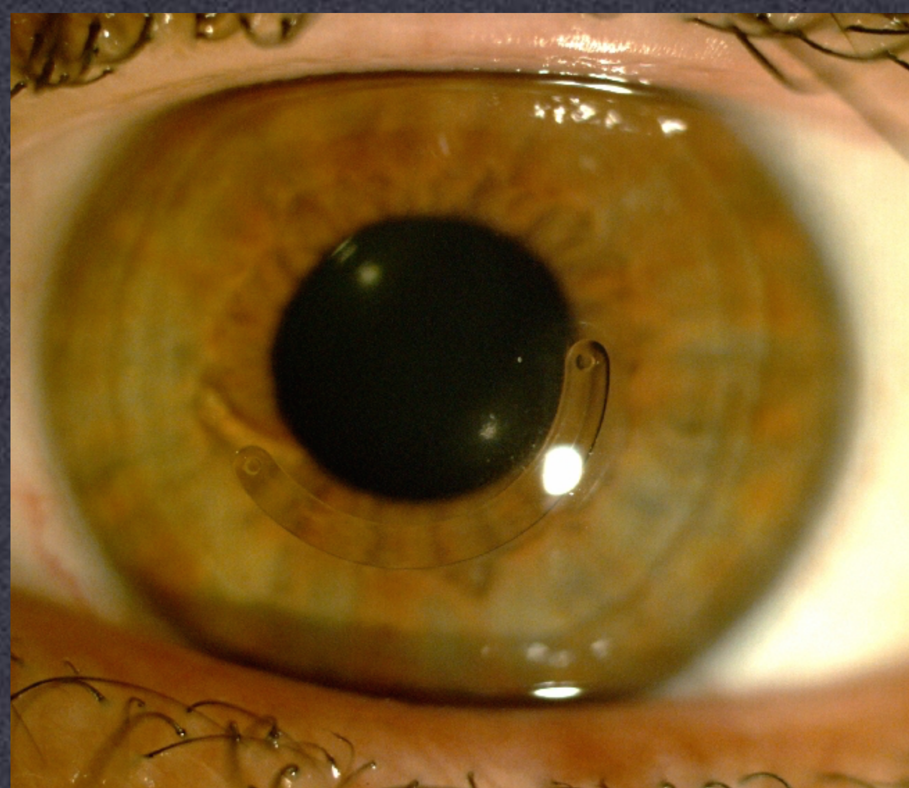
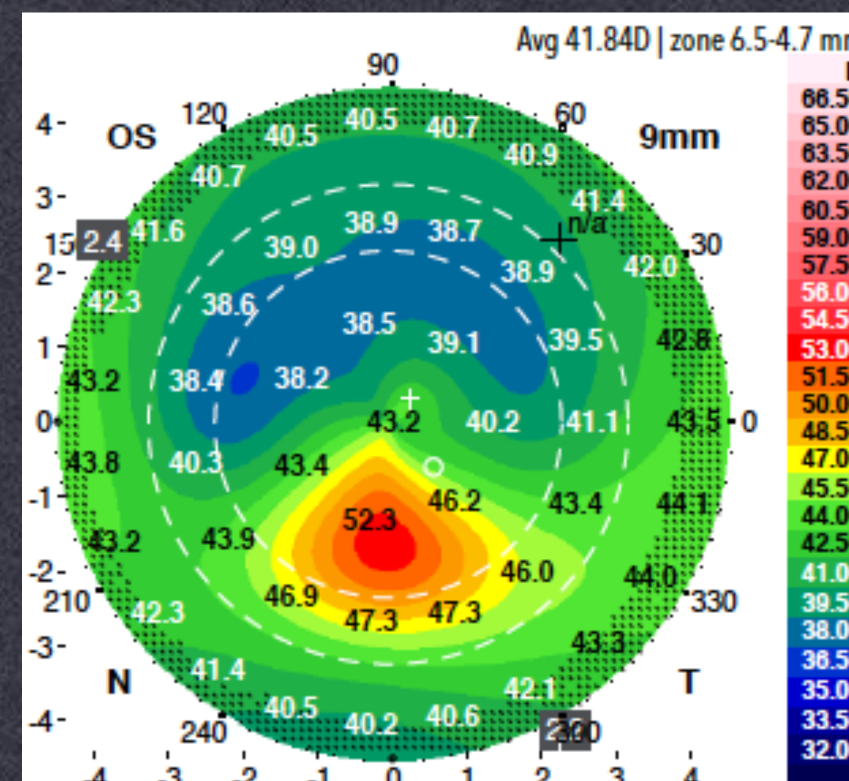
PLANEJAMENTO CIRÚRGICO PARA IMPLANTE DE ANEL DE FERRARA





LEONARDO TORQUETTI

CENTRO DE EXCELÊNCIA EM OFTALMOLOGIA
PARÁ DE MINAS - MG
WWW.CEOCLINICA.MED.BR

NOMOGRAMA DO ANEL DE FERRARA

Evolução do Nomograma
(critério para seleção do anel)

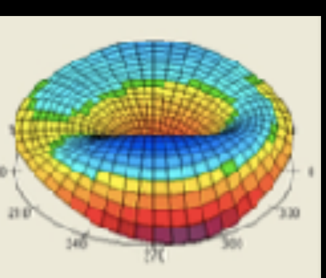
- Primeira geração (1997 - 2002): Estágio do ceratocone
- Segunda geração (2003 - 2006): Equivalente esférico
- Terceira geração (2006 - 2009): Astigmatismo topográfico
- Quarta geração (2009-2013): Asfericidade
- Quinta geração (2013-2018): Asfericidade + Astigmatismo topográfico + Elevação posterior

Torquetti, L

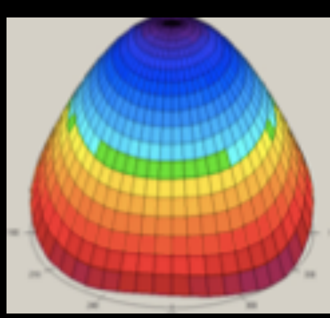
EXCENTRICIDADE (ϵ^2)
ASFERICIDADE (Q)

ϵ^2

-	0	+



+	0	-
Oblada	Esférica	Prolada



Q

$$\epsilon^2 = -Q$$

Torquetti, L

QUAL E’ O PAPEL DA ELEVAÇÃO POSTERIOR NO NOMOGRAMA?

- Identificar padrões de mapas que se correlacionam com mapas axiais anteriores;
- Classificação mais fácil de padrões (elevação posterior) em comparação a mapas axiais anteriores;
- Melhor reprodutibilidade;
- Melhor concordância em planejamento cirúrgico entre especialistas.

Torquetti, L

MAPAS DE ELEVAÇÃO POSTERIOR

PADRÕES GEOGRÁFICOS

LAGO

ISTMO

estreita área de terra que separa duas áreas maiores

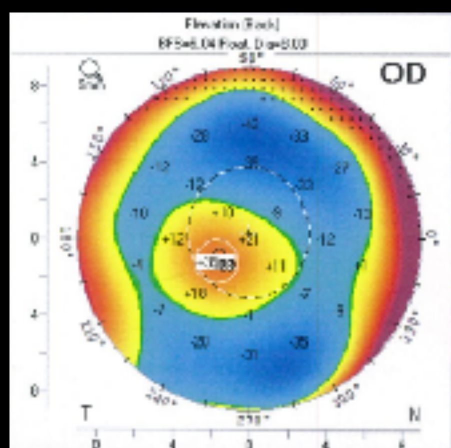
PENÍNSULA

área de terra circundada por agua na maioria de suas margens e conectada a uma área de terra maior, no continente

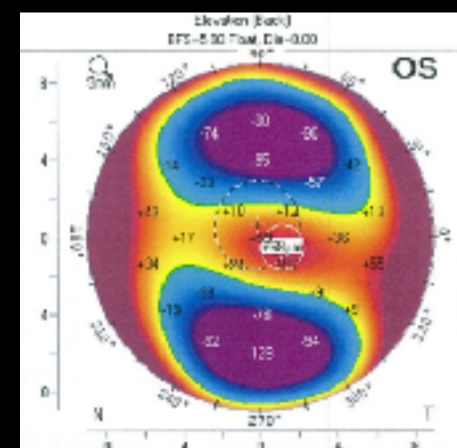
Torquetti, L

MAPAS DE ELEVAÇÃO POSTERIOR

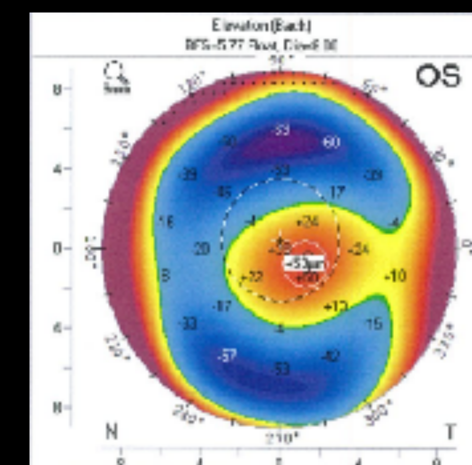
LAGO



ISTMO



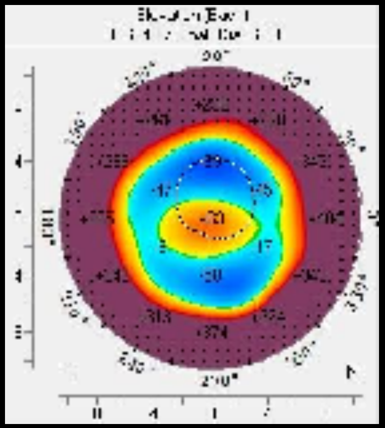
PENÍNSULA



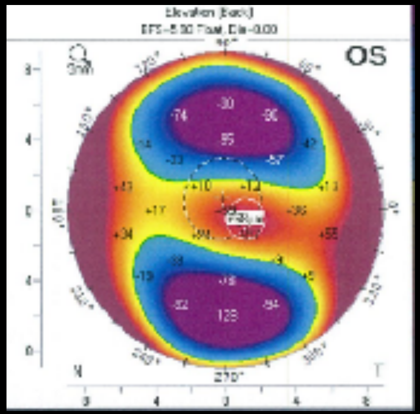
Torquetti, L

MAPAS DE ELEVAÇÃO POSTERIOR

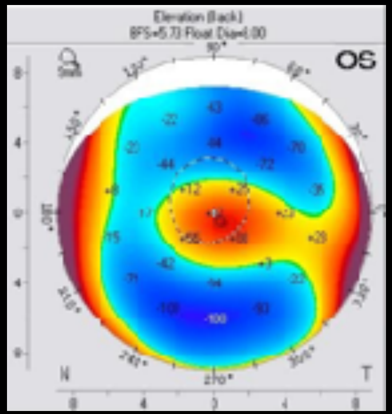
LAGO



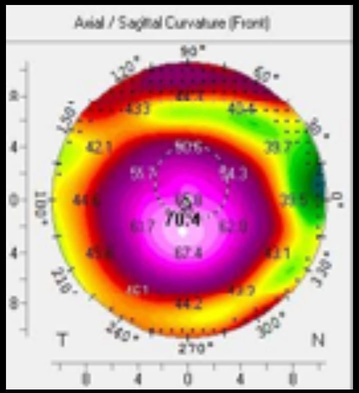
ISTMO



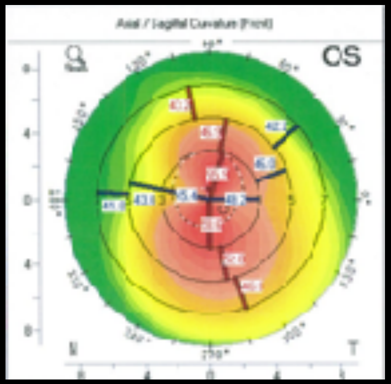
PENÍNSULA



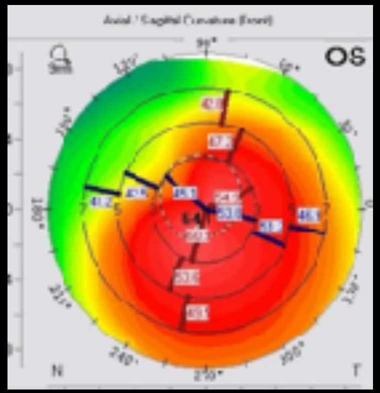
NIPPLE



BOW-TIE / ASTIGMÁTICO



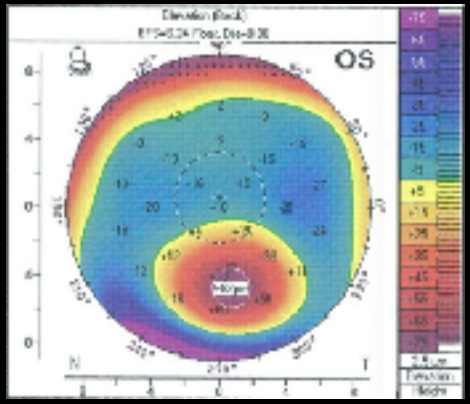
OVAL



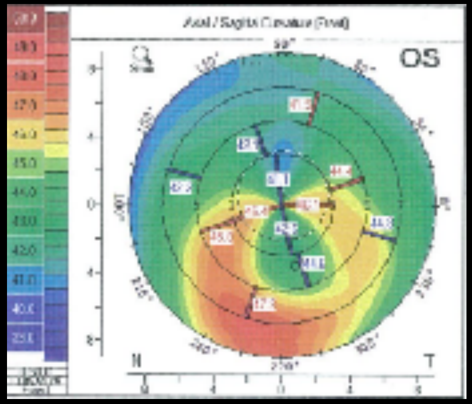
Torquetti, L

MAPAS DE ELEVAÇÃO POSTERIOR

LAGO DESCENTRADO



DMP / DMP "LIKE"



