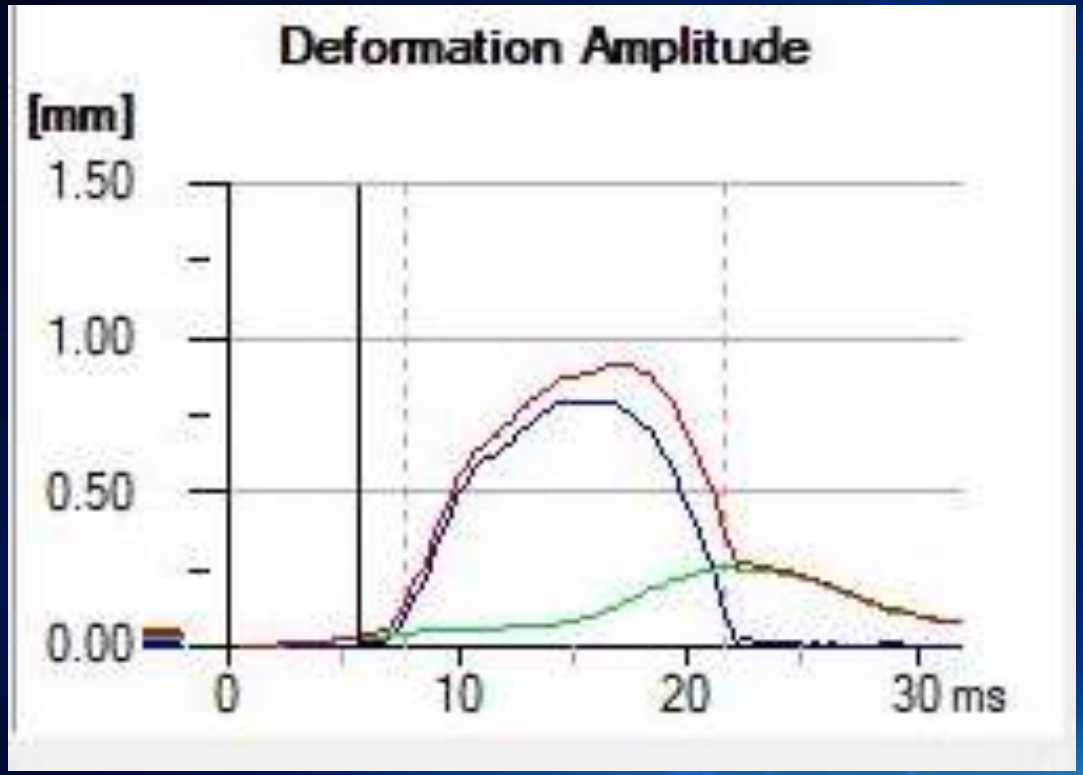

Deformation Amplitude
[mm]
1.50
1.00
0.50
0.00
0
10
20
30 ms


Deformation Amplitude
[mm]
1.50
1.00
0.50
0.00
0
10
20
30 ms


Deformation Amplitude
[mm]
1.50
1.00
0.50
0.00
0
10
20
30 ms


Deformation Amplitude
[mm]
1.50
1.00
0.50
0.00
0
10
20
30 ms

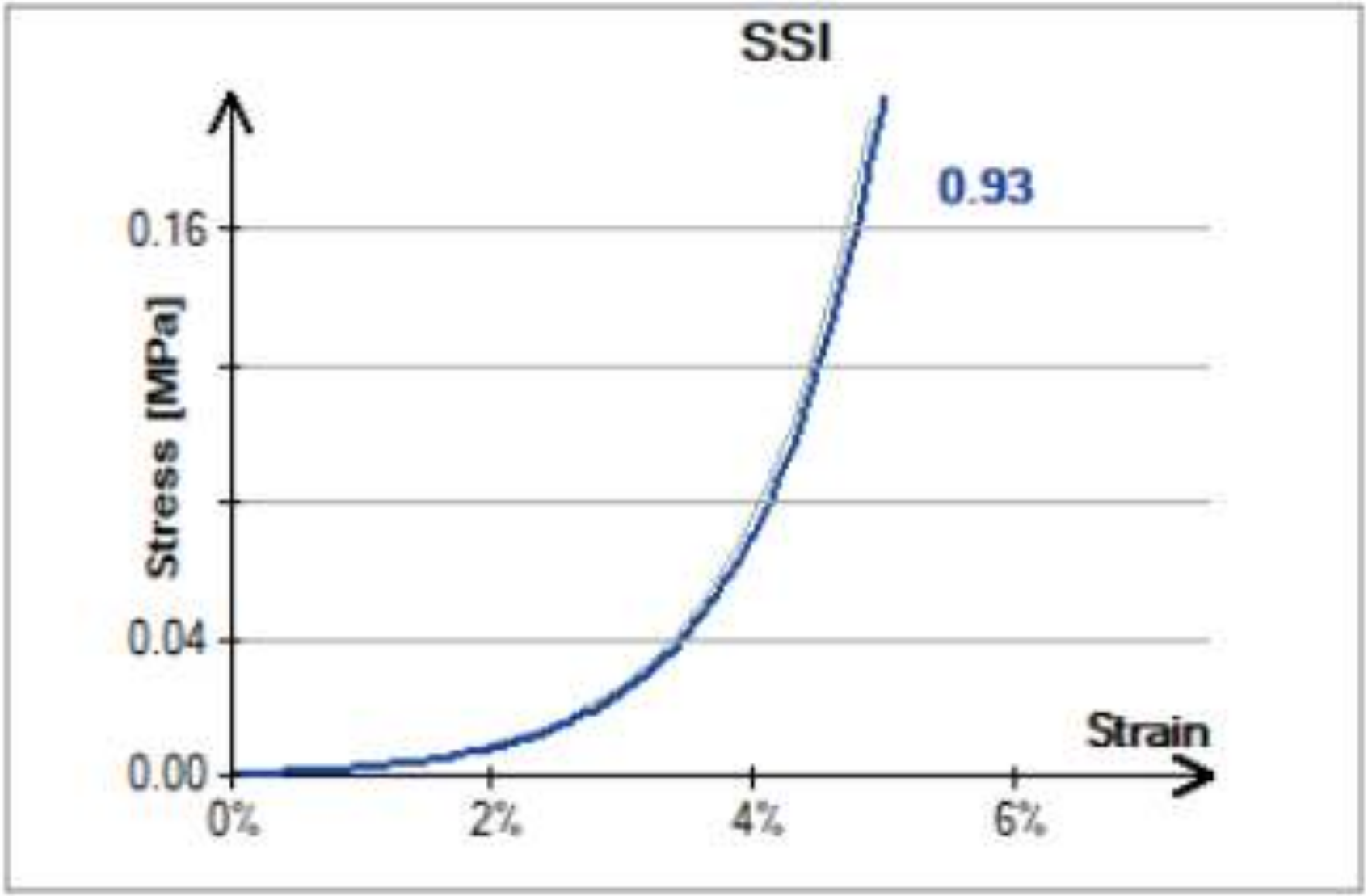

Deformation Amplitude
[mm]
1.50
1.00
0.50
0.00
0
10
20
30 ms

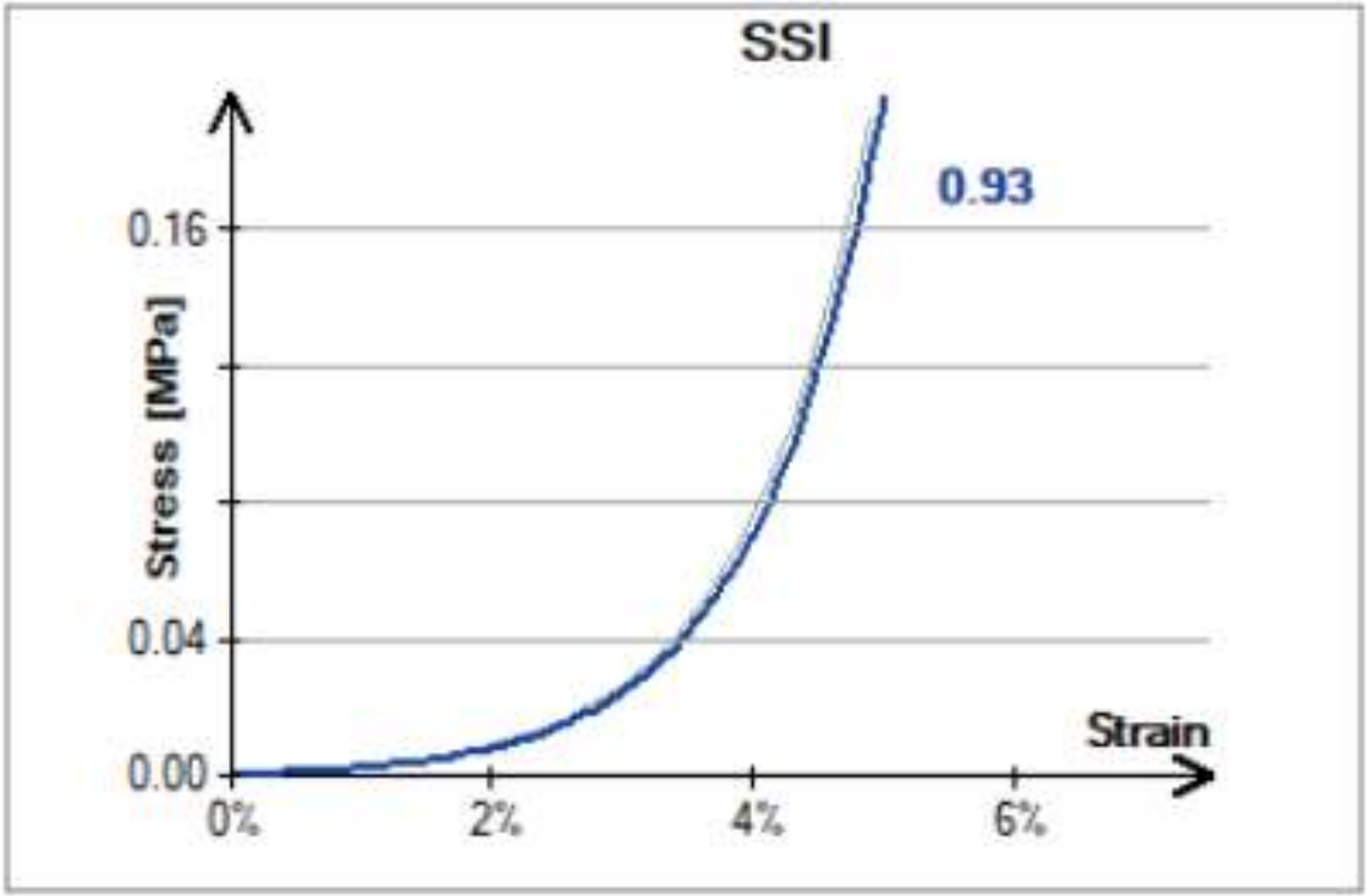

Deformation Amplitude
[mm]
1.50
1.00
0.50
0.00
0
10
20
30 ms

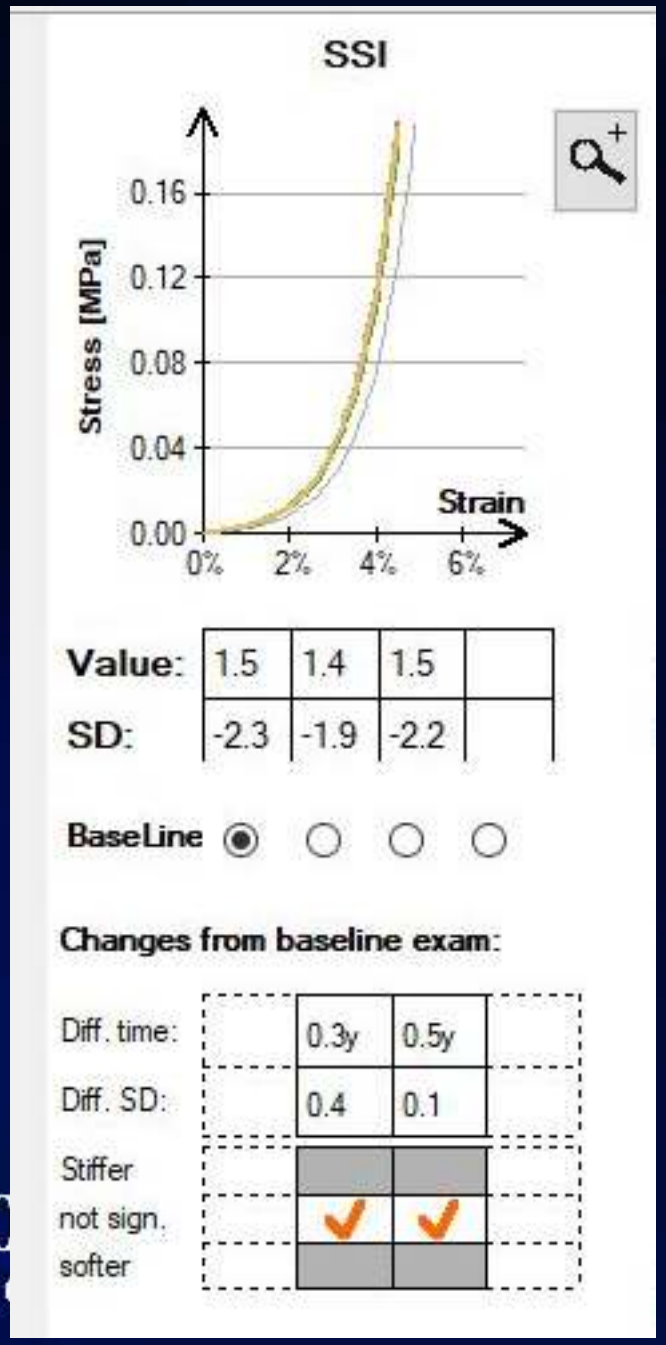
SS Curve and SSI

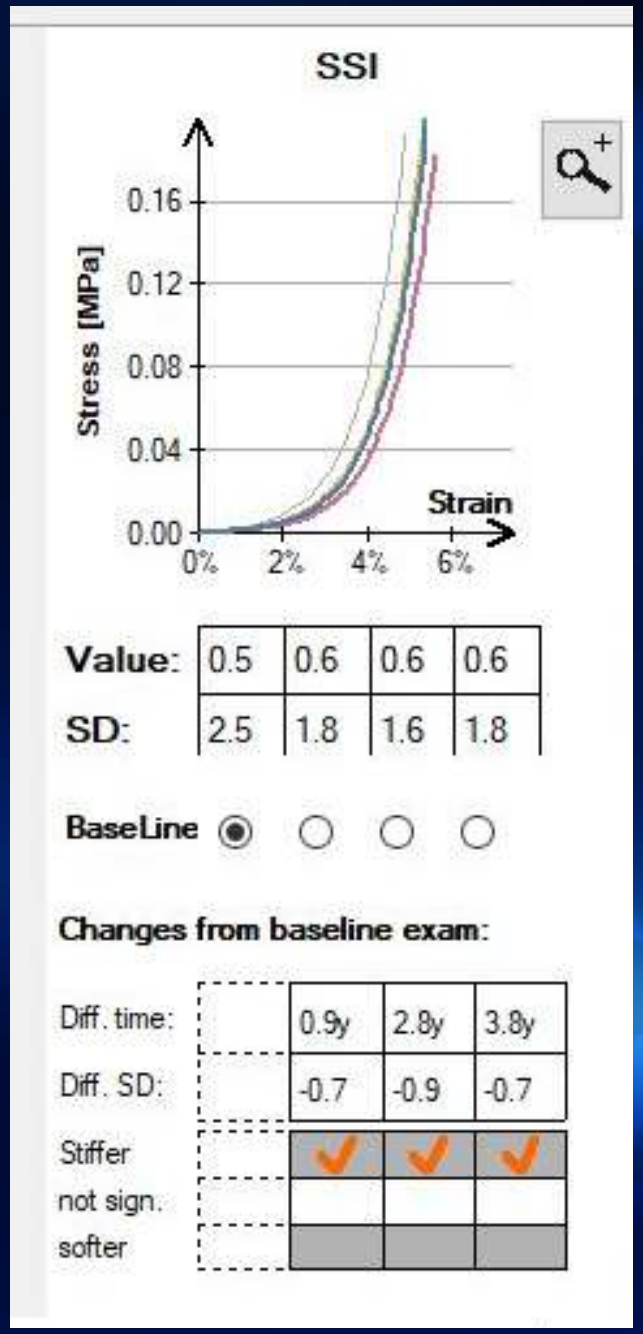
- SS curves describe the intrinsic elastic properties of the cornea.
- Shifted to the right if the cornea is softer, and shifted to the left if the cornea is stiffer.
- Less dependent on corneal thickness and IOP.

SS Curve and SSI


SSI
0.93
0.16
0.04
0.00
Stress [MPa]
Strain
0%
2%
4%
6%


SSI
0.93
0.16
0.04
0.00
Stress [MPa]
Strain
0%
2%
4%
6%





EOS 20
EGYPTIAN

1st Applanation	Moment at the first applanation of the cornea during the air puff (in miliseconds). In parenthesis is the length of the applanation at this moment (in milimeters)
Highest Concavity	Moment that the cornea assumes its maximum concavity during the air puff (in miliseconds). In parenthesis is the length of the distance between the two peaks of the cornea at this moment (in milimeters)
2nd Applanation	Moment at the second applanation of the cornea during the air puff (in miliseconds). In parenthesis is the lenght of the applanation at this moment (in milimeters)
Maximum Deformation	Measurement (in milimeters) of the maximum cornea deformation during the air puff
Wing Distance	Length of the distance between the two peaks of the cornea at this moment (in milimeters)
Maximum Velocity (in)	Maximum velocity during the ingoing phase (in meters per secons [m/s])
Maximum Velocity (out)	Maximum velocity during the outgoing phase (in meters per secons [m/s])
Curvature Radius Normal	Radius of curvature of the cornea in its natural state (in milimeters)
Curvature Radius HC	Radius of curvature of the cornea at the time of maximum concavity during the air puff (in milimeters)
Cornea Thickness	Measurement of the corneal thickness (in milimeters)
IOP	Measurement of the intraocular pressure (in milimeters of Mercury [mmHg])
DAratio 2 mm	Ratio between vertical displacement at apex and at 2 mm
Inverse concave Radius	Inverse of the Radius of curvature during concave phase of the deformation
Integrated Radius	Area under the inverse concave Radius vs. time curve
SP-A1	Parameter reflecting bending stiffness of the cornea as defined by force/replacement
bIOP	Biomechanical corrected IOP
CBI	Corvis Biomechanical Index: overall biomechanical index for kc detection
TBI	Tomographic Biomechanical Index: combines tomographic and biomechanical data for enhanced ectasia detection

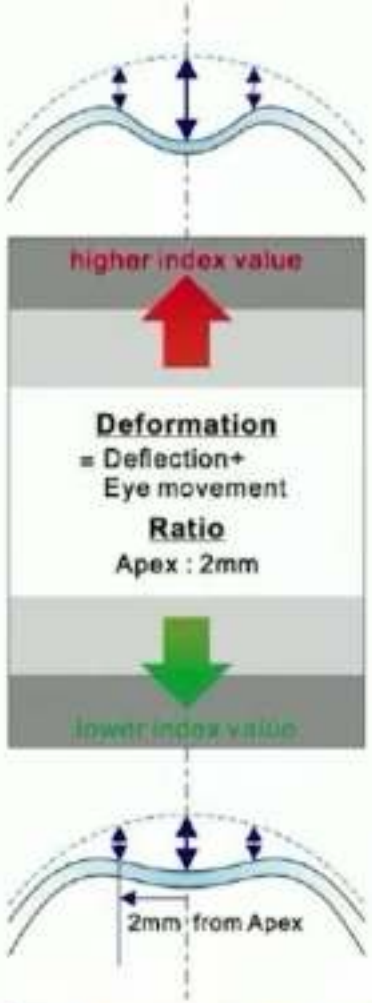
CBI
Corvis Biomechanical Index

Corvis ST

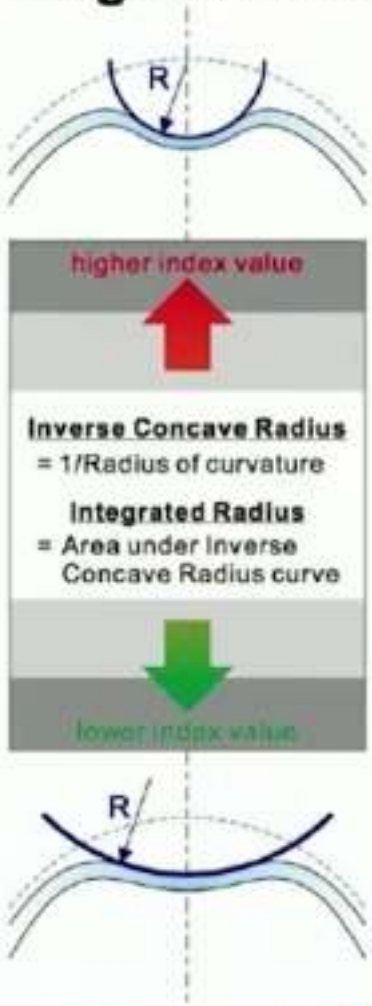
Softer Cornea

Vinciguerra Screening Report

DA Ratio



Integr. Radius



The lower the index value, the stiffer the cornea

ARTh

SP-A1

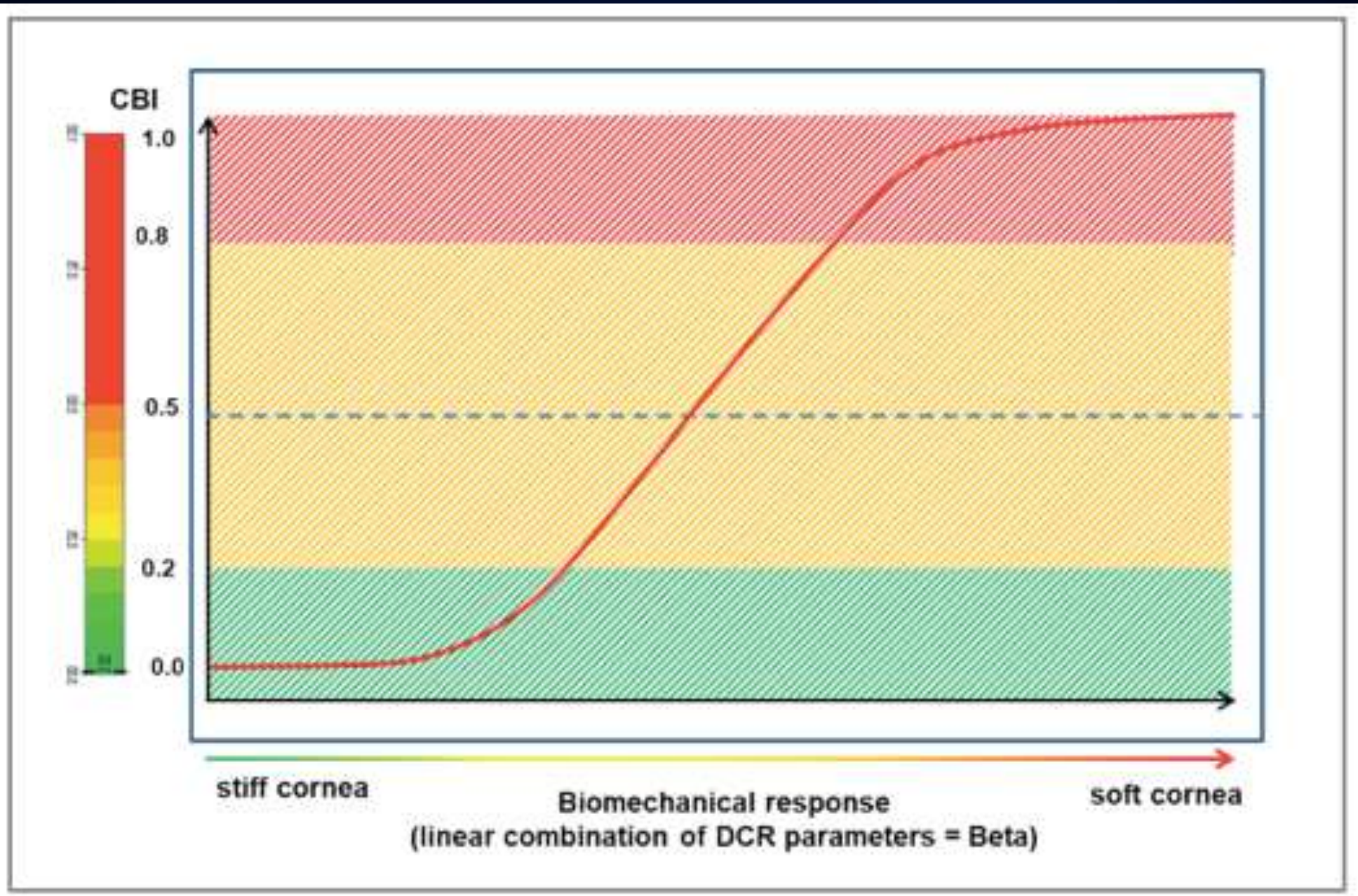
The higher the index value, the stiffer the cornea

Stiffer Cornea

OCULUS®

SKYVIEW

updated 20170721


CBI
1.0
0.8
0.5
0.2
0.0
stiff cornea
Biomechanical response
(linear combination of DCR parameters = Beta)
soft cornea

TBI
Tomographic Biomechanical Index

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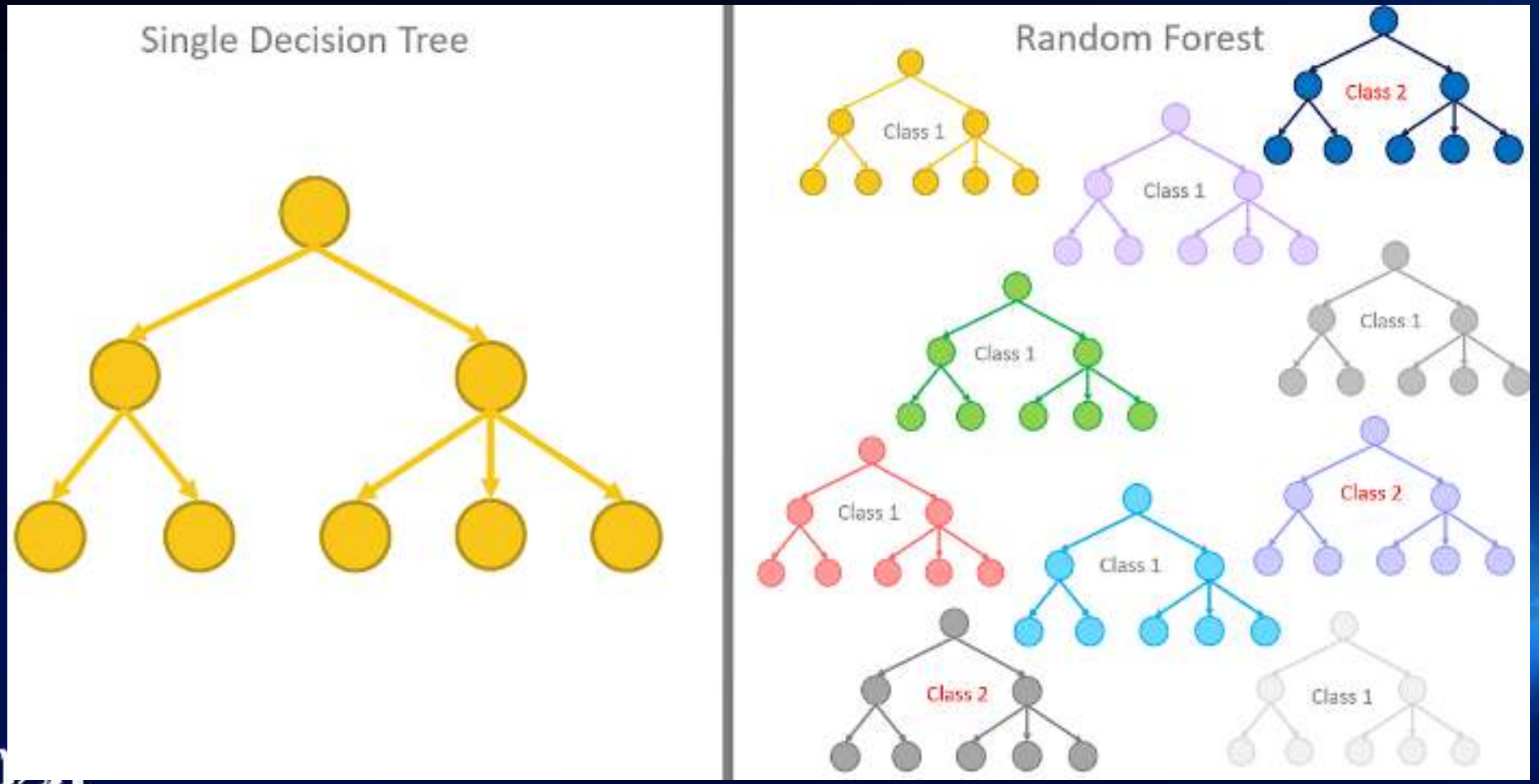
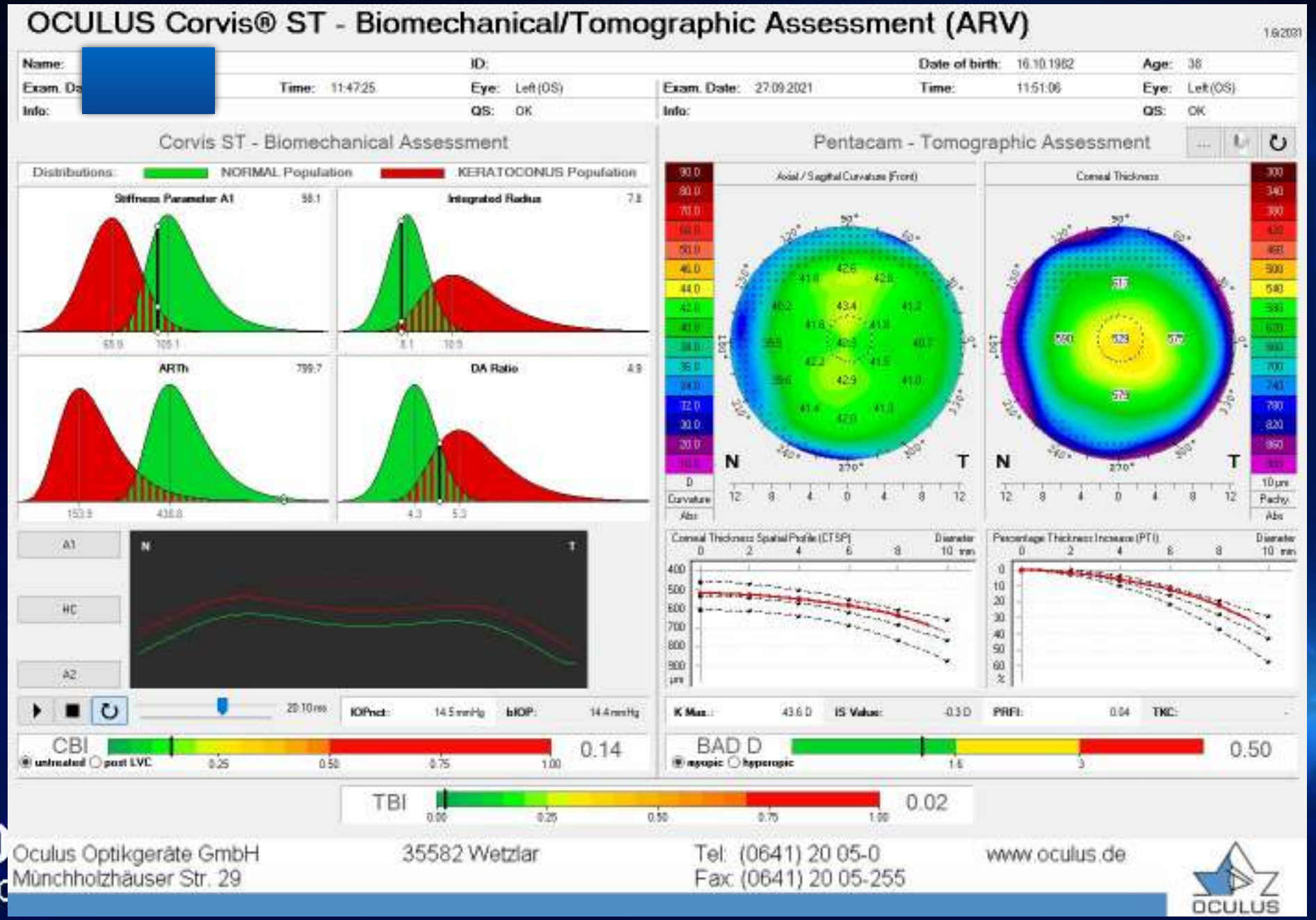
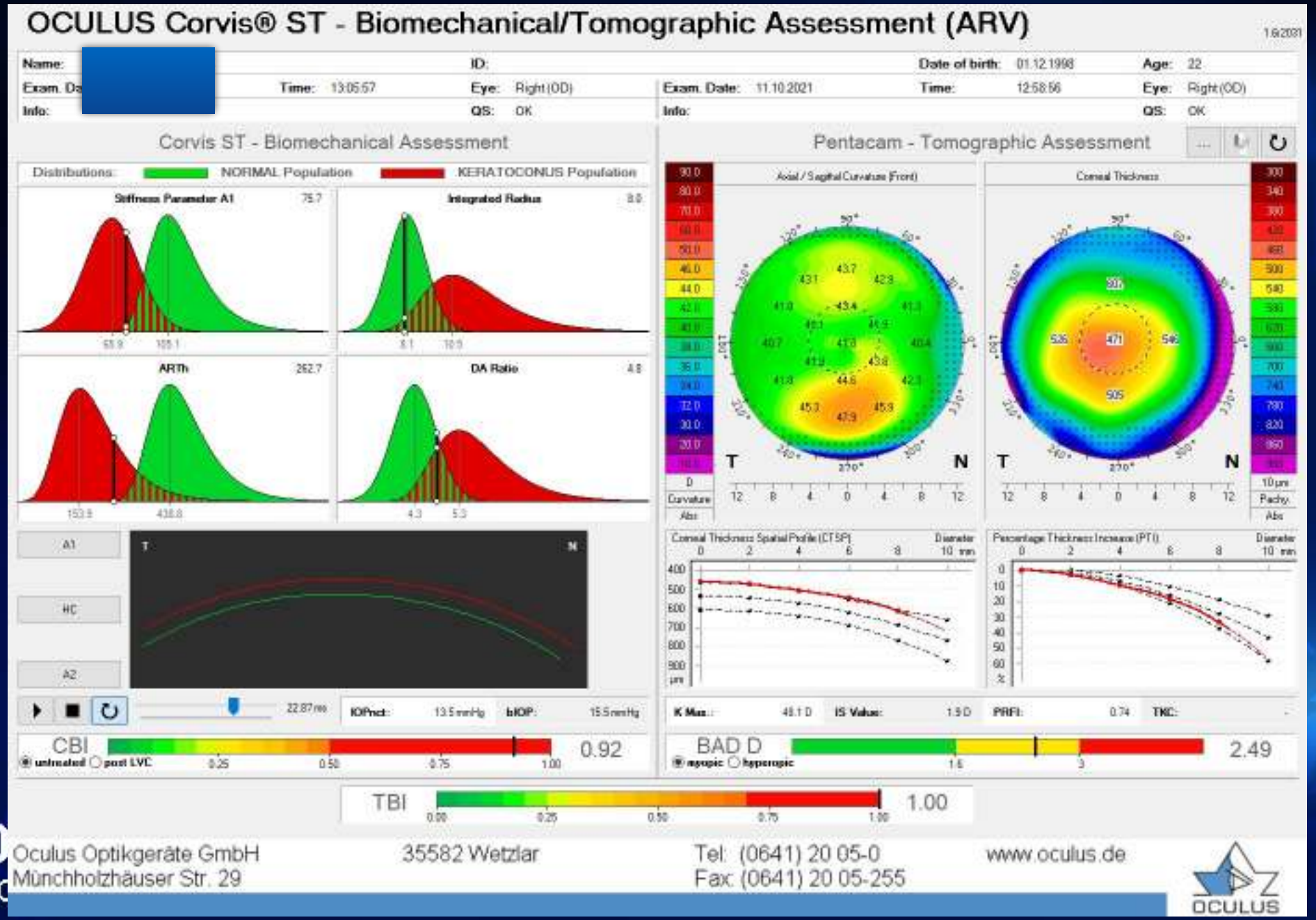
TBI calculation



