ORBSCAN
Corneal Imaging

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Topographic technologies

- Placido disk –based topography
- AstraMax : (three-dimensional topography)
- Elevation-based topography:
  - Slit-scanning topography (orbscan)
  - Scheimpflug imaging (Pentacam-Galilei-Precisio)
- Artemis : (ultrasound digital topography)

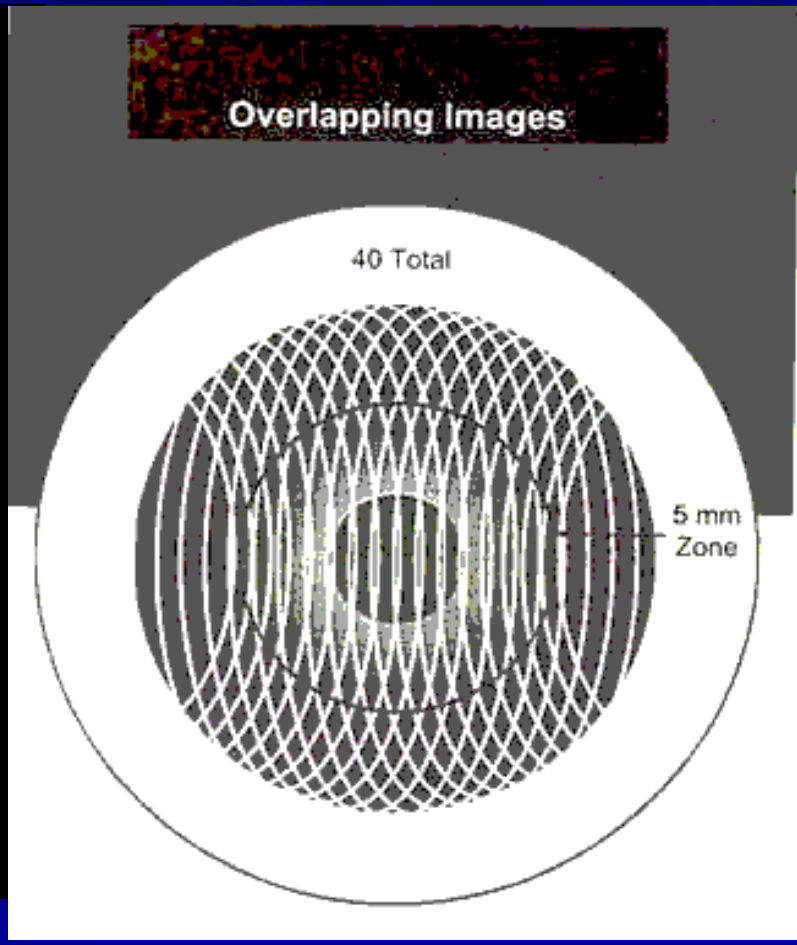
Elevation based topography

- **Orbscan:**
  - **Placido disc & slit scanning**
- Pentacam:
  - Scheimpflug imaging
- Galilei :
  - Dual scheimpflug imaging & placido disc
- Precisio:
  - Scheimpflug imaging

Orbscan IIz

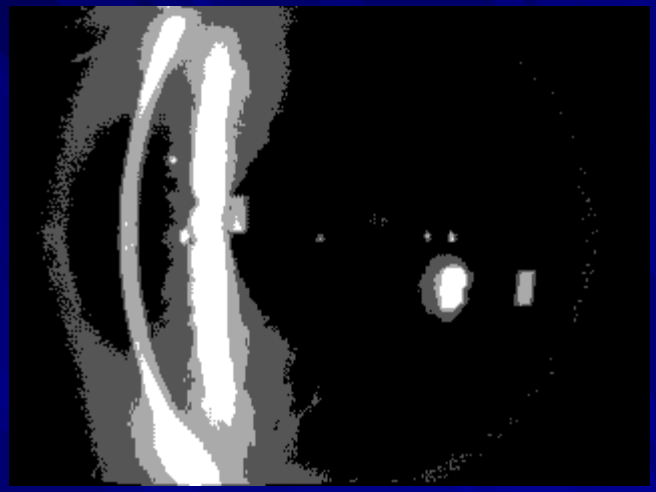
Orbscan IIz

- Placido disk - 40 rings
- Slit scanning system
  - 20 R , 20 L : 40 scans
  - 0.7 seconds
  - 45 degree angle
- 240 points measure per slit : 9600 points totally
- Tracking system measure eye movement