Torquetti, L

ASFERICIDADE (EXCENTRICIDADE) x CERATOMETRIA x ASTIGMATISMO

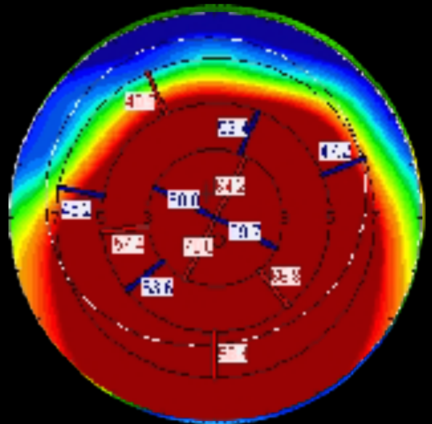
	ϵ^2	Q	K	Cyl
140 (arc)	↓	↑	↓	↓↓↓
160 (arc)	↓↓	↑↑	↓↓	↓↓
210 (arc)	↓↓↓	↑↑↑	↓↓↓	↓
320 (arc)	↓↓↓↓	↑↑↑↑	↓↓↓↓	↓↓

1632a0 arc +90% ... (perfil “standard”)

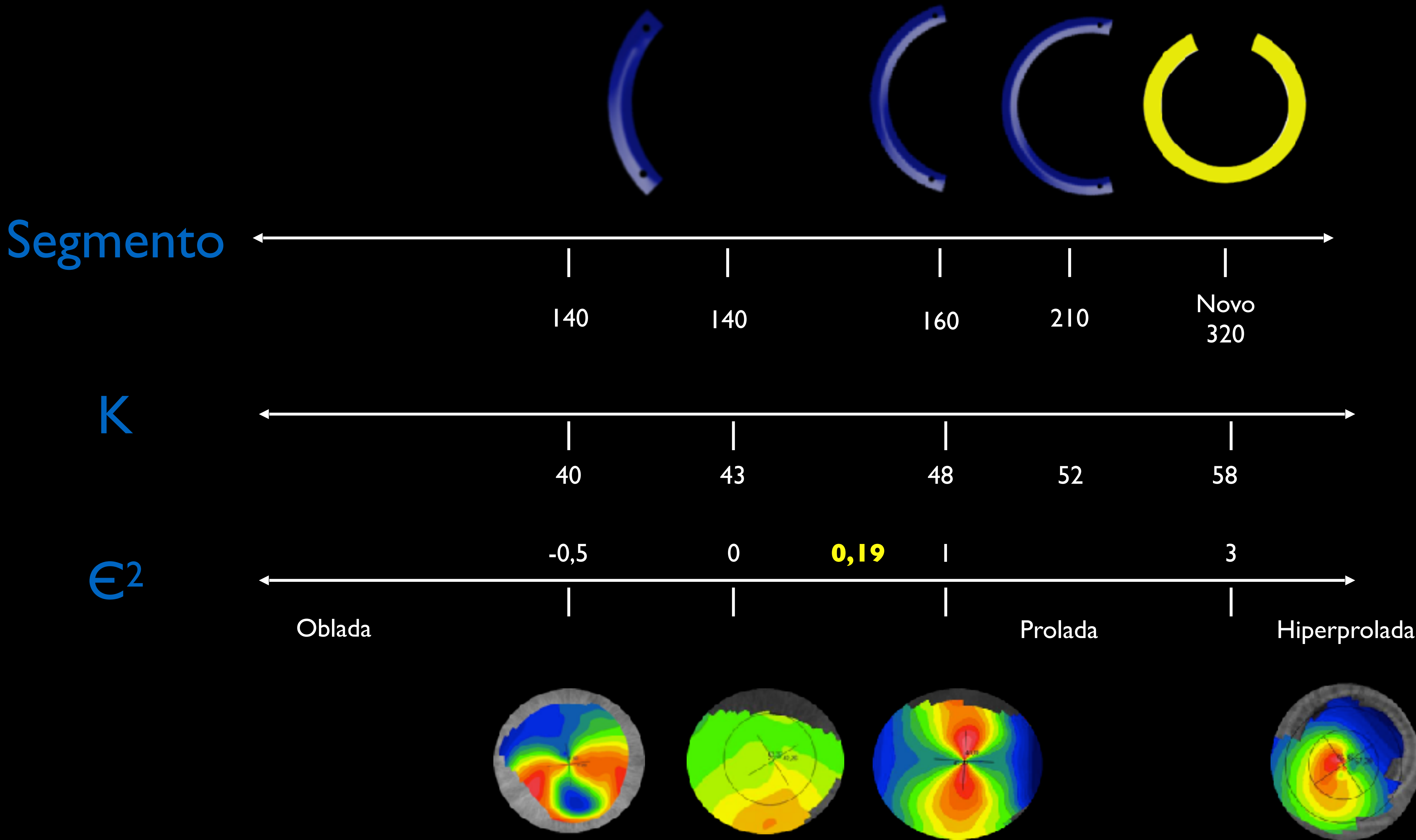
- Q ... hiperprolada

- K baixo / K médio a alto

- Astigmatismo baixo / médio a alto



ECENTRICIDADE x CERATOMETRIA x COMPRIMENTO DE ARCO DO ANEL



NOMOGRAMA

Regras Gerais

DEVE SER DETERMINADO:

1. Tipo de ceratocone:

    Central → Nipple / Astigmático
    Oval ou Bow-tie
    PMD

2. Ecentricidade ($Є^2$) e Astigmatismo Topográfico;

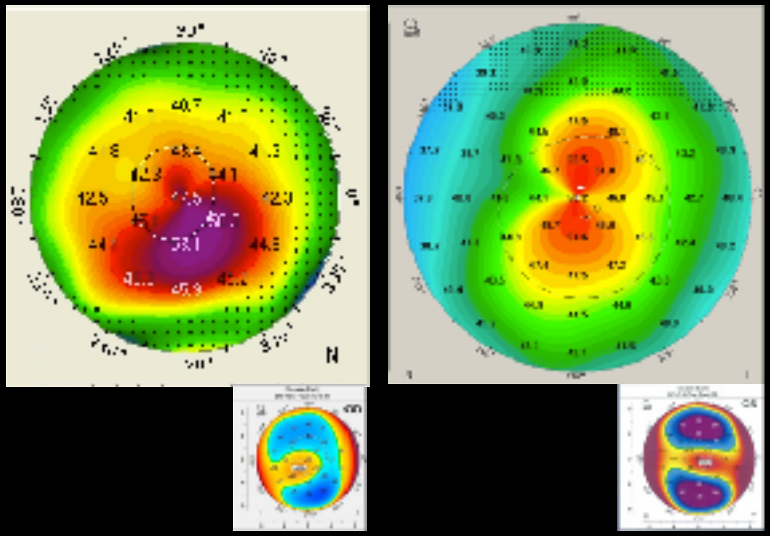
3. Paquimetria no meridiano mais curvo e trajeto do anel (zona óptica - 5 mm)

Torquetti, L

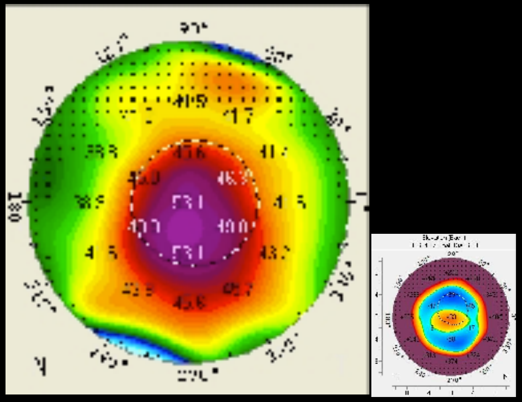
NOMOGRAMA

1. Tipo de ceratocone

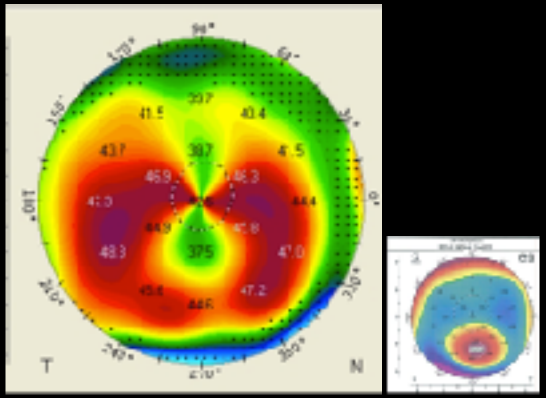
Oval / Bow-tie



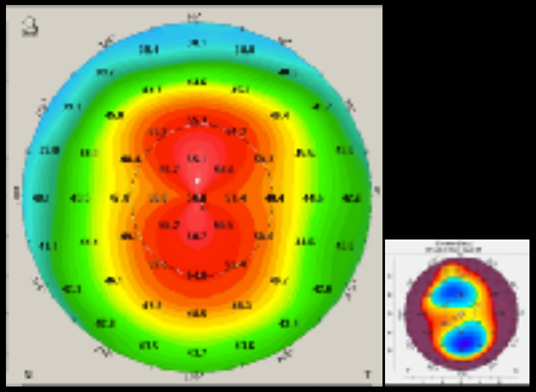
Nipple



DMP



Astigmático



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NOMOGRAMA

Excentricidade (Є^{2}) ou Asfericidade (-Q)

Calculada dentro de uma área com 8 mm diâmetro, na superfície corneana anterior

Comparative Evaluation of Elevation, Keratometric, Pachymetric and Wavefront Parameters in Normal Eyes, Subclinical Keratoconus and Keratoconus with a Dual Scheimpflug Analyzer

David Smadja, David Touboul, Joseph Colin

Int J Kerat Ect Cor Dis 2012;1(3):158-166.

Excentricidade (Є^{2})

Olhos normais = 0.19 ± 0.19

Ceratocone = 1.30 ± 0.96

Torquetti, L

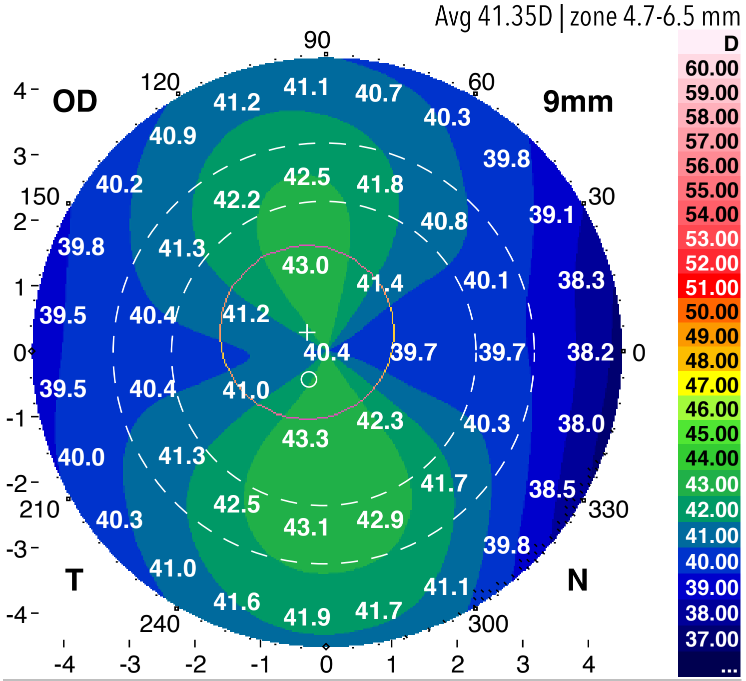
COSTA LEONARDO TORQUETTI

ziemer

GALILEI G4

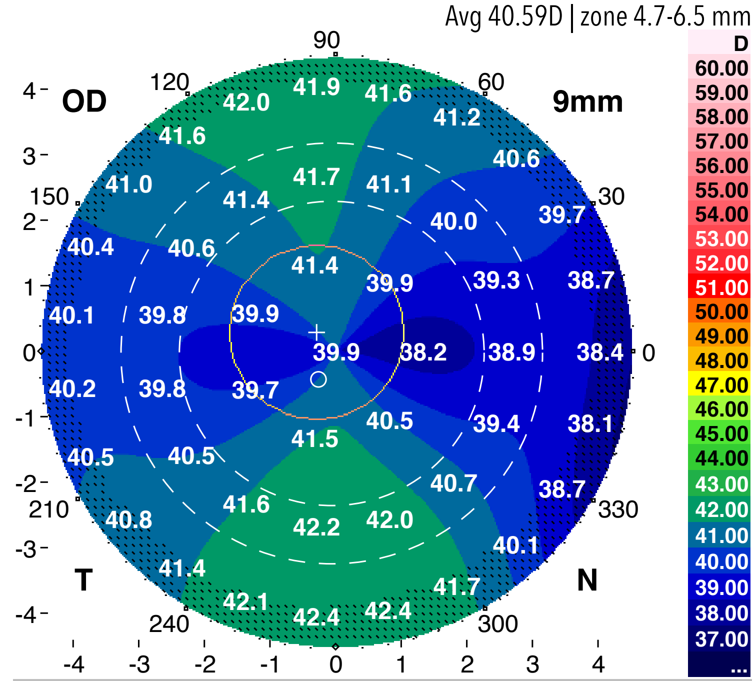
Anterior Axial Curvature [D] n 1.3375

Avg 41.35D | zone 4.7-6.5 mm



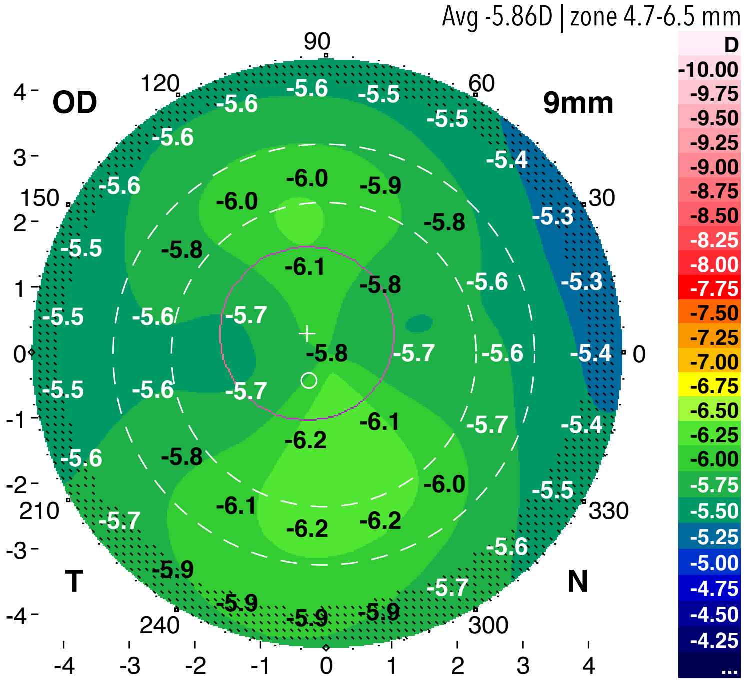
Total Corneal Power 2 (Ray Traced) [D]