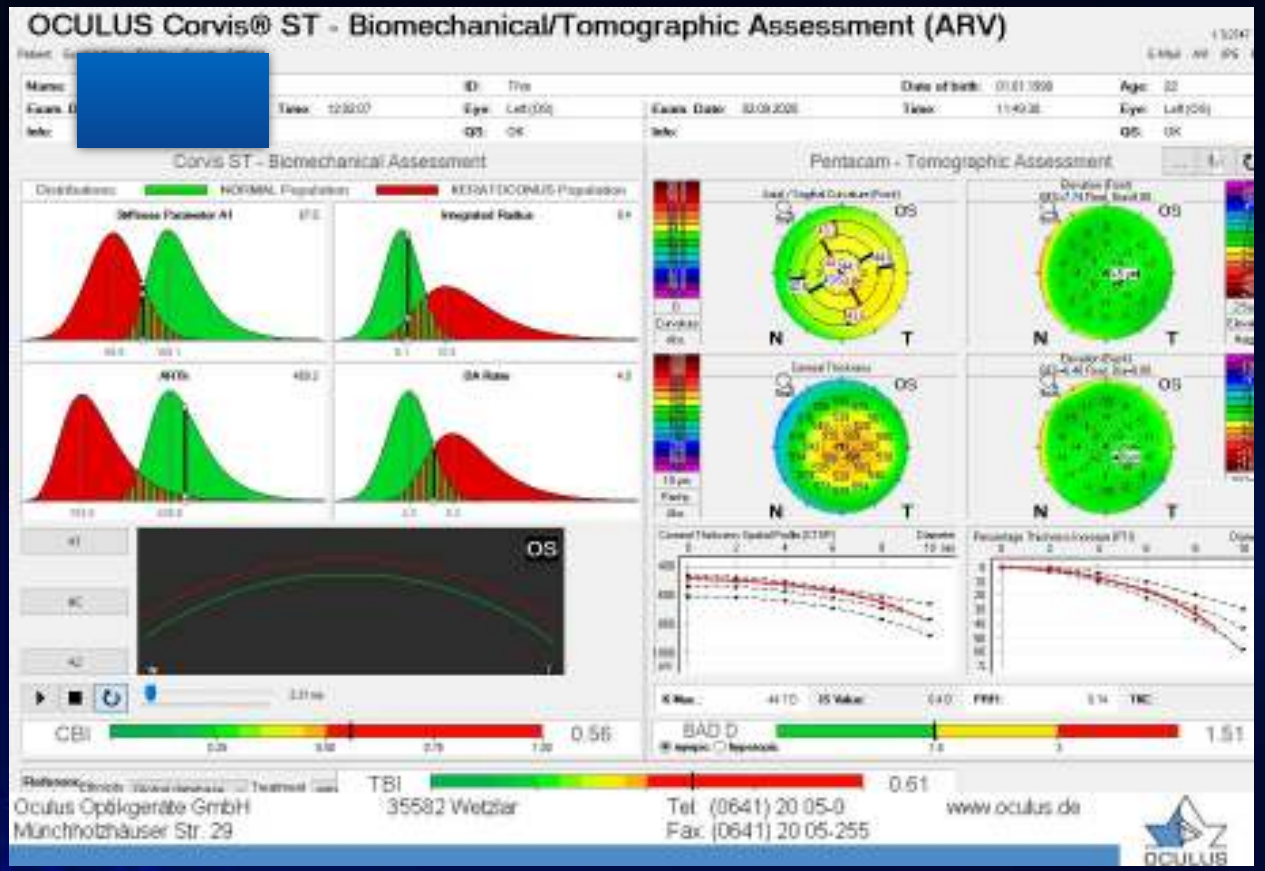


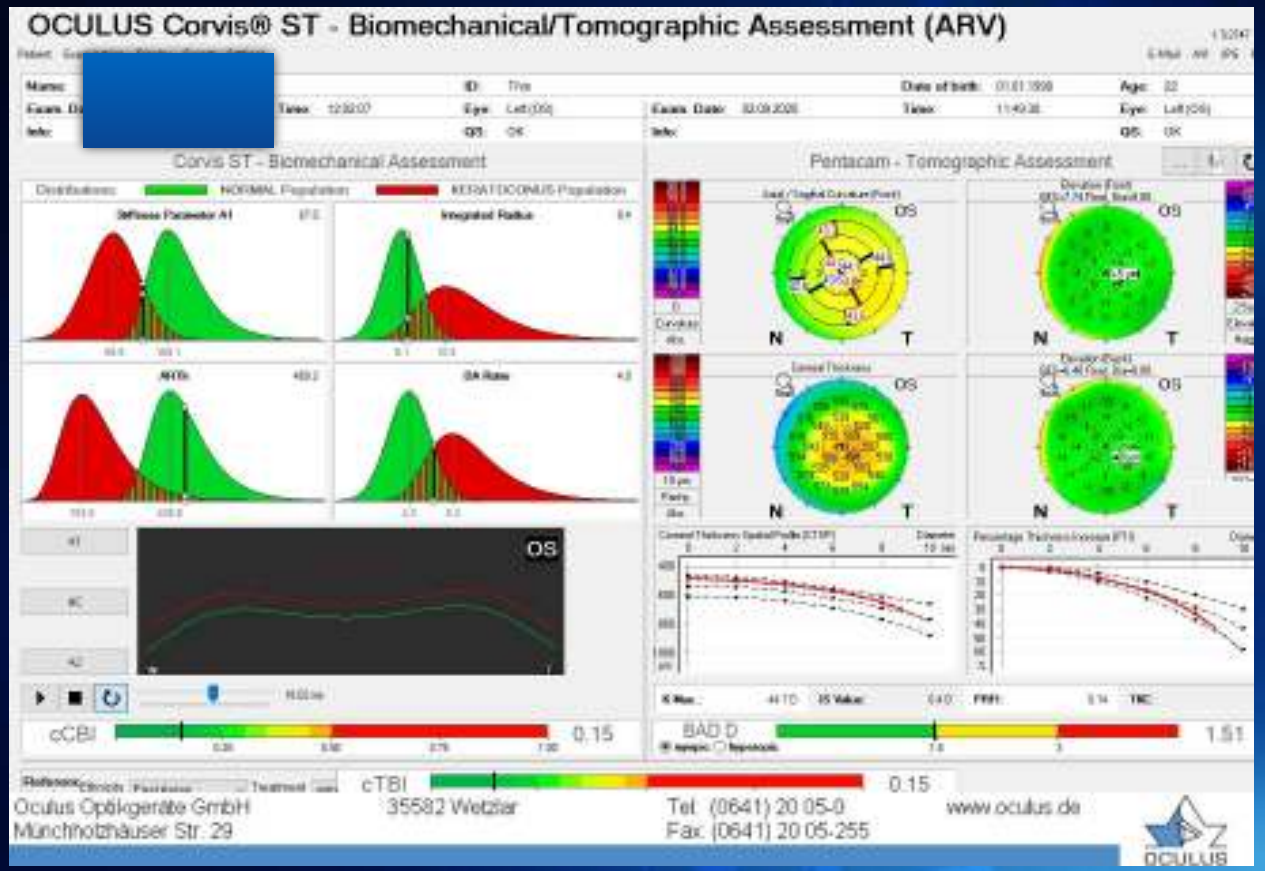
EOS 20
EGYPTIAN



EOS 20
EGYPTIAN

CBI
Ethnicity





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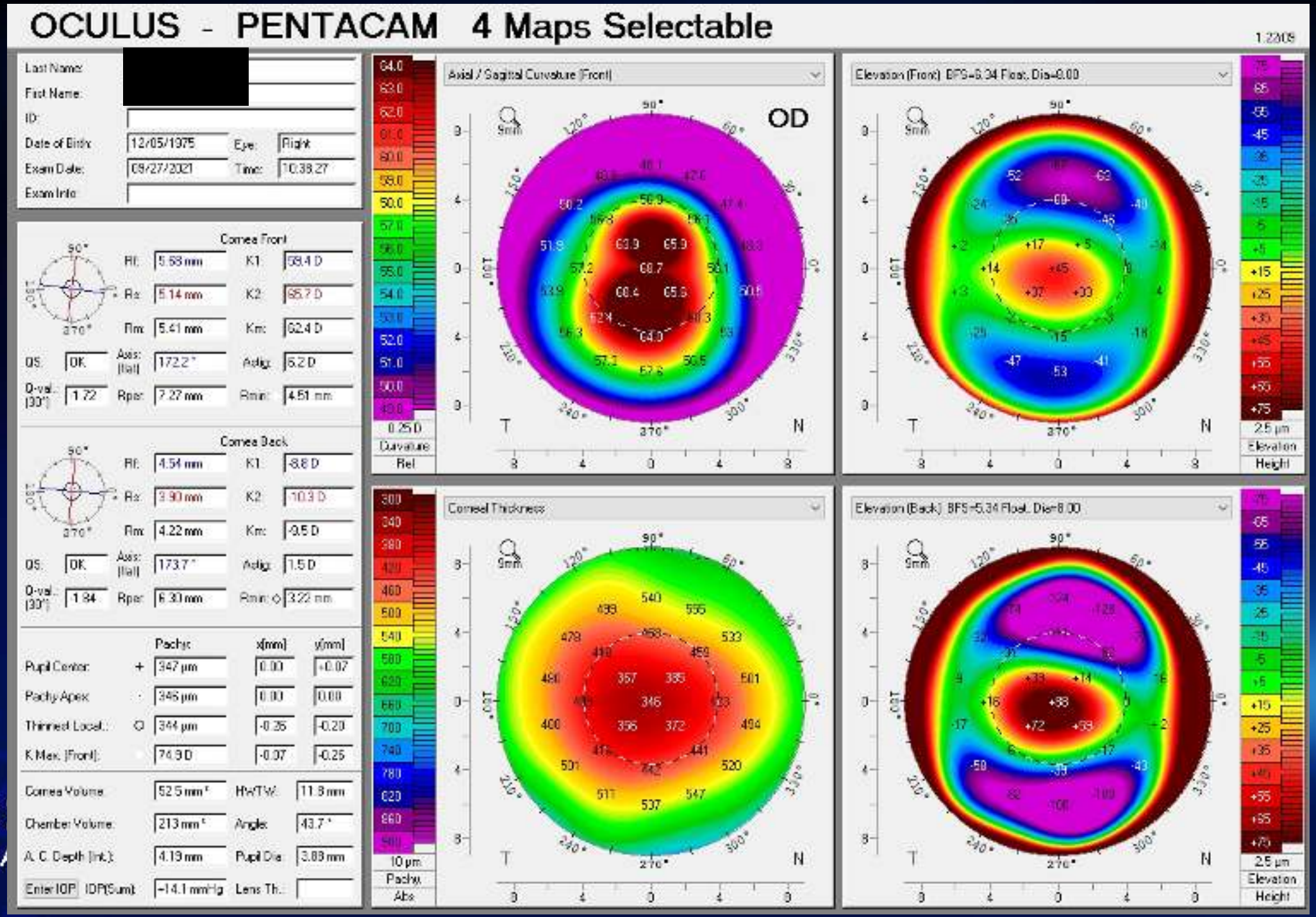
KC ≠ Ectasia Susceptibility

OCULUS - PENTACAM 4 Maps Selectable

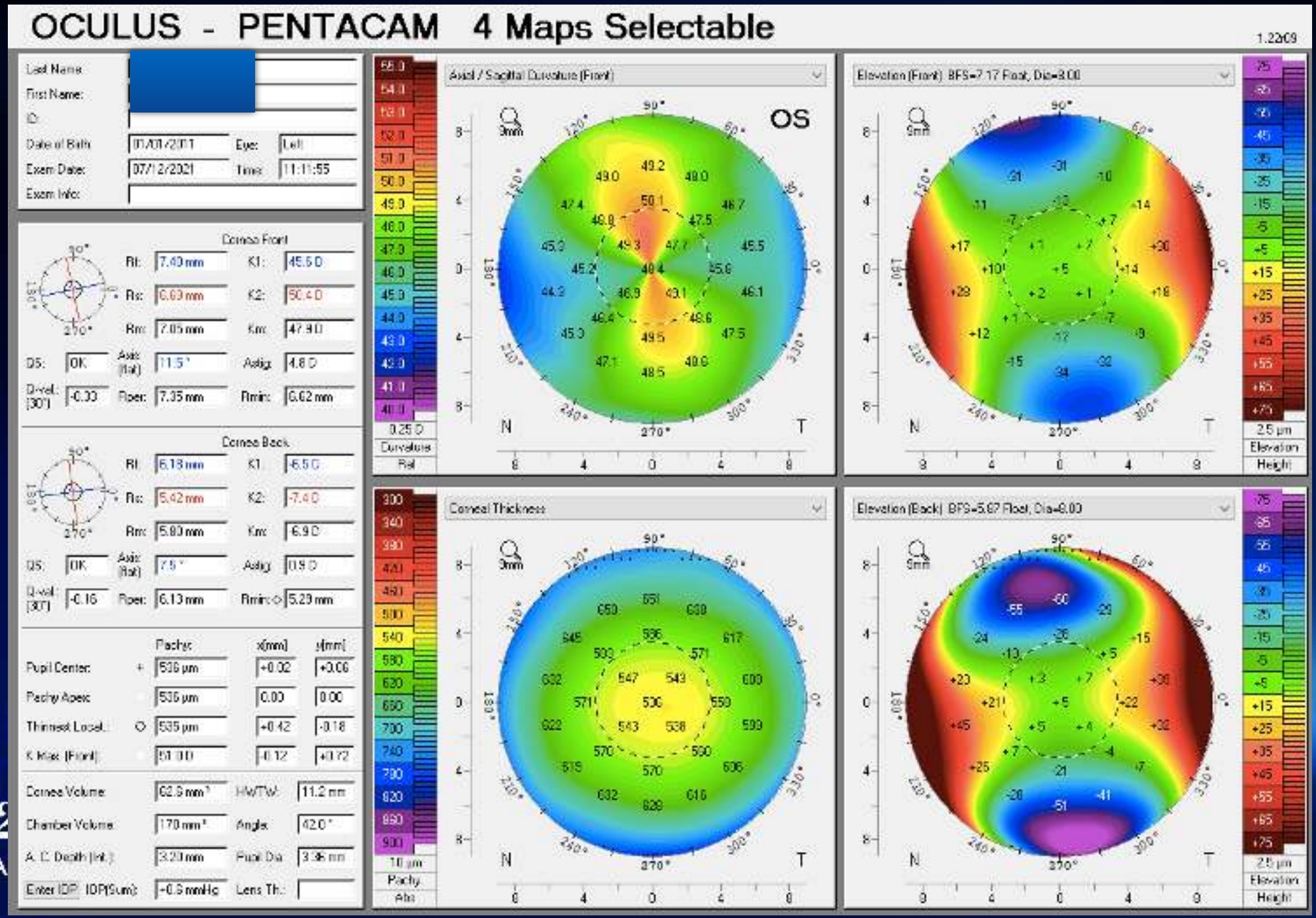


Biomechanics Evaluation

Biomechanics Evaluation

- KC:
  - Diagnosis of KC.
  - Follow up of KC.
  - Assessment of Ectasia Management.
- Refractive Surgery:
  - Avoid Post LVC Ectasia.
  - Exclude Ectasia Susceptibility.
  - Diagnosis of Post LVC Ectasia.
- Other options.

Diagnosis of KC



10 Years Old F referred for CXL

EOS 2
EGYPTIA

OCULUS - PENTACAM Holladay Report

1.22r08

Last Name:	[redacted]		
First Name:			
ID:			
Date of Birth:	01/01/2011	Eye:	Left
Exam Date:	07/12/2021	Time:	11:11:55

Equiv K-Readings 65 (4.5mm Zone) — Details

EKR65 Flat K1:	46.58 D (12 °)	Q (5.0mm):	-0.31
EKR65 Steep K2:	51.13 D (102 °)	Total SA: Z(4+5+6.0):	+0.173 µ
EKR65 Mean:	48.84 D	Red. Rate (S/F):	82.1 %
Astig. EKR65:	4.52 D	RMS HOA WE (5mm):	0.347 µm

Pupil Dia:	+	3.36 mm	x:	0.32 mm T	y:	0.06 mm S	(el.VN)
HWTW:	[ ]	11.2 mm	x:	0.20 mm T	y:	0.11 mm S	(el.VN)
Pachy Min:	○	535 µm	x:	0.42 mm T	y:	0.18 mm I	(el.VN)
Est. Pre-Refr. K:		47.9 D	Refr. Change:			-0.1 D	
ACD (Est.):		3.73 mm	Chord µ:		0.06 mm	OS:	OK

Axial / Sagittal Curvature (Front)

Corneal Thickness

Elevation (Front)
BFTEF=5.70/7.35 Q=-0.22 Float. Dia=8.00

Tangential Curvature (Front)

Relative Pachymetry

Elevation (Back)
BFTEF=5.38/6.05 Q=-0.20 Float. Dia=8.00

EOS
EGYPTIA

OCULUS - PENTACAM Topometric/KC-Staging

1.2208

Last Name:
First Name:
ID:
Date of Birth: 01/01/2011 Eye: Left
Exam Date: 07/12/2021 Time: 11:11:55
Exam Info:

Cornea Front

R1	7.40 mm	K1	45.6 D
Rs:	8.00 mm	K2	50.4 D
Rm:	7.06 mm	Km:	47.9 D
Axis: (Rad)	11.5°	Astig:	4.8 D
Rper:	7.35 mm	Rmin:	6.62 mm
OS:	OK		
Q-val (30°)	-0.33		

Cornea Back

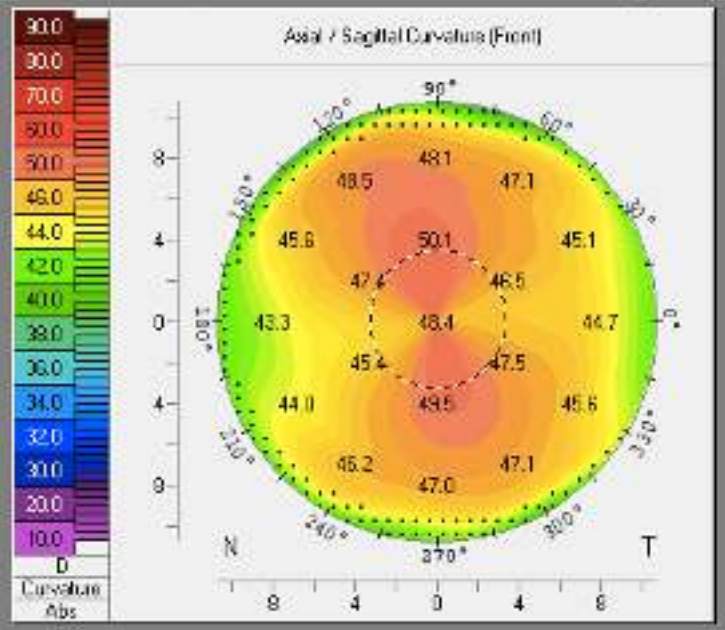
R1	5.18 mm	K1	-6.5 D
Rs:	5.42 mm	K2	-7.4 D
Rm:	5.80 mm	Km:	-6.9 D
Axis: (Rad)	7.5°	Astig:	0.9 D
Rper:	5.13 mm	Rmin:	5.29 mm
OS:	OK		
Q-val (30°)	-0.15		

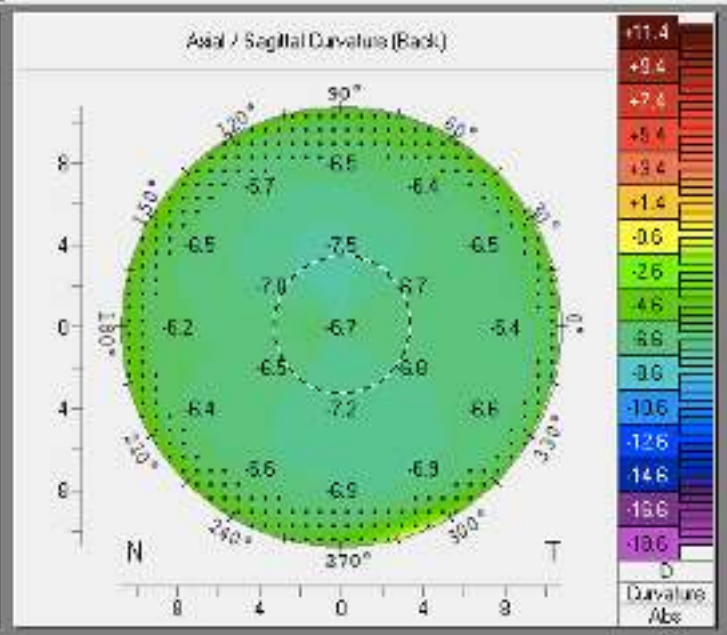
True Net Power

Astig:	4.5 D	K1	44.4 D
Axis (Rt.)	12.1°	K2	48.9 D
P.Max:	49.4 D	Km:	46.6 D

		Pachy:	x[mm]	y[mm]
Pupil Center:	+	535 µm	+0.02	-0.06
Pachy Apex:		535 µm	0.00	0.00
Thinnest Locat.:	○	535 µm	+0.42	-0.10
K Max. (Front):		51.0 D	0.12	+0.72

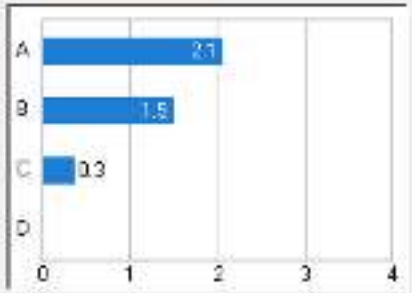
Cornea Volume:	62.6 mm³	HWTW:	11.2 mm
Chamber Volume:	170 mm³	Angle:	42.0°
A. C. Depth (Int.):	3.20 mm	Pupil Dia:	3.39 mm
IOP(Sum):	+0.6 mmHg	Lens Th:	





Belin ABCD Keratoconus Staging

ARC (3mm Zone):	7.01 mm
PRC (3mm Zone):	5.60 mm
Thinnest Pachy:	535 µm
DCVA:	



A2 B1 C0 D

Asphericity (Front) at Major Meridians

(Q-val)	Degrees peripheral 20°	25°	30°	35°	40°
Nas	-0.35	-0.35	-0.37	-0.37	-0.32
Temp	-0.14	-0.15	-0.22	-0.33	-0.33
Inf	-0.40	-0.40	-0.41	-0.45	-0.43
Sup	-0.37	-0.34	-0.33	-0.34	-0.42
Mean	-0.32	-0.31	-0.33	-0.37	-0.38

Front:
- Asphericity
- Axial/Sag. Curval

Back:
- Asphericity
- Axial/Sag. Curval

Indices (in 8mm zone)

ISV:	36	IHA:	4.9
IVA:	0.12	IHD:	0.015
KI:	1.00	RMin:	6.62
CKI:	1.01	TKC:	Abnorm.
KISA:	5.721	IS:	-0.64

Asphericity (Front) at 30°

Hor.:	-0.30
Vert.:	-0.36

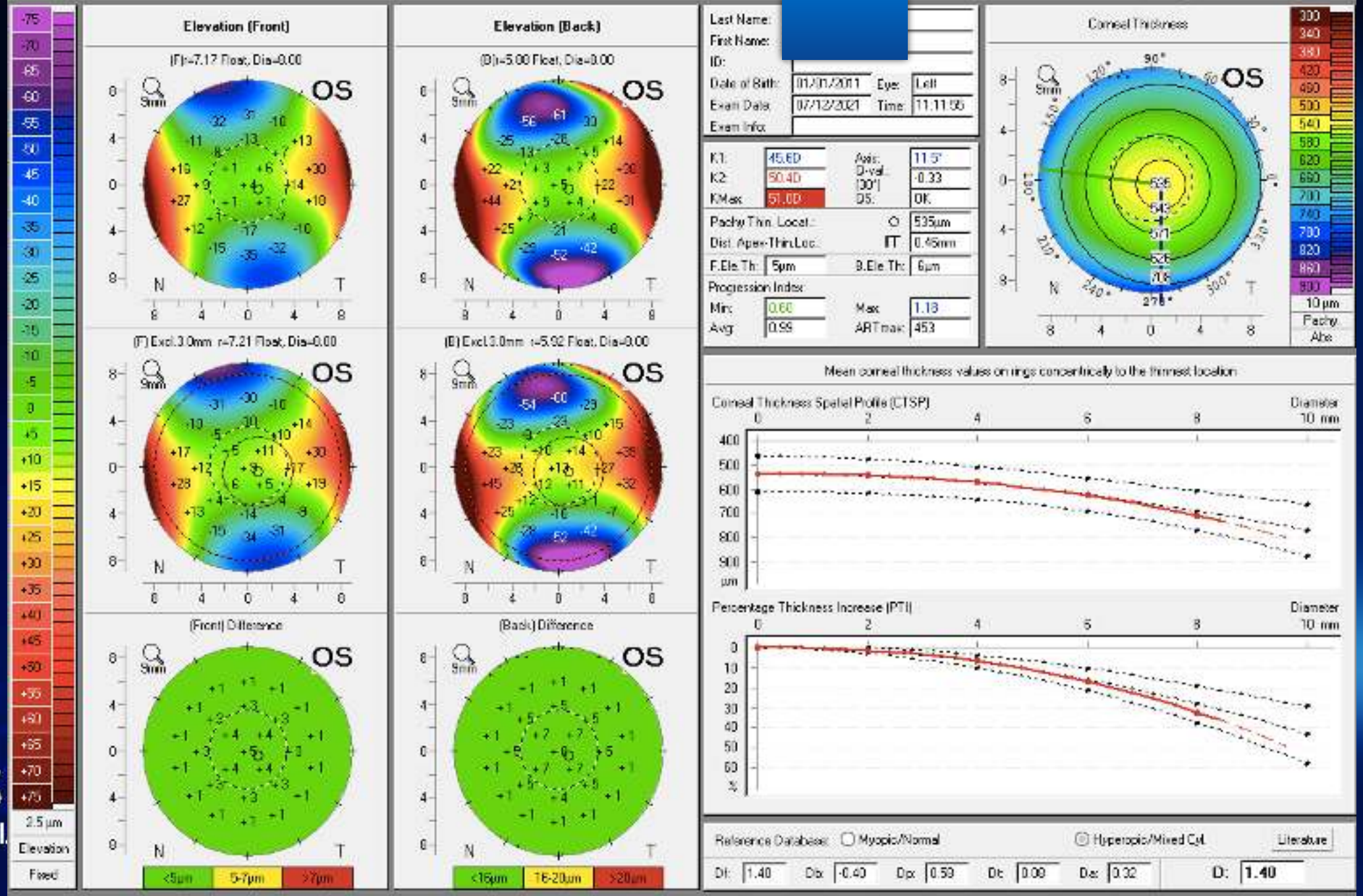
Spot locations in 8mm zone (polar coordinates)

Pupil Center:	+	0.06mm (72.7°)
Thinnest Locat.:	○	0.46mm (336.8°)
K Max. (Front):		0.73mm (96.5°)

EOS EGYPT

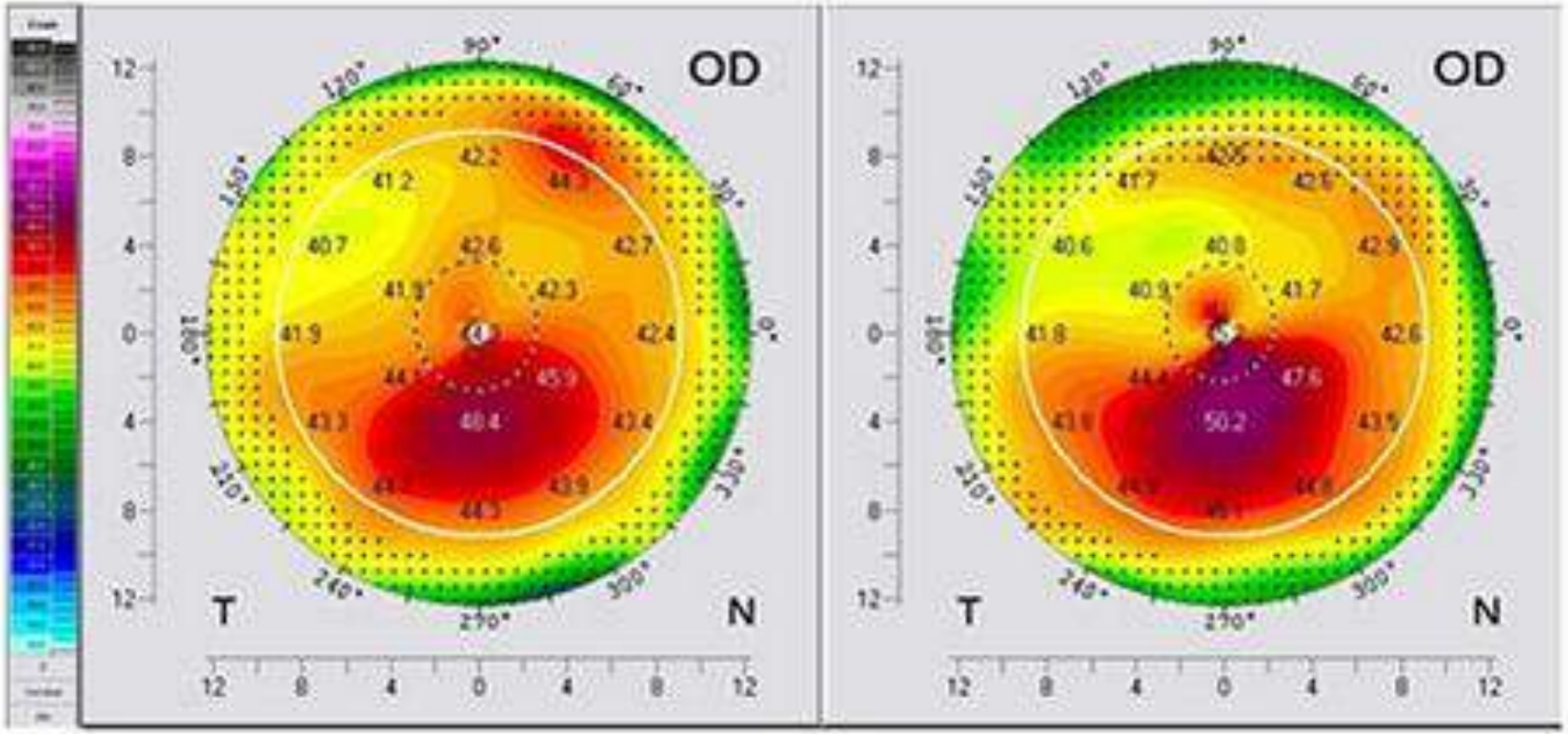
OCULUS - PENTACAM Belin/Ambrósio Enhanced Ectasia Display

1.22r09



May 2009

August 2009



OCULUS Corvis® ST - Biomechanical/Tomographic Assessment (ARV)

Name:	[redacted]	ID:		Date of birth:	01.01.2011	Age:	10
Exam. Date:	[redacted] Time: 11:14:57	Eye:	Left (OS)	Exam. Date:	12.07.2021	Time:	11:11:55	Eye:	Left (OS)
Info:		QS:	OK	Info:				QS:	OK

Corvis ST - Biomechanical Assessment

Distributions: NORMAL Population KLHATOCONUS Population

Stiffness Parameter A1 95.7

Integrated Radius 9.0

ARTh 514.2

DA Ratio 4.4

A1 HC A2

N T

CBI 0.13
untreated post LVC
0.25 0.50 0.75 1.00

Pentacam - Tomographic Assessment

Axial / Sagittal Curvature (Front)

Corneal Thickness

N T

Corneal Thickness Spatial Profile (CTSP) Diameter 10 mm

Percentage Thickness Increase (PTI) Diameter 10 mm

K Max... 51.0 D IS Value: 0.6 D PRFI 0.02 TKC...