Reflective and Slit-scan Technologies

- One image, one surface
- Angle-dependent specular reflection
- Measures slope (as a function of distance)



- Multiple images, multiple surfaces
- Omni-direction diffuse backscatter
- Triangulates elevation

ORBSCAN is Multidimensional

Integrates multiple disparate technologies:
slit-scan, reflective, ultrasound

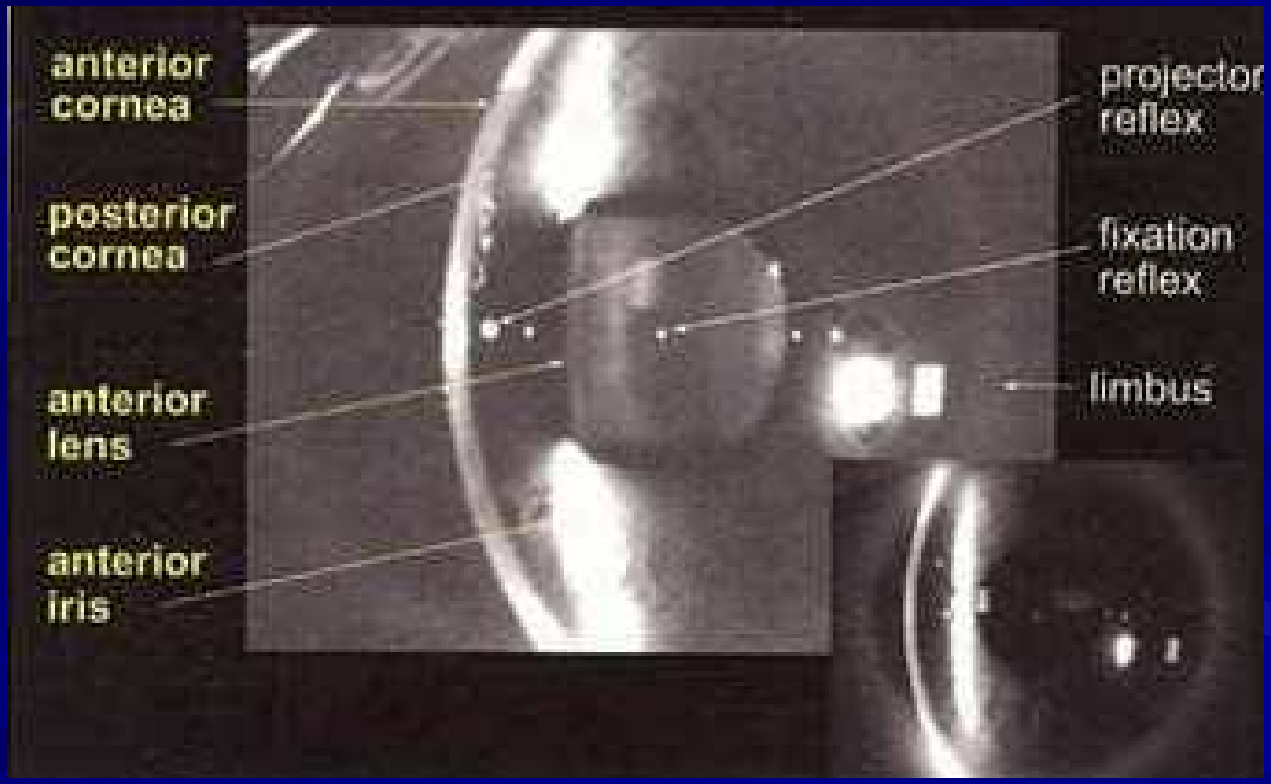
Measures multiple ocular surfaces:
anterior cornea, posterior cornea, anterior iris, anterior lens

Displays multiple and complete mathematical surfaces:
curvature, power, elevation, thickness

Multidimensionality makes Orbscan powerful
The wide variety of maps can make Orbscan bewildering