Avg 40.59D | zone 4.7-6.5 mm



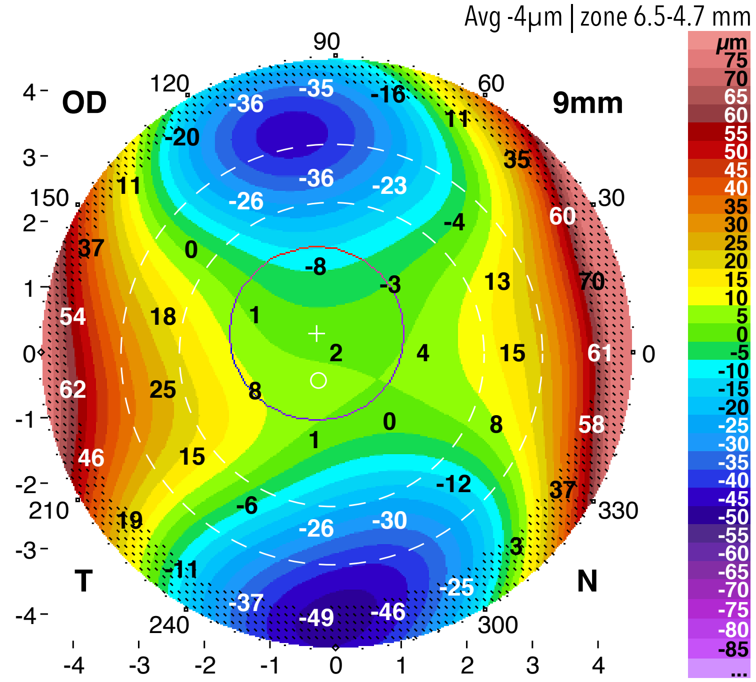
Posterior Axial Curvature [D]

Avg -5.86D | zone 4.7-6.5 mm



Post. Elevation BFS [μm] Fit Zone 8.0 mm | RadiusBFS 6.86 mm

Avg -4μm | zone 6.5-4.7 mm



SimK n 1.3375

SimK	41.66D		R	8.10mm
Flat SimK	40.13D	5°	R1	8.41mm
Steep SimK	43.19D	95°	R2	7.81mm
Astig	3.06D	95°	e² (-Q)	0.23

Anterior Instantaneous Curvature (Tangential) n 1.3375

Mean K	41.57D		R	8.12mm
Flat K	39.95D	4°	R1	8.45mm
Steep K	43.19D	94°	R2	7.81mm
Astig	3.24D	94°	e² (-Q)	0.23

Posterior Axial Curvature

Mean K	-5.91D		R	6.77mm
Flat K	-5.64D	11°	R1	7.09mm
Steep K	-6.18D	101°	R2	6.48mm
Astig	-0.53D	101°	e² (-Q)	0.28

Total Corneal Power 1 (Ray Traced)

Mean TCP	41.26D		Central	41.26D
Flat TCP	39.79D	4°	Mid	41.79D
Steep TCP	42.72D	94°	Periph	41.85D
Astig	2.93D	94°		

Pachymetry

o Thinnest	560μm	location x,y	-0.27mm -0.42mm
Central	569μm	CCT	562μm

Anterior Chamber and Biometry

WTW, N-T	12.42mm	Mean Angle	32.2°
ACV	143mm³	Kappa Dist	0.42mm
AQD	3.01mm	ASL endo	n/a
+ Pupil Diam	2.66mm	location x,y	-0.30mm 0.30mm

Keratoconus Probability & Indices

KPI	0.0%	Kprob	0.3%
CLMIaa	0.62D	PPK	0.6%
I-S	0.74D	DSI	3.24D
SAI	0.67D	OSI	0.98D
SRI	0.68D	CSI	0.21D
IAI	0.42D	ACP	41.71D
AA	100.0%	SDP	1.39D

NOMOGRAMA

2. Excentricidade ($Є^2$) e astigmatismo topográfico

O(s) segmento(s) selecionado(s) deve(m) induzir mudança em $Є^2$ que produza valor próximo do "normal" $= -0.19 \pm 0.19$

$$\Delta Є^2$$

140 segmento = 0.80 ± 1.53
160 segmento = 1.17 ± 0.90
210 segmento = 1.21 ± 1.27

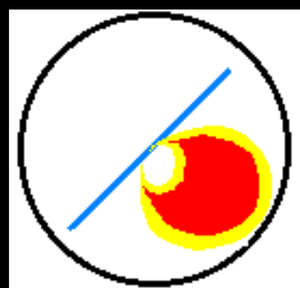
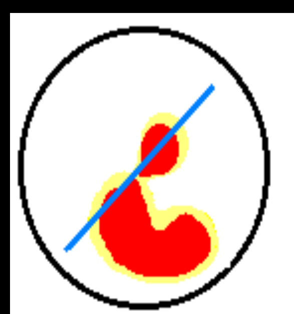
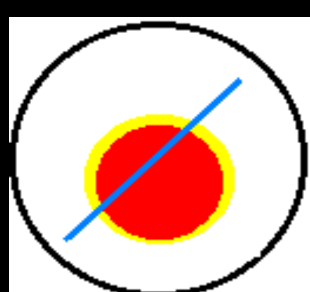
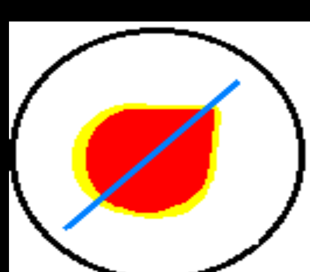
Torquetti L, Arce C, Ferrara P, Signorelli A. Evaluation of anterior segment parameters using a dual scheimpflug in keratoconus patients implanted with intrastromal corneal ring segments. *International Journal of Ophthalmology*

NOMOGRAMA

Oval ou Bow-tie

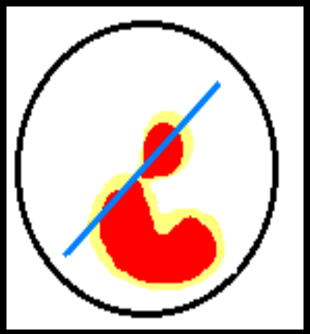
Segmentos de 160 ou 140 graus de arco

Torquetti, L

Mapa	Distribuição da ectasia	Descrição
	0% / 100%	Toda área ectásica em um lado da córnea
	25% / 75%	75% da área ectásica localizada em um lado da córnea
	33% / 66%	66% da área ectásica localizada em um lado da córnea
	50% / 50%	A área ectásica é simetricamente distribuída na córnea

Torquetti, L

Nomograma
Segmentos Assimétricos
25/75%



Astigmatismo Topográfico	Segmento
ate 2,00 D	160/150
2,25 a 4,00D	160/200
4,25 a 6,00D	160/250
6,25 a 8,00D	160/200 + 160/250
8,25 a 10,00D	140/200 + 140/150
10,25 a 12,00D	140/250 + 140/150