BAD D 1.40
myopic hyperopic
1.6 3

TBI 0.07
0.00 0.25 0.50 0.75 1.00

Oculus Optikgeräte GmbH
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Tel: (0641) 20 05-0
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OCULUS

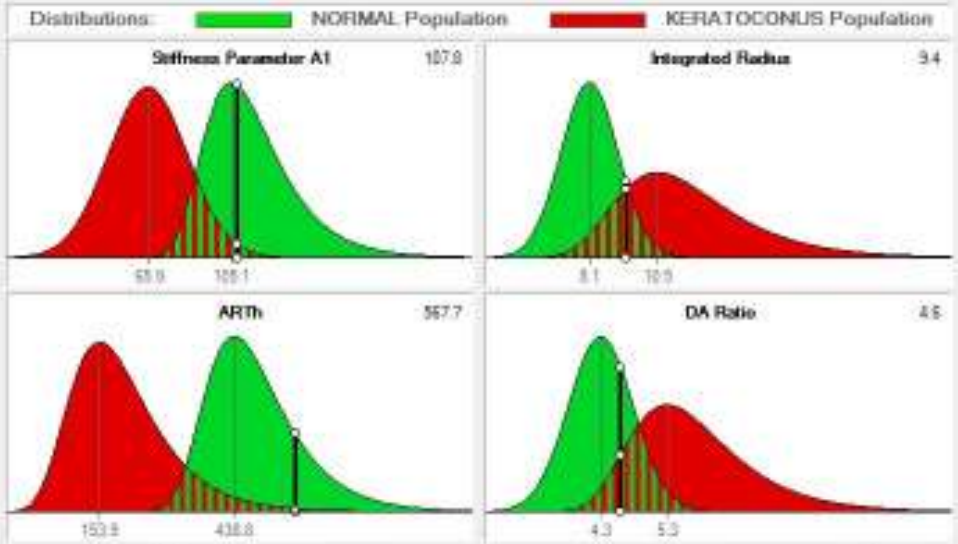
EOS 2
EGYPTIA

OCULUS Corvis® ST - Biomechanical/Tomographic Assessment (ARV)

1.6r2091

Name:	[redacted]	ID:		Date of birth:	01.01.2011	Age:	10
Exam. Date:		Time: 11:14:17	Eye: Right (OD)	Exam. Date:	12.07.2021	Time: 11:10:55	Eye: Right (OD)
Info:			QS: OK	Info:			QS: OK

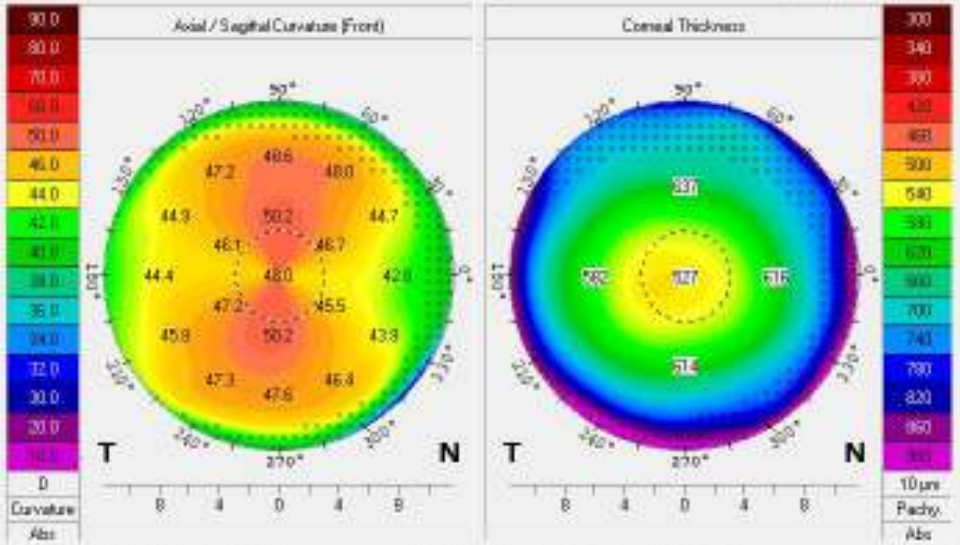
Corvis ST - Biomechanical Assessment



IOPnct: 16.0 mmHg bIOP: 16.4 mmHg

CBI (untreated / post LVC): 0.20

Pentacam - Tomographic Assessment



K Max.: 51.1 D IS Value: -0.1 D PRFI: 0.07 TKC: Abnorm.

BAD D (myopic / hyperopic): 2.23

TBI: 0.13

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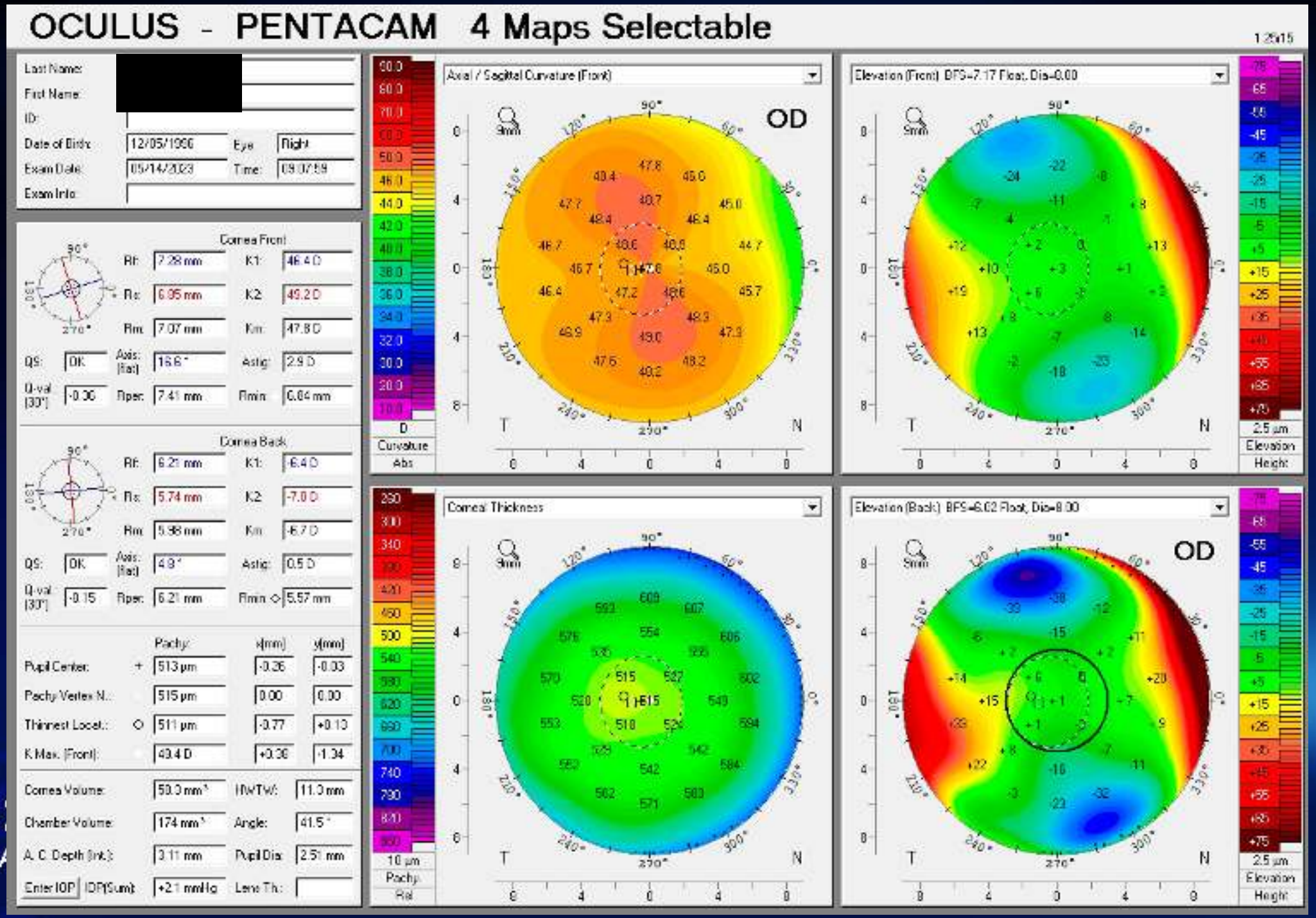
OCULUS

EOS 2
EGYPTIAN

Steep Cornea

OCULUS - PENTACAM 4 Maps Selectable



OCULUS - PENTACAM Topometric/KC-Staging

1.25r15

Last Name:	[redacted]
First Name:	
ID:	
Date of Birth:	12/05/1998
Eye:	Right
Exam Date:	05/14/2023
Time:	09:07:59
Exam Info:	

Cornea Front

Rf:	7.20 mm	K1:	46.4 D
Rs:	6.85 mm	K2:	49.2 D
Rm:	7.07 mm	Km:	47.8 D
Axis: (flat)	16.6°	Astig	2.9 D
Rper:	7.41 mm	Rmin:	6.64 mm
QS:	OK		
Q-val (30°):	-0.36		

Cornea Back

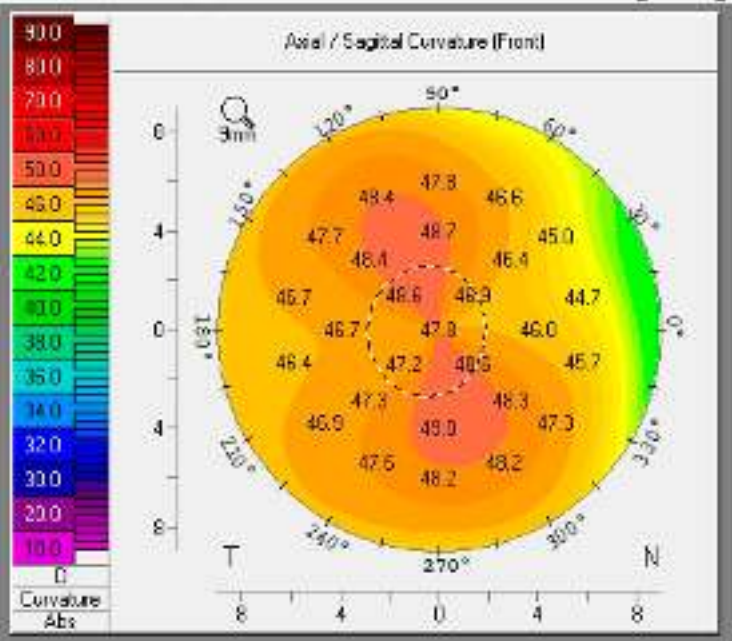
Rf:	5.21 mm	K1:	-6.4 D
Rs:	5.74 mm	K2:	-7.0 D
Rm:	5.98 mm	Km:	-6.7 D
Axis: (flat)	4.8°	Astig	0.5 D
Rper:	5.21 mm	Rmin:	5.57 mm
QS:	OK		
Q-val (30°):	-0.15		

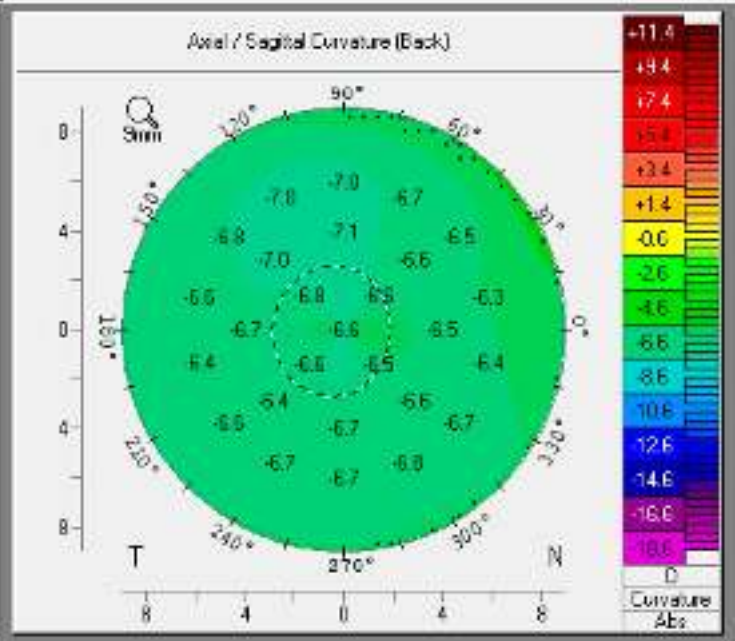
True Net Power

Astig	2.7 D	K1:	45.2 D
Axis (flt.)	18.0°	K2:	47.9 D
P.Max	48.2 D	Km:	46.5 D

		Pachy:	x[mm]	y[mm]
Pupil Center:	+	513 µm	0.26	0.03
Pachy Vertex N.:	·	515 µm	0.00	0.00
Thinnest Locat.:	○	511 µm	-0.77	+0.13
K Max. (Front)		49.4 D	+0.38	-1.34

Cornea Volume:	58.3 mm³	HW/TW:	11.3 mm
Chamber Volume:	174 mm³	Angle:	41.5°
A. C. Depth (int.):	3.11 mm	Pupil Dia:	2.51 mm
IOP(Sum)	+21 mmHg	Lens Th:	





Asphericity (Front) of Major Meridians

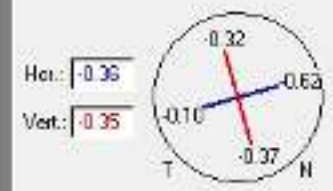
(Q-val.)	Degrees peripheral 20°	25°	30°	35°	40°
Nas	-0.52	-0.58	-0.62	-0.61	-0.52
Temp	-0.07	-0.08	-0.10	-0.12	-0.18
Inf	-0.27	-0.32	-0.37	-0.46	-0.61
Sup	-0.22	-0.27	-0.32	-0.42	-0.64
Mean	-0.27	-0.31	-0.36	-0.40	-0.49

Front:
- (•) Asphericity
- ( ) Axial/Sag. Curva

Back:
- ( ) Asphericity
- ( ) Axial/Sag. Curva

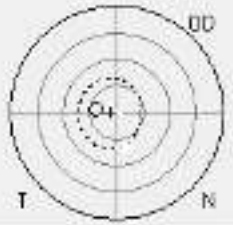
Indices (in 8mm zone)

ISV:	29	IHA:	0.1
IVA:	0.14	IHD:	0.014
KI:	1.00	RMin:	6.64
CKI:	1.00	TKC:	-
KISA:	2.688	IS:	0.53



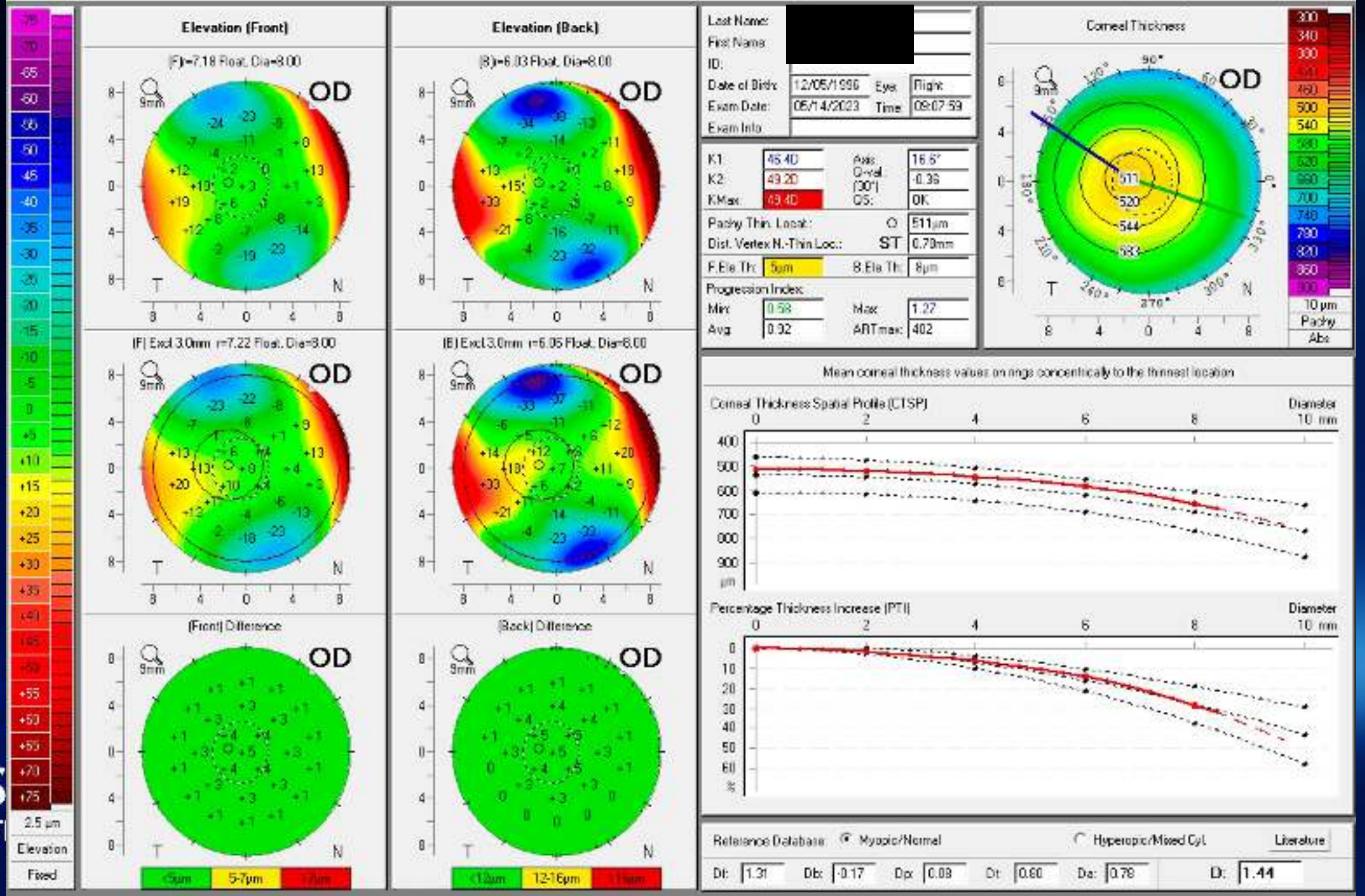
Spot locations in 8mm zone (polar coordinates)

Pupil Center:	+	0.26mm (186.4°)
Thinnest Locat.:	○	0.78mm (170.5°)
K Max. (Front)		1.39mm (280.9°)



OCULUS - PENTACAM Belin/Ambrósio Enhanced Ectasia Display

1.25r15

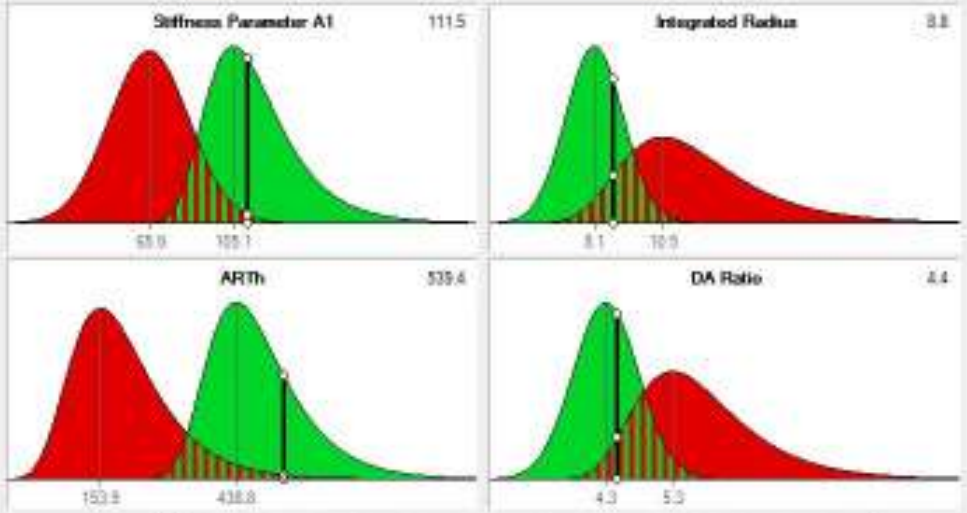


OCULUS Corvis® ST - Biomechanical/Tomographic Assessment (ARV)

Name:	[redacted]	ID:		Date of birth:	05.12.1996	Age:	26
Exam. Date:	Time: 09:11:14	Eye:	Right (OD)	Exam. Date:	14.05.2023	Time:	09:07:59	Eye:	Right (OD)
Info:		QS:	OK	Info:				QS:	OK

Corvis ST - Biomechanical Assessment

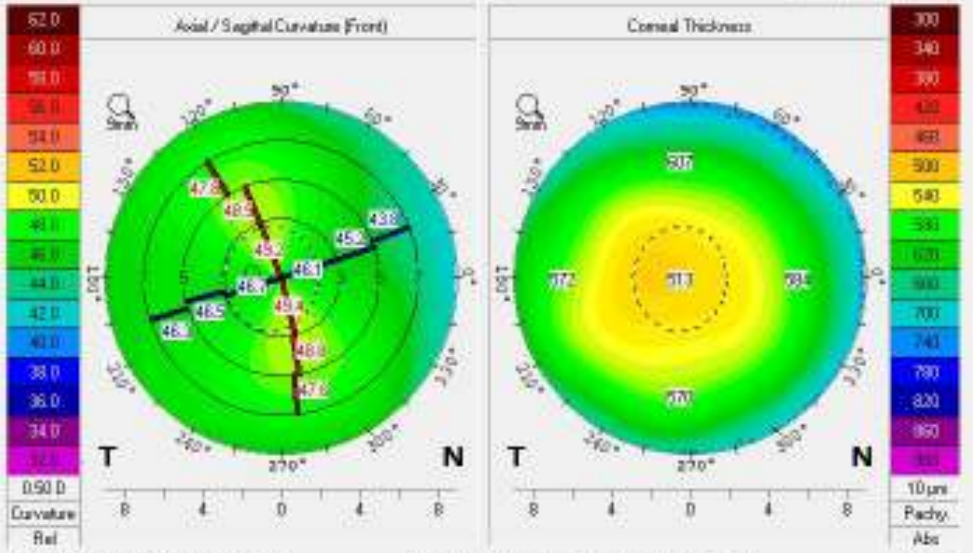
Distributions: NORMAL Population KERATOCONUS Population

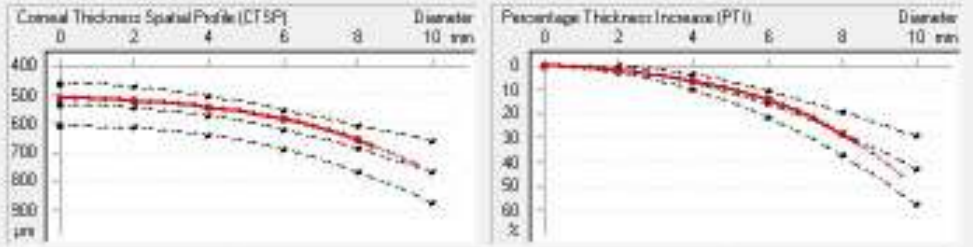


IOPnct: 16.5 mmHg bIOP: 17.0 mmHg

CBI (untreated / post LVC) 0.21

Pentacam - Tomographic Assessment





K Max.: 49.4 D IS Value: 0.5 D PRFI: 0.03 TKC:

BAD D (myopic / hyperopic) 1.44

TBI 0.01

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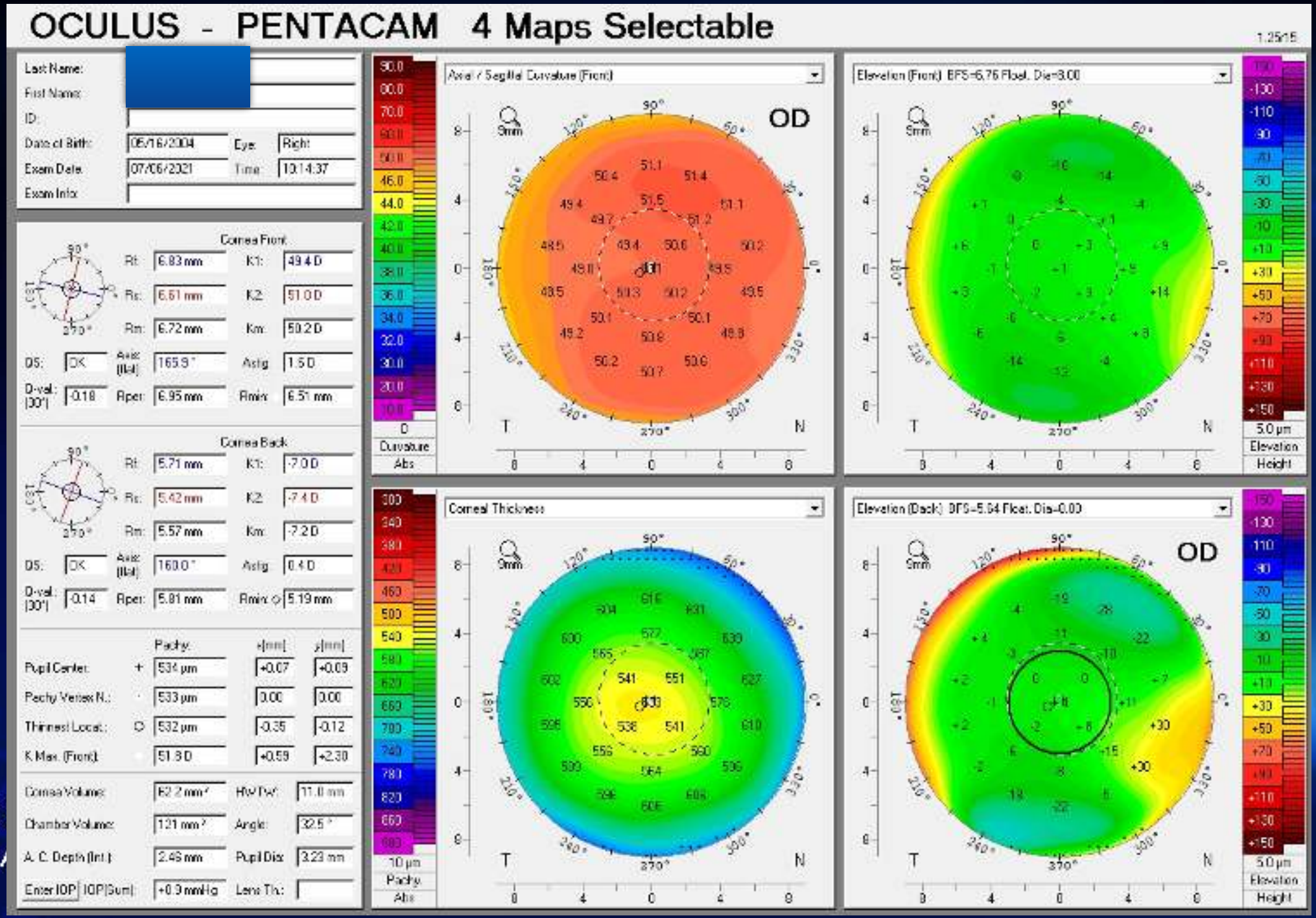
EOS 2
EGYPTIAN

Steep Cornea


OCULUS - PENTACAM 4 Maps Selectable
Last Name:
First Name:
ID:
Date of Birth: 05/16/2004 Eye: Right
Exam Date: 07/06/2021 Time: 10:14:37
Exam Info:
Cornea Front
Rt: 6.83 mm K1: 49.4 D
Rs: 6.61 mm K2: 51.0 D
Rm: 6.72 mm Km: 50.2 D
DS: OK Axis (Rel): 165.9° Astig: 1.5 D
D-val (30°): -0.18 Rper: 6.95 mm Rmin: 6.51 mm
Cornea Back
Rt: 5.71 mm K1: -7.0 D
Rs: 5.42 mm K2: -7.4 D
Rm: 5.57 mm Km: -7.2 D
DS: OK Axis (Rel): 160.0° Astig: 0.4 D
D-val (30°): -0.14 Rper: 5.81 mm Rmin: 5.19 mm
Pachy x [mm] y [mm]
Pupil Center: + 534 µm +0.07 +0.09
Pachy Vertex N.: 533 µm 0.00 0.00
Thinnest Local.: 532 µm -0.35 -0.12
K Max. (Front): 51.3 D +0.59 +2.30
Cornea Volume: 62.2 mm³ HW Dia: 11.8 mm
Chamber Volume: 121 mm³ Angle: 32.5°
A. C. Depth (Int.): 2.46 mm Pupil Dia: 3.23 mm
Enter IOP IOP[Sum]: +0.9 mmHg Lens Th.:
Axial / Sagittal Curvature (Front)
OD
Elevation (Front) BFS=6.76 Float. Dia=8.00
Corneal Thickness
Elevation (Back) BFS=5.64 Float. Dia=8.00
OD

OCULUS - PENTACAM Holladay Report

1.25r15

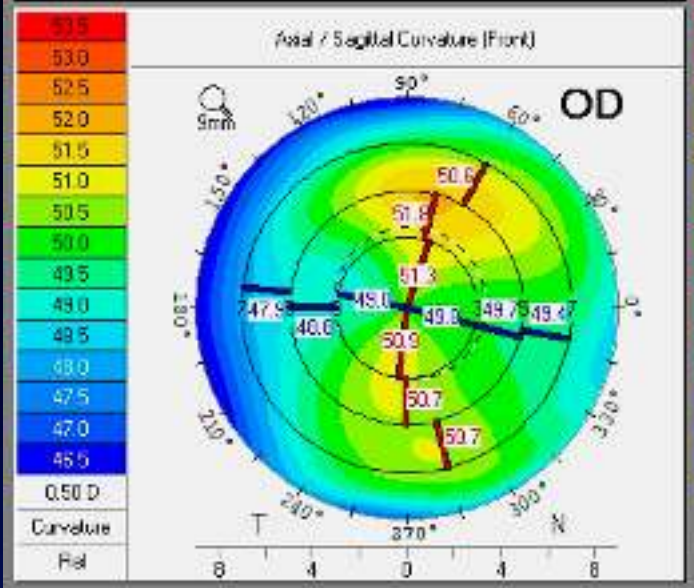
Last Name:	[redacted]		
First Name:			
ID:			
Date of Birth:	05/16/2004	Eye:	Right
Exam Date:	07/06/2021	Time:	10:14:37

Equiv K-Readings 65 (4.5mm Zone) — Details

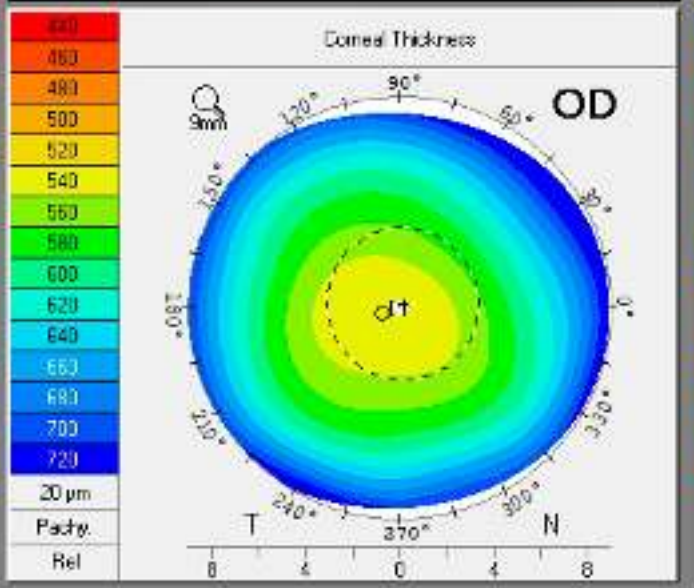
EKR65 Flat K1:	49.25 D (169 °)	D (5.0mm)	-0.12
EKR65 Steep K2:	50.07 D (79 °)	Total SA: Z(4+6+8.0)	+0.542 µ
EKR65 Mean:	50.06 D	Radii Ratio (B/F)	32.9 %
Astig EKR65:	1.62 D	RMS HOA WE (6mm)	0.742 µm

Pupil Dia:	+	3.23 mm	x: 0.07 mm N	y: 0.03 mm S	(rel.VR)
HWTW:	( )	11.0 mm	x: 0.03 mm T	y: 0.02 mm S	(rel.VR)
Pachy Min:	○	532 µm	x: 0.35 mm T	y: 0.12 mm I	(rel.VR)
Est. Pre-Refr. K:		49.8 D	Refr. Change	-0.4 D	
ACD (Est.):		3.00 mm	Chord µ:	0.11 mm	QS: OK

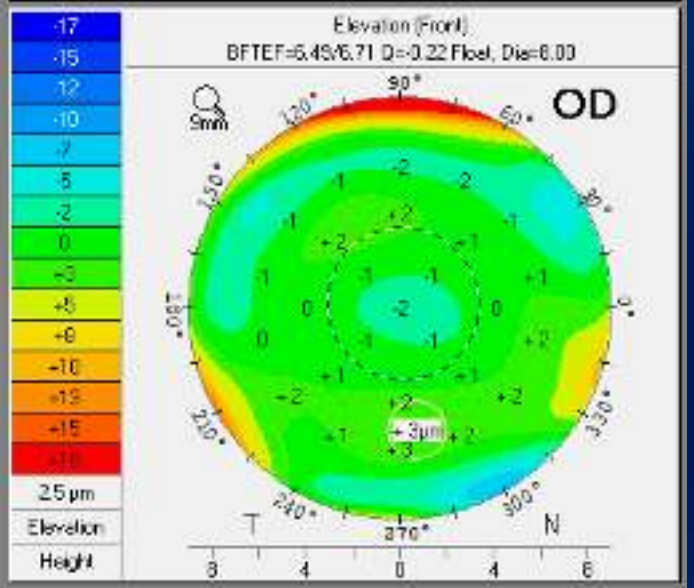
Axial / Sagittal Curvature (Front)



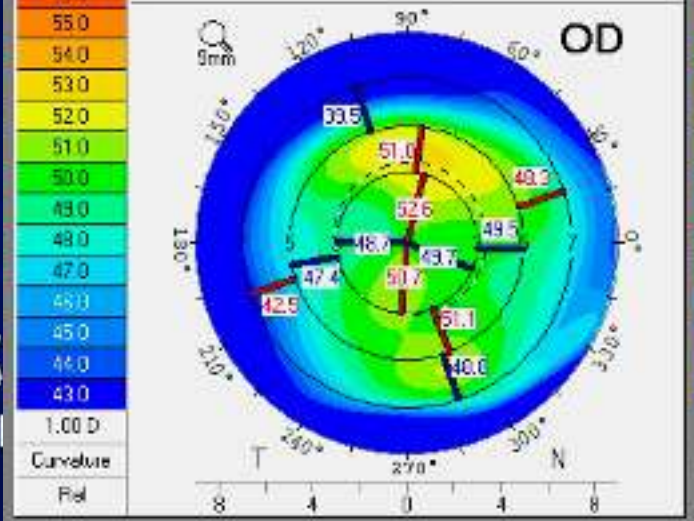
Corneal Thickness



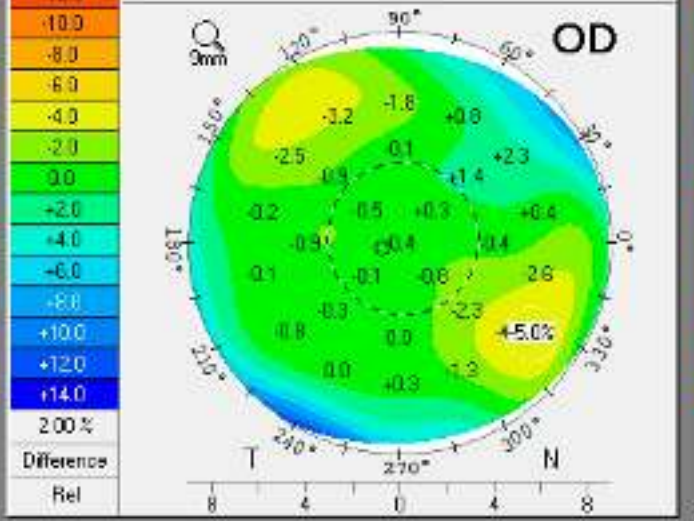
Elevation (Front)
BFTEF=6.49/6.71 D=-0.22 Floel. Dia=8.00