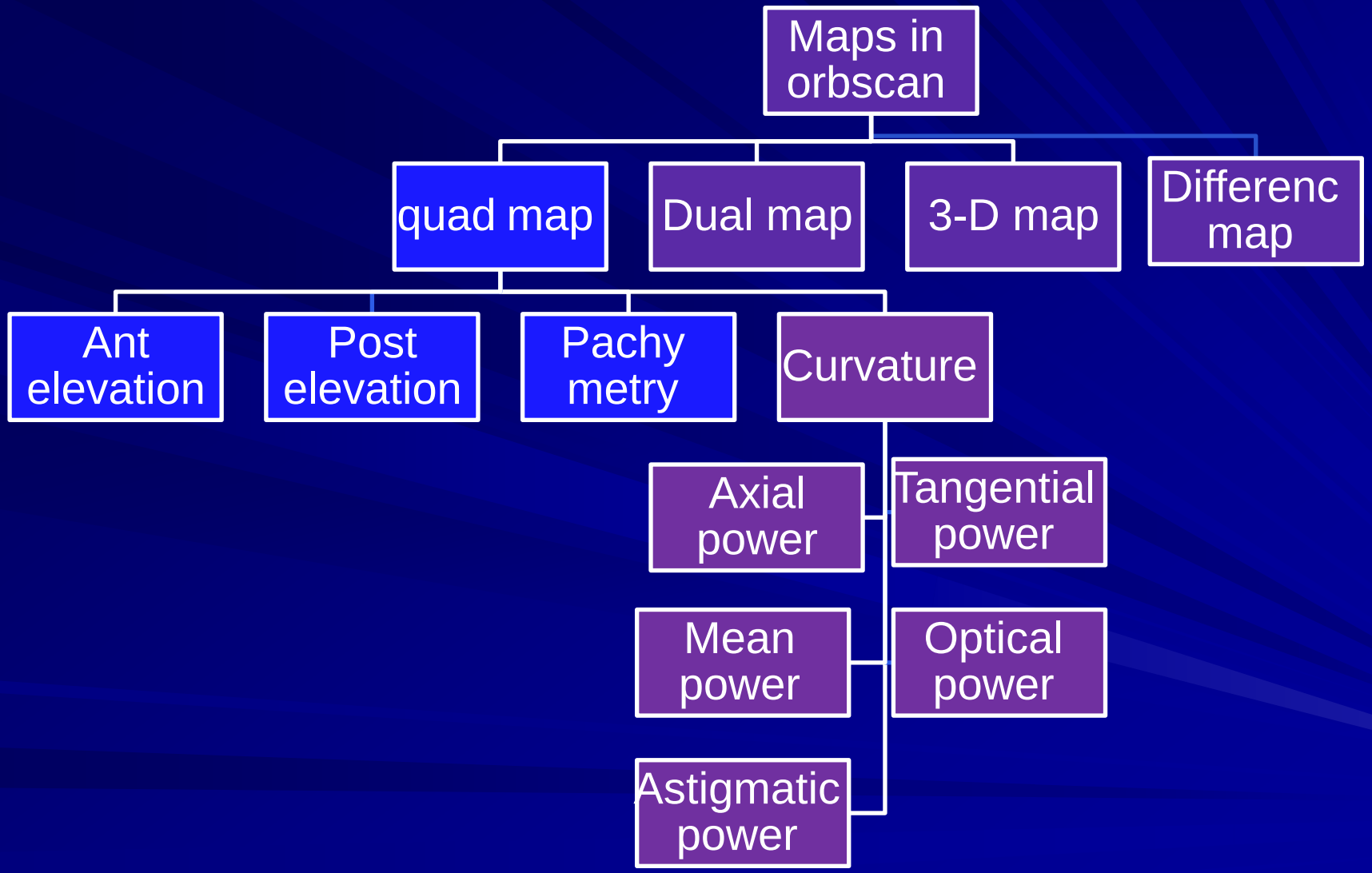
Orbscan IIz

Slit scanning system



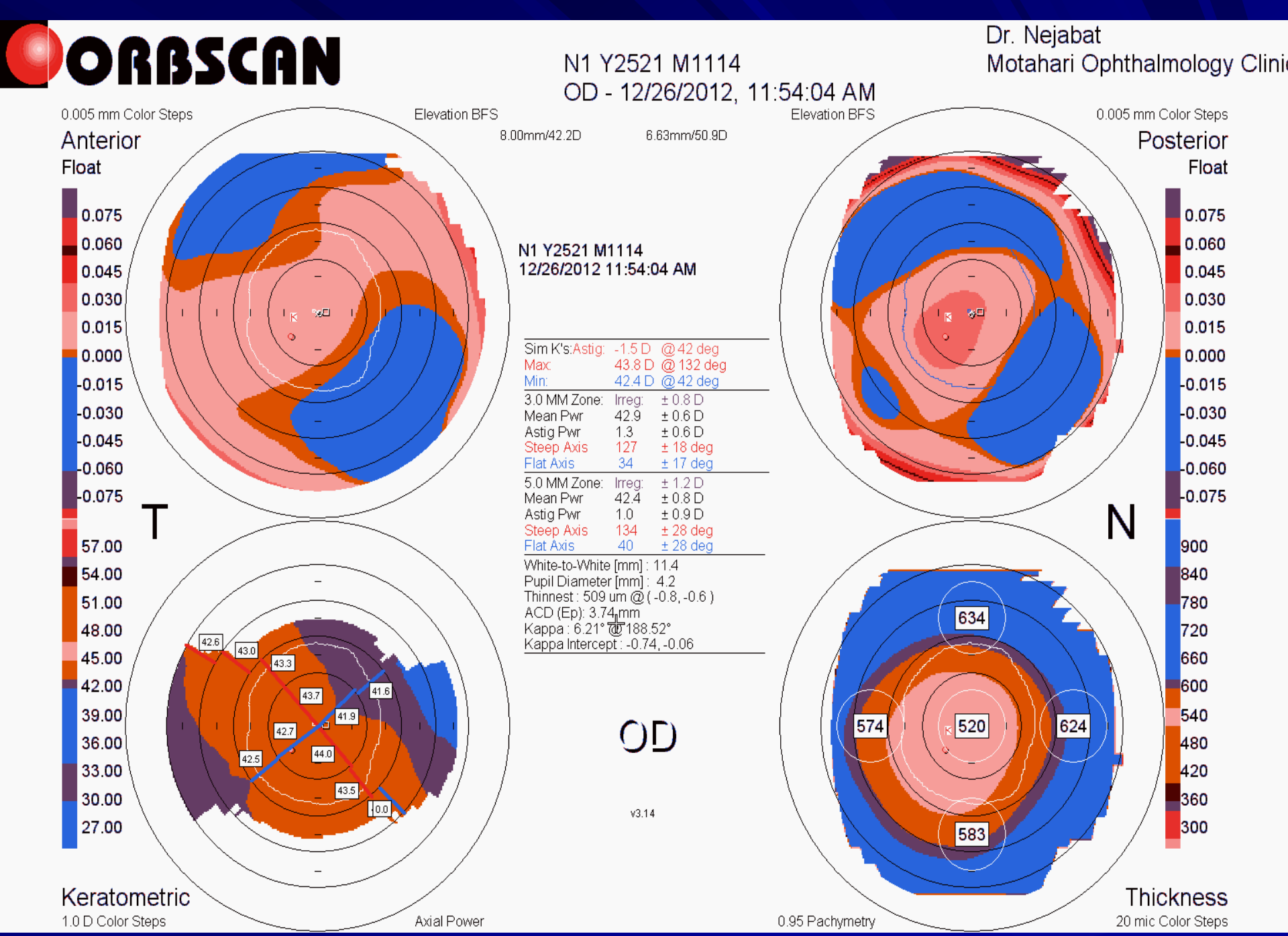
Orbscan IIz is able to measure

- AC depth
- Angle kappa
- Pupil diameter
- Sim K
- Pachymetry
- Anterior corneal surface
- Posterior corneal surface


Maps in orbscan
quad map
Dual map
3-D map
Differenc map
Ant elevation
Post elevation
Pachy metry
Curvature
Axial power
Tangential power
Mean power
Optical power
Astigmatic power