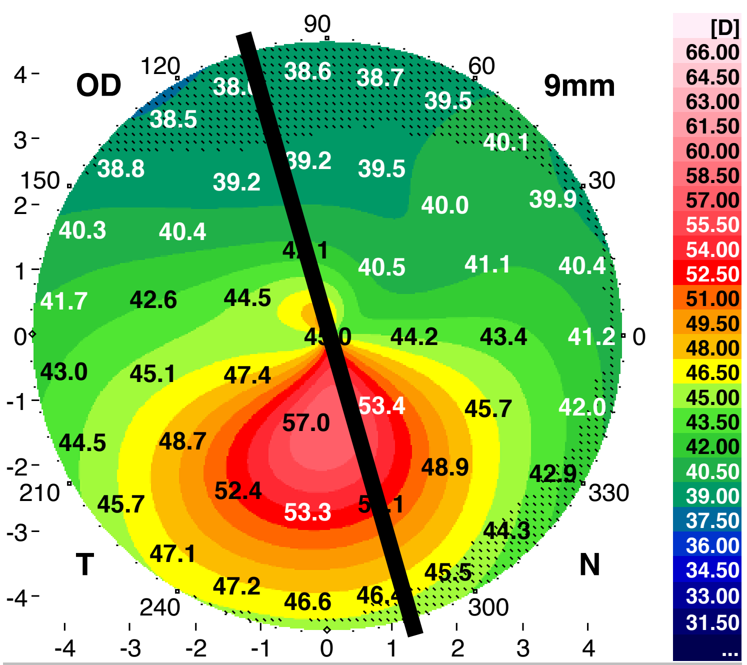
Torquetti, L

CEO
CENTRO DE EXCELÊNCIA EM OFTALMOLOGIA

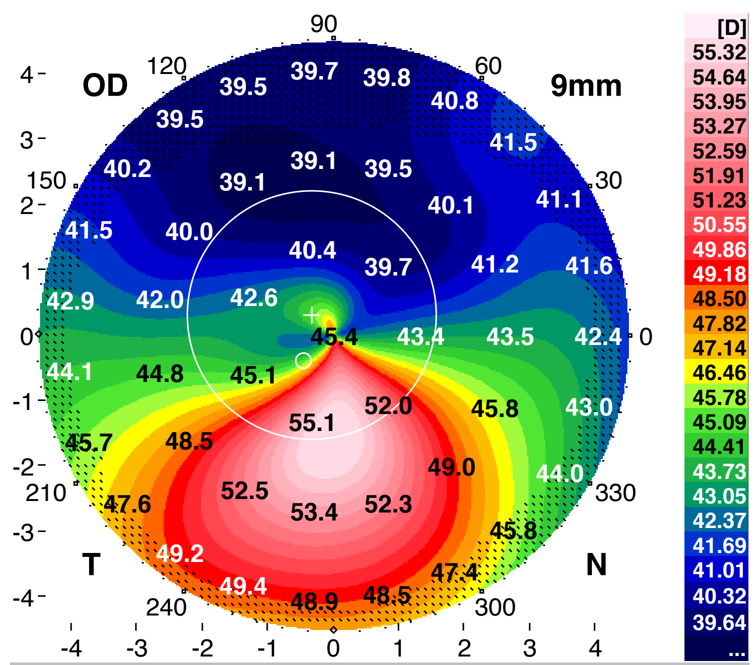
Plano cirúrgico: 160/200

ziemer
Topography
Tomography

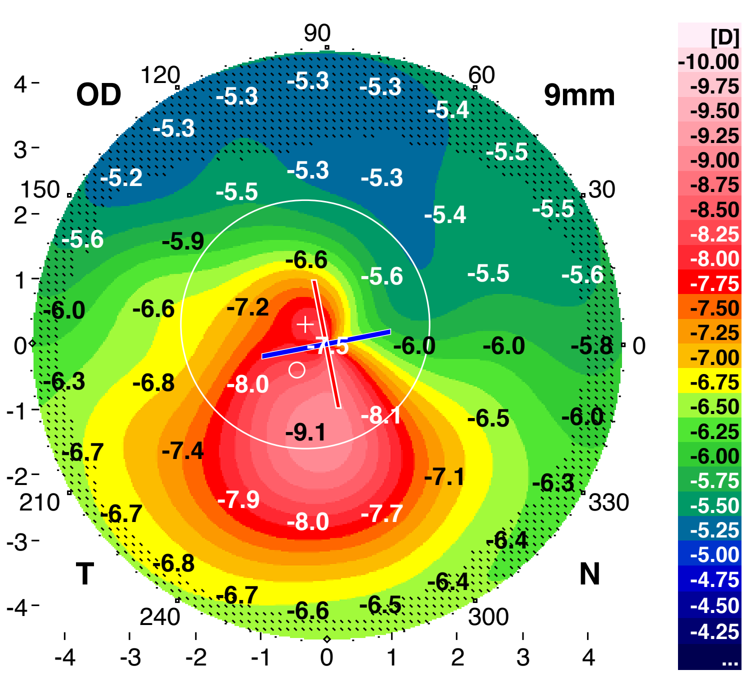
Anterior Axial Curvature [D] n 1.3375



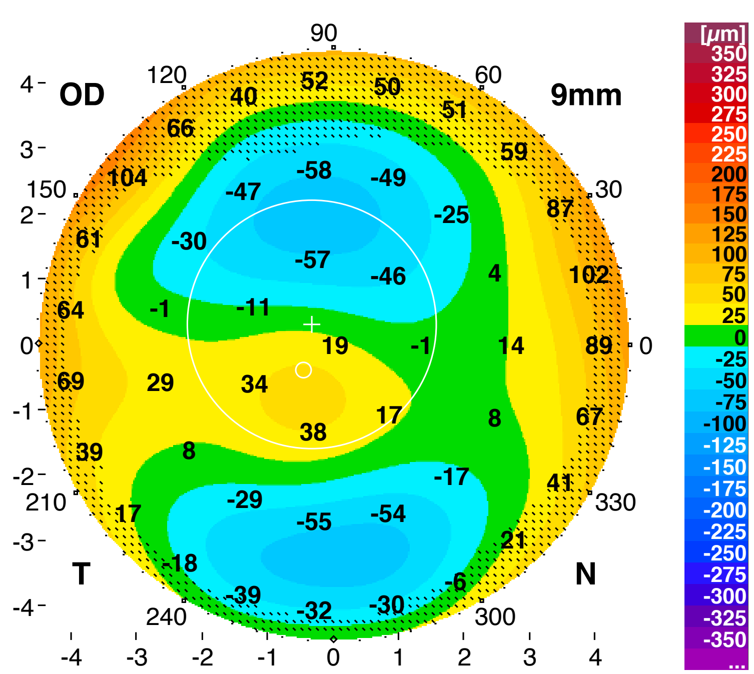
Total Corneal Power IOL (Ray Traced) [D]



Posterior Axial Curvature [D]



Post. Elevation BFS [µm] Fit Zone 8.0 mm | RadiusBFS 6.12 mm



SimK n 1.3375

SimK	46.93D		R	7.19mm
Flat SimK	44.15D	12°	R1	7.64mm
Steep SimK	49.71D	102°	R2	6.79mm
Astig	5.56D	102°	e² (-Q)	1.29

Anterior Axial Curvature Zones n 1.3375

Central	47.18D	7.15mm		
Mid	44.74D	7.54mm		
Periph	42.03D	8.03mm		
Kmax	57.73D	5.85mm	location x,y	0.00mm -1.40mm

Posterior Axial Curvature

Mean K	-7.31D		R	5.47mm
Flat K	-6.79D	11°	R1	5.89mm
Steep K	-7.83D	101°	R2	5.11mm
Astig	-1.04D	101°	e² (-Q)	2.19

Pachymetry

o Thinnest	486µm	x,y	-0.46mm -0.39mm
Central	514µm	CCT	495µm
Mid	584µm		
Periph	691µm	Corneal Vol.	30.6mm³

Total Corneal Power IOL (Ray Traced)

Mean TCPIOL	45.26D		Central	45.34D
Flat TCPIOL	42.64D	12°	Mid	44.68D
Steep TCPIOL	47.89D	102°	Periph	43.44D
Astig	5.25D	102°		

Anterior Chamber and Biometry

WTW, N-T	11.48mm	Mean Angle	41.3°
ACV	93mm³	Kappa Dist	0.46mm
AQD	3.14mm	ASL endo	n/a
+ Pupil Diam	3.80mm	location x,y	-0.33mm 0.31mm

Corneal Shape Asymmetry

CLMIaa	15.45D	PPK	100.0%

Exam Label and Notes

CINTIA |

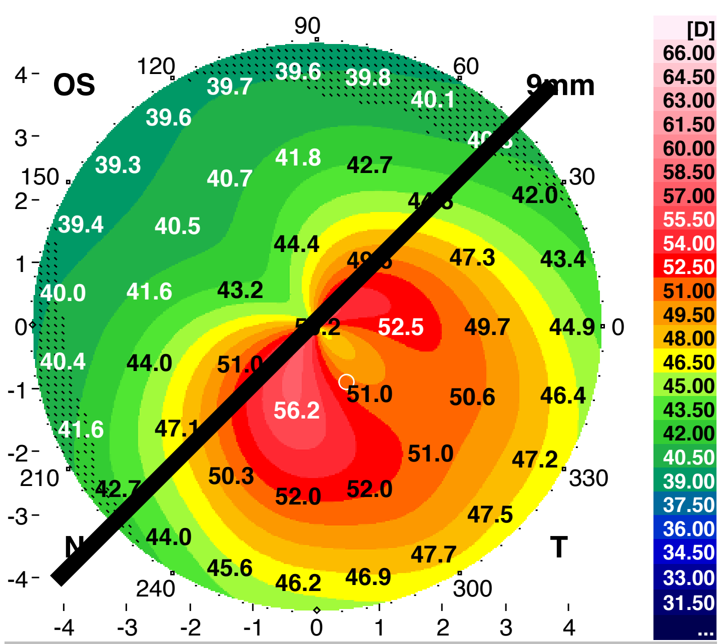
Torquetti, L

CEO
CENTRO DE EXCELÊNCIA EM OFTALMOLOGIA

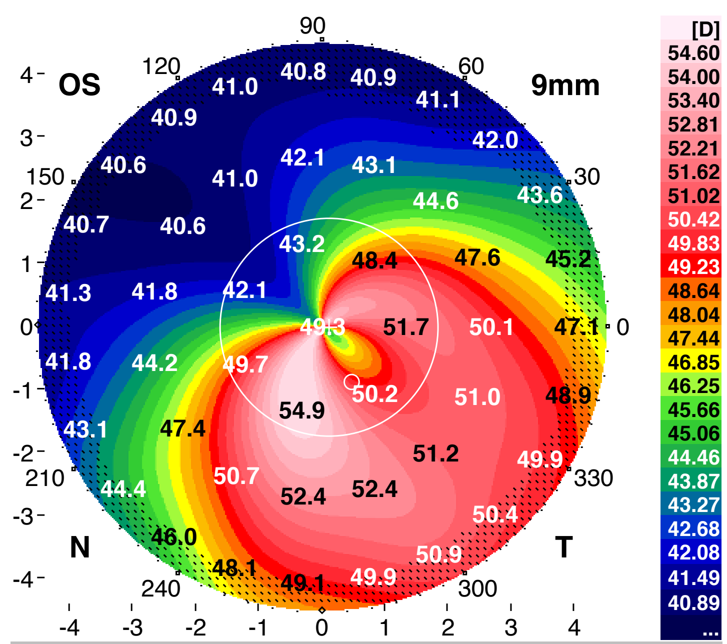
Plano cirúrgico: 160/250

ziemer
Topography
Tomography

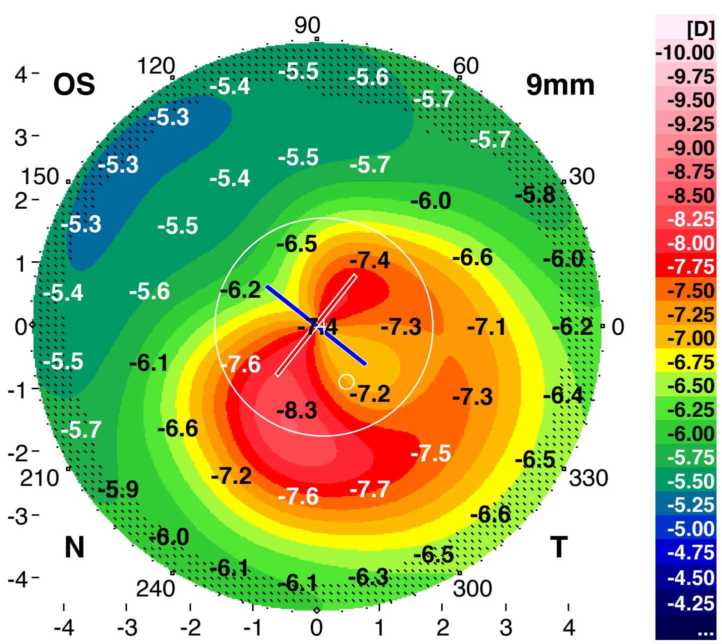
Anterior Axial Curvature [D] n 1.3375



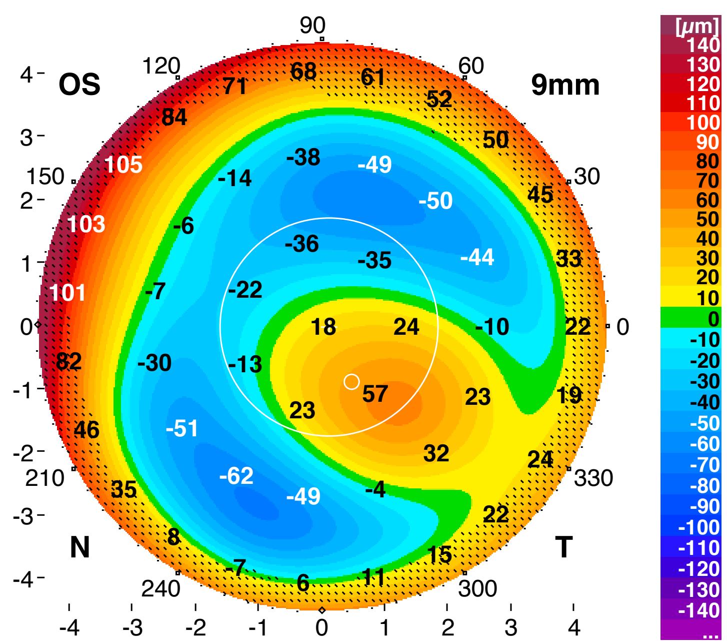
Total Corneal Power IOL (Ray Traced) [D]



Posterior Axial Curvature [D]



Post. Elevation BFS [µm] Fit Zone 8.0 mm | RadiusBFS 6.12 mm



SimK n 1.3375

SimK	49.64D		R	6.80mm
Flat SimK	46.28D	140°	R1	7.29mm
Steep SimK	52.99D	50°	R2	6.37mm
Astig	6.70D	50°	e² (-Q)	1.34

Anterior Axial Curvature Zones n 1.3375

Central	50.13D	6.73mm		
Mid	46.37D	7.28mm		
Periph	42.62D	7.92mm		
Kmax	56.56D	5.97mm	location x,y	-0.35mm -0.72mm

Posterior Axial Curvature

Mean K	-7.21D		R	5.55mm
Flat K	-6.63D	142°	R1	6.04mm
Steep K	-7.80D	52°	R2	5.13mm
Astig	-1.17D	52°	e² (-Q)	1.36

Pachymetry

o Thinnest	475µm	x,y	0.47mm -0.88mm
Central	494µm	CCT	483µm
Mid	548µm		
Periph	622µm	Corneal Vol.	28.6mm³

Total Corneal Power IOL (Ray Traced)

Mean TCPIOL	48.47D		Central	48.86D
Flat TCPIOL	45.27D	139°	Mid	46.68D
Steep TCPIOL	51.67D	49°	Periph	44.50D
Astig	6.40D	49°		

Anterior Chamber and Biometry

WTW, N-T	12.97mm	Mean Angle	n/a
ACV	n/a	Kappa Dist	0.11mm
AQD	3.63mm	ASL endo	n/a
+ Pupil Diam	3.45mm	location x,y	0.11mm -0.02mm

Corneal Shape Asymmetry

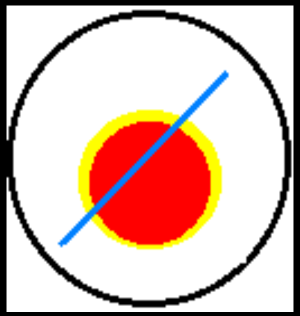
CLMIaa	7.80D	PPK	100.0%

Exam Label and Notes

CINTIA |

Torquetti, L

Nomograma
Segmentos Assimétricos
33/66%



Astigmatismo Topográfico	Segmento
ate 2,00 D	160/150
2,25 a 4,00D	160/150 + 160/200
4,25 a 6,00D	160/200 + 160/250
6,25 a 8,00D	140/150 + 140/200
8,25 a 10,00D	140/200 + 140/250

Torquetti, L

Nomograma
Bow-tie simétrico
50/50%

Astigmatismo Topográfico	Segmento
ate 2,00 D	160/150 + 160/150
2,25 a 4,00D	160/200 + 160/200
4,25 a 6,00D	160/250 + 160/250
6,25 a 8,00D	140/200 + 140/200
8,25 a 10,00D	140/250 + 140/250