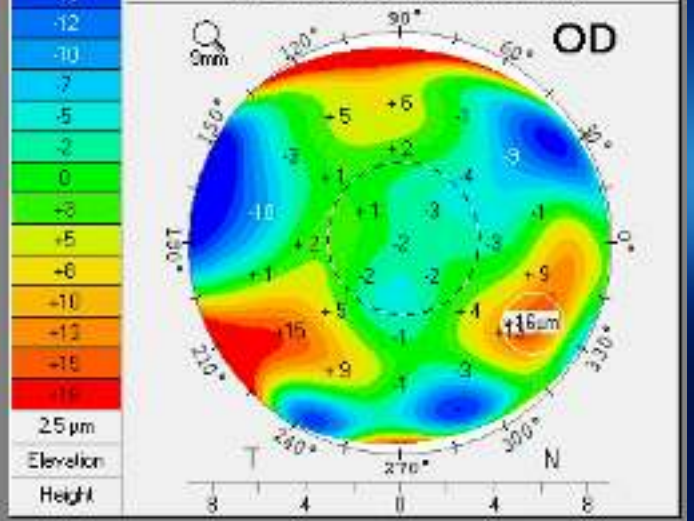
Tangential Curvature (Front)



Relative Pachymetry



Elevation (Back)
BFTEF=6.33/6.59 D=-0.20 Floel. Dia=8.00



OCULUS - PENTACAM Topometric/KC-Staging

1.25r15

Last Name:	[redacted]		
First Name:			
ID:			
Date of Birth:	05/16/2004	Eye:	Right
Exam Date:	07/06/2021	Time:	10:14:37
Exam Info:			

Cornea Front

Rf:	6.83 mm	K1:	49.4 D
Rs:	6.61 mm	K2:	51.0 D
Rm:	6.72 mm	Km:	50.2 D
QS:	OK	Axis: (flat)	165.9 °
Q-val (30°):	-0.18	Rper:	6.95 mm
		Astig:	1.6 D
		Rmin:	6.51 mm

Cornea Back

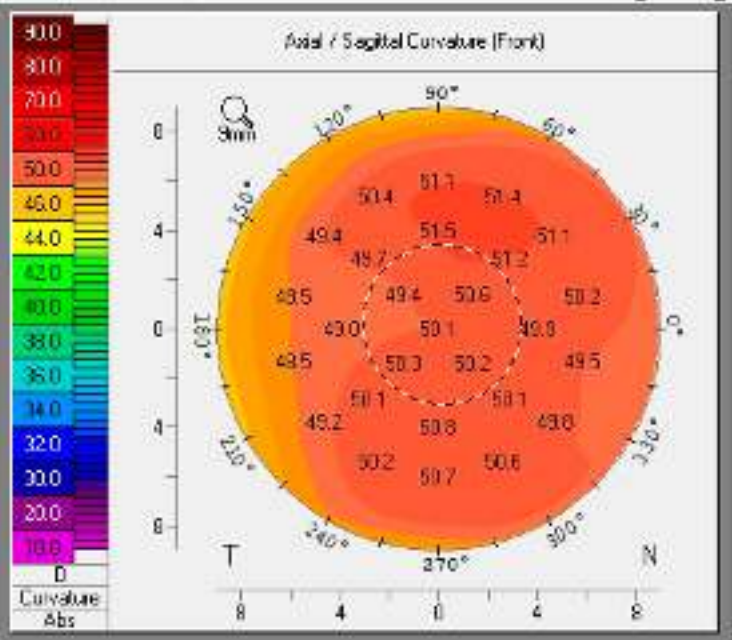
Rf:	5.71 mm	K1:	-7.0 D
Rs:	5.42 mm	K2:	-7.4 D
Rm:	5.57 mm	Km:	-7.2 D
QS:	OK	Axis: (flat)	160.0 °
Q-val (30°):	-0.14	Rper:	5.81 mm
		Astig:	0.4 D
		Rmin:	5.15 mm

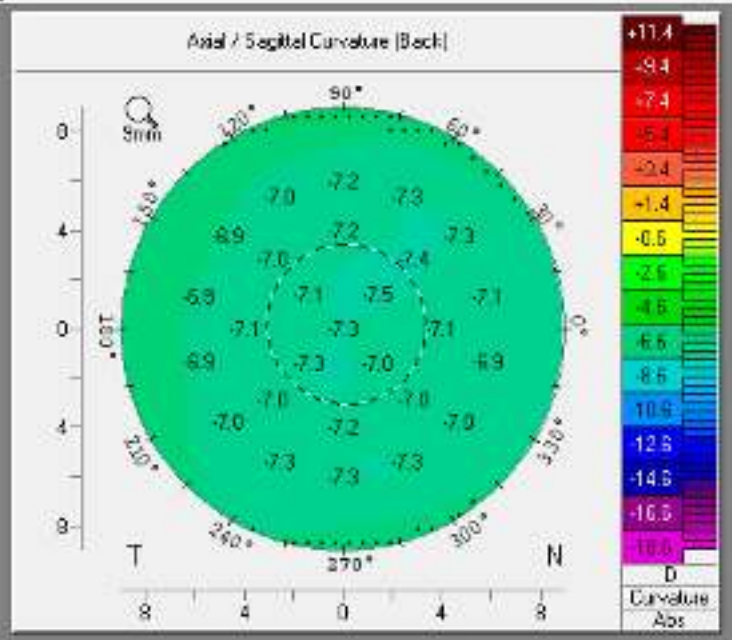
True Net Power

Astig:	1.4 D	K1:	48.0 D
Axis: (flat)	160.2 °	K2:	49.4 D
P Max:	50.5 D	Km:	48.7 D

		Pachy:	x [mm]	y [mm]
Pupil Center:	+	534 µm	+0.07	+0.03
Pachy Vertex N.:	·	533 µm	0.00	0.00
Thinnest Local.:	○	532 µm	-0.35	-0.12
K Max. (Front):		51.8 D	+0.59	+2.30

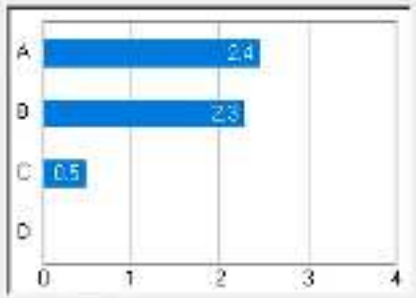
Cornea Volume:	62.2 mm³	HW/TW:	11.0 mm
Chamber Volume:	121 mm³	Angle:	32.5 °
A. C. Depth (Int.):	2.46 mm	Pupil Dia:	3.23 mm
IOP (Sum):	+0.9 mmHg	Lens Th.:	





Belin ABCD Keratoconus Staging

ARC (3mm Zone):	6.74 mm
PRC (3mm Zone):	5.55 mm
Thinnest Pachy:	532 µm
DDVA:	



A2 B2 C0 D

Asphericity (Front) of Major Meridians

(D-val.)	Degrees peripheral 20°	25°	30°	35°	40°
Nas	-0.06	-0.08	-0.10	-0.12	-0.13
Temp	-0.14	-0.18	-0.26	-0.34	-0.34
Inf	-0.09	-0.10	-0.15	-0.27	-0.42
Sup	0.14	-0.03	-0.19	-0.37	-0.53
Mean	-0.04	-0.10	-0.18	-0.27	-0.36

Front:
- (•) Asphericity
- ( ) Axial/Sag. Curva

Back:
- ( ) Asphericity
- ( ) Axial/Sag. Curva

Indices (in 8mm zone)

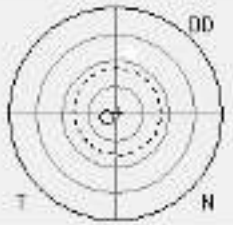
ISV:	20	IHA:	13.7
IVA:	0.14	IHD:	0.021
KI:	1.02	RMin:	6.51
CKI:	1.00	TKC:	Abnorm.
KISA:	11.550	IS:	0.59

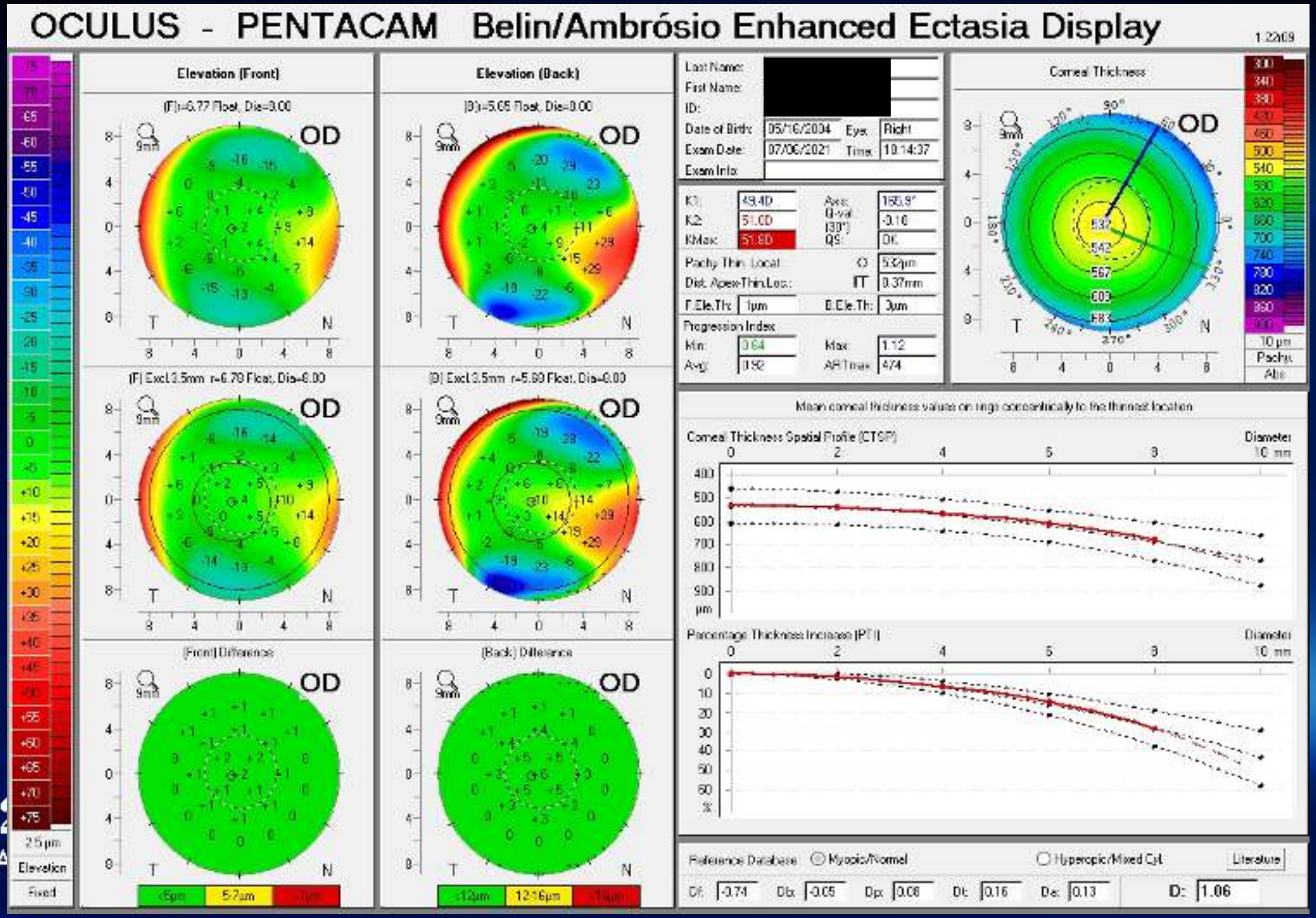
Asphericity (Front) at 30°

Hor.: -0.16
Vert.: -0.17

Spot locations in 8mm zone (polar coordinates)

Pupil Center:	+	0.11mm (51.3°)
Thinnest Local.:	○	0.37mm (156.4°)
K Max. (Front):		2.39mm (75.6°)




OCULUS - PENTACAM Belin/Ambrósio Enhanced Ectasia Display
1.22r09
Elevation (Front)
Elevation (Back)
Last Name:
First Name:
ID:
Date of Birth: 05/16/2004 Eye: Right
Exam Date: 07/06/2021 Time: 10:14:37
Exam Info:
K1: 49.4D
K2: 51.0D
Kmax: 51.8D
Axis: 160.9°
Q-val (3.0mm): -0.16
QS: OK
Pachy Thin. Locat: 537µm
Dist. Apex-Thin.Loc.: 1.37mm
F.Ele.Th: 1µm
B.Ele.Th: 3µm
Progression Index
Min: 0.64
Max: 1.12
Avg: 0.92
ART max: 474
Corneal Thickness
Mean corneal thickness values on rings concentrically to the thinnest location
Corneal Thickness Spatial Profile (CTSP)
Diameter
Percentage Thickness Increase (PTI)
Reference Database
Myopic/Normal
Hyperopic/Mixed Cyl
Literature
D: 1.06

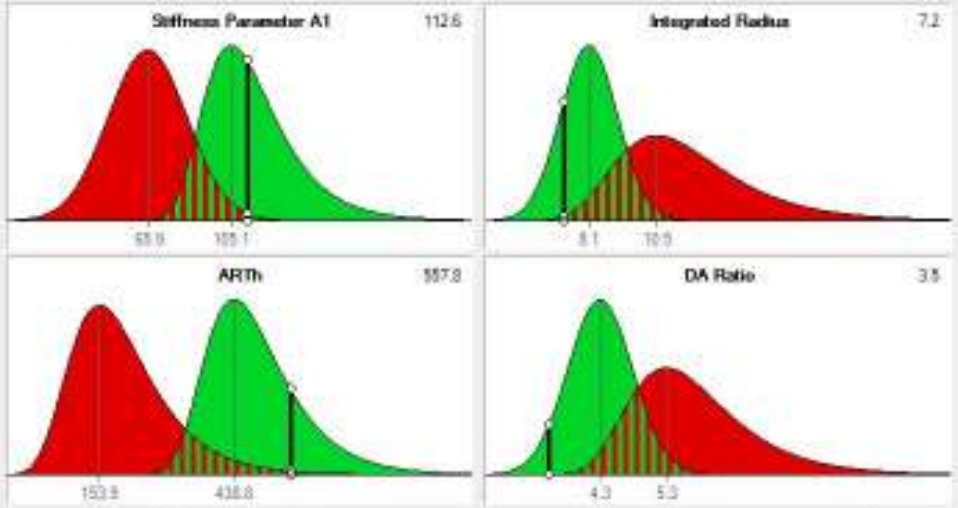
OCULUS Corvis® ST - Biomechanical/Tomographic Assessment (ARV)

Name:	[redacted]	ID:		Date of birth:	16.05.2004	Age:	17
Exam. Date:	[redacted]	Time:	10:28:45	Eye:	Right (OD)		
Info:		QS:	OK				

Exam. Date:	06.07.2021	Time:	10:14:37	Eye:	Right (OD)		
Info:		QS:	OK				

Corvis ST - Biomechanical Assessment

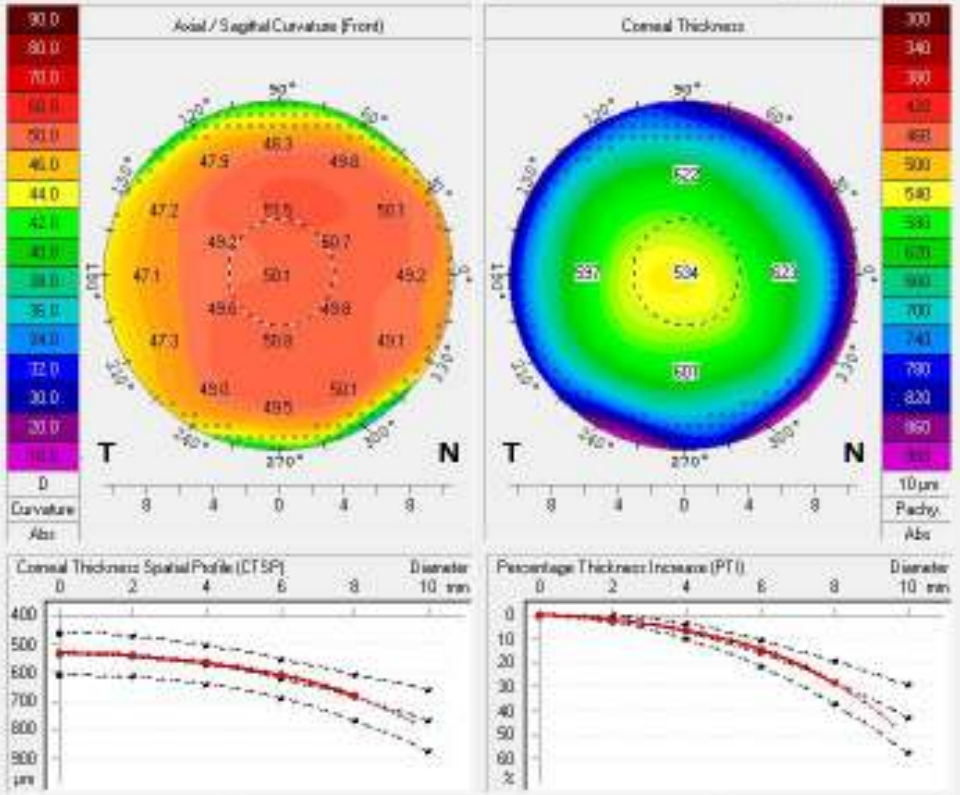
Distributions: NORMAL Population KERATOCONUS Population



CBI (untreated / post LVC): 0.18

TBI: 0.15

Pentacam - Tomographic Assessment



K Max.: 51.8 D IS Value: -0.6 D PRFI: 0.01 TKC: Abnorm.

BAD D (myopic / hyperopic): 1.06

Oculus Optikgeräte GmbH
Münchholzhäuser Str. 29
35582 Wetzlar
Tel: (0641) 20 05-0
Fax: (0641) 20 05-255
www.oculus.de

OCULUS

Minimum Corneal Diameter and Anterior Steep Axis Curvature Share the Same Meridian: A Novel Finding

MATHEW FRANCIS, HIMANSHU MATALIA, ANSU ANN JOHN, JYOTI MATALIA, NANDINI CHINNAPPAIAH, PRARTHANA BHANDARY, ROHIT SHETTY, RUDY M.M.A. NUIJTS, AND ABHIJIT SINHA ROY

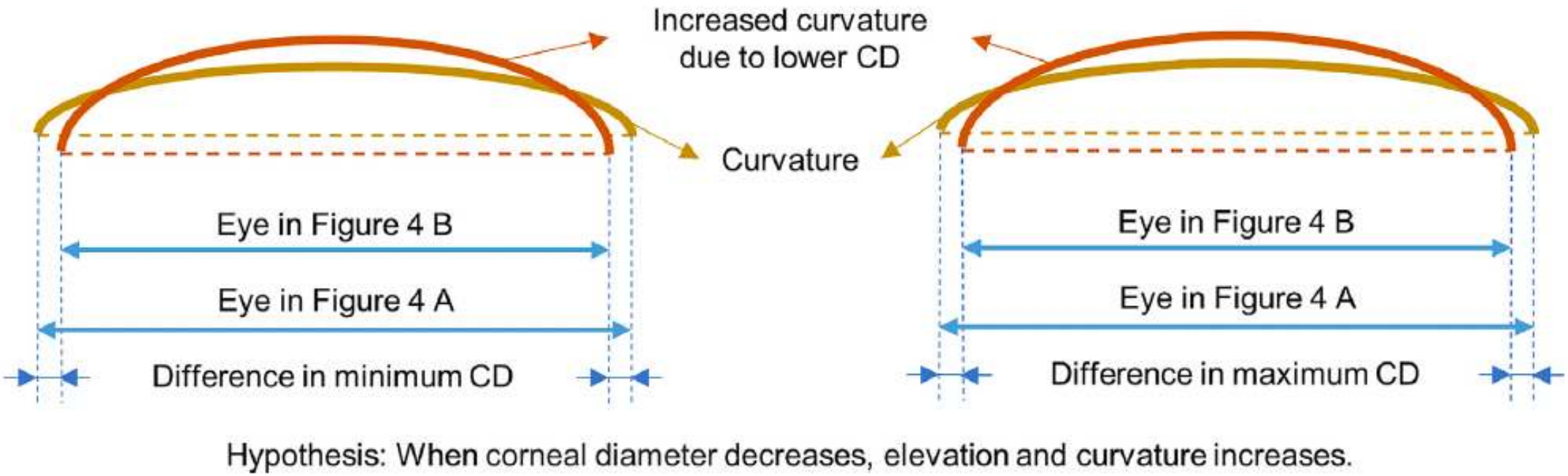


FIGURE 5. Schematic diagram showing how lower cornea diameter (CD) was causing warping of the cornea, especially along the minimum corneal diameter (minCD) meridian resulting in higher elevation and curvature along the same meridian.

Thin Cornea

OCULUS - PENTACAM 4 Maps Refractive

1.30r04

Last Name: [redacted]
First Name:
ID:
Date of Birth: 02/01/1987 Eye: Left
Exam Date: 01/27/2025 Time: 10:48:35
Exam Info:

Cornea Front

	Rf:	8.19 mm	K1:	41.2 D
	Rs:	7.72 mm	K2:	43.7 D
	Rm:	7.96 mm	Km:	42.4 D
OS ⚠	OK	Axis: [Rel]	6.6 °	Astig:	2.5 D
Q-val: (8mm)	-0.47	Rper:	8.24 mm	Rmin:	7.70 mm

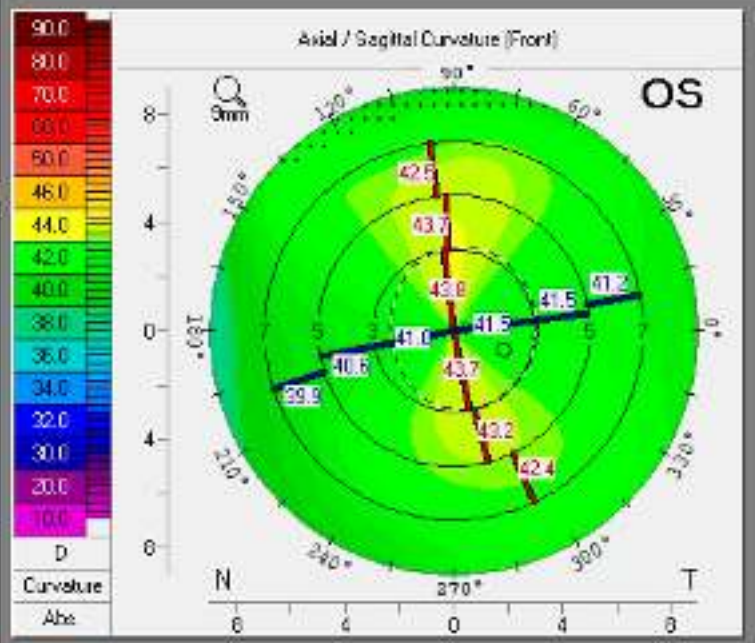
Cornea Back

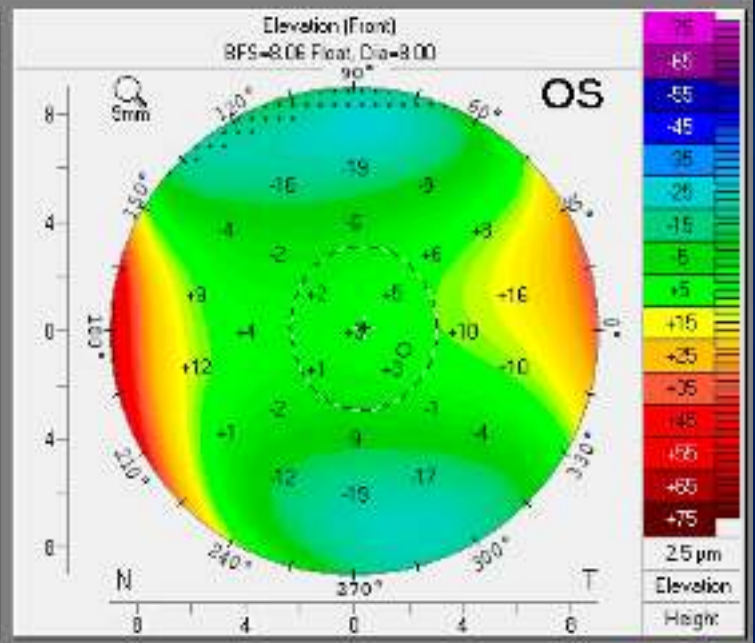
	Rf:	6.56 mm	K1:	-5.7 D
	Rs:	6.44 mm	K2:	-6.2 D
	Rm:	6.70 mm	Km:	-6.0 D
OS ⚠	OK	Axis: [Rel]	1.8 °	Astig:	0.5 D
Q-val: (8mm)	-0.45	Rper:	7.03 mm	Rmin:	6.35 mm

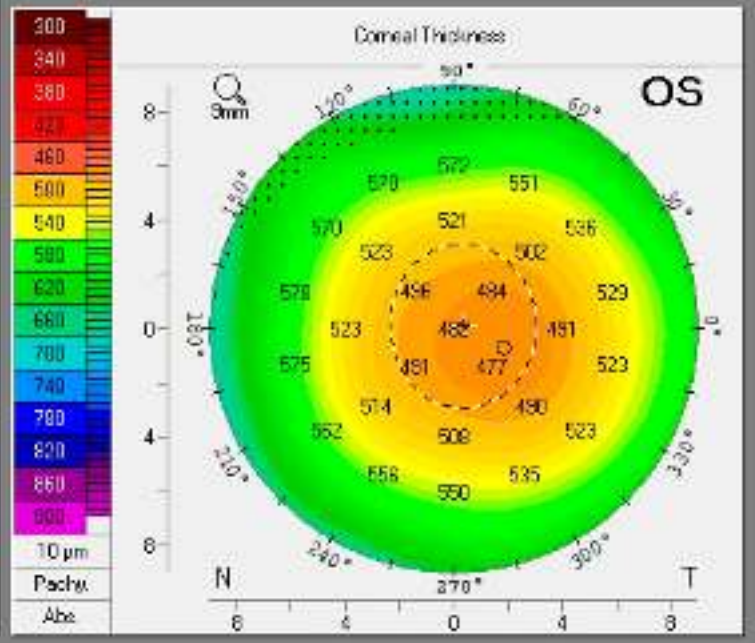
		Pachy:	x[mm]	y[mm]
Pupil Center:	+	480 µm	+0.18	+0.05
Pachy Vertex N.:	·	482 µm	0.00	0.00
Thinnest Locat.:	○	476 µm	+0.90	-0.35
K Max (Front):		43.8 D	-0.07	+1.11

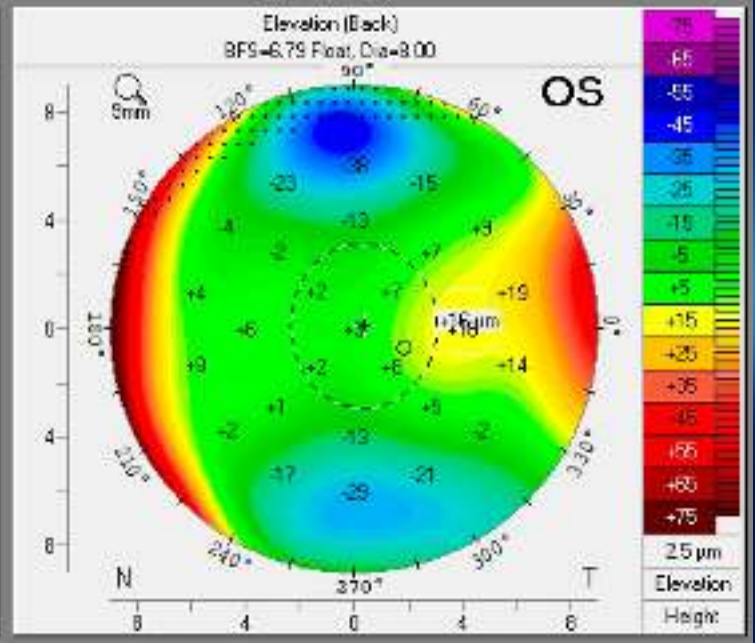
Cornea Volume:	52.2 mm³	HWTW:	11.9 mm
Chamber Volume:	101 mm³	Angle:	41.3 °
A. C. Depth (Int.):	3.07 mm	Pupil Dia:	2.85 mm
Enter IOP	IOP(Sum)	Lens Thi:	

Refractive









OCULUS - PENTACAM Holladay Report

1.30r04

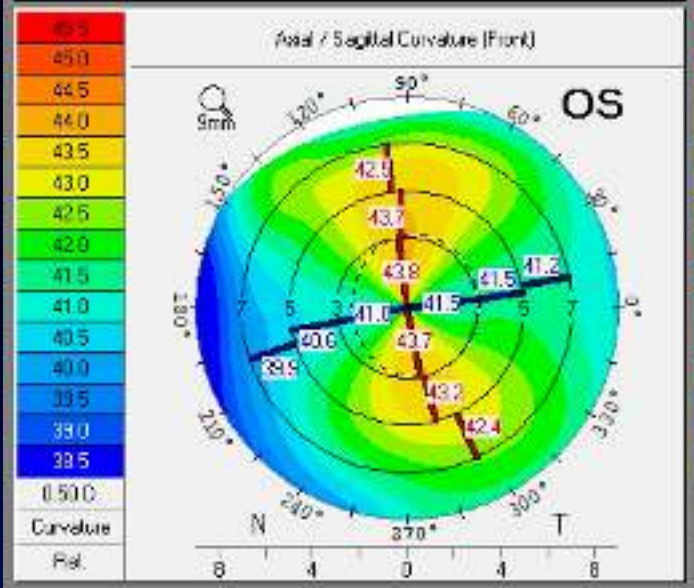
Last Name:	[redacted]		
First Name:			
ID:	Thin Cornea Good Dia		
Date of Birth:	02/01/1997	Eye:	Left
Exam Date:	01/27/2025	Time:	10:48:35

Equiv K-Readings 65 (4.5mm Zone) — Details

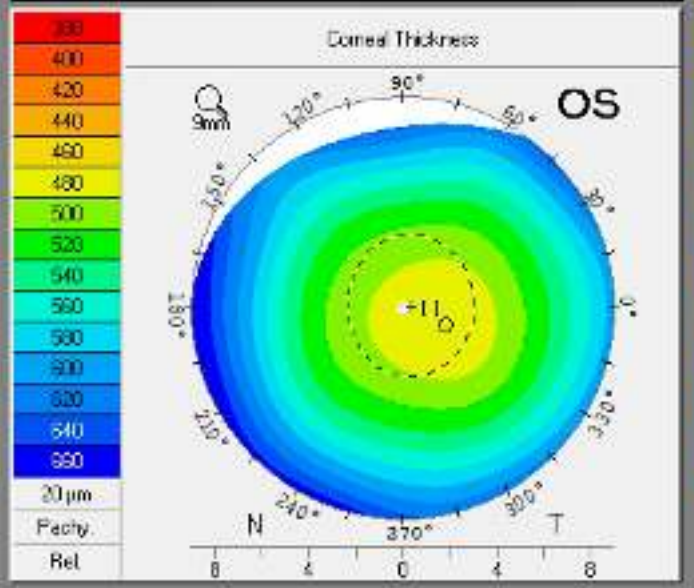
EKR65 Flat K1:	41.73 D (8 °)	D (5.0mm)	-0.33
EKR65 Steep K2:	44.03 D (98 °)	Total SA: Z(4+6+8.0)	+0.100 µ
EKR65 Mean:	42.88 D	Radii Ratio (B/F)	94.5 %
Astig EKR65:	2.30 D	RMS HOA WF (6mm)	0.358 µm

Pupil Dia:	+	2.85 mm	x: 0.10 mm T	y: 0.05 mm S	(rel.VR)
HWTW:	( )	11.9 mm	x: 0.58 mm T	y: 0.01 mm S	(rel.VR)
Pachy Min:	○	476 µm	x: 0.50 mm T	y: 0.35 mm I	(rel.VR)
Est. Pre-Refr. K:		41.4 D	Refr. Change:	-1.0 D	
ACD (Est.):		3.55 mm	Chord µ:	0.19 mm	QS: OK

Axial / Sagittal Curvature (Front)

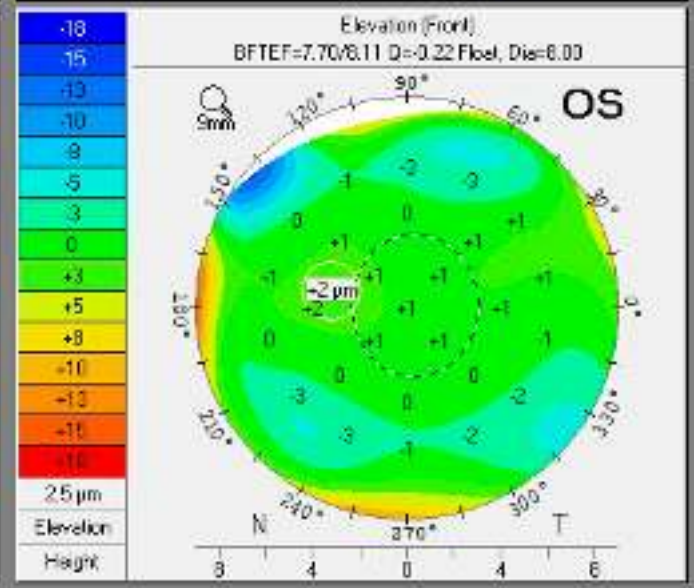


Corneal Thickness

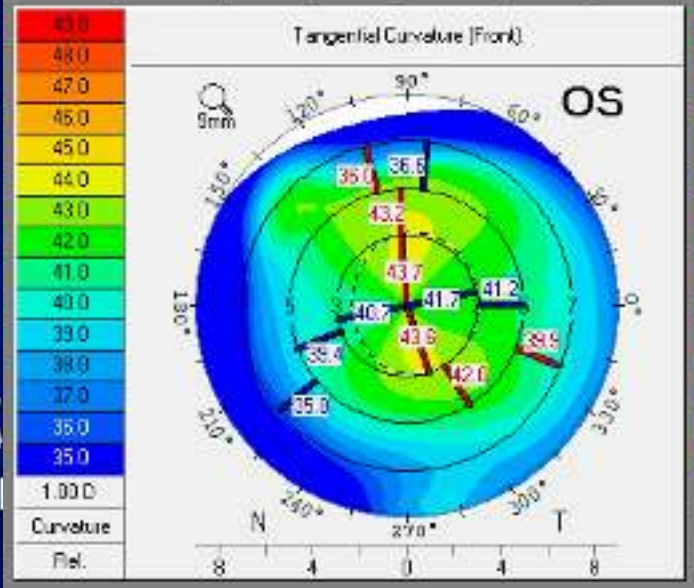


Elevation (Front)