Quad map : show 4 pictures

- Anterior float
- Posterior float
- Keratometric pattern
- Pachymetry


ORBSCAN
N1 Y2521 M1114
OD - 12/26/2012, 11:54:04 AM
Dr. Nejabat
Motahari Ophthalmology Clinic
0.005 mm Color Steps
Elevation BFS
8.00mm/42.2D
6.63mm/50.9D
Elevation BFS
0.005 mm Color Steps
Anterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
Posterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
N1 Y2521 M1114
12/26/2012 11:54:04 AM
Sim K's:Astig: -1.5 D @ 42 deg
Max: 43.8 D @ 132 deg
Min: 42.4 D @ 42 deg
3.0 MM Zone: Irreg: ± 0.8 D
Mean Pwr 42.9 ± 0.6 D
Astig Pwr 1.3 ± 0.6 D
Steep Axis 127 ± 18 deg
Flat Axis 34 ± 17 deg
5.0 MM Zone: Irreg: ± 1.2 D
Mean Pwr 42.4 ± 0.8 D
Astig Pwr 1.0 ± 0.9 D
Steep Axis 134 ± 28 deg
Flat Axis 40 ± 28 deg
White-to-White [mm] : 11.4
Pupil Diameter [mm] : 4.2
Thinnest : 509 um @ (-0.8, -0.6)
ACD (Ep): 3.74 mm
Kappa : 6.21° @ 188.52°
Kappa Intercept : -0.74, -0.06
T
N
57.00
54.00
51.00
48.00
45.00
42.00
39.00
36.00
33.00
30.00
27.00
900
840
780
720
660
600
540
480
420
360
300
42.6
43.0
43.3
43.7
41.6
41.9
42.7
42.5
44.0
43.5
0.0
634
574
520
624
583
OD
v3.14
Keratometric
1.0 D Color Steps
Axial Power
0.95 Pachymetry
Thickness
20 mic Color Steps

BEST FIT SPHERE

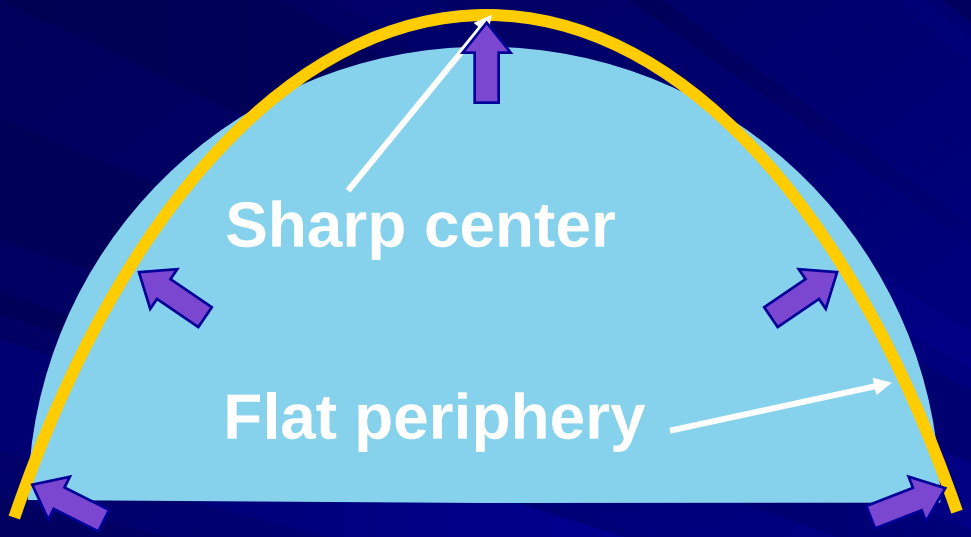
- The computer calculates a hypothetical sphere that matches as close as possible to the actual corneal shape being measured.
- Compares the real surface to the hypothetical sphere showing areas above the surface of the sphere in **warm colors** and areas below the surface in cool colors

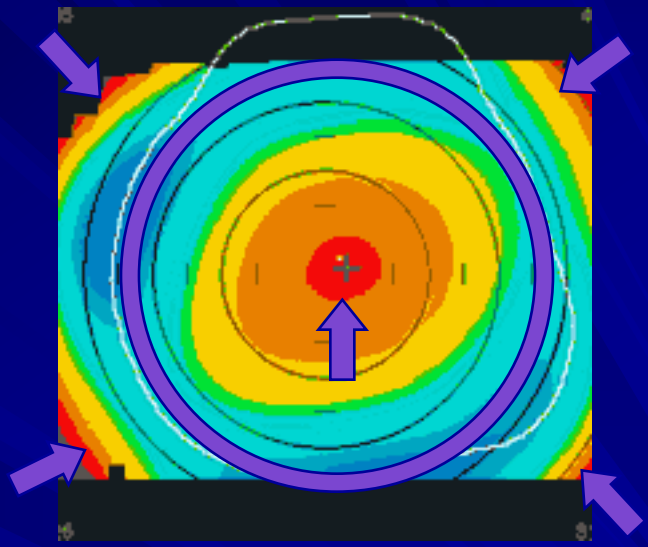
Best fit sphere (BFS)