Torquetti, L

Bow-tie simétrico

Plano cirúrgico: 140/200 + 140/200

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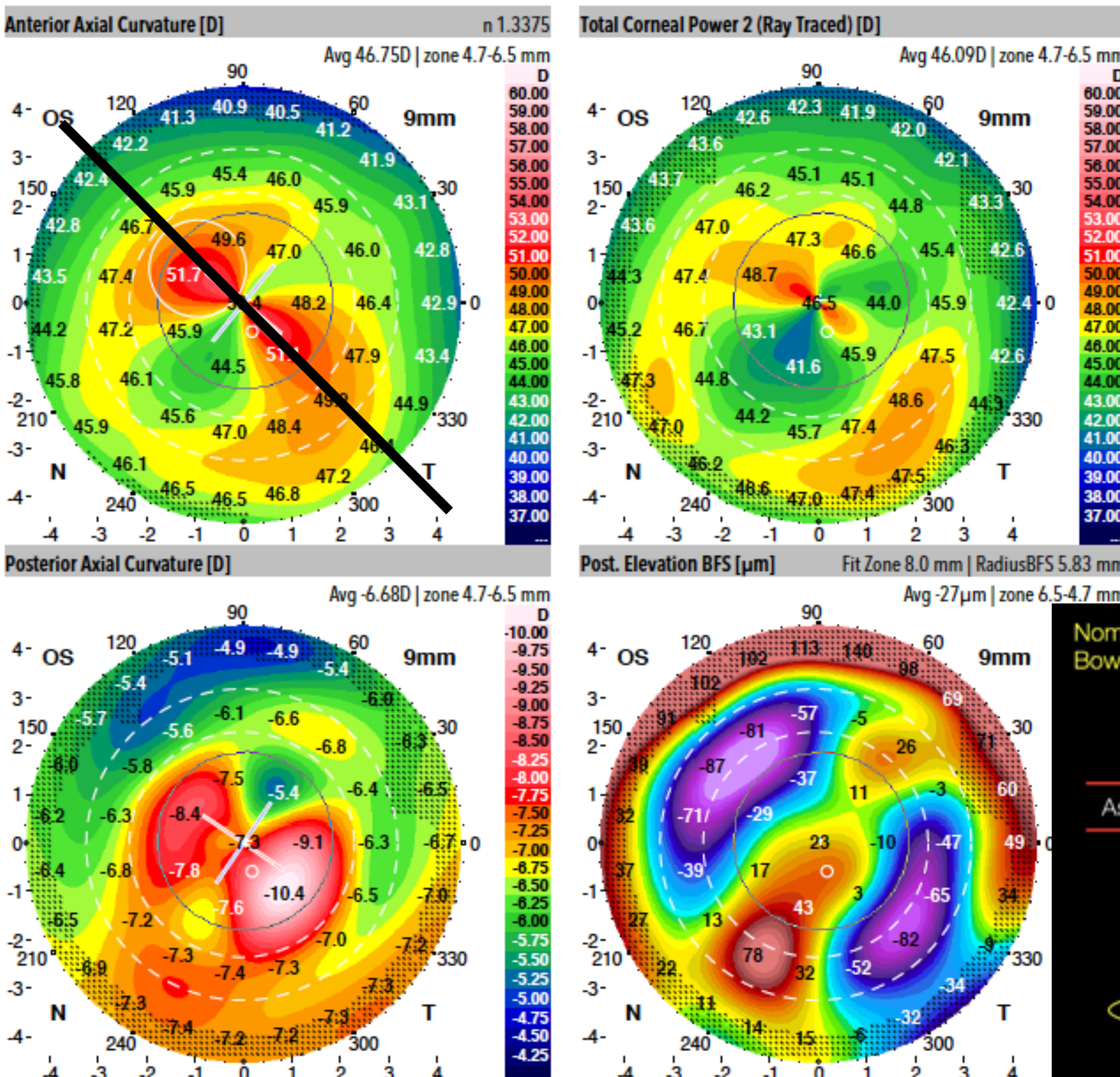
GALILEI G4



SimK n 1.3375

SimK	48.45D		R	6.97mm
Flat SimK	45.25D	51°	R1	7.46mm
Steep SimK	51.65D	141°	R2	6.53mm
Astig	6.40D	141°	e² (-Q)	0.93

Anterior Instantaneous Curvature (Tangential) n 1.3375

Mean K	47.17D		R	7.15mm
Flat K	45.63D	48°	R1	7.40mm
Steep K	48.71D	138°	R2	6.93mm
Astig	3.08D	138°	e² (-Q)	0.93

Posterior Axial Curvature

Mean K	-7.64D		R	5.24mm
Flat K	-6.43D	56°	R1	6.22mm
Steep K	-8.85D	146°	R2	4.52mm
Astig	-2.42D	146°	e² (-Q)	1.17

Total Corneal Power 1 (Ray Traced)

Mean TCP	47.15D		Central	47.14D
Flat TCP	44.80D	49°	Mid	47.36D
Steep TCP	49.50D	139°	Periph	44.94D
Astig	4.70D	139°		

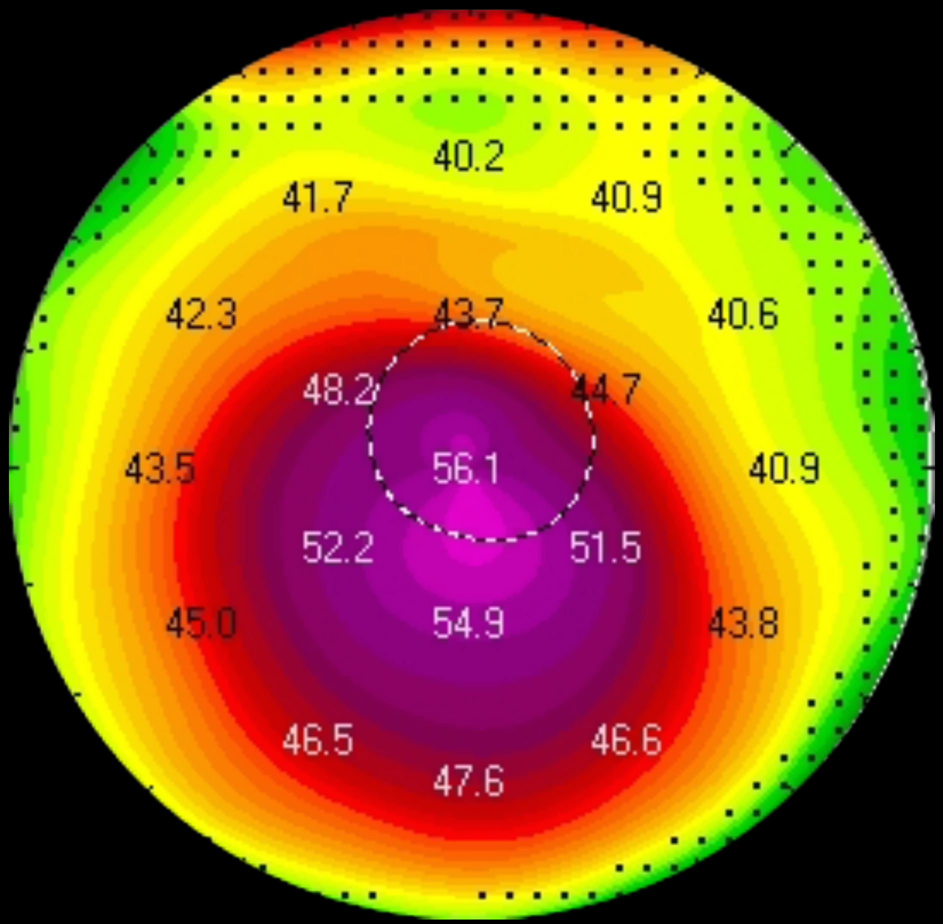
Nomograma
Bow-tie simétrico
50/50%

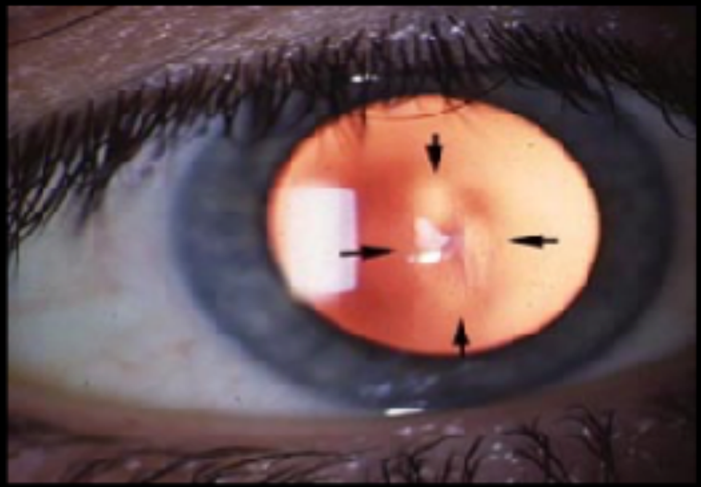
Astigmatismo Topográfico	Segmento
ate 2,00 D	160/150 + 160/150
2,25 a 4,00D	160/200 + 160/200
4,25 a 6,00D	160/250 + 160/250
6,25 a 8,00D	140/200 + 140/200
8,25 a 10,00D	140/250 + 140/250

Torquetti, L

NOMOGRAMA

Nipple



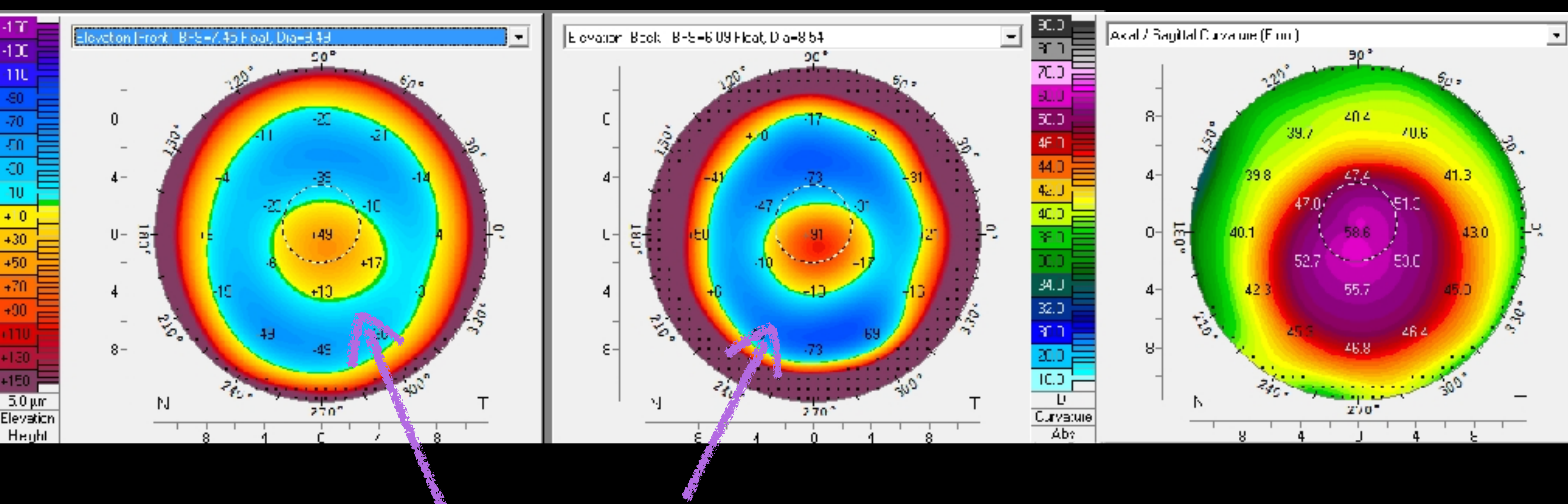


Central
Hiperprolada
Astigmatismo baixo
Lago no mapa de elevação

Torquetti, L

NOMOGRAMA

Nipple



Lago na elevação posterior

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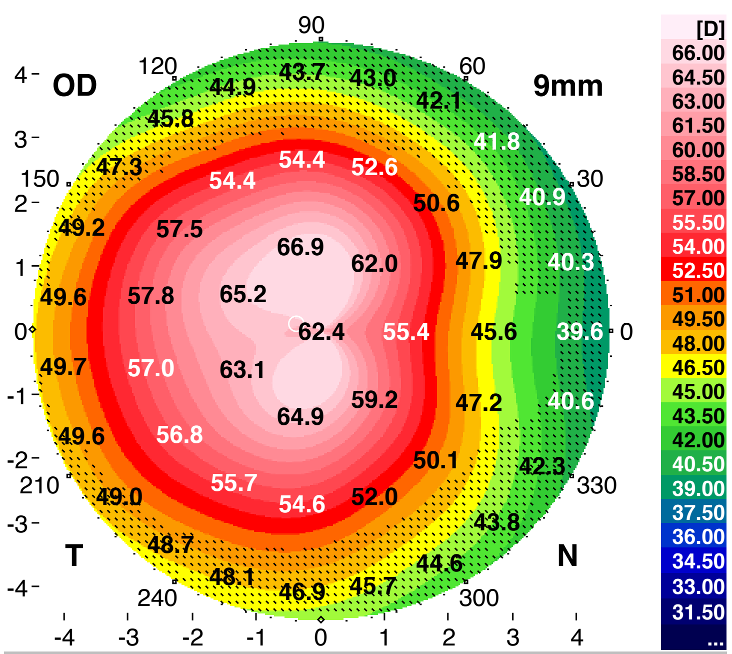
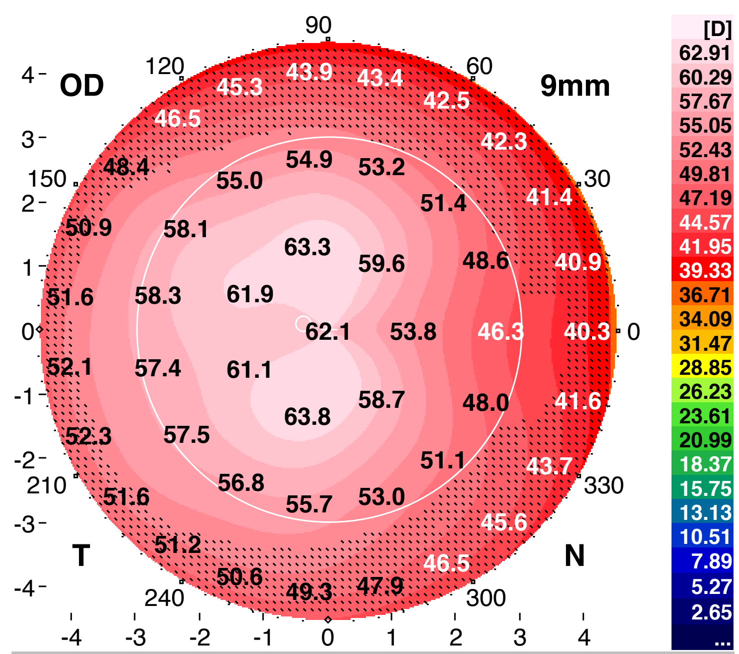
Topography
Tomography