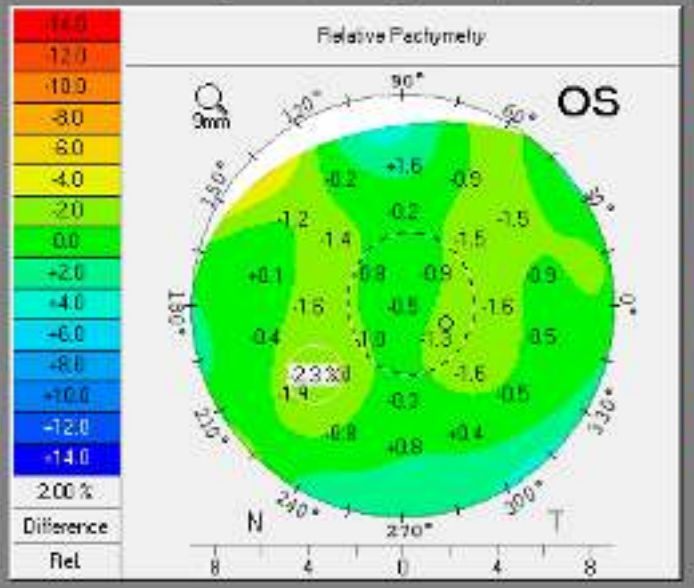
BFTEF=7.70/8.11 D=-0.22 Fbel, Dia=8.00



Tangential Curvature (Front)

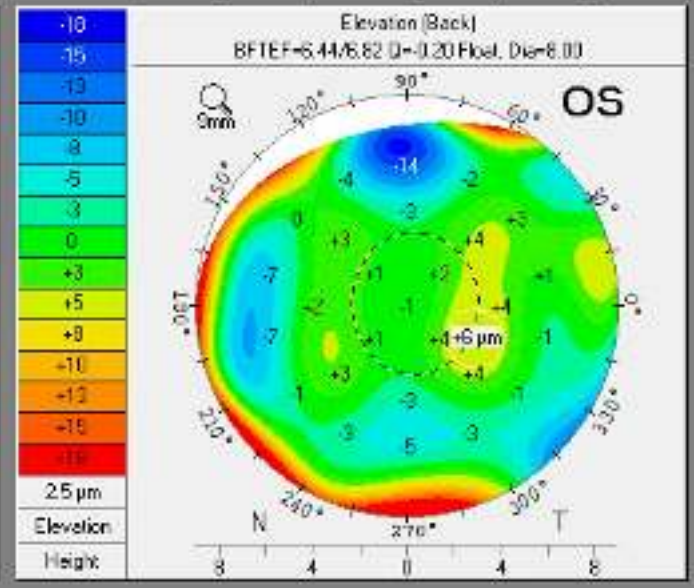


Relative Pachymetry



Elevation (Back)

BFTEF=6.44/6.82 D=-0.20 Fbel, Dia=8.00



OCULUS - PENTACAM Topometric/KC-Staging

1.30r04

Last Name:	[redacted]
First Name:	
ID:	Thin Cornea Good Bio
Date of Birth:	02/01/1987
Eye:	Left
Exam Date:	01/27/2025
Time:	10:46:35
Exam Info:	

Cornea Front

Rf:	8.19 mm	K1:	41.2 D
Rs:	7.72 mm	K2:	43.7 D
Rm:	7.96 mm	Km:	42.4 D
Axis: (flat)	6.6 °	Astig:	2.5 D
Rper:	8.24 mm	Rmin:	7.70 mm
QS:	OK		
Q-val: (8mm)	-0.47		

Cornea Back

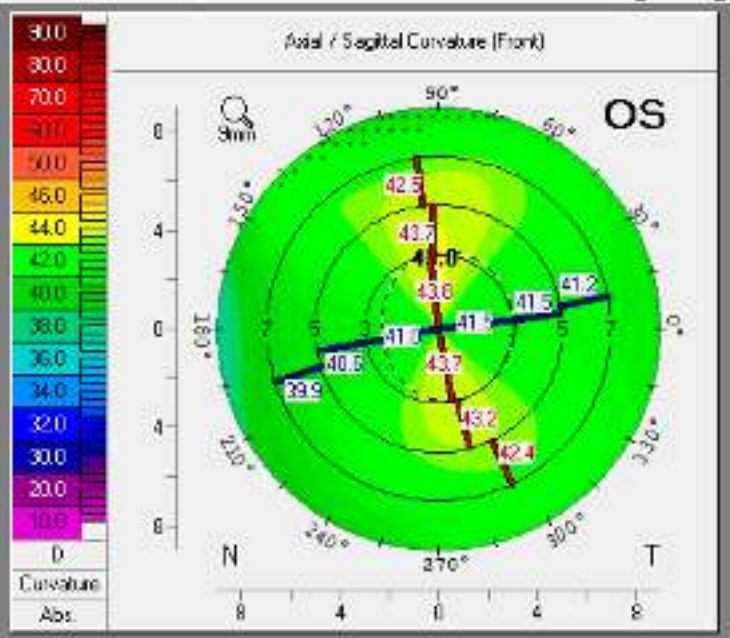
Rf:	6.96 mm	K1:	-5.7 D
Rs:	6.44 mm	K2:	-6.2 D
Rm:	6.70 mm	Km:	-6.0 D
Axis: (flat)	1.9 °	Astig:	0.5 D
Rper:	7.03 mm	Rmin:	6.36 mm
QS:	OK		
Q-val: (8mm)	-0.48		

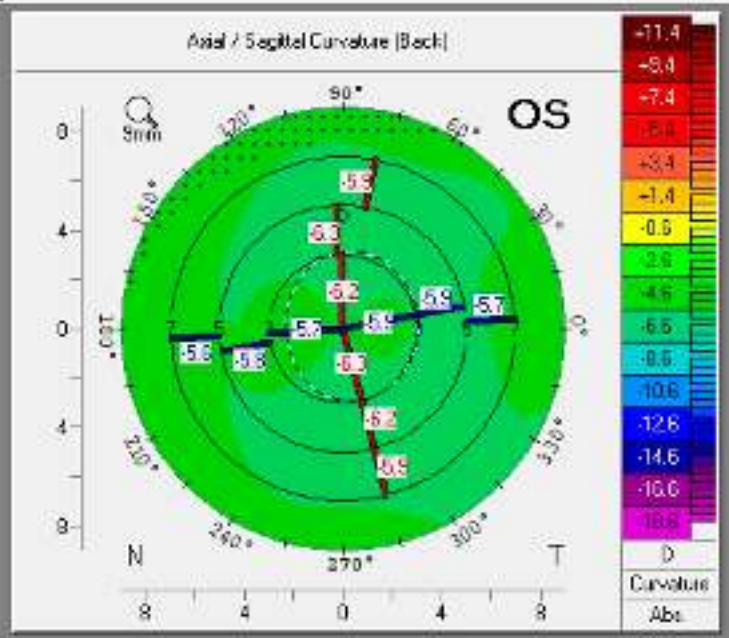
True Net Power

Astig:	2.3 D	K1:	40.2 D
Axis: (flt.)	7.6 °	K2:	42.5 D
P.Max:	42.7 D	Km:	41.4 D

		Pachy:	x[mm]	y[mm]
Pupil Center:	+	490 µm	+0.19	+0.05
Pachy Vertex N.:	·	482 µm	0.00	0.00
Thinnest Local.:	○	476 µm	+0.90	-0.35
K Max. (Front):		43.8 D	-0.07	+1.11

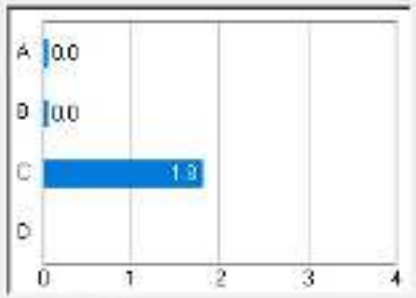
Cornea Volume:	52.2 mm³	HW/TW:	11.9 mm
Chamber Volume:	101 mm³	Angle:	41.3 °
A. C. Depth (Int.):	3.07 mm	Pupil Dia:	2.85 mm
IOP(Sum):		Lens Th.:	





Belin ABCD Keratoconus Staging

ARC (3mm Zone):	7.91 mm
PRC (3mm Zone):	0.54 mm
Thinnest Pachy:	476 µm
DDVA:	



A0 B0 C1 D

Asphericity (Front) of Major Meridians

(D-val.)	Peripheral mm-Rings (Dia) 5mm	7mm	8mm	9mm	10mm
Nas	-0.44	-0.55	-0.69	-0.81	-0.79
Temp	-0.09	-0.13	-0.17	-0.23	-0.30
Inf	-0.45	-0.45	-0.44	-0.42	-0.49
Sup	-0.34	-0.46	-0.58	-0.66	-0.71
Mean	-0.33	-0.40	-0.47	-0.53	-0.57

Front:
- (•) Asphericity
- ( ) Axial/Sag. Curva

Back:
- ( ) Asphericity
- ( ) Axial/Sag. Curva

Indices (in 8mm zone)

ISV:	24	IHA:	4.1
IVA:	0.14	IHD:	0.012
KI:	1.00	RMin:	7.70
CKI:	1.00	TKD:	·
KISA:	3.857	IS:	0.54

Asphericity (Front) at 8mm

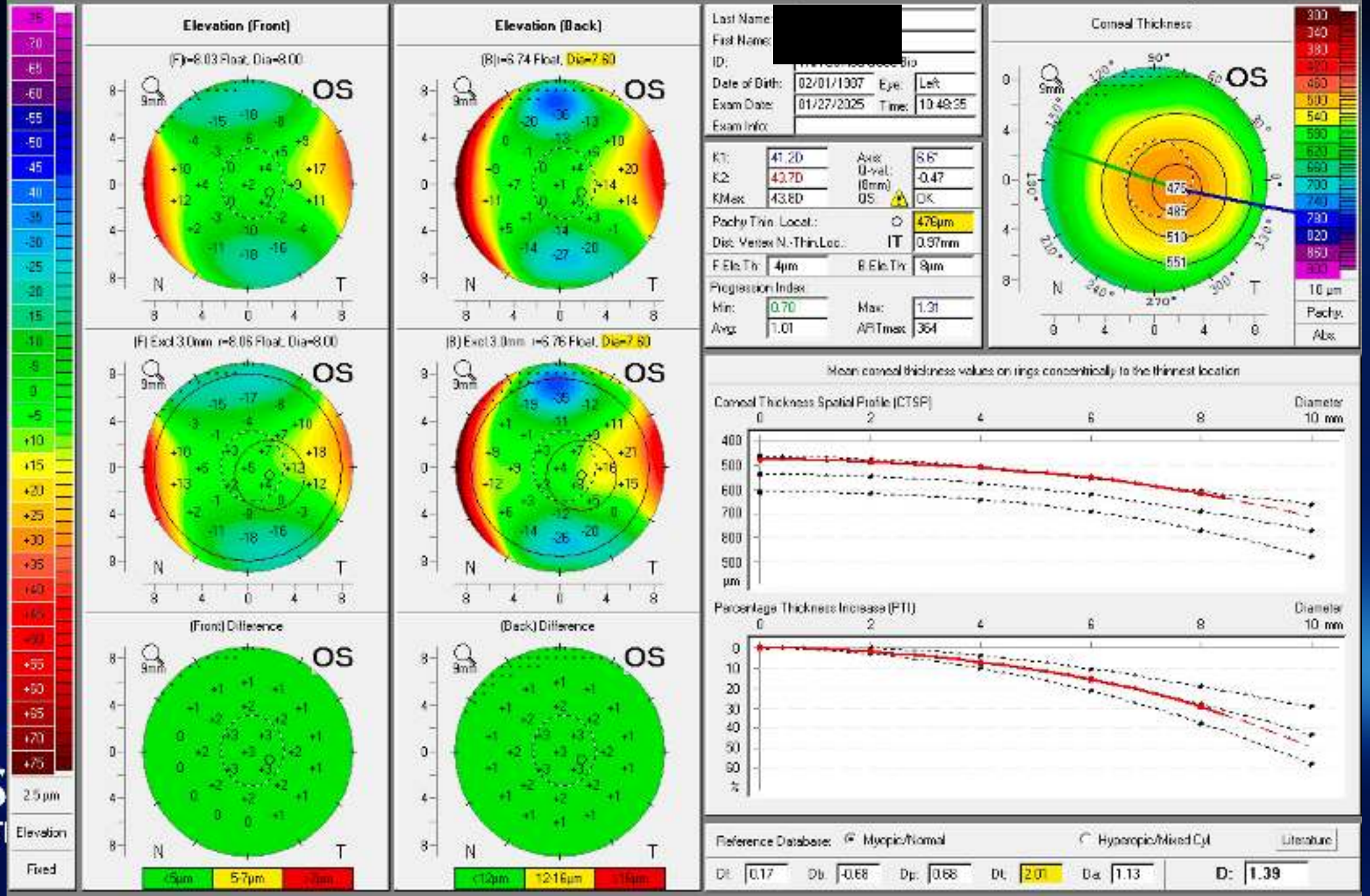
Hor.:	-0.43
Vert.:	-0.51

Spot locations in 8mm zone (polar coordinates)

Pupil Center:	+	0.19mm (15.1°)
Thinnest Local.:	○	0.97mm (339.0°)
K Max (Front):		1.11mm (93.6°)

OCULUS - PENTACAM Belin/Ambrósio Enhanced Ectasia Display

1.30r04



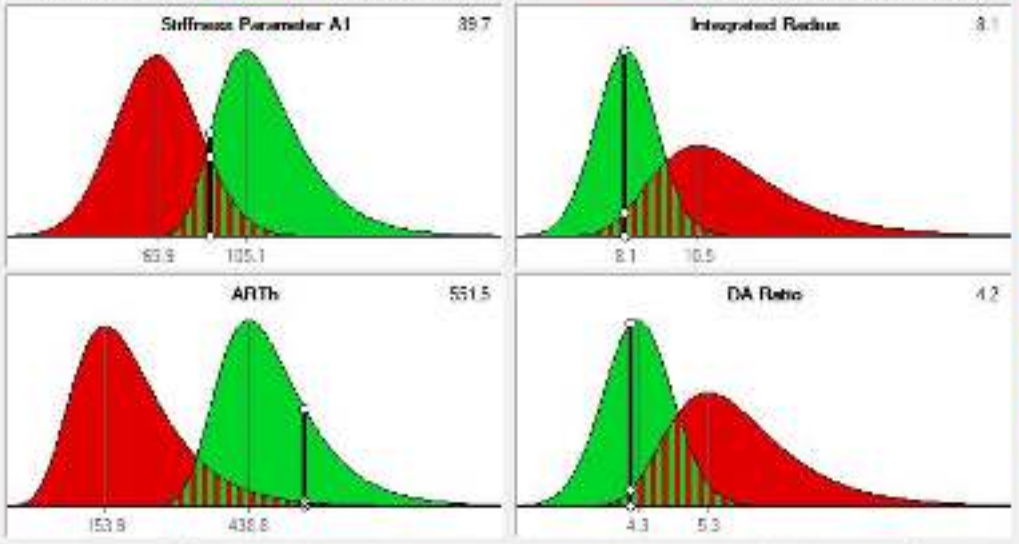
OCULUS Corvis® ST – Biomechanical/Tomographic Assessment (ARV)

Patient Examination Display Export Settings External software

Name:	[redacted]	ID:		Date of birth:	01.02.1997	Age:	37
Exam. Date:		Time: 10:52:02	Eye: Left (OS)	Exam. Date: 27.01.2025	Time: 10:48:35	Eye: Left (OS)	
Info:			QS: OK	Info:		QS: OK	

Corvis ST - Biomechanical Assessment

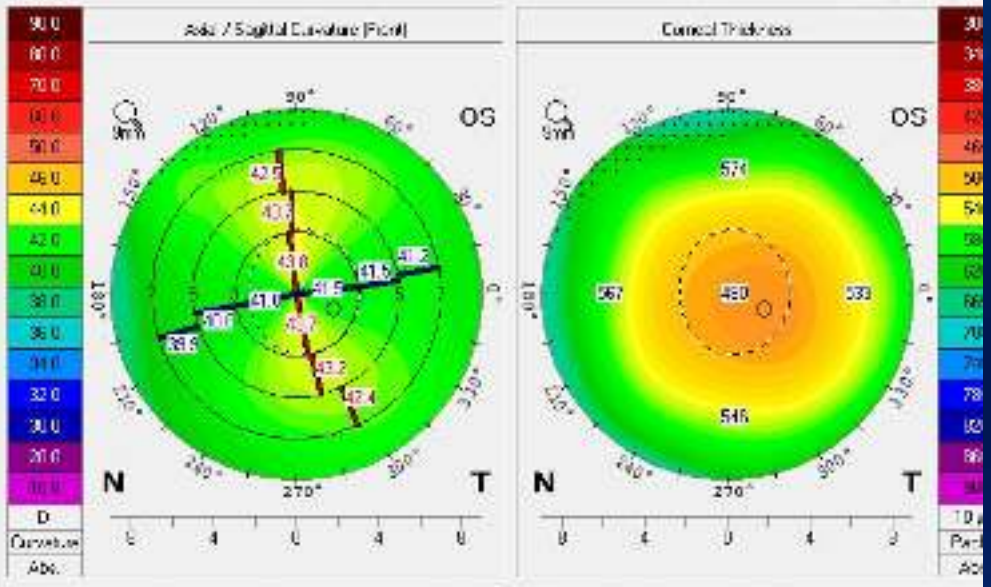
Distributions: NORMAL Population KERATOCONUS Population

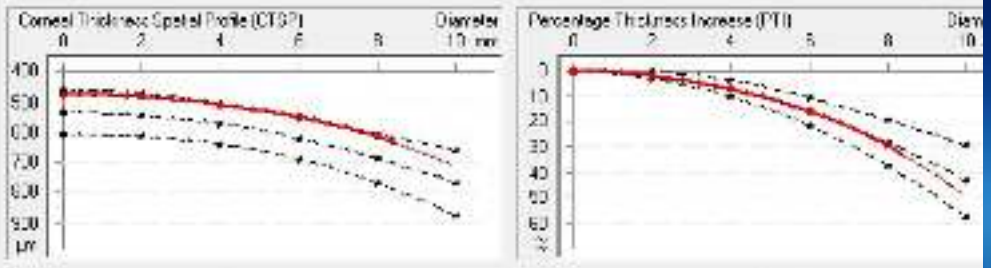


IOPnct: 16.0 mmHg bIOP: 17.2 mmHg

CBI 0.19 (0.25 / 0.50 / 0.75 / 1.00)

Pentacam - Tomographic Assessment





K Max.: 43.0 D IS Value: -0.5 D PRTI: 0.20 TKC:

BAD D 1.39 (myopic / hyperopic)

Reference Ethnicity: Global database Treatment:

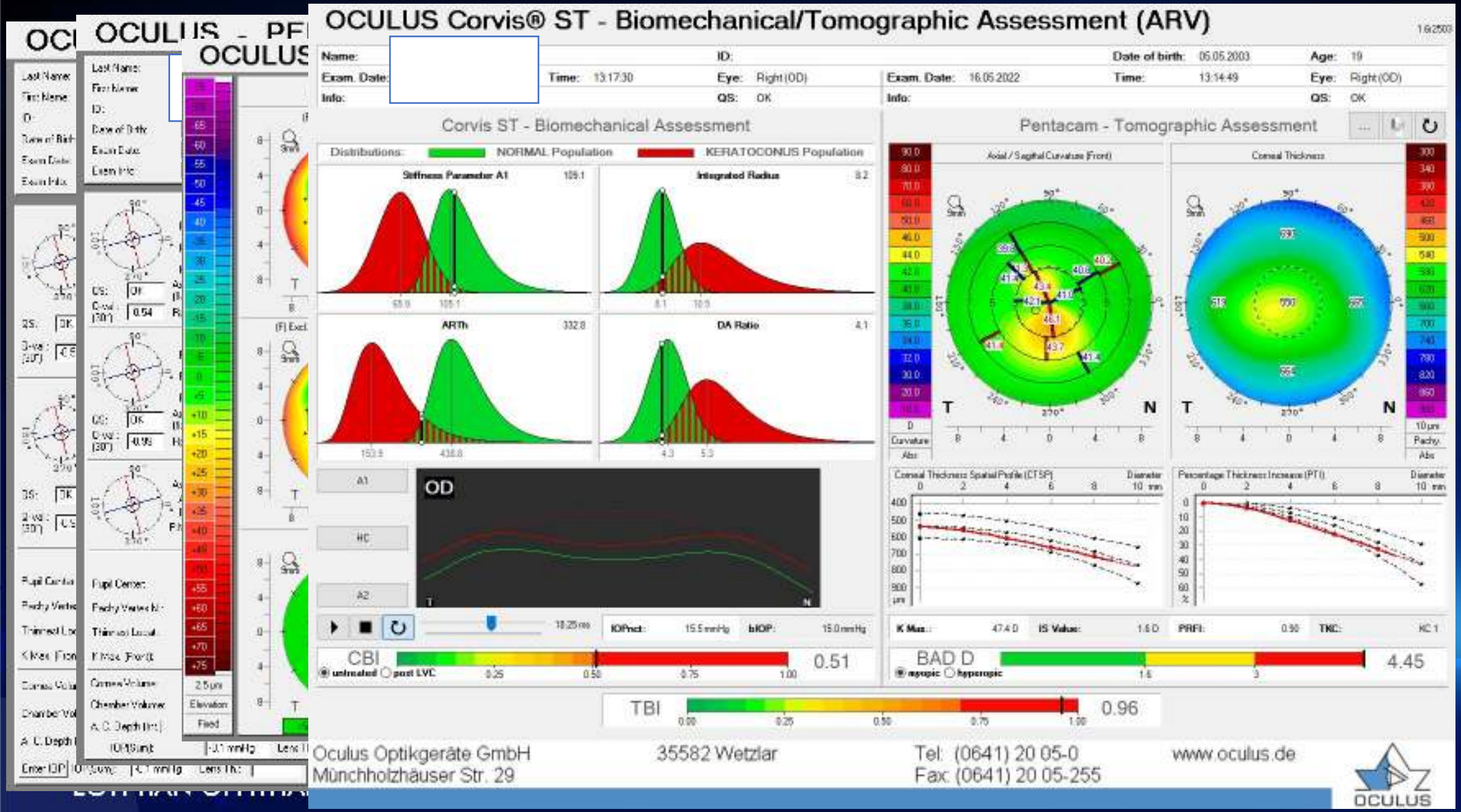
TBI 0.24

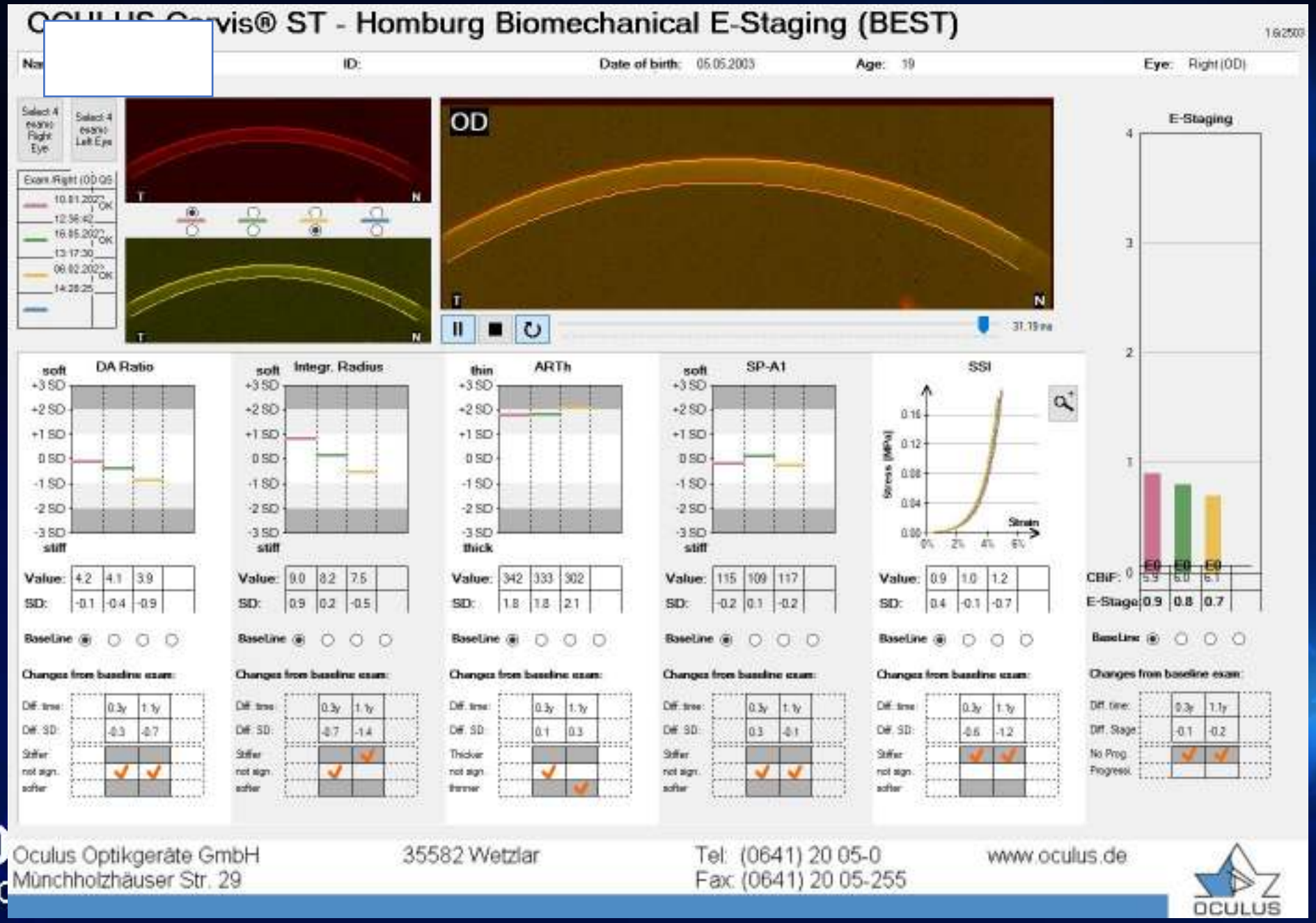
Oculus Optikgeräte GmbH
Münchholzhäuser Str. 29
35582 Wetzlar
Tel: (0641) 20 05-0
Fax: (0641) 20 05-255
www.oculus.de

OCULUS

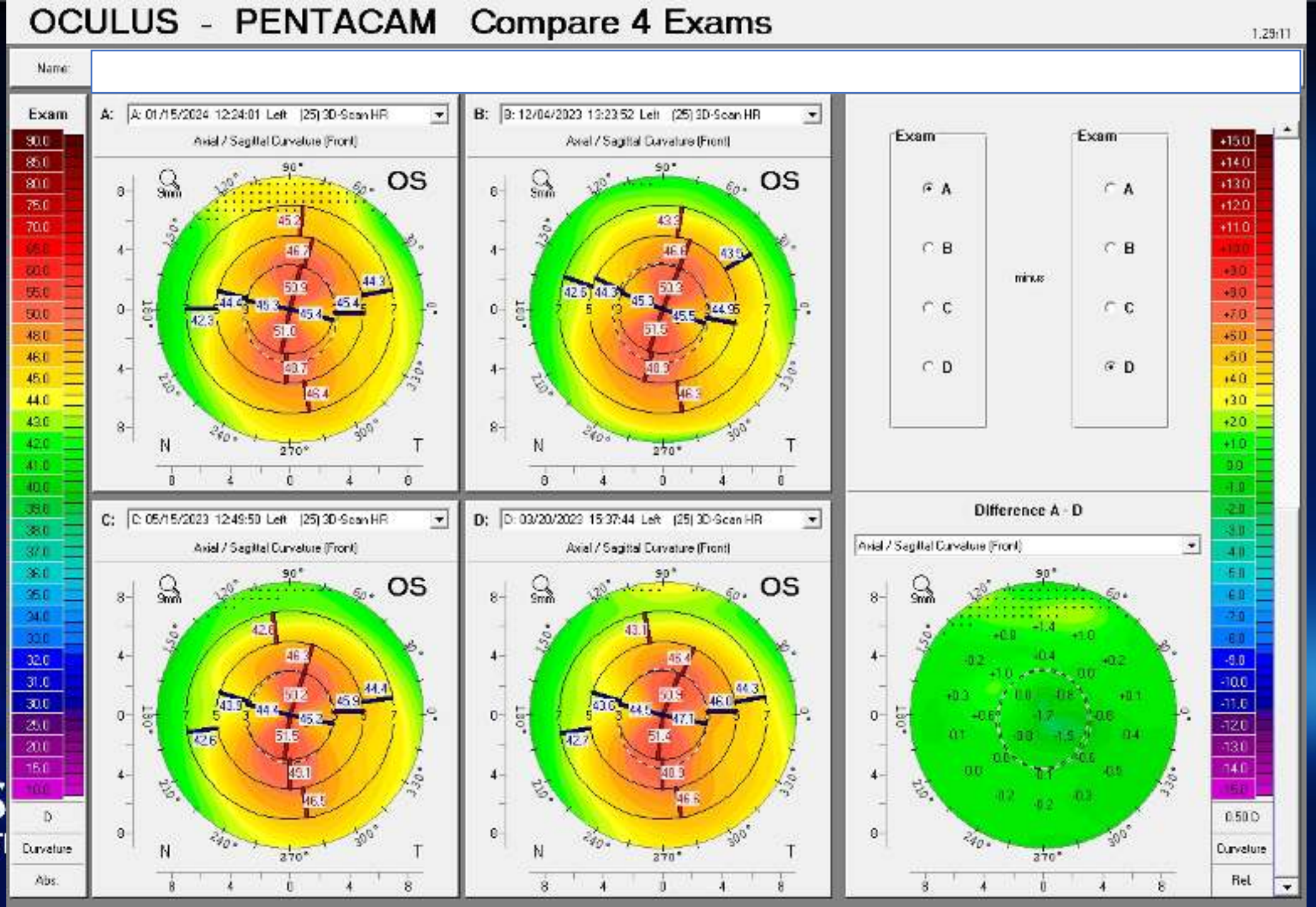
Follow Up of KC

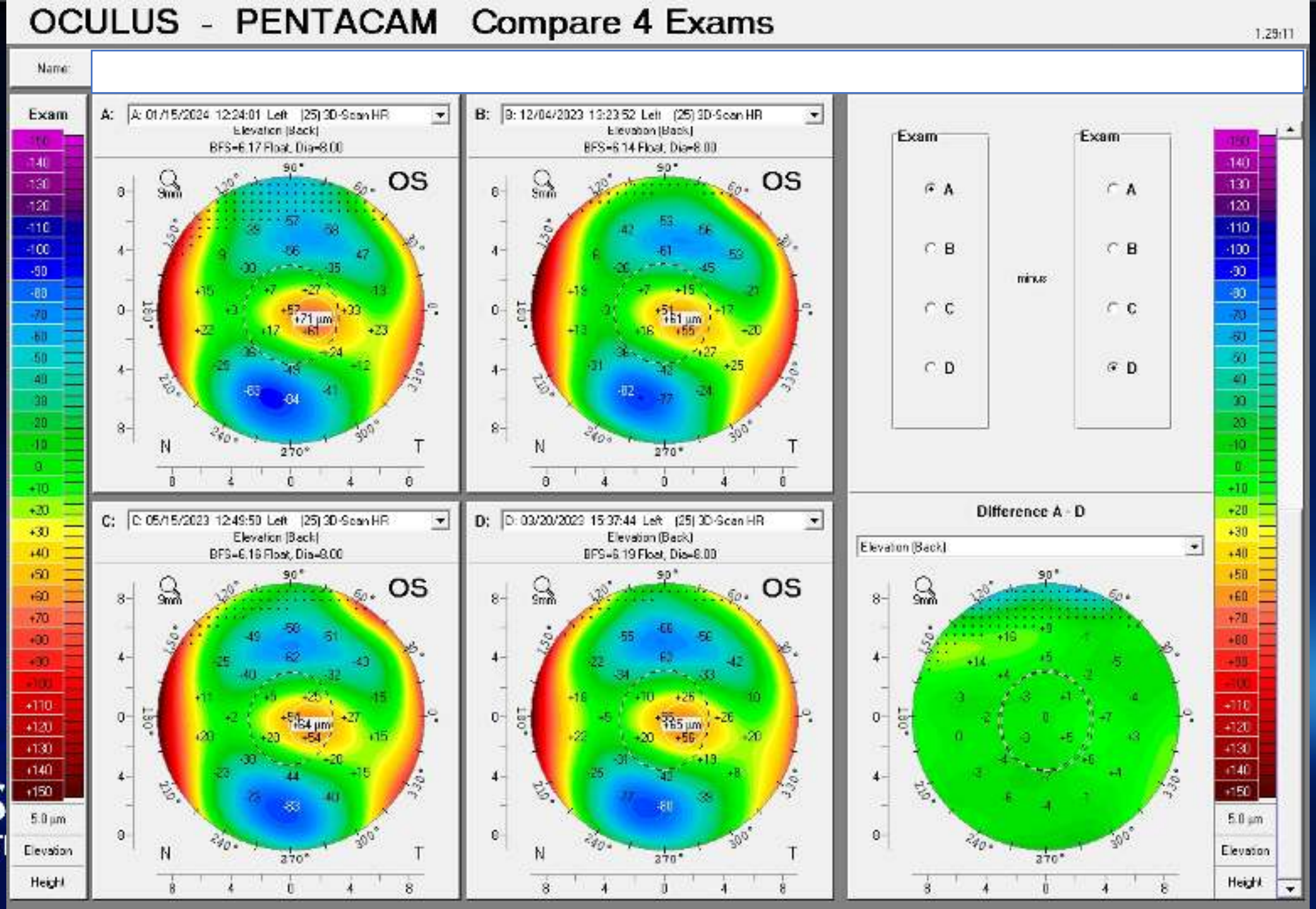
Without treatment


OCULUS Corvis® ST - Biomechanical/Tomographic Assessment (ARV)
Name:
ID:
Date of birth: 06.05.2003
Age: 19
Exam. Date:
Time: 13:17:30
Eye: Right (OD)
QS: OK
Exam. Date: 16.05.2022
Time: 13:14:49
Eye: Right (OD)
QS: OK
Info:
Corvis ST - Biomechanical Assessment
Distributions: NORMAL Population KERATOCONUS Population
Stiffness Parameter A1 159.1
Integrated Radius 8.2
ARTh 332.8
DA Ratio 4.1
OD
Pentacam - Tomographic Assessment
Axial / Sagittal Curvature (Front)
Corneal Thickness
Corneal Thickness Spatial Profile (CTSP)
Percentage Thickness Increase (PTI)
K Max.: 47.4 D
IS Value: 1.6 D
PRFI: 0.90
TKC: KC 1
CBI
untreated post LVC
0.51
BAD D
myopic hyperopic
4.45
TBI
0.96
Oculus Optikgeräte GmbH
Münchholzhäuser Str. 29
35582 Wetzlar
Tel: (0641) 20 05-0
Fax: (0641) 20 05-255
www.oculus.de
OCULUS

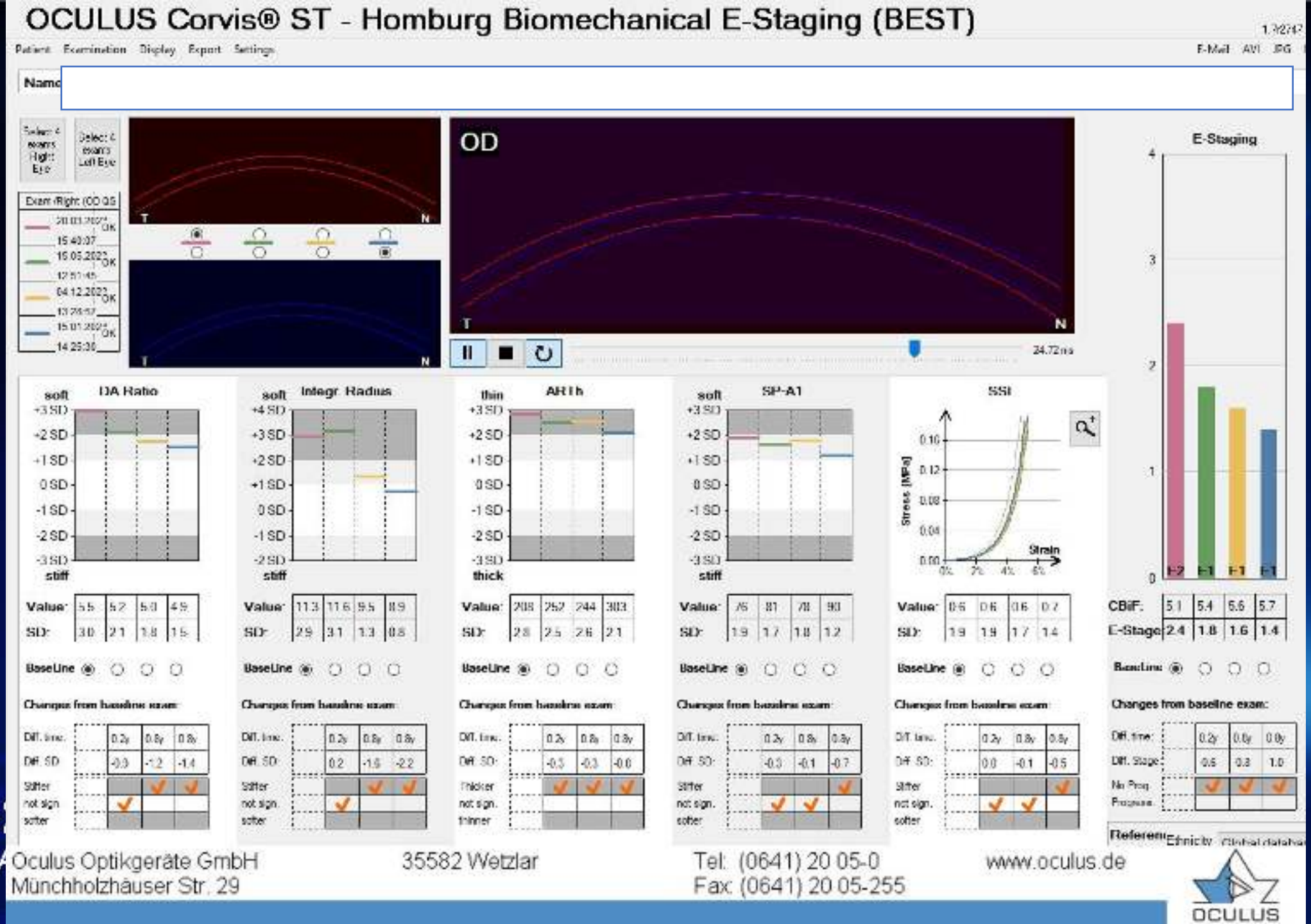

Corvis® ST - Homburg Biomechanical E-Staging (BEST)
ID:
Date of birth: 05.05.2003
Age: 19
Eye: Right (OD)
OD
E-Staging
DA Ratio
Integr. Radius
ARTh
SP-A1
SSI
soft
stiff
thin
thick
Value:
SD:
Baseline
Changes from baseline exam:
CBiF:
E-Stage:
Oculus Optikgeräte GmbH
Münchholzhäuser Str. 29
35582 Wetzlar
Tel: (0641) 20 05-0
Fax: (0641) 20 05-255
www.oculus.de
OCULUS

Post CXL

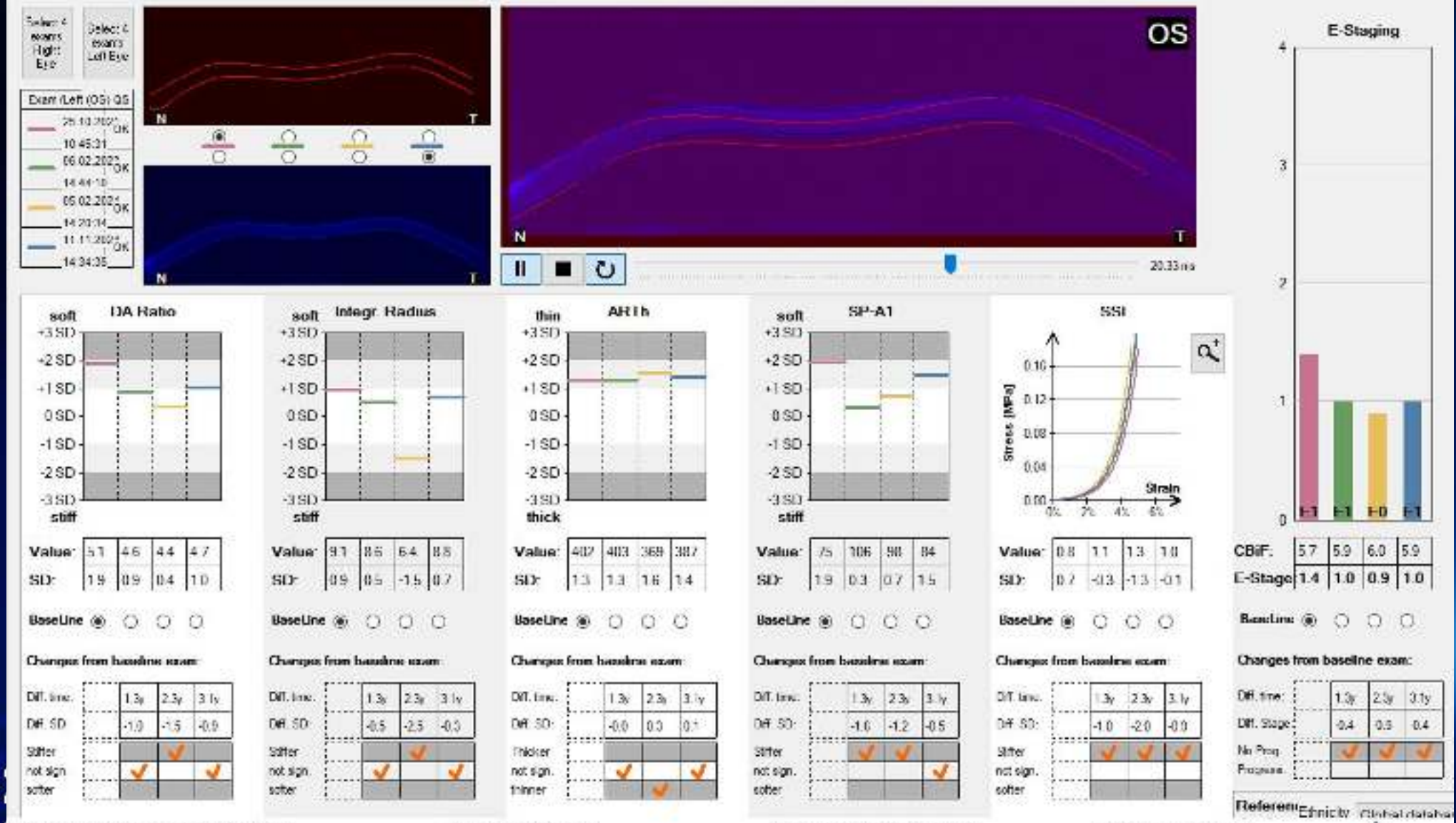

OCULUS - PENTACAM Compare 4 Exams
1.29r11
Name:
Exam
A: A: 01/15/2024 12:24:01 Left (25) 3D-Scan HR
Axial / Sagittal Curvature (Front)
B: B: 12/04/2023 13:23:52 Left (25) 3D-Scan HR
Axial / Sagittal Curvature (Front)
C: C: 05/15/2023 12:49:50 Left (25) 3D-Scan HR
Axial / Sagittal Curvature (Front)
D: D: 03/20/2022 15:37:44 Left (25) 3D-Scan HR
Axial / Sagittal Curvature (Front)
OS
Exam
A
B
C
D
minus
Exam
A
B
C
D
Difference A - D
Axial / Sagittal Curvature (Front)
D
Curvature
Abs.
0.50 D
Curvature
Rel.


OCULUS - PENTACAM Compare 4 Exams
1.29r11
Name:
Exam
A: A: 01/15/2024 12:24:01 Left (25) 3D-Scan HR
Elevation (Back)
BFS=6.17 Float, Dia=8.00
B: B: 12/04/2023 13:23:52 Left (25) 3D-Scan HR
Elevation (Back)
BFS=6.14 Float, Dia=8.00
C: C: 05/15/2023 12:49:50 Left (25) 3D-Scan HR
Elevation (Back)
BFS=6.16 Float, Dia=8.00
D: D: 03/20/2022 15:37:44 Left (25) 3D-Scan HR
Elevation (Back)
BFS=6.19 Float, Dia=8.00
OS
N
T
Exam
A
B
C
D
minus
Exam
A
B
C
D
Difference A - D
Elevation (Back)
5.0 µm
Elevation
Height

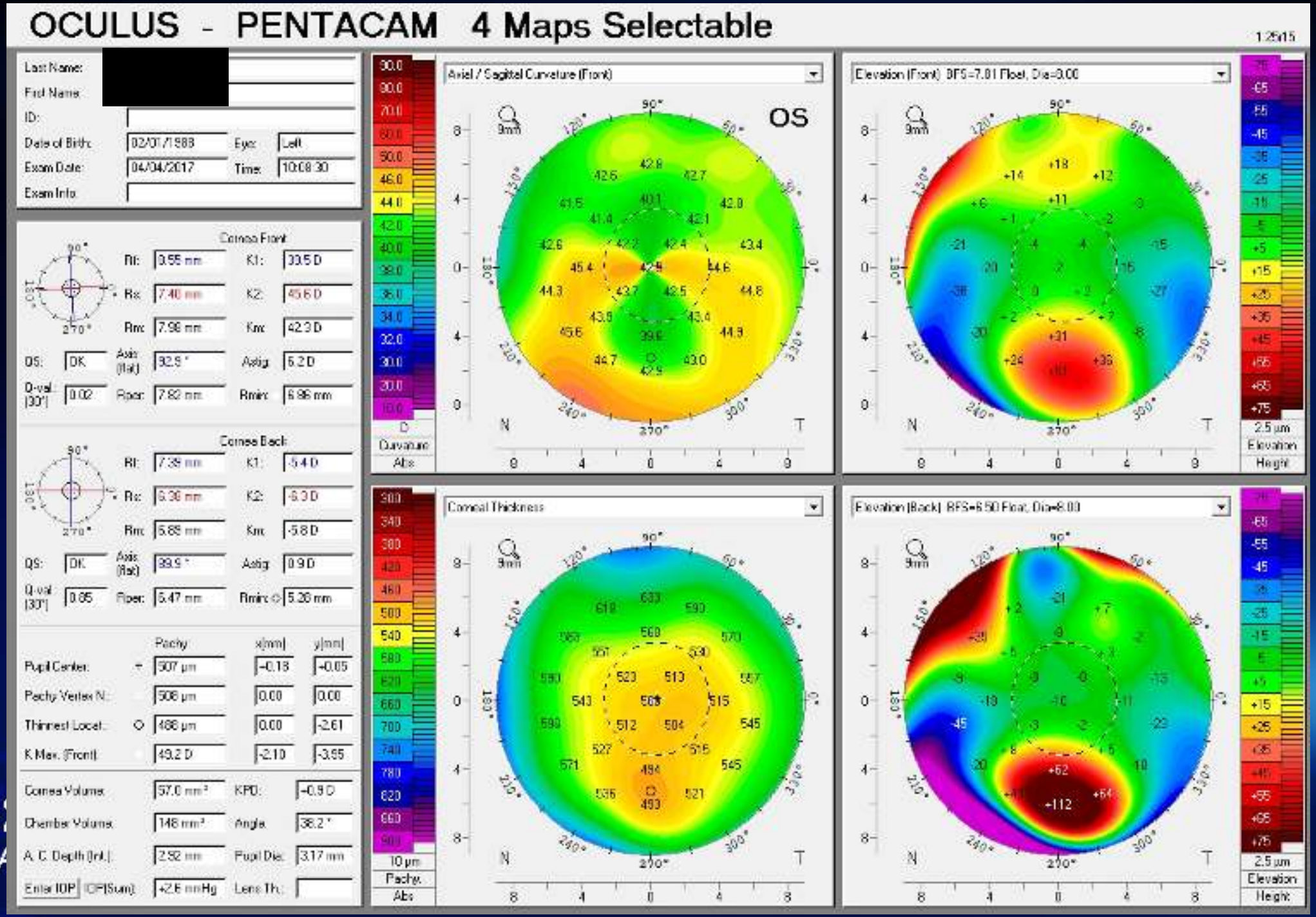
OCULUS Corvis® ST – Homburg Biomechanical E-Staging (BEST)



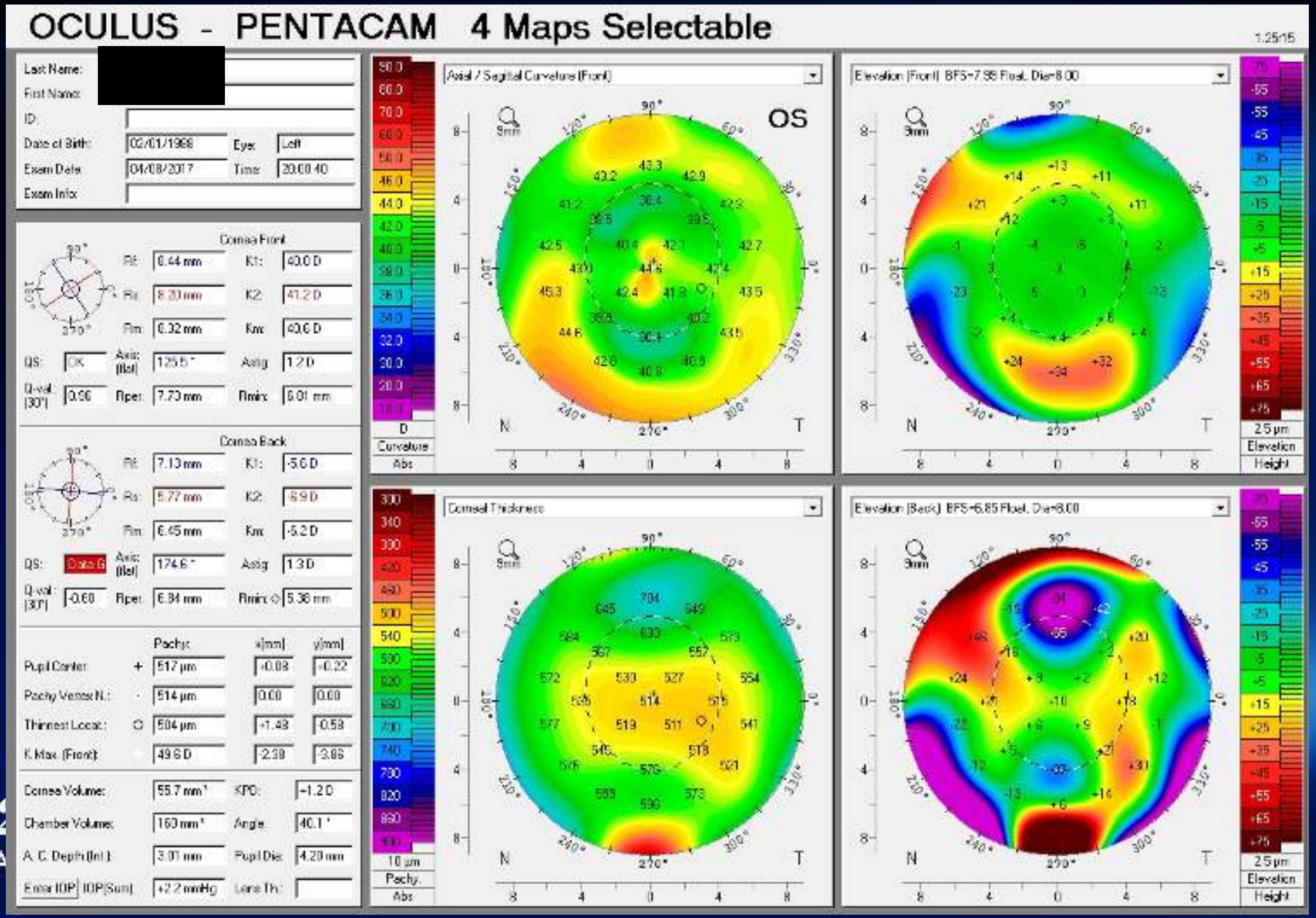
OCULUS Corvis® ST – Homburg Biomechanical E-Staging (BEST)



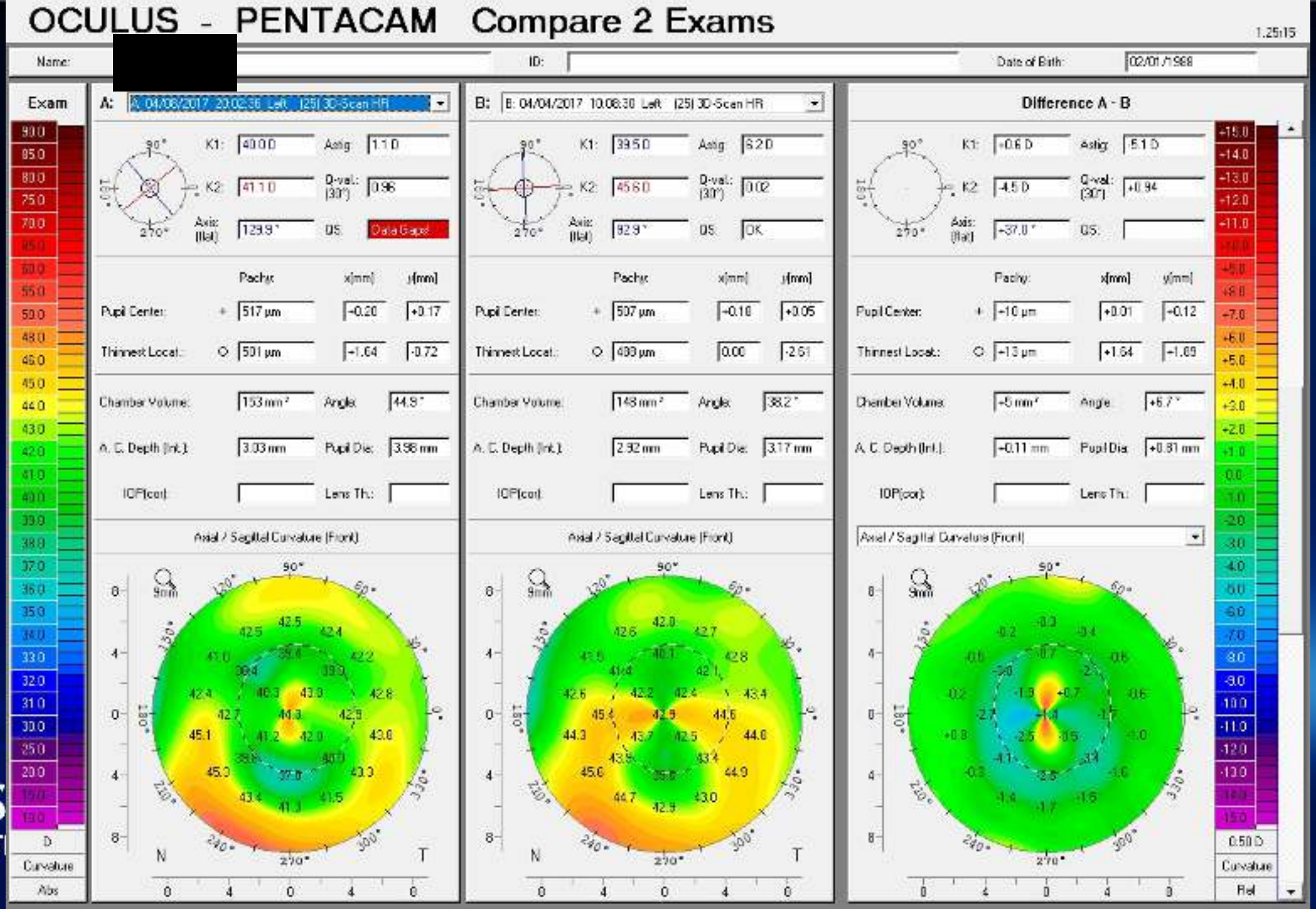
Post ICRS


OCULUS - PENTACAM 4 Maps Selectable
1.25r15
Last Name:
First Name:
ID:
Date of Birth: 02/07/1988 Eye: Left
Exam Date: 04/04/2017 Time: 10:08:30
Exam Info:
Cornea Front
Rf: 8.55 mm K1: 39.5 D
Rs: 7.40 mm K2: 45.6 D
Rm: 7.98 mm Km: 42.3 D
BS: OK Axis (flat): 82.9 ° Astig: 6.2 D
Q-val (30°): 0.02 Rper: 7.82 mm Rmin: 6.96 mm
Cornea Back
Rf: 7.39 mm K1: -5.4 D
Rs: 6.39 mm K2: -6.3 D
Rm: 6.88 mm Km: -5.8 D
BS: OK Axis (flat): 89.9 ° Astig: 0.9 D
Q-val (30°): 0.65 Rper: 5.47 mm Rmin: 5.26 mm
Pachy x[mm] y[mm]
Pupil Center: 507 µm -0.18 -0.05
Pachy Vertex N: 506 µm 0.00 0.00
Thinnest Locat.: 486 µm 0.00 -2.61
K Max. (Front): 49.2 D -2.10 -3.55
Cornea Volume: 57.0 mm³ KPD: -0.9 D
Chamber Volume: 148 mm³ Angle: 38.2 °
A. C. Depth (int.): 2.92 mm Pupil Dia: 3.17 mm
Enter IOP IOP(Sum): +2.6 mmHg Lens Th:
Axial / Sagittal Curvature (Front)
OS
Elevation (Front) BFS=7.81 Float. Dia=8.00
Corneal Thickness
Elevation (Back) BFS=6.50 Float. Dia=8.00
D
Curvature
Abs
2.5 µm
Elevation
Height
10 µm
Pachy.

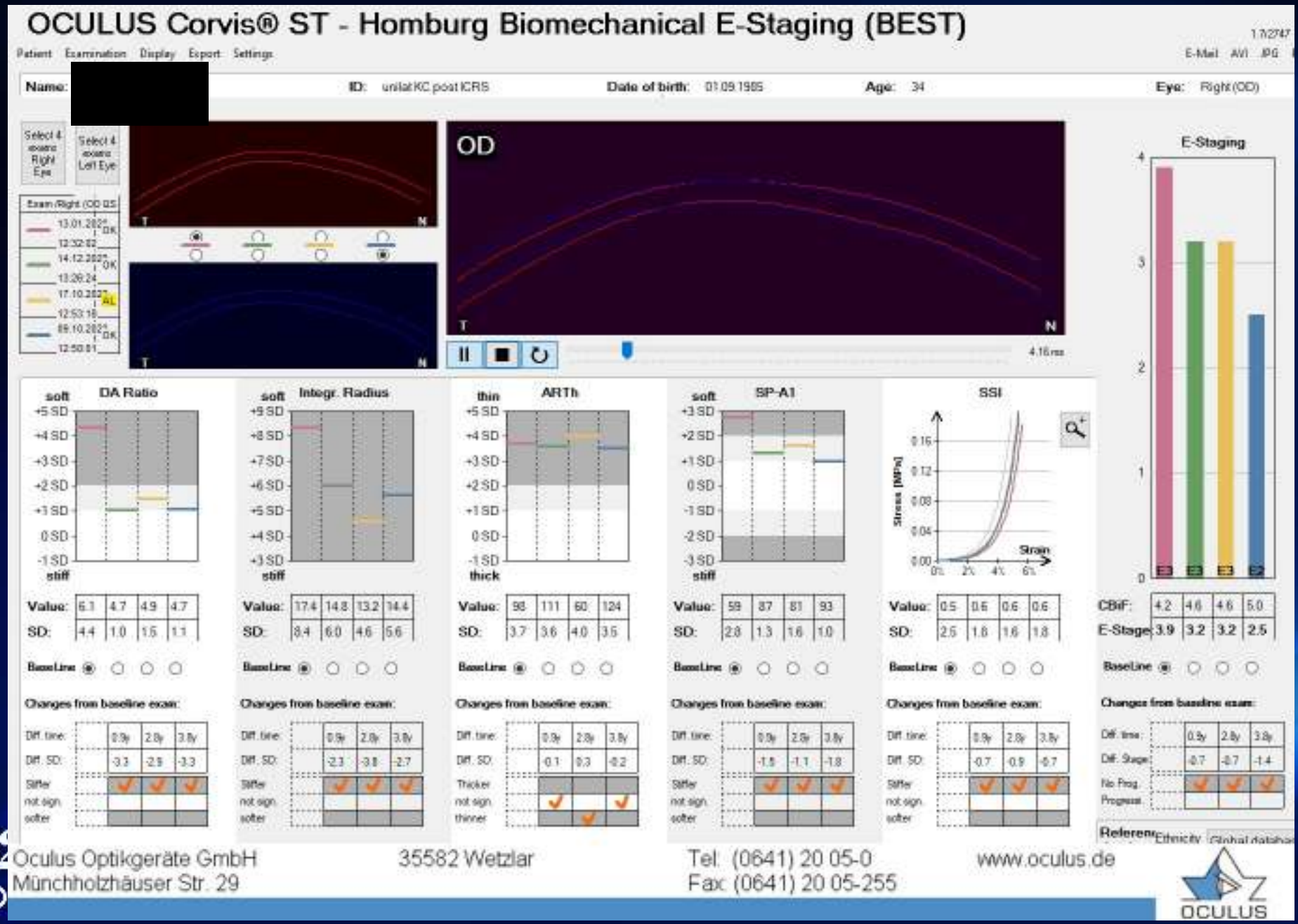
OCULUS - PENTACAM 4 Maps Selectable



EOS 2
EGYPTIA


OCULUS - PENTACAM Compare 2 Exams
1.25r15
Name:
ID:
Date of Birth:
02/01/1988
Exam
A:
A: 04/04/2017 10:02:36 Left (25) 3D-Scan HR
B:
B: 04/04/2017 10:06:30 Left (25) 3D-Scan HR
Difference A - B
K1: 40.0 D
Astig: 1.1 D
K2: 41.1 D
D-val.: (30°) 0.96
Axis: (flat) 129.9°
OS: Data Gaps!
K1: 39.5 D
Astig: 0.2 D
K2: 45.6 D
D-val.: (30°) 0.02
Axis: (flat) 92.9°
OS: OK
K1: +0.6 D
Astig: -5.1 D
K2: -4.5 D
D-val.: (30°) +0.94
Axis: (flat) -37.0°
OS:
Pachy
x[mm]
y[mm]
Pupil Center: 517 µm -0.20 +0.17
Thinnest Local.: 501 µm -1.64 -0.72
Pupil Center: 507 µm -0.10 +0.05
Thinnest Local.: 493 µm 0.00 -2.61
Pachy: -10 µm +0.01 -0.12
Thinnest Local.: -13 µm +1.64 -1.69
Chamber Volume: 153 mm³
Angle: 44.9°
A. C. Depth (Int.): 3.03 mm
Pupil Dia: 3.96 mm
IOP(cor):
Lens Th.:
Chamber Volume: 148 mm³
Angle: 38.2°
A. C. Depth (Int.): 2.92 mm
Pupil Dia: 3.17 mm
IOP(cor):
Lens Th.:
Chamber Volume: -5 mm³
Angle: +6.7°
A. C. Depth (Int.): -0.11 mm
Pupil Dia: +0.81 mm
IOP(cor):
Lens Th.:
Axial / Sagittal Curvature (Front)
Axial / Sagittal Curvature (Front)
Axial / Sagittal Curvature (Front)
D
Curvature
Abs
0.50 D
Curvature
Rel

Post ICRS

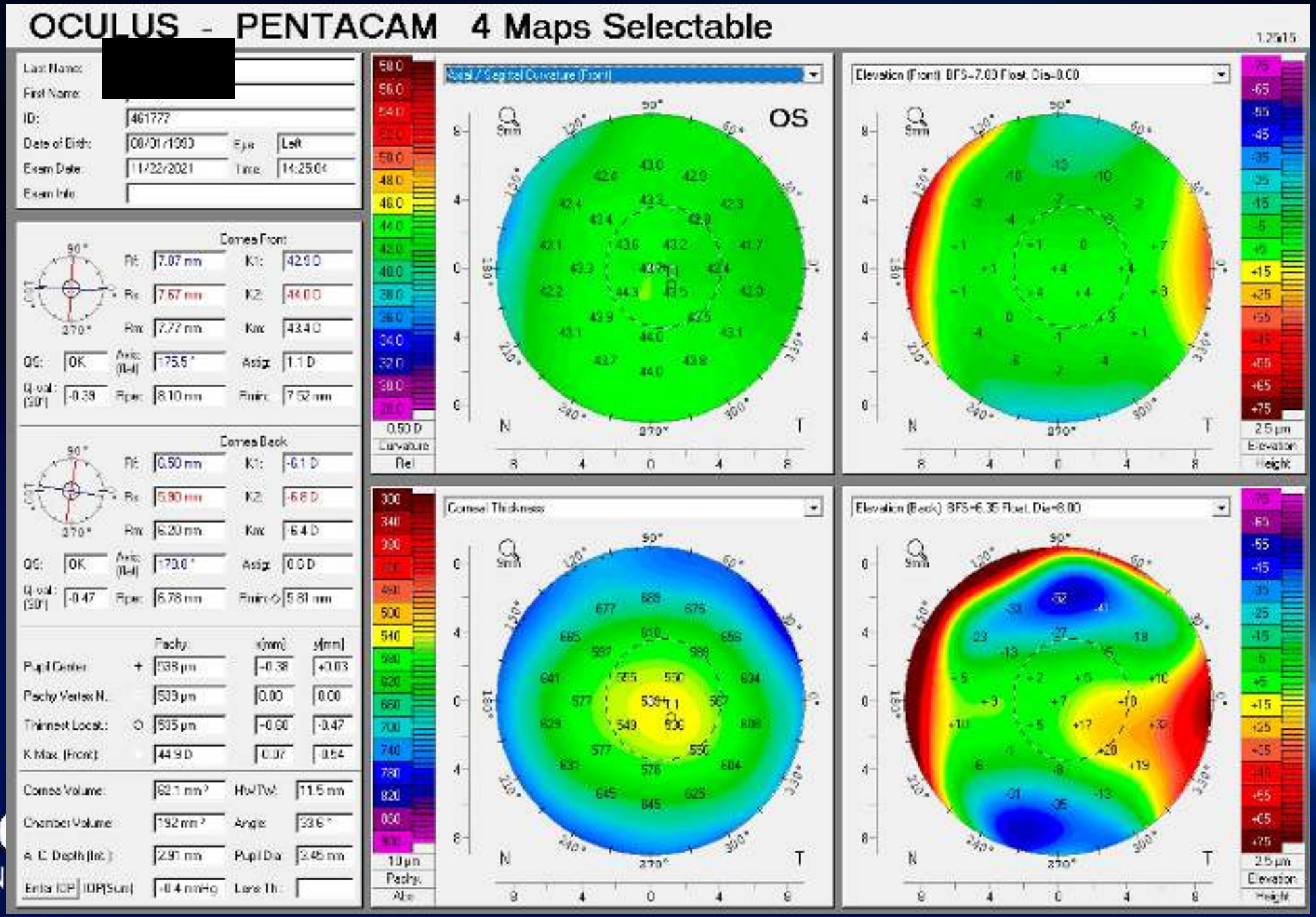



Name [redacted]
Eye: Left (OS)
Exam. Date: 18.11.2019 12:51:54
OCULUS
0.00 ms

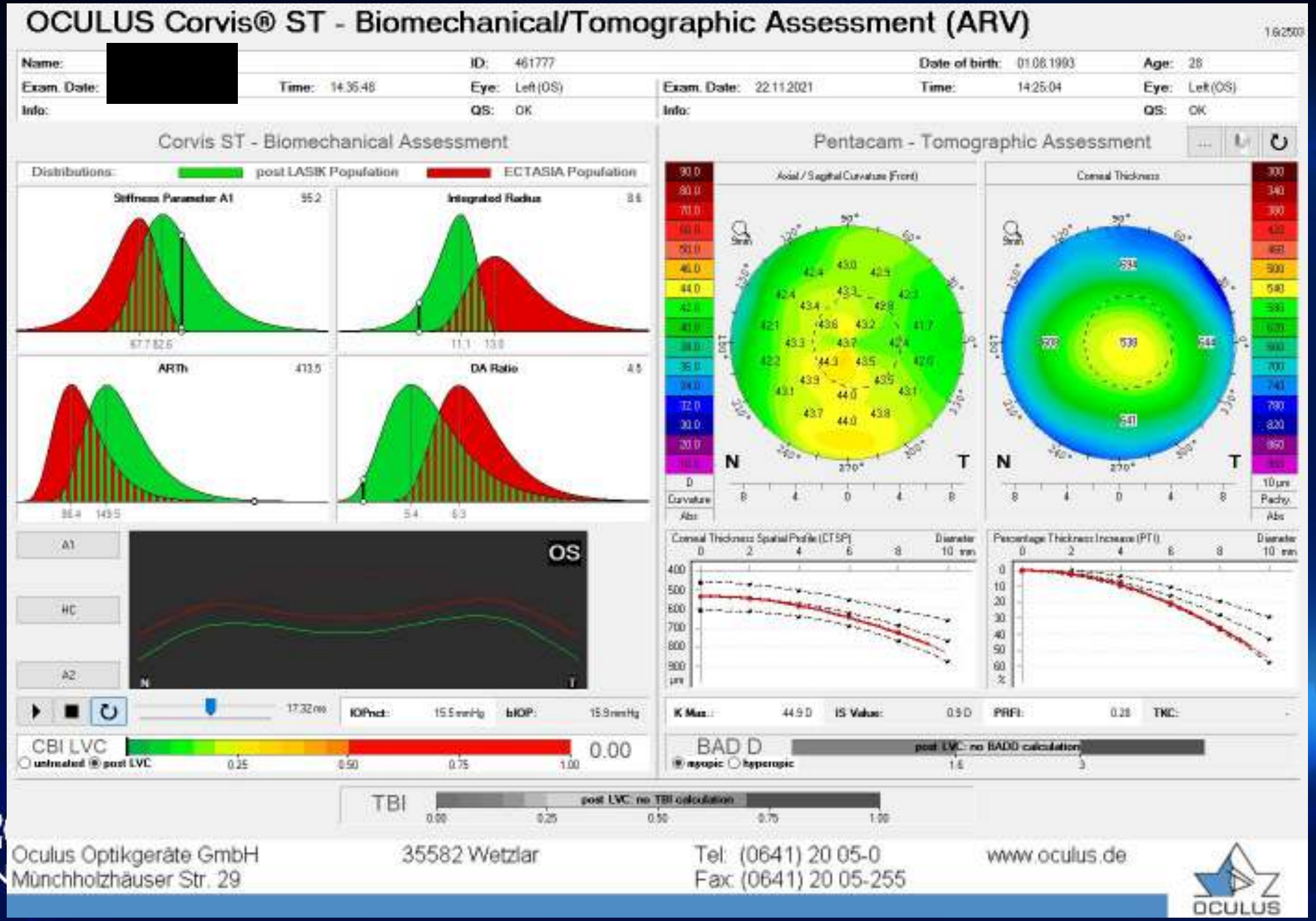
Diagnosis of Post LVC Ectasia.