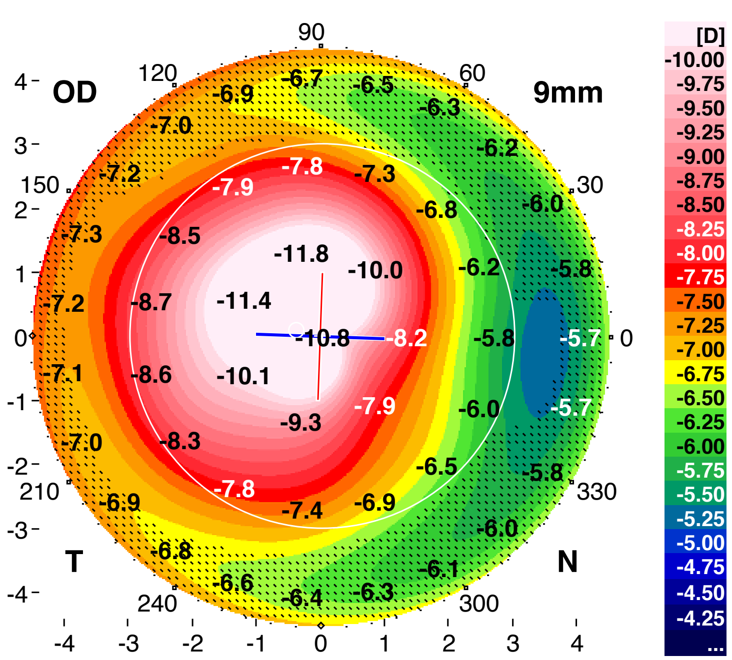
Anterior Axial Curvature [D] n 1.3375



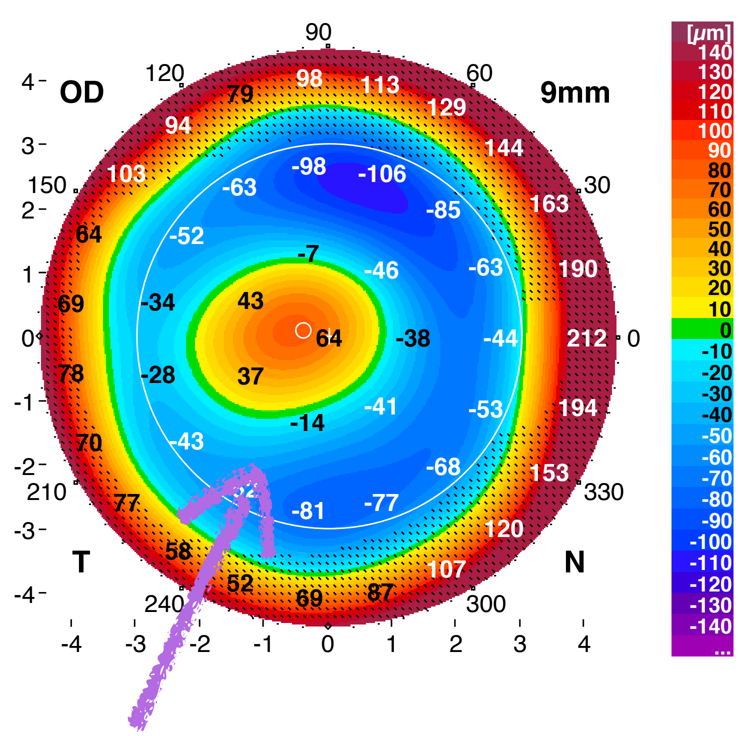
Total Corneal Power IOL (Ray Traced) [D]



Posterior Axial Curvature [D]



Post. Elevation BFS [µm] Fit Zone 8.0 mm | RadiusBFS 5.25 mm



SimK n 1.3375

SimK	62.72D		R	5.38mm
Flat SimK	59.67D	179°	R1	5.66mm
Steep SimK	65.77D	89°	R2	5.13mm
Astig	6.10D	89°	e² (-Q)	1.93

Anterior Axial Curvature Zones n 1.3375

Central	63.61D	5.31mm			
Mid	53.13D	6.35mm			
Periph	44.53D	7.58mm			
Kmax	70.54D	4.78mm	location x,y	-0.02mm	0.30mm

Posterior Axial Curvature

Mean K	-10.11D		R	3.96mm
Flat K	-9.59D	178°	R1	4.17mm
Steep K	-10.63D	88°	R2	3.76mm
Astig	-1.04D	88°	e² (-Q)	2.31

Pachymetry

o Thinnest	385µm	x,y	-0.38mm	0.11mm
Central	422µm	CCT	391µm	
Mid	520µm			
Periph	605µm	Corneal Vol.	27.0mm³	

Total Corneal Power IOL (Ray Traced)

Mean TCPIOL	60.34D		Central	60.79D
Flat TCPIOL	57.41D	179°	Mid	53.78D
Steep TCPIOL	63.28D	89°	Periph	44.19D
Astig	5.87D	89°		

Anterior Chamber and Biometry

WTW, N-T	12.27mm	Mean Angle	n/a	
ACV	n/a	Kappa Dist	0.03mm	
AQD	n/a	ASL endo	n/a	
+ Pupil Diam	6.00mm	location x,y	0.02mm	0.02mm

Corneal Shape Asymmetry

CLMIaa	8.37D	PPK	100.0%

Exam Label and Notes

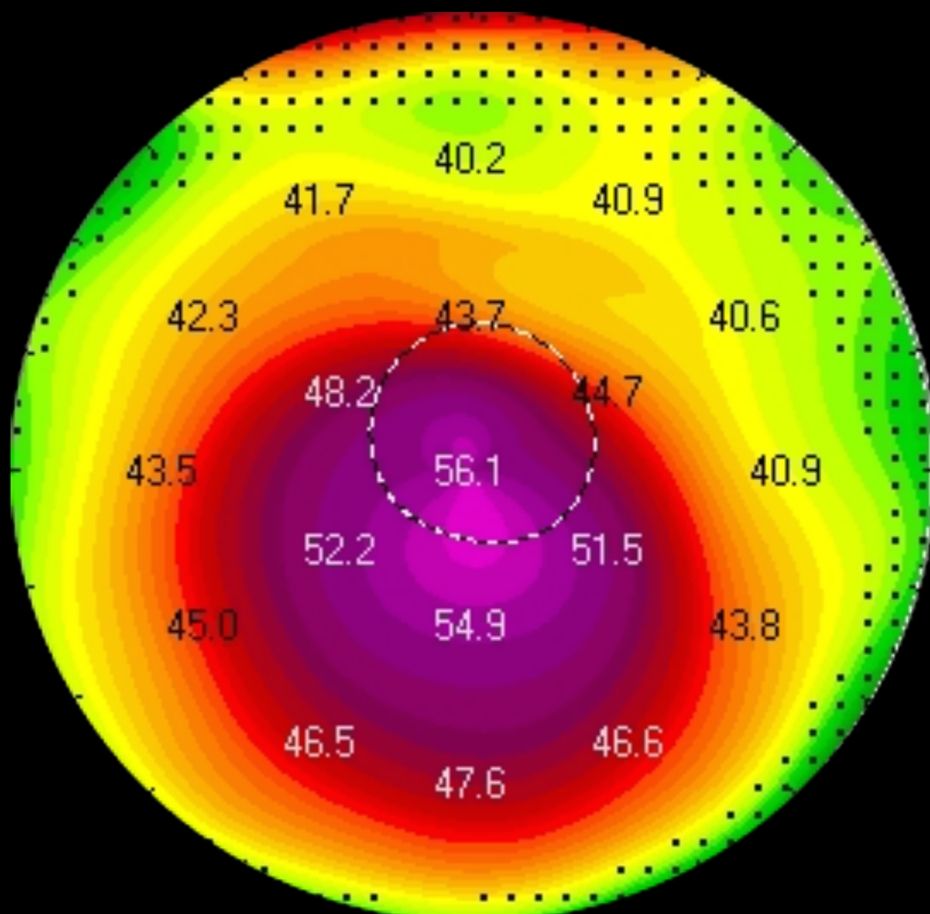
CINTIA |

Lago na elevação posterior

Torquetti, L

NOMOGRAMA

Nipple



Nipple = 210 ou 320

Ceratometria Media (D) - 210

210/150	ate 49,00
210/200	49,25 a 54,00
210/250	> 54,00

Ceratometria Media (D) - 320

320/150	49,25 a 54,00
320/200	54,25 a 60,00
320/250	> 60,00

Preop Km

49,00	49,25 a 54,00	54,25 a 60,00	60,25
210/150	210/200 320/150	210/250 320/200	320/250

NOMOGRAMA

Nipple

Se a ceratometria media tiver valor que seja possível implantar o segmento de 210 e 320:
Qual escolher?

Astigmatismo Topográfico < 3,00 D = **210**

Astigmatismo Topográfico > 3,00 D = **320**

Nipple

Plano cirúrgico: 210/200

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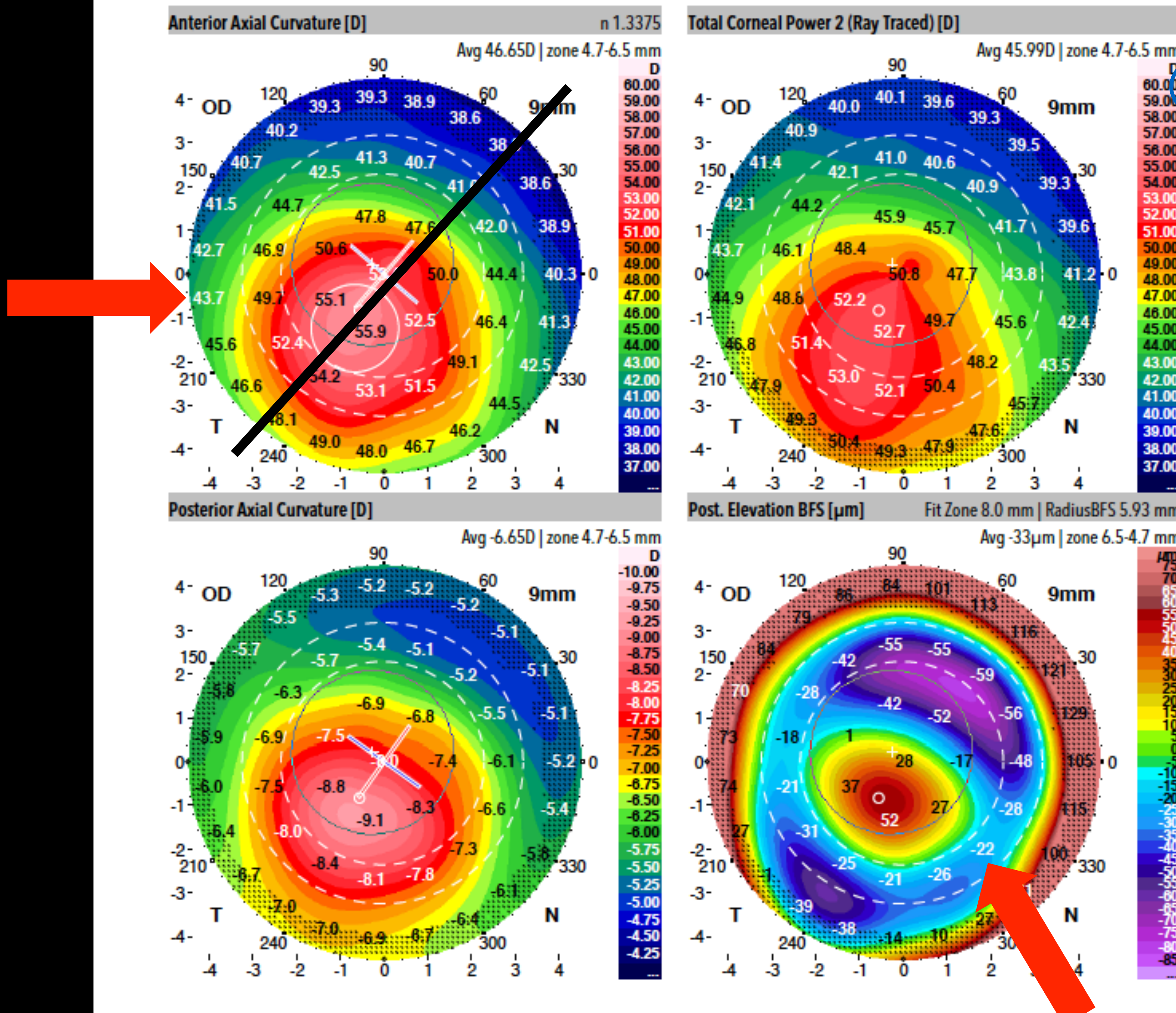
GALILEI G4