CBI LVC

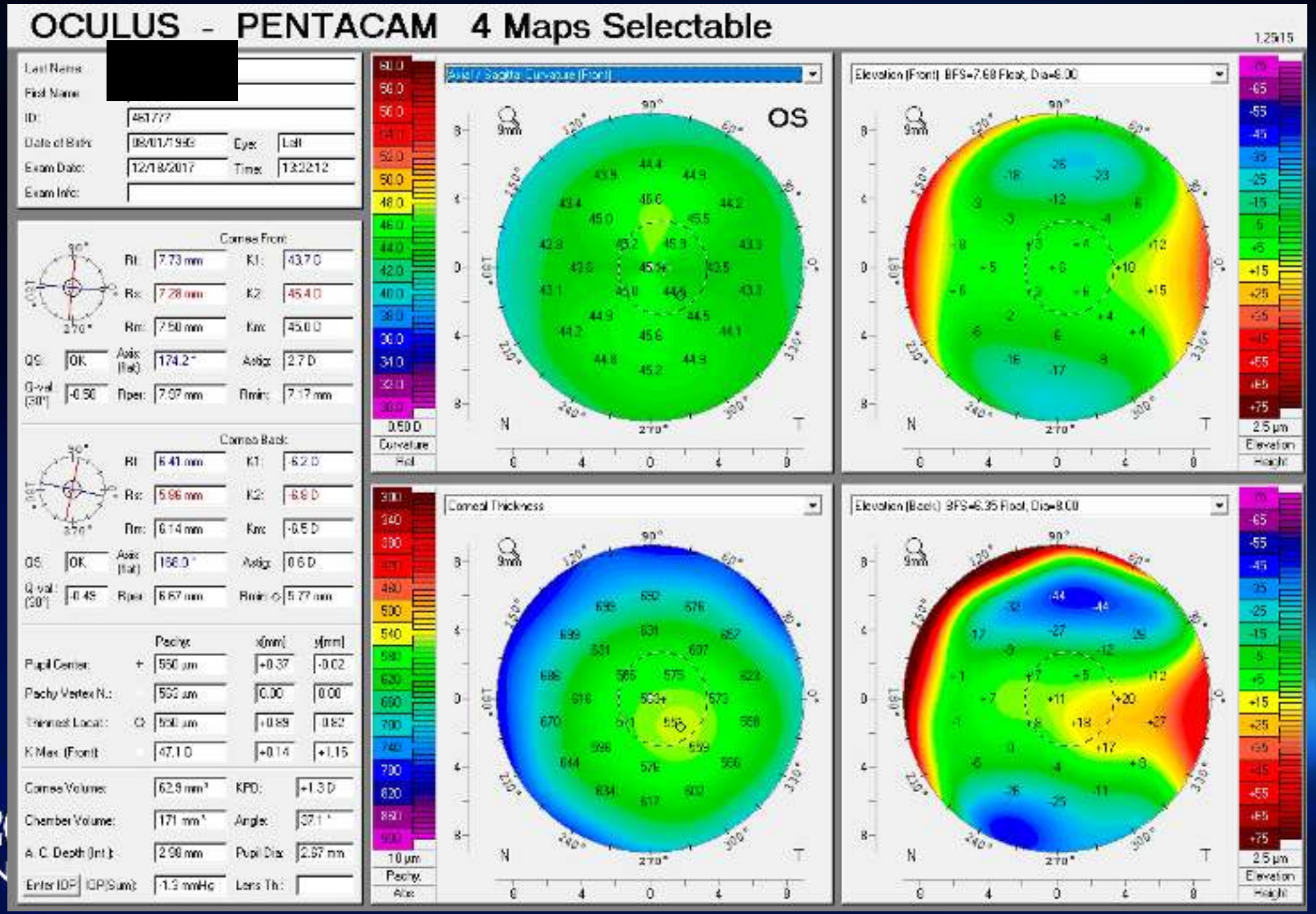
Post Elevation Post LVC



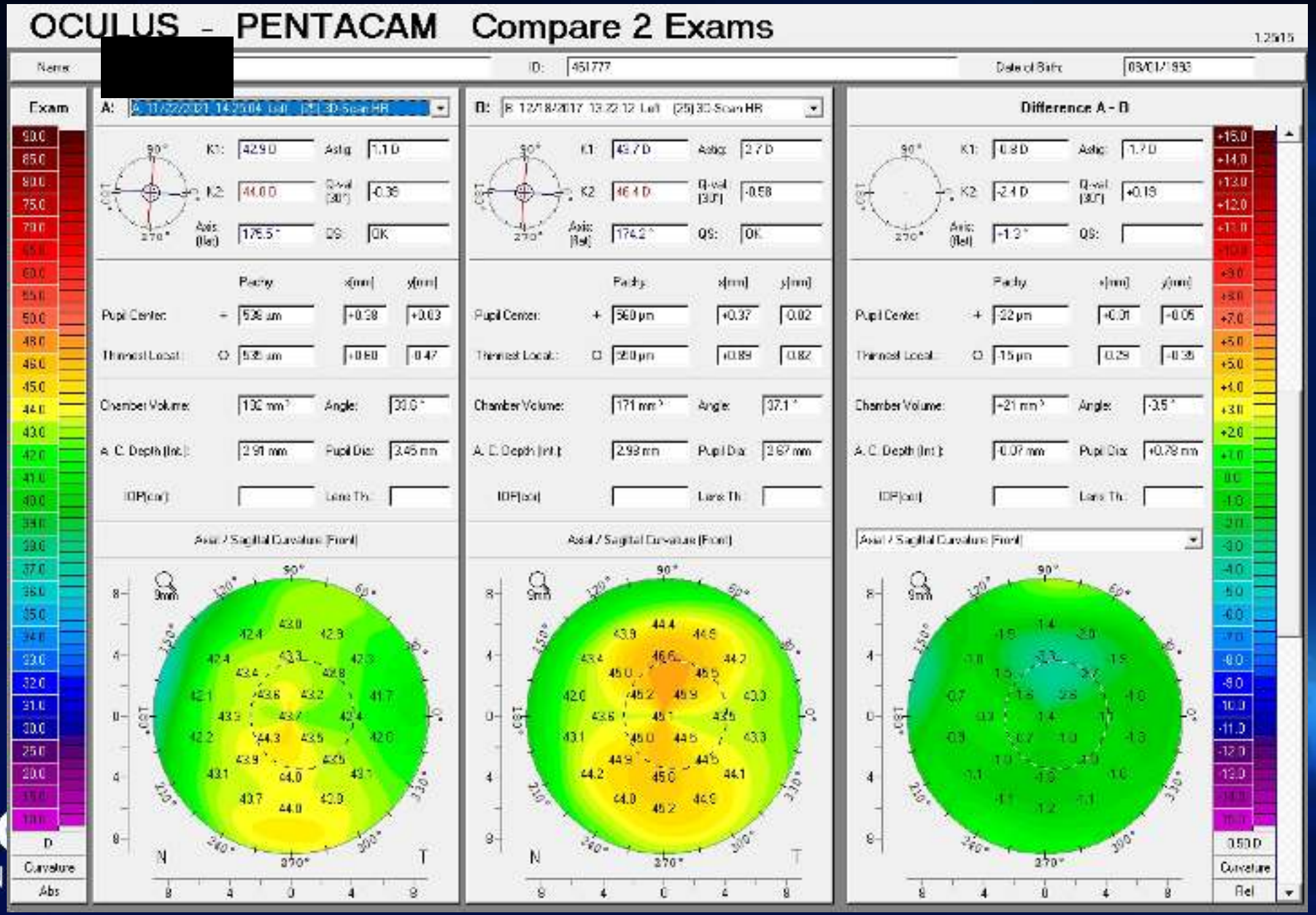
EOS 2
EGYPTIAN


OCULUS Corvis® ST - Biomechanical/Tomographic Assessment (ARV)
Name: [redacted]
ID: 461777
Date of birth: 01.08.1993
Age: 28
Exam. Date:
Time: 14:36:48
Eye: Left (OS)
Info:
QS: OK
Exam. Date: 22.11.2021
Time: 14:25:04
Eye: Left (OS)
Info:
QS: OK
Corvis ST - Biomechanical Assessment
Distributions:
post LASIK Population
ECTASIA Population
Stiffness Parameter A1
95.2
87.7 82.6
Integrated Radius
8.6
11.1 13.8
ARTh
413.5
86.4 149.5
DA Ratio
4.5
5.4 6.3
A1
HC
A2
OS
N
T
17.32 mm
IOPnct: 15.5 mmHg
bIOP: 15.9 mmHg
CBI LVC
untreated
post LVC
0.25
0.50
0.75
1.00
0.00
Pentacam - Tomographic Assessment
Axial / Sagittal Curvature (Front)
Corneal Thickness
N
T
D
Curvature
Abs
10 µm
Pachy
Abs
Corneal Thickness Spatial Profile (CTSP)
Diameter
10 mm
Percentage Thickness Increase (PTI)
Diameter
10 mm
K Max.: 44.9 D
IS Value: 0.9 D
PRFI: 0.28
TKC:
BAD D
myopic
hyperopic
post LVC: no BAD-D calculation
1.6
3
TBI
post LVC: no TBI calculation
0.00
0.25
0.50
0.75
1.00
Oculus Optikgeräte GmbH
Münchholzhäuser Str. 29
35582 Wetzlar
Tel: (0641) 20 05-0
Fax: (0641) 20 05-255
www.oculus.de
OCULUS

OCULUS - PENTACAM 4 Maps Selectable



EOS 2
EGYPTIAN



OCULUS - PENTACAM Compare 2 Exams

1.25r15

Name: [redacted] ID: 461777 Date of Birth: 08/01/1993

Exam	A: [redacted] Left (25) 3D-Scan HR	B: B: 12/19/2017 13:22:12 Left (25) 3D-Scan HR	Difference A - B
K1	42.8 D	43.7 D	-0.8 D
Astig.	1.1 D	2.7 D	-1.7 D
K2	44.0 D	46.4 D	-2.4 D
Q-val: (3.0")	-0.38	-0.58	+0.19
Axis: (flat)	175.5 °	174.2 °	+1.3 °
QS:	OK	OK	
	Pachy:	Pachy:	Pachy:
Pupil Center:	538 µm	560 µm	-22 µm
x[mm]	+0.00	+0.07	+0.01
y[mm]	-0.00	-0.02	-0.05
Thinnest Locat.:	535 µm	550 µm	-15 µm
x[mm]	+0.60	+0.69	-0.09
y[mm]	-0.47	-0.62	-0.35
Chamber Volume:	192 mm³	171 mm³	+21 mm³
Angle:	32.6 °	37.1 °	-3.5 °
A. C. Depth (int.):	2.91 mm	2.99 mm	-0.07 mm
Pupil Dia:	3.45 mm	2.67 mm	+0.79 mm
IOP(cct)			
Lens Th.:			
	Elevation (Back) BFS=6.35 Float, Dia=9.00	Elevation (Back) BFS=6.35 Float, Dia=9.00	Elevation (Back)

5.0 µm

Elevation

Height

EOS 2

EGYPTIA

Unilateral Post LVC Ectasia?

OCULUS - PENTACAM 4 Maps Selectable

1.30r04

Last Name:	[redacted]
First Name:	
ID:	Post LVC Ectasia
Date of Birth:	12/24/1974 Eye: Right
Exam Date:	12/16/2024 Time: 10:52:29
Exam Info:	

Cornea Front

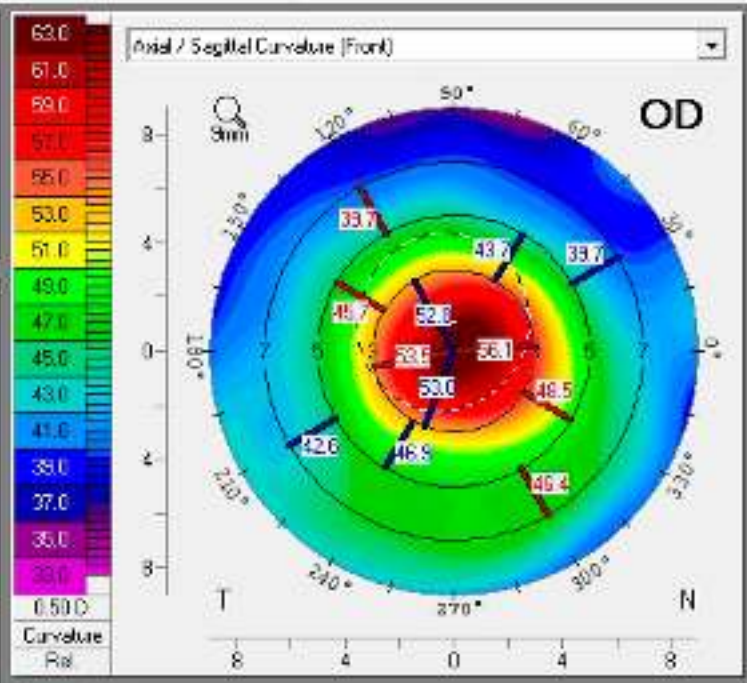
Rf:	6.25 mm	K1:	54.0 D
Rs:	6.13 mm	K2:	55.1 D
Rm:	6.19 mm	Km:	54.5 D
OS: Data G	Axis: (Rel) 106.1 °	Astig:	1.1 D
Q-val: (8mm) -1.97	Rper: 8.24 mm	Rmin:	5.21 mm

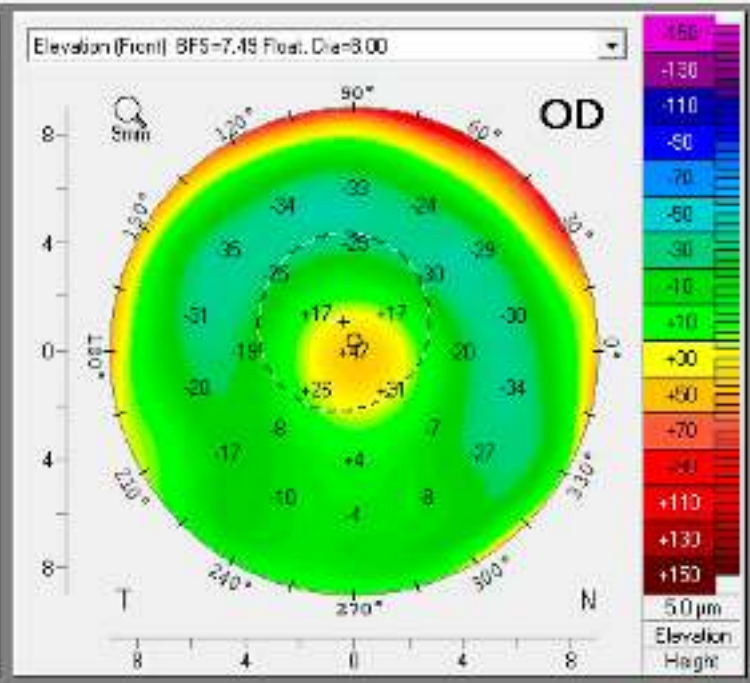
Cornea Back

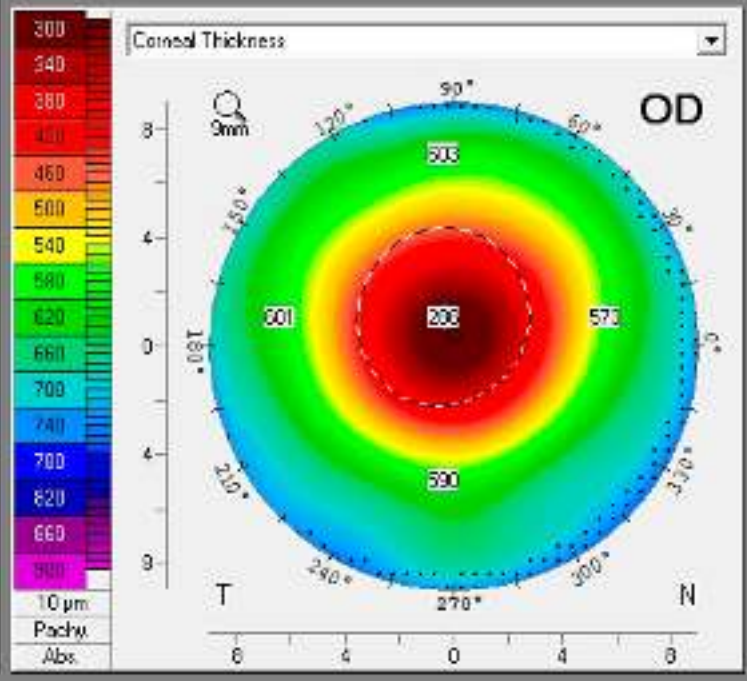
Rf:	3.52 mm	K1:	-10.2 D
Rs:	3.65 mm	K2:	-10.4 D
Rm:	3.58 mm	Km:	-10.3 D
OS: OK	Axis: (Rel) 27.6 °	Astig:	0.2 D
Q-val: (8mm) -2.16	Rper: 6.70 mm	Rmin:	2.85 mm

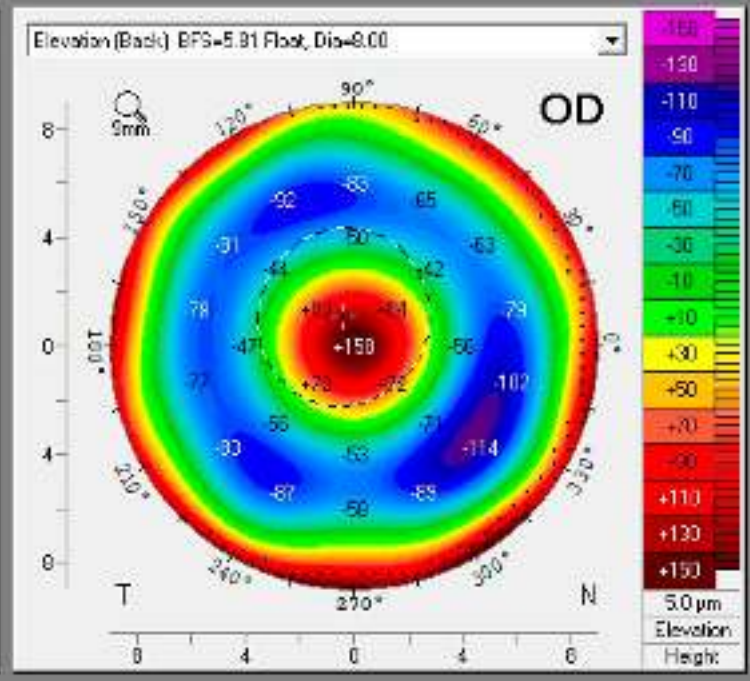
		Pachy:	x[mm]	y[mm]
Pupil Center:	+	286 µm	-0.20	+0.54
Pachy Vertex N.:	·	279 µm	0.00	0.00
Thinnest Locat.:	○	276 µm	0.00	+0.19
K Max (Front):		64.8 D	+0.12	+0.12

Cornea Volume:	57.4 mm³	HWTW:	10.9 mm
Chamber Volume:	169 mm³	Angle:	39.1 °
A. C. Depth (Int.):	3.48 mm	Pupil Dia:	3.22 mm
Enter IOP	IOP(Sum)	Lens Th.:	

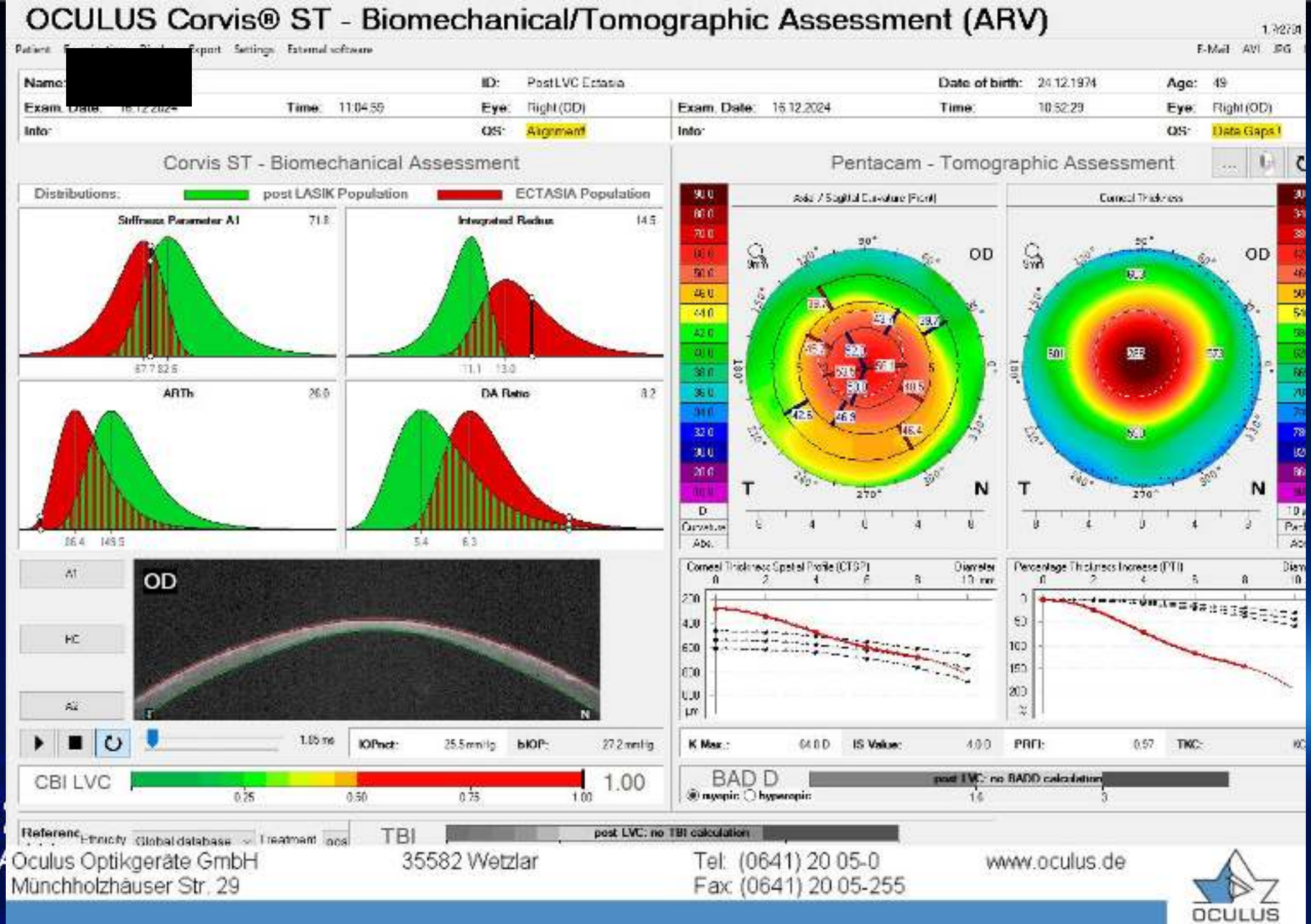








EOS EGYPT



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35582 Wetzlar
Tel: (0641) 20 05-0
Fax: (0641) 20 05-255
www.oculus.de

OCULUS - PENTACAM 4 Maps Selectable

1.30r04

Last Name: [redacted]
First Name:
ID: Post LVC Ectasia
Date of Birth: 12/24/1974 Eye: Left
Exam Date: 12/16/2024 Time: 10:54:11
Exam Info:

Cornea Front

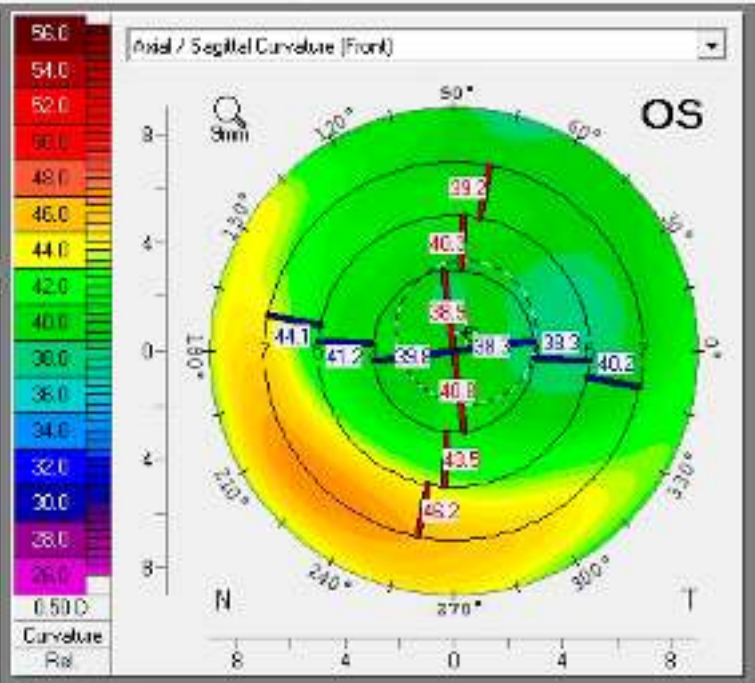
Rf:	8.62 mm	K1:	39.1 D
Rs:	8.46 mm	K2:	39.9 D
Rm:	8.54 mm	Km:	39.5 D
OS: OK	Axis (Rel): 11.1°	Astig:	0.8 D
Q-val (8mm): 0.52	Rper: 7.94 mm	Rmin:	7.15 mm

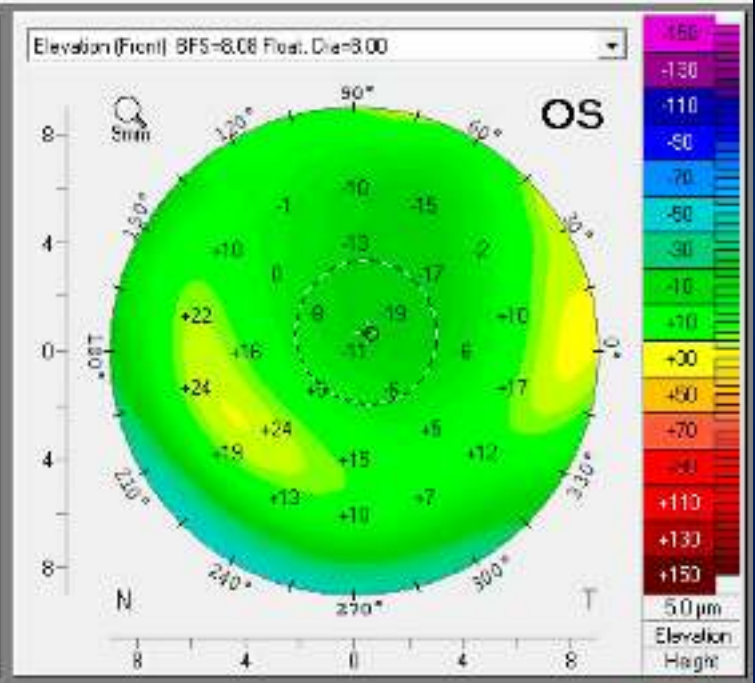
Cornea Back

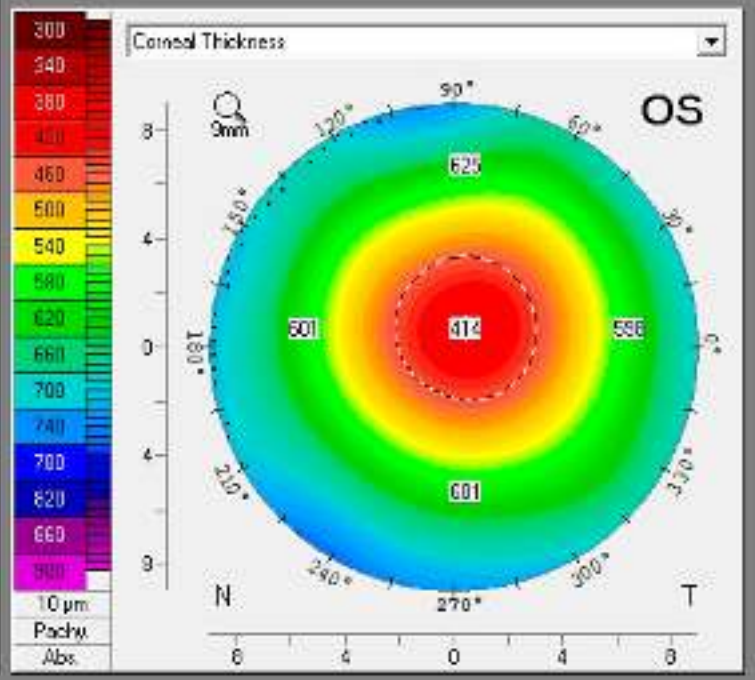
Rf:	5.55 mm	K1:	-6.7 D
Rs:	5.74 mm	K2:	-7.0 D
Rm:	5.86 mm	Km:	-6.8 D
OS: OK	Axis (Rel): 3.7°	Astig:	0.3 D
Q-val (8mm): -0.86	Rper: 6.81 mm	Rmin:	5.69 mm

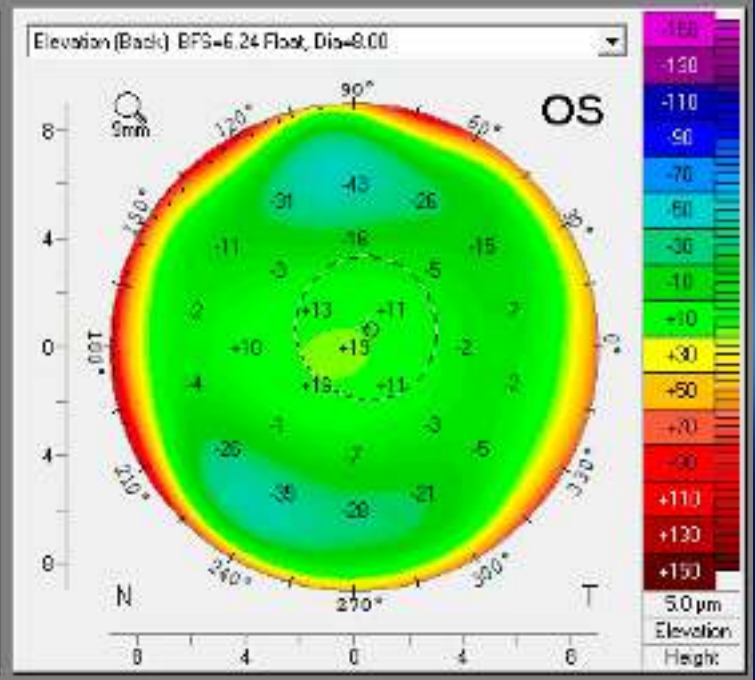
		Pachy:	x[mm]	y[mm]
Pupil Center:	+	414 µm	+0.24	+0.35
Pachy Vertex N.:	·	415 µm	0.00	0.00
Thinnest Locat.:	○	414 µm	+0.31	+0.31
K Max (Front):		47.2 D	-2.52	-2.46

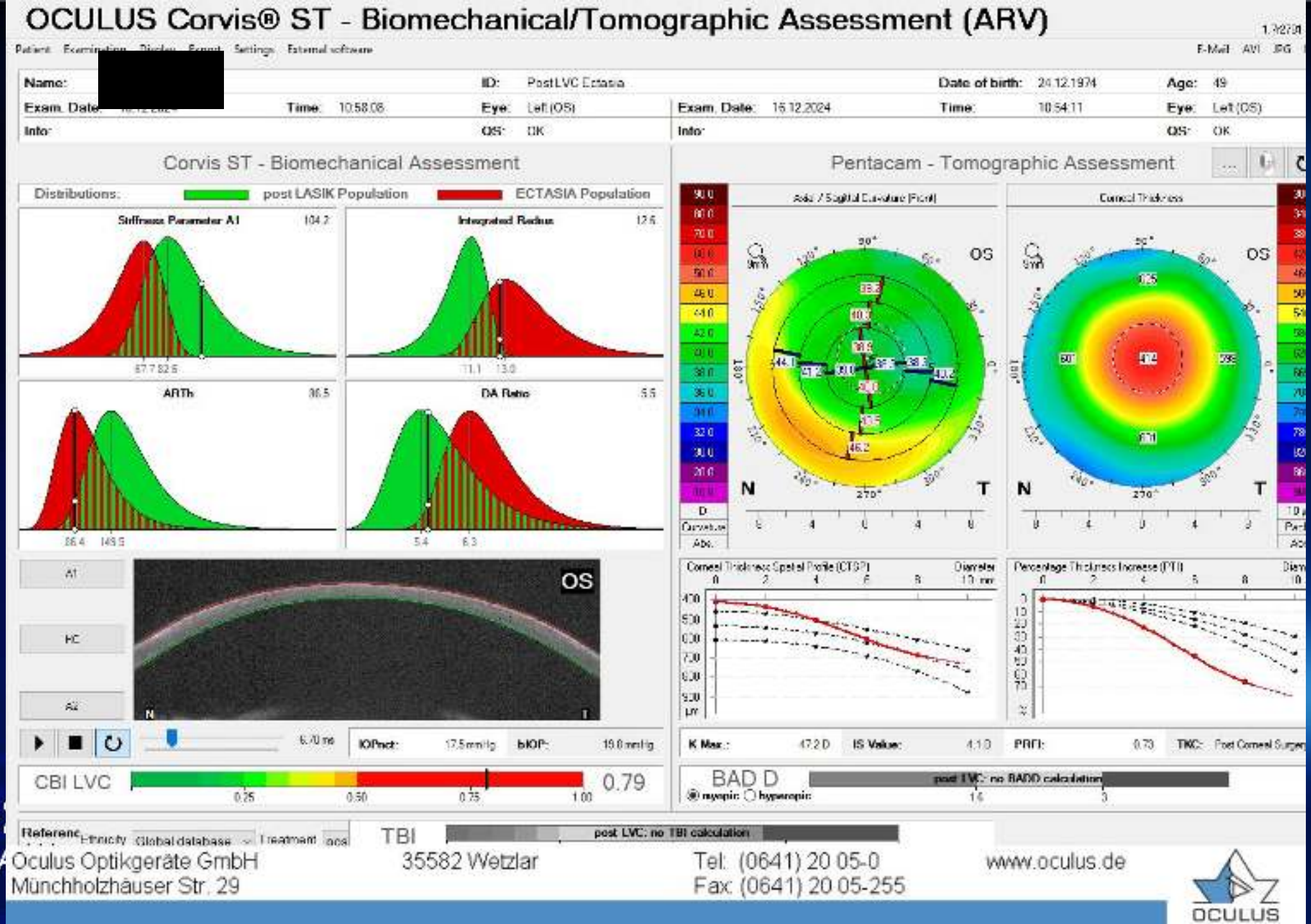
Cornea Volume:	57.1 mm³	HWTW:	11.0 mm
Chamber Volume:	199 mm³	Angle:	43.9°
A. C. Depth (Int.):	3.29 mm	Pupil Dia:	2.62 mm
Enter IOP	IOP(Sum):	Lens Th.:	