SimK			n 1.3375
SimK 51.55D		R	6.55mm
Flat SimK 50.84D	139°	R1	6.64mm
Steep SimK 52.25D	49°	R2	6.46mm
Astig 1.41D	49°	e² (-Q)	1.76

Anterior Instantaneous Curvature (Tangential)			n 1.3375
Mean K 47.95D		R	7.04mm
Flat K 47.65D	150°	R1	7.08mm
Steep K 48.26D	60°	R2	6.99mm
Astig 0.61D	60°	e² (-Q)	1.76

Posterior Axial Curvature			
Mean K -7.79D		R	5.13mm
Flat K -7.66D	145°	R1	5.22mm
Steep K -7.92D	55°	R2	5.05mm
Astig -0.26D	55°	e² (-Q)	1.44

Total Corneal Power 1 (Ray Traced)			
Mean TCP 50.59D		Central	50.99D
Flat TCP 49.92D	137°	Mid	47.39D
Steep TCP 51.26D	47°	Periph	44.50D
Astig 1.34D	47°		

Pachymetry			
o Thinnest	463µm	location x,y	-0.57mm -0.82mm
Central	496µm	CCT	480µm

Anterior Chamber and Biometry			
WTW, N-T	12.04mm	Mean Angle	40.3°
ACV	123mm³	Kappa Dist	0.36mm
AQD	3.35mm	ASL endo	n/a
+ Pupil Diam	3.72mm	location x,y	-0.27mm 0.23mm

Keratoconus Probability & Indices			
KPI	100.0%	Kprob	100.0%
CLMIaa	9.28D	PPK	100.0%
I-S	11.17D	DSI	10.87D
SAI	5.67D	OSI	10.87D
SRI	1.77D	CSI	4.21D
IAI	0.74D	ACP	52.58D
AA	100.0%	SDP	5.51D

Plano cirúrgico: 320/250

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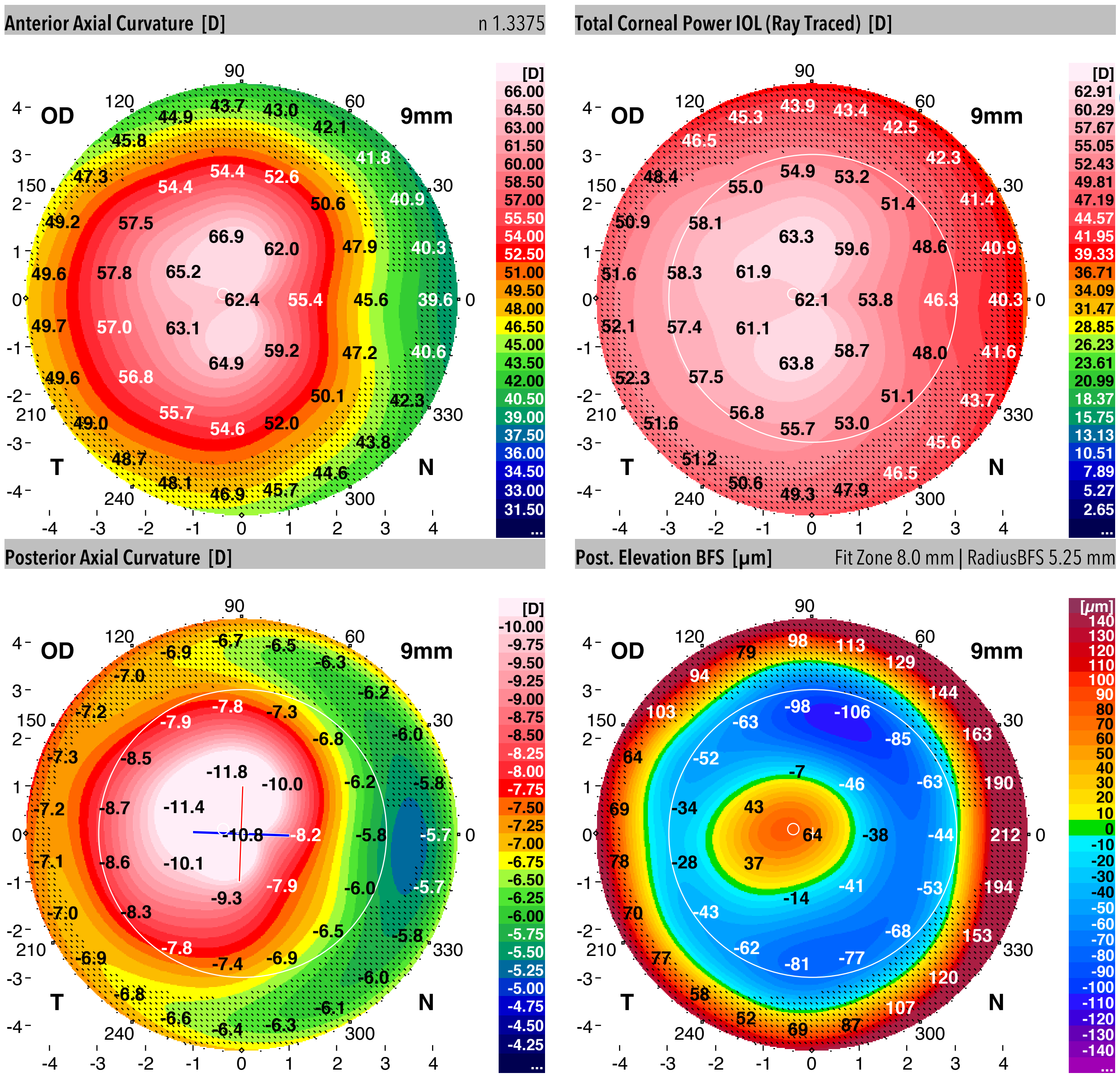
Topography
Tomography



SimK n 1.3375

SimK	62.72D		R	5.38mm
Flat SimK	59.67D	179°	R1	5.66mm
Steep SimK	65.77D	89°	R2	5.13mm
Astig	6.10D	89°	e² (-Q)	1.93

Anterior Axial Curvature Zones n 1.3375

Central	63.61D	5.31mm			
Mid	53.13D	6.35mm			
Periph	44.53D	7.58mm			
Kmax	70.54D	4.78mm	location x,y	-0.02mm	0.30mm

Posterior Axial Curvature

Mean K	-10.11D		R	3.96mm
Flat K	-9.59D	178°	R1	4.17mm
Steep K	-10.63D	88°	R2	3.76mm
Astig	-1.04D	88°	e² (-Q)	2.31

Pachymetry

o Thinnest	385µm	x,y	-0.38mm	0.11mm
Central	422µm	CCT	391µm	
Mid	520µm			
Periph	605µm	Corneal Vol.	27.0mm³	

Total Corneal Power IOL (Ray Traced)

Mean TCPIOL	60.34D		Central	60.79D
Flat TCPIOL	57.41D	179°	Mid	53.78D
Steep TCPIOL	63.28D	89°	Periph	44.19D
Astig	5.87D	89°		

Anterior Chamber and Biometry

WTW, N-T	12.27mm	Mean Angle	n/a	
ACV	n/a	Kappa Dist	0.03mm	
AQD	n/a	ASL endo	n/a	
+ Pupil Diam	6.00mm	location x,y	0.02mm	0.02mm

Corneal Shape Asymmetry

CLMIaa	8.37D	PPK	100.0%

Exam Label and Notes

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NOMOGRAMA

Degeneração Marginal Pelúcida

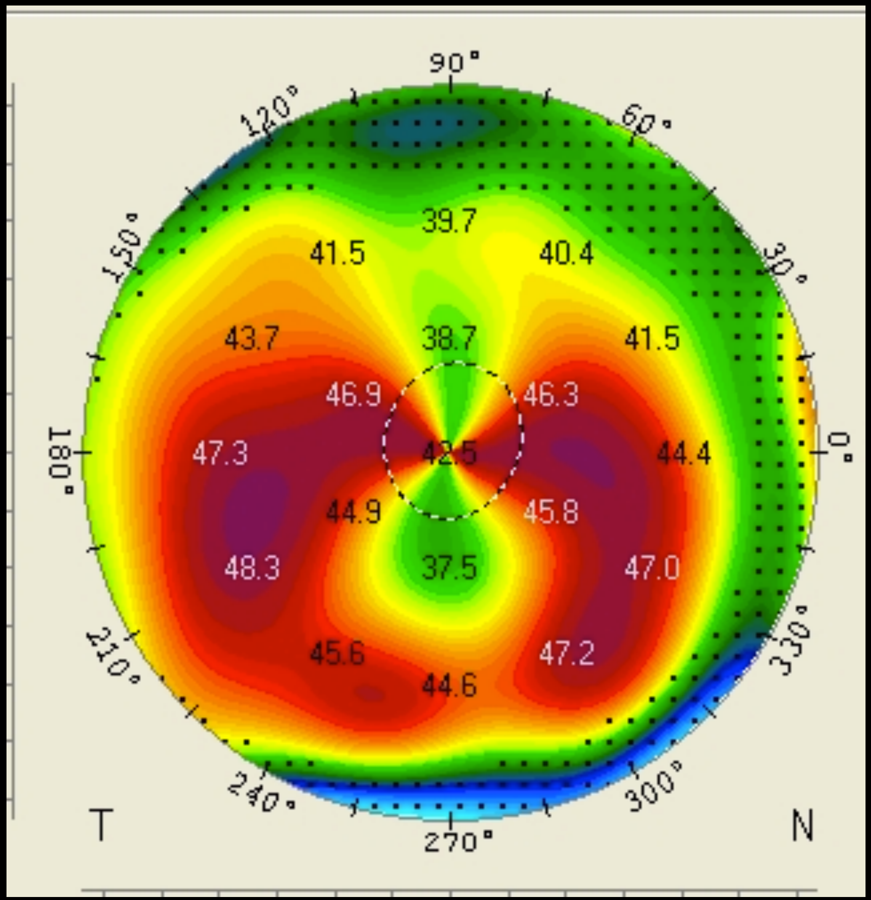
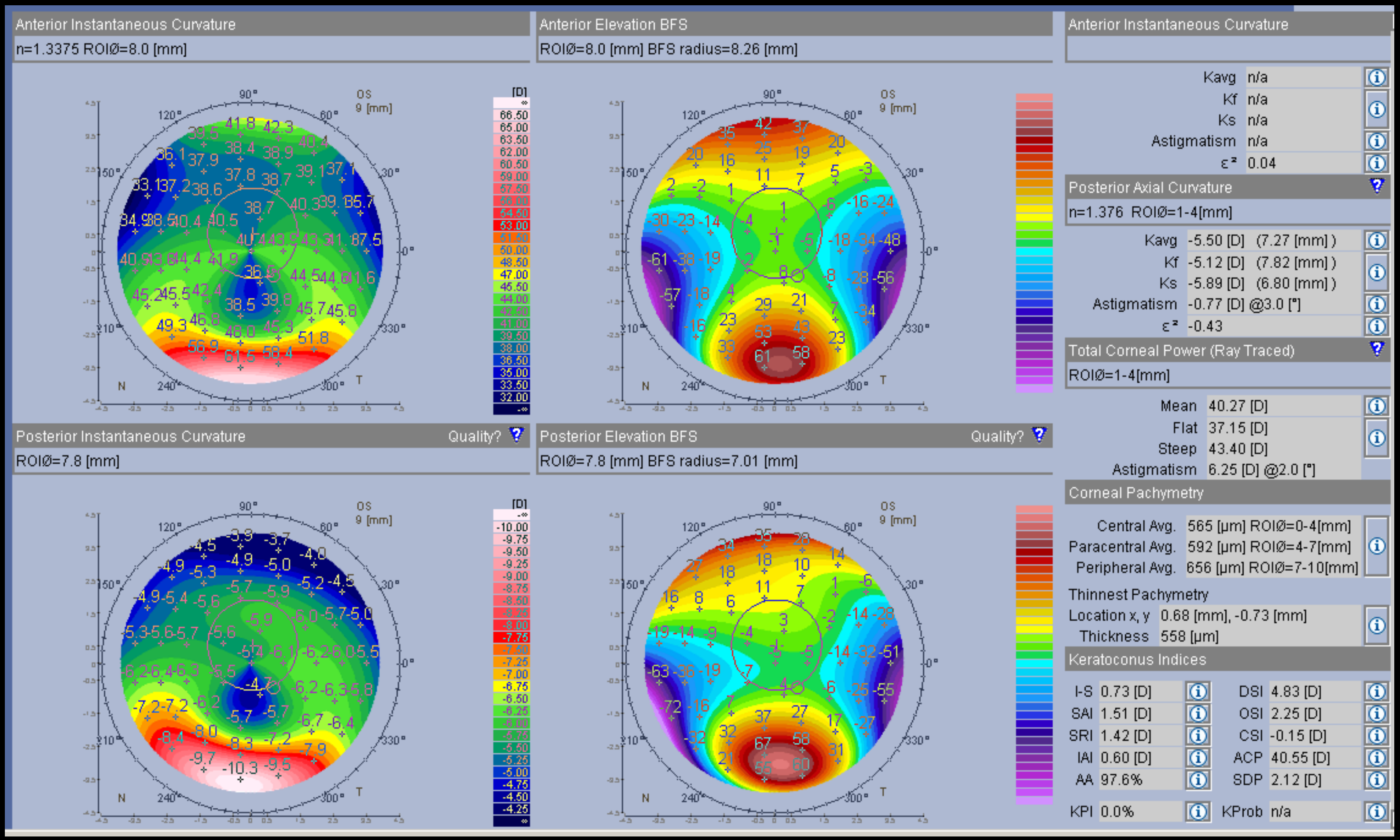


Imagem em garra de caranguejo
Oblada
Astigmatismo alto
Ceratometria baixa
Elevação posterior: lago descentrado

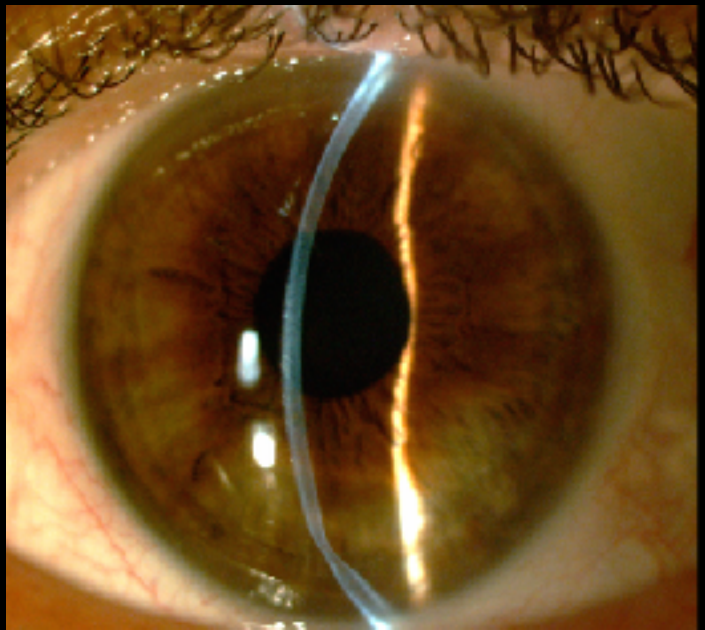
NOMOGRAMA

Degeneração Marginal Pelúcida



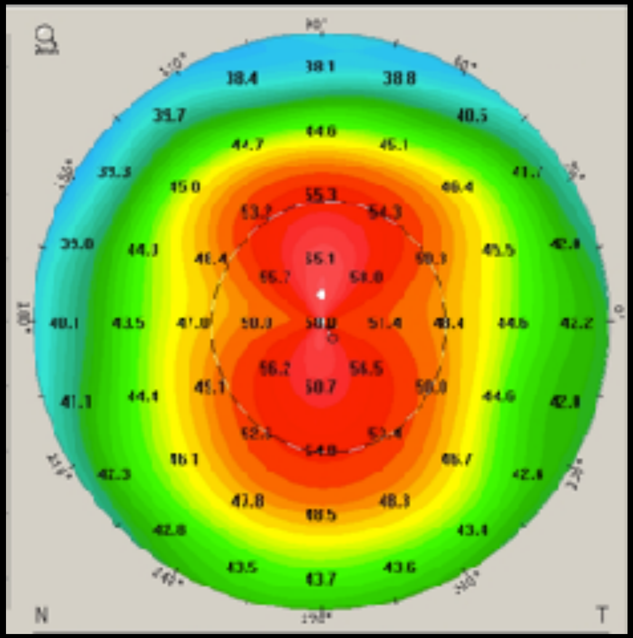
Astigmatismo Topográfico (D)

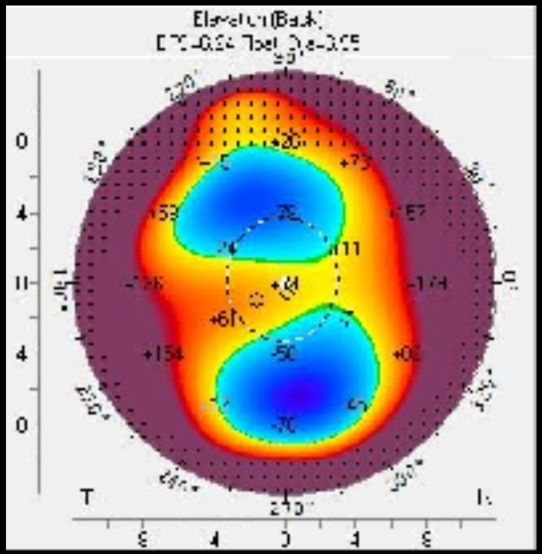
140/150	ate 4,00
140/200	4,00 a 8,00
140/250	> 8,00



NOMOGRAMA

Ceratocone Astigmático





Central
Hiperprolada
Alto astigmatismo
Alta ceratometria
Elevação posterior: Istmo

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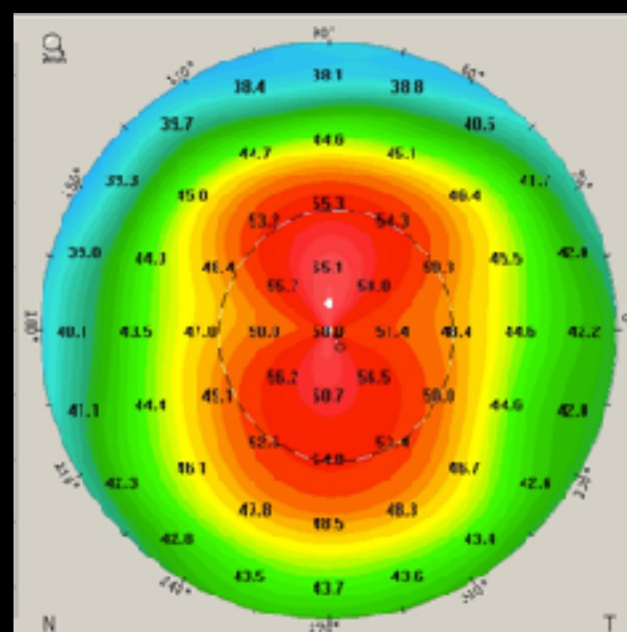
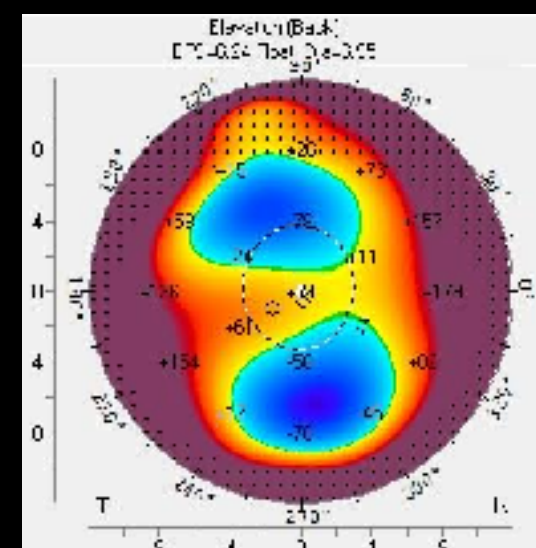
NOMOGRAMA

Ceratocone Astigmático





ASTIGMÁTICO =

2 segmentos 140 ou 320

Astigmatismo Topográfico (D)	Segmento
ate 6,00	320/200
6,00 a 10,00	2 x 140/200 or 320/250
> 10,00	2 x 140/250 or 320/250

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Plano cirúrgico: 2 seg 140/250

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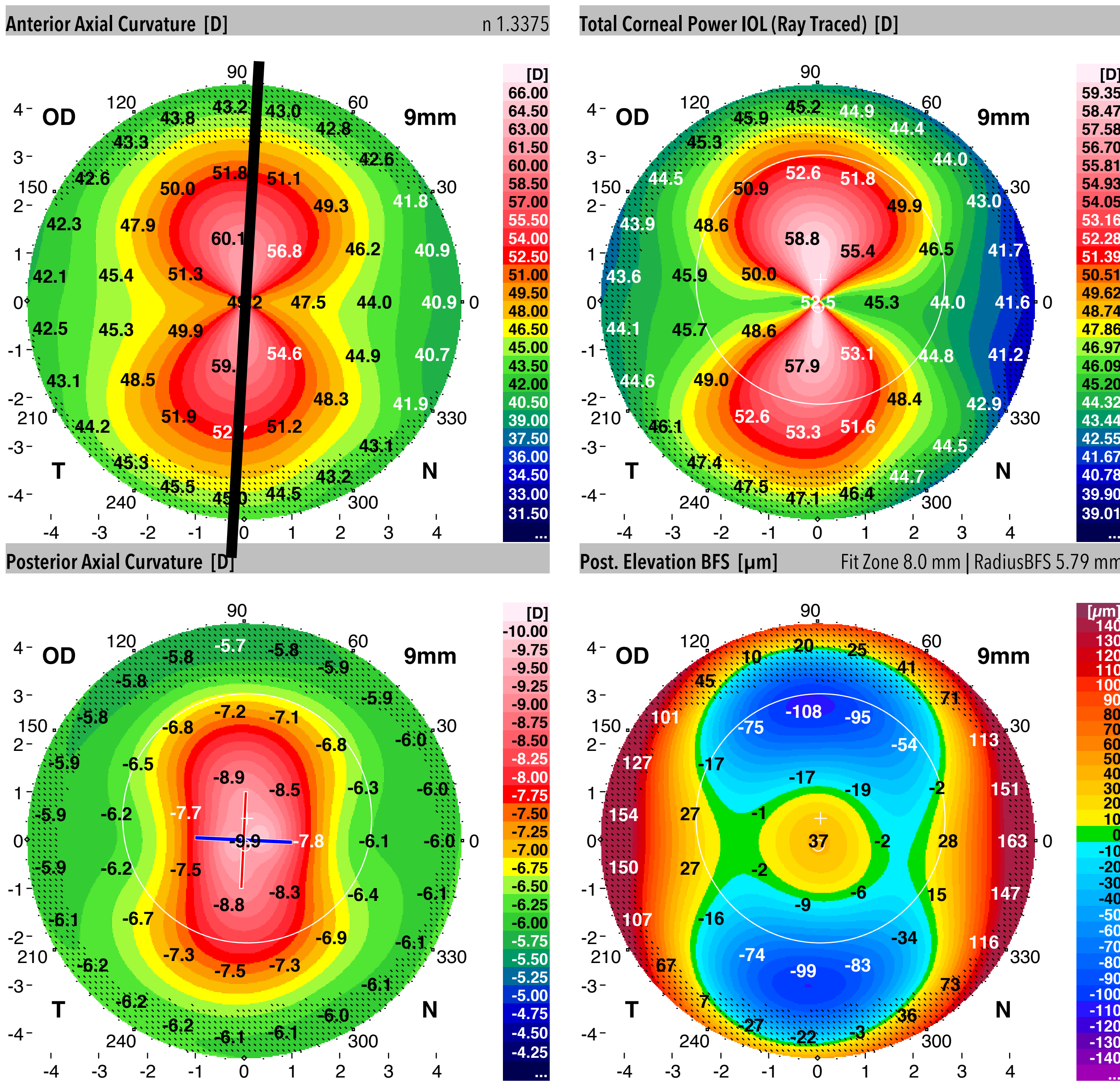
Topography
Tomography



SimK				n 1.3375
SimK	54.00D		R	6.25mm
Flat SimK	47.86D	0°	R1	7.05mm
Steep SimK	60.13D	90°	R2	5.61mm
Astig	12.28D	90°	e² (-Q)	1.58

Anterior Axial Curvature Zones					n 1.3375
Central	54.58D	6.18mm			
Mid	48.61D	6.94mm			
Periph	42.61D	7.92mm			
Kmax	62.41D	5.41mm	location x,y	-0.01mm	0.30mm

Posterior Axial Curvature				
Mean K	-8.41D		R	4.76mm
Flat K	-7.88D	177°	R1	5.07mm
Steep K	-8.93D	87°	R2	4.48mm
Astig	-1.05D	87°	e² (-Q)	2.38

Pachymetry				
o Thinnest	421µm	x,y	0.01mm	-0.10mm
Central	444µm	CCT	421µm	
Mid	515µm			
Periph	597µm	Corneal Vol.	26.9mm³	

Total Corneal Power IOL (Ray Traced)				
Mean TCPIOL	52.18D		Central	52.45D
Flat TCPIOL	45.69D	0°	Mid	49.05D
Steep TCPIOL	58.69D	90°	Periph	43.97D
Astig	13.00D	90°		

Anterior Chamber and Biometry				
WTW, N-T	12.68mm	Mean Angle	n/a	
ACV	n/a	Kappa Dist	0.47mm	
AQD	3.26mm	ASL endo	5.68mm	
+ Pupil Diam	5.16mm	location x,y	0.06mm	0.46mm

Corneal Shape Asymmetry			
CLMIaa	1.08D	PPK	1.6%

Exam Label and Notes

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CONCLUSÃO
Regras Gerais

- Evitar hipercorrecoes (inversão do eixo do astigmatismo / córnea oblada);

- Evitar implante de segmentos em áreas planas;

- O nomograma apresenta ótima reprodutibilidade e tem como objetivo corrigir a deformidade corneana (não a refração);

- O mapa de elevação posterior pode ser útil para identificação do tipo de ceratocone;

- Qualidade de visão = mais importante que o resultado refracional.

Torquetti, L

OBRIGADO !!!

leonardo@ceoclinica.med.br