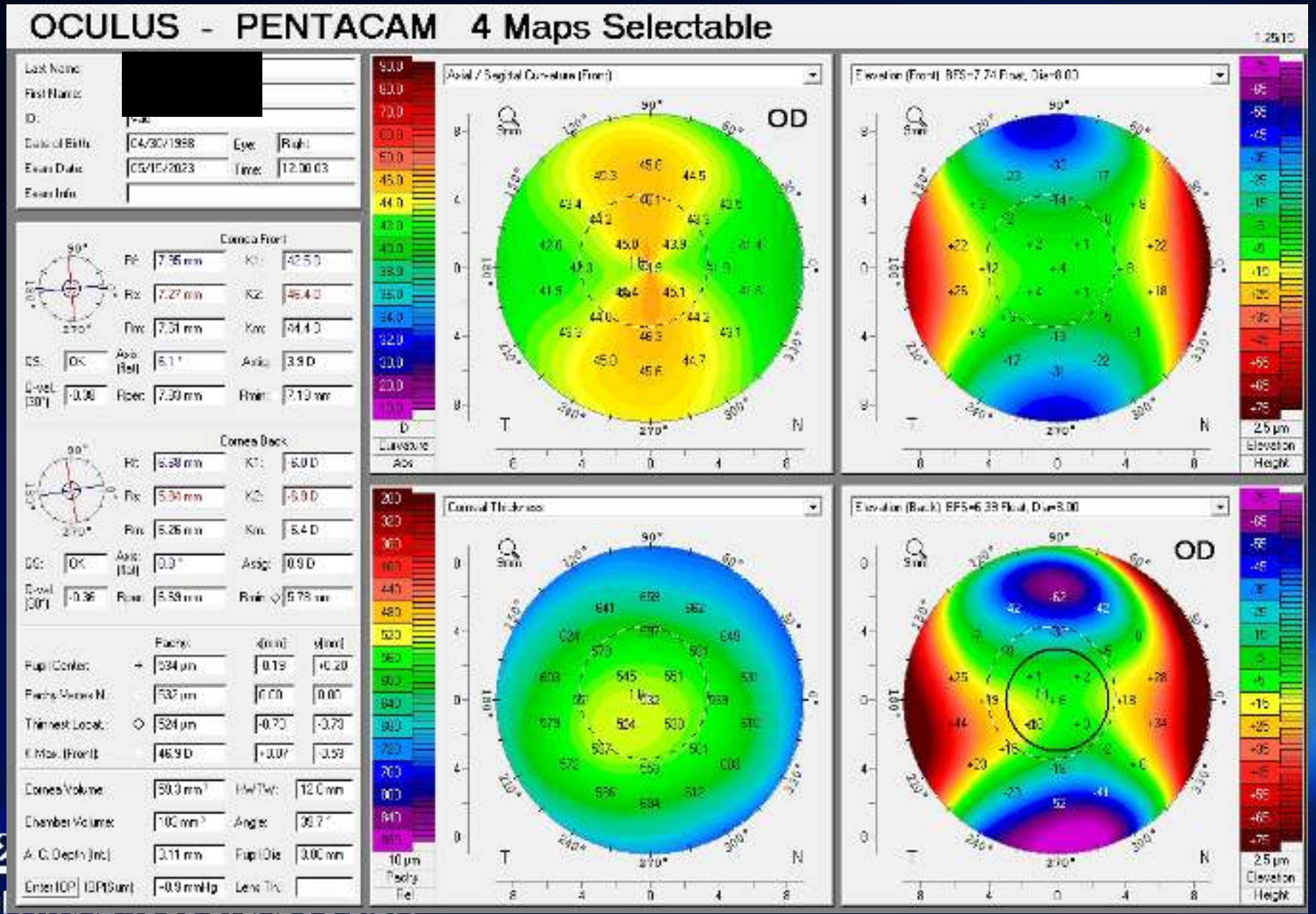




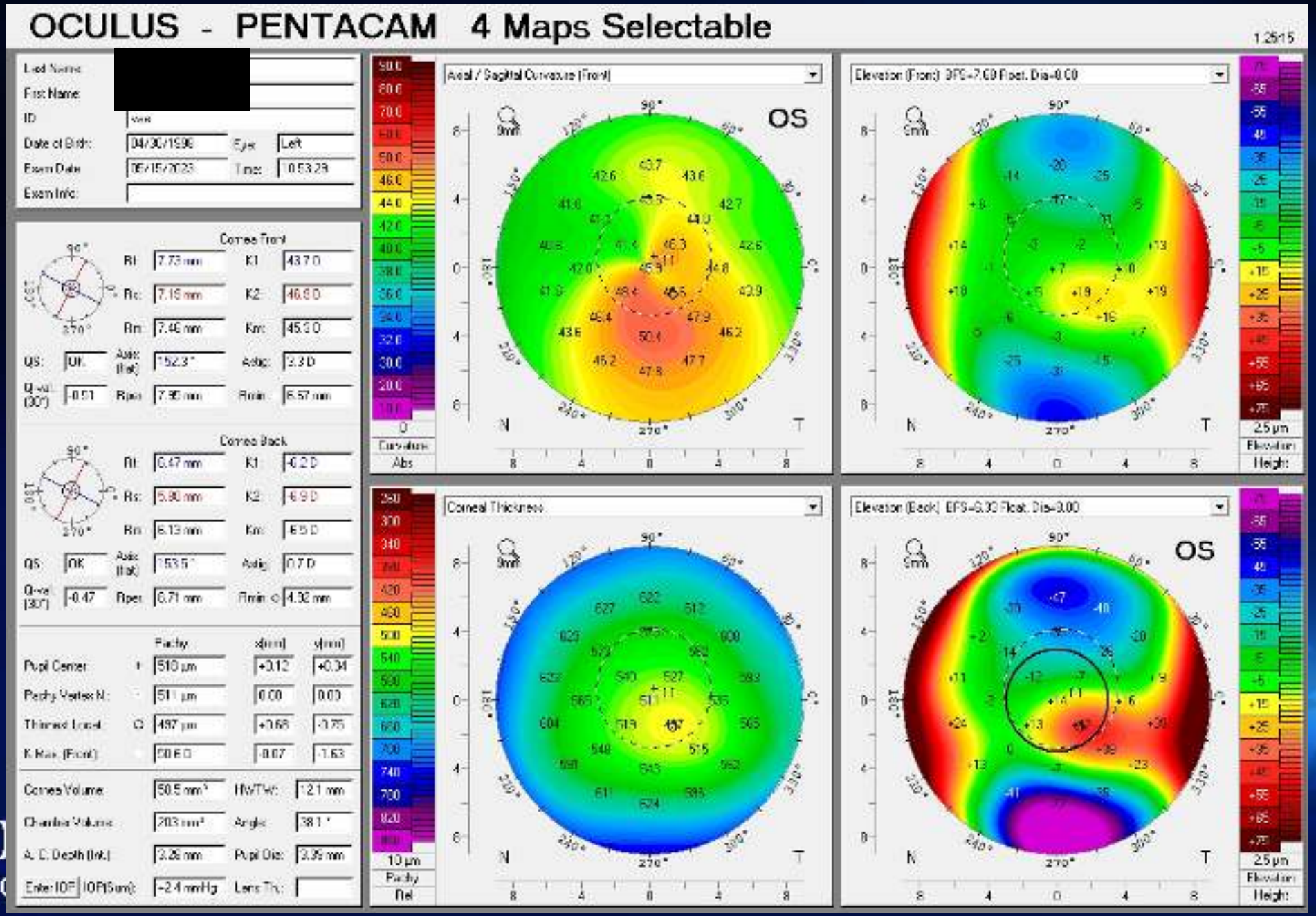


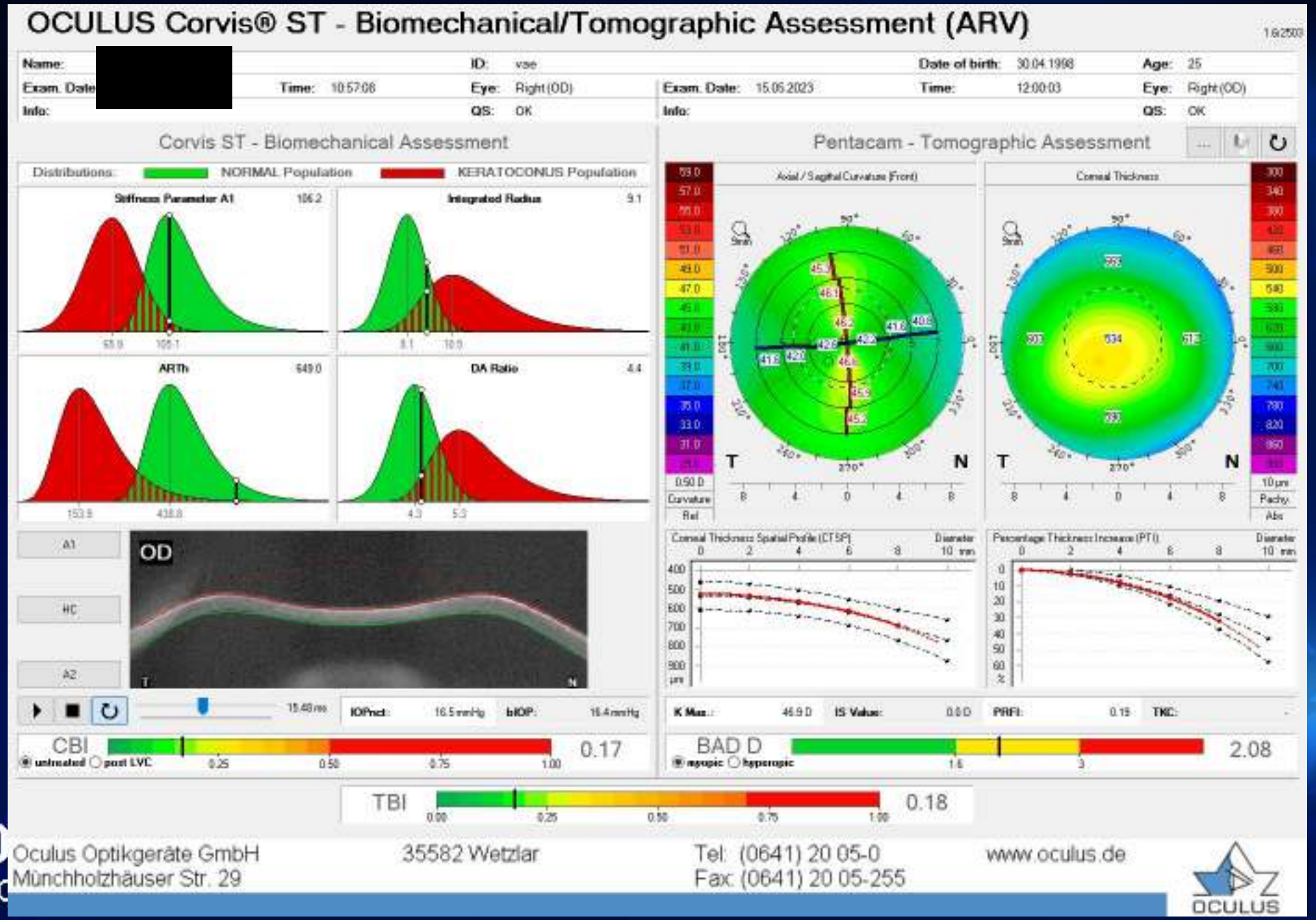

OCULUS Corvis® ST – Biomechanical/Tomographic Assessment (ARV)
Name:
ID: Post LVC Ectasia
Date of birth: 24.12.1974
Age: 49
Exam. Date: 15.12.2024
Time: 10:54:11
Eye: Left (OS)
Info:
QS: OK
Exam. Date:
Time: 10:58:06
Eye: Left (OS)
Info:
QS: OK
Corvis ST - Biomechanical Assessment
Distributions:
post LASIK Population
ECTASIA Population
Stiffness Parameter A1
104.2
87.7 82.6
Integrated Radius
12.6
11.1 13.0
ARTh
36.5
26.4 149.5
DA Ratio
5.5
5.4 6.3
A1
HC
A2
OS
N
T
6.70 ms
IOPnct: 17.5 mmHg
bIOP: 19.0 mmHg
CBI LVC
0.25
0.50
0.75
1.00
0.79
Pentacam - Tomographic Assessment
Axial / Sagittal Curvature (Front)
Corneal Thickness
OS
N
T
Corneal Thickness Spatial Profile (CTSP)
Percentage Thickness Increase (PTI)
K Max.: 47.2 D
IS Value: 4.10
PRTI: 0.79
TKC: Post Corneal Surgery
BAD D
myopic
hyperopic
post LVC: no BADD calculation
TBI
post LVC: no TBI calculation
Reference
Ethnicity: Global database
Treatment: pca
Oculus Optikgeräte GmbH
Münchholzhäuser Str. 29
35582 Wetzlar
Tel: (0641) 20 05-0
Fax: (0641) 20 05-255
www.oculus.de
OCULUS

VAE

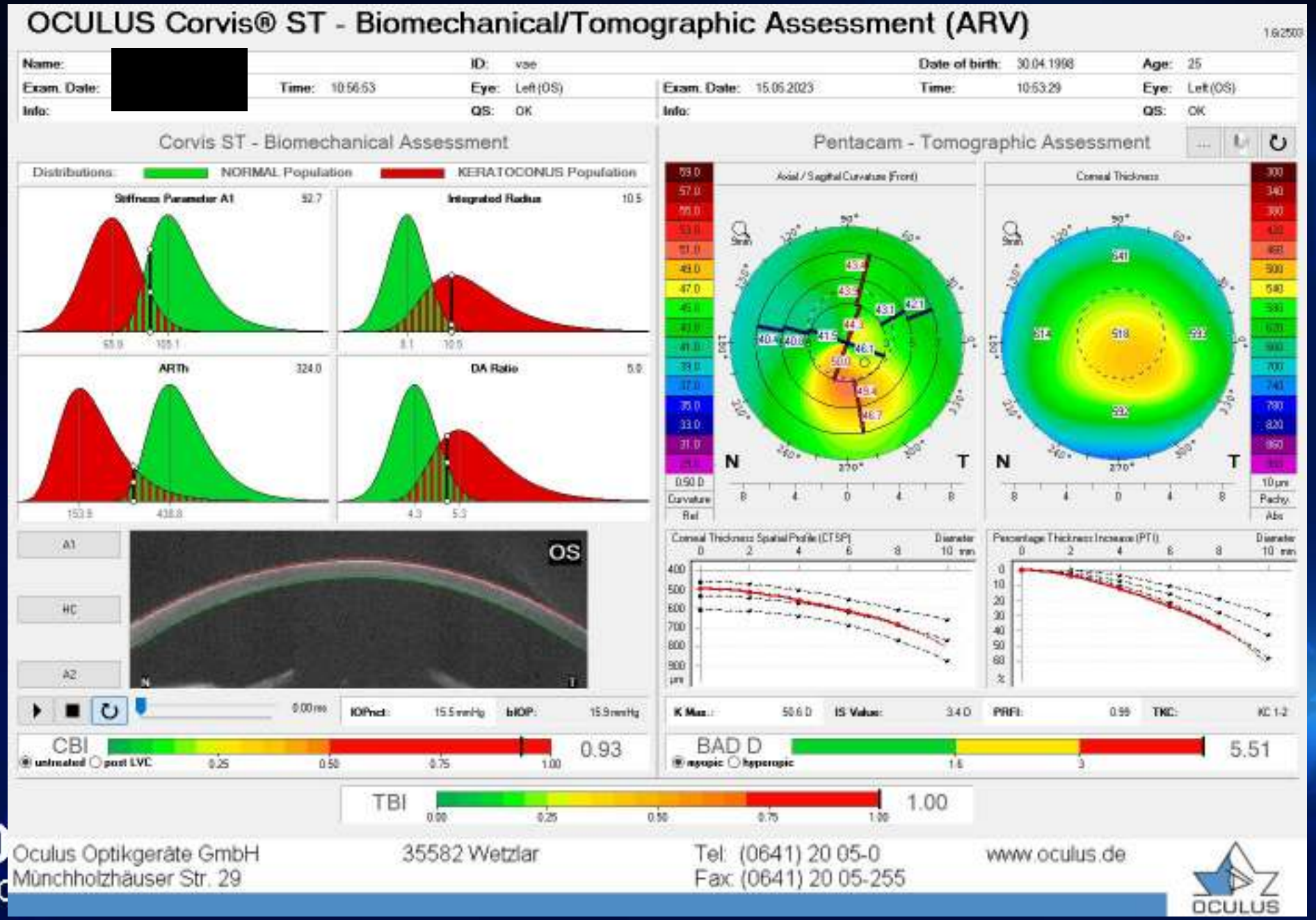


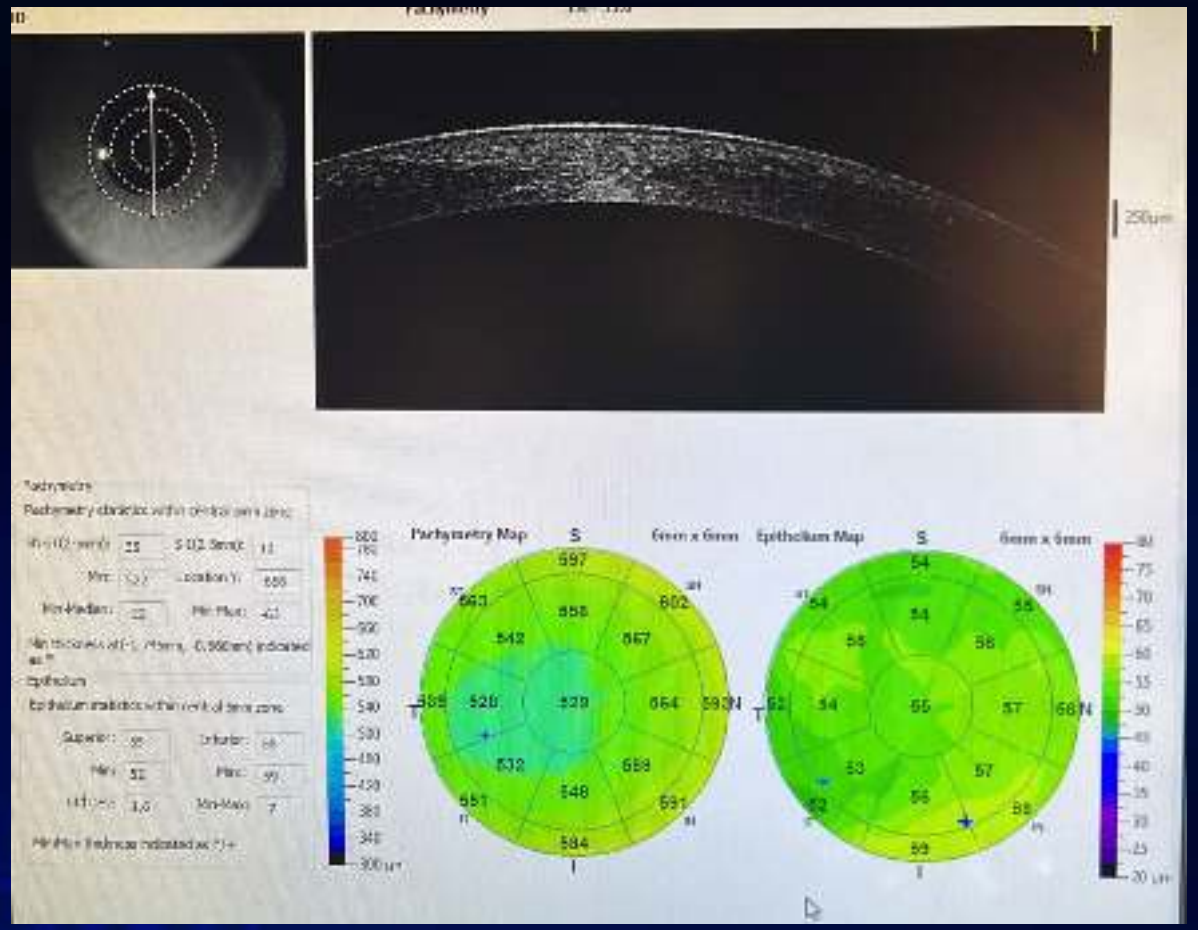
OCULUS - PENTACAM 4 Maps Selectable

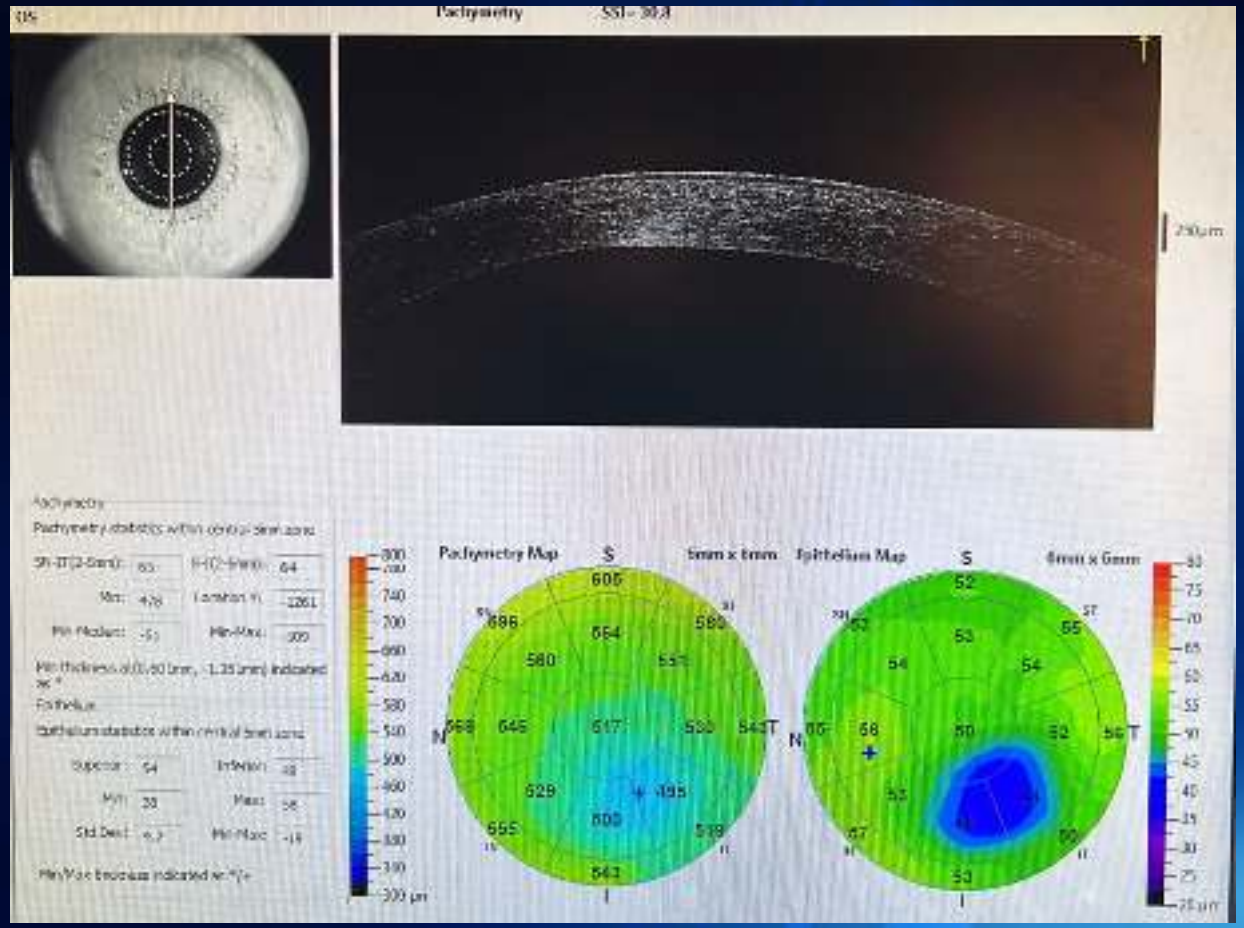




EOS 20
EGYPTIAN







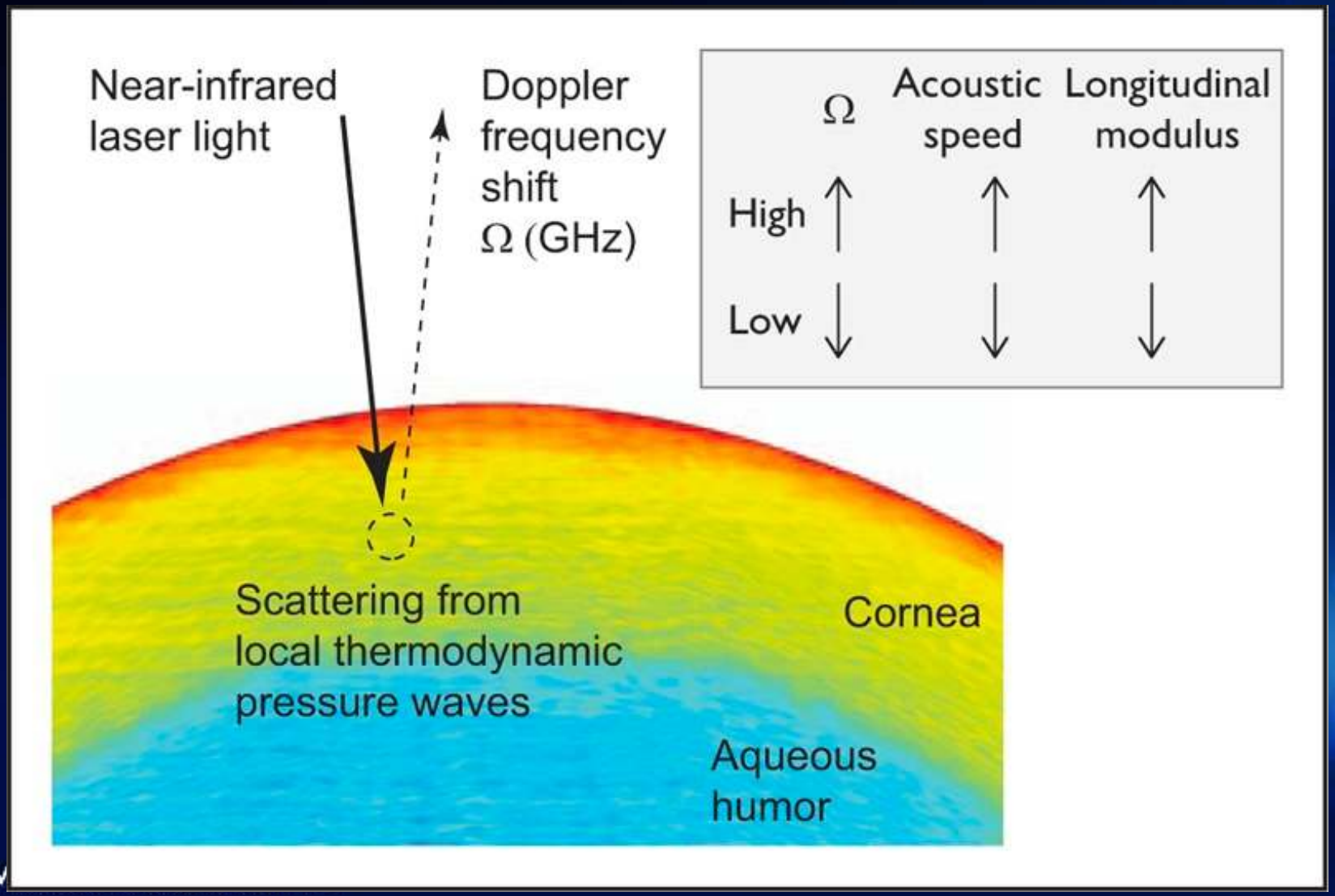
EOS 2025

EGYPTIAN OPHTHALMOLOGICAL SOCIETY

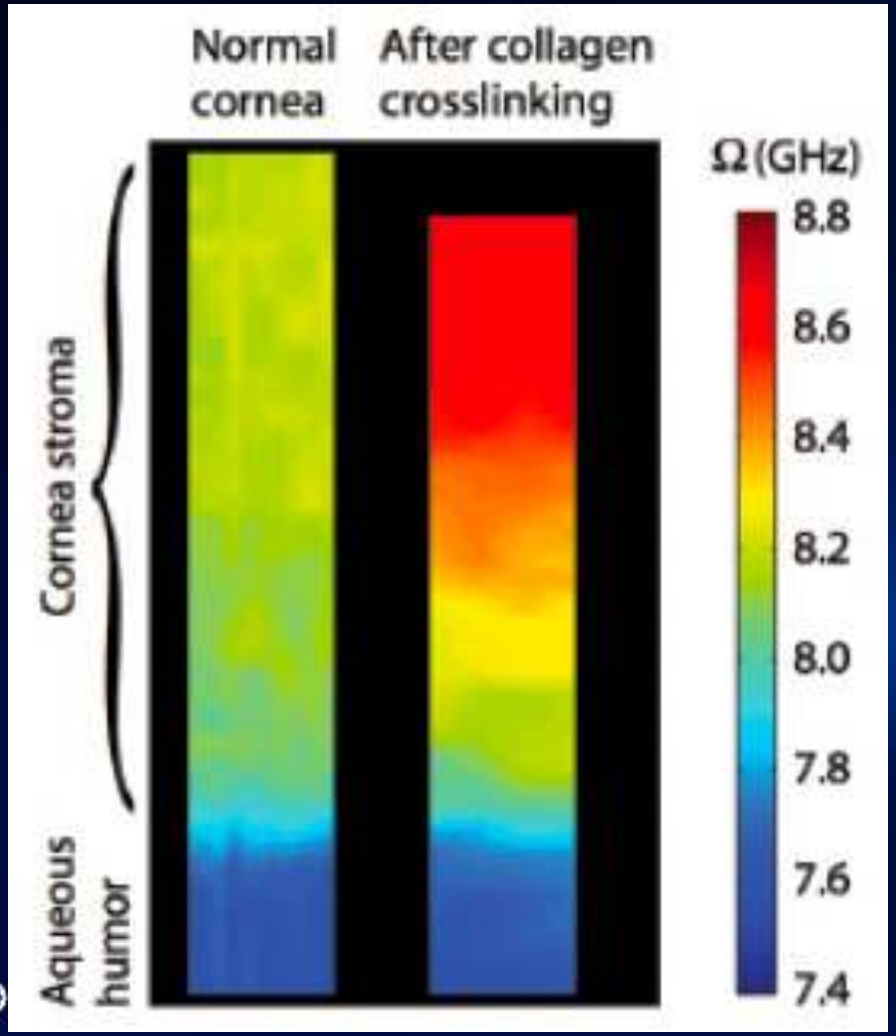
Brillouin microscopy

- Brillouin Optical Scanner System (BOSS)
- Based on a Brillouin microscopy technique that measures minute changes in the wavelength of back-scattered light produced by light directed and focused into the cornea
- The measured frequency shift, which is correlated to the material stiffness, will be used to determine cornea stiffness

The principle of Brillouin microscopy



CXL

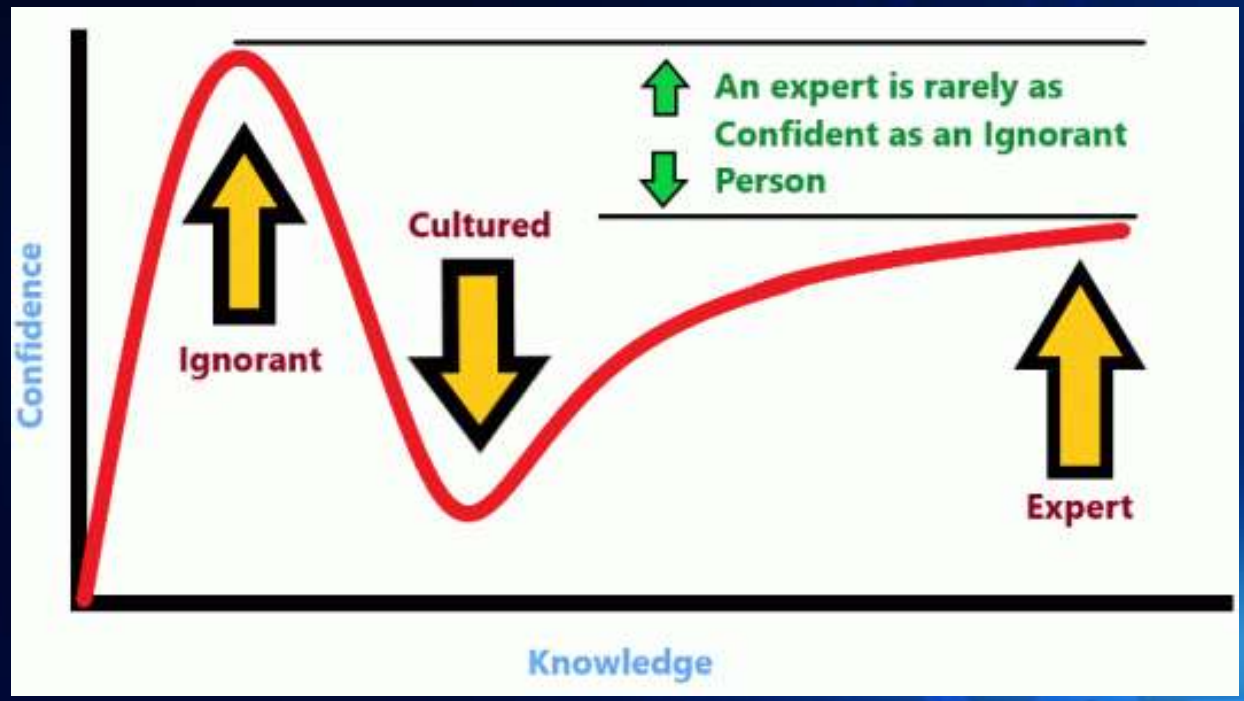

Normal cornea
After collagen crosslinking
Cornea stroma
Aqueous humor
Ω (GHz)
8.8
8.6
8.4
8.2
8.0
7.8
7.6
7.4

Optical coherence elastography (OCE)

- Dynamic OCE is a clinically promising non-contact imaging technique that can provide measurements of corneal tissue stiffness directly in vivo.

Take Home Message

Dunning-Kruger effect



- The more knowledge you get, the better decision you can make

Thank you

EOS 2025
EGYPTIAN OPHTHALMOLOGICAL SOCIETY