- BFS-eye surface in mm
- Best fit between eye surface and sphere : GREEN
- Area under this spherical ideal surface: BLUE
- Area above this ideal sphere

  ORANGE-RED

Elevation Topology: Central Hill

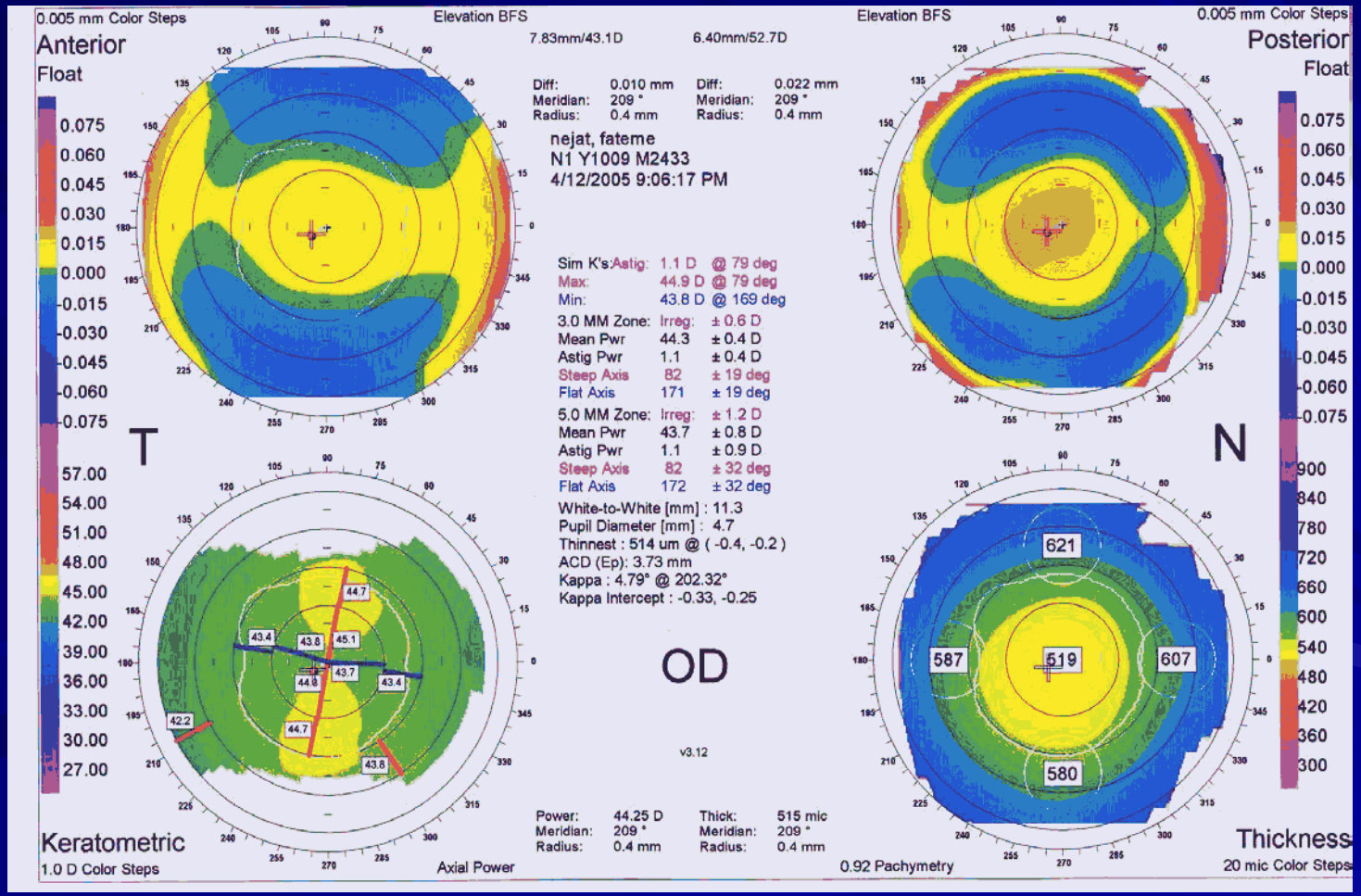




The normal cornea is Prolate, meaning that meridional curvature decreases from center to periphery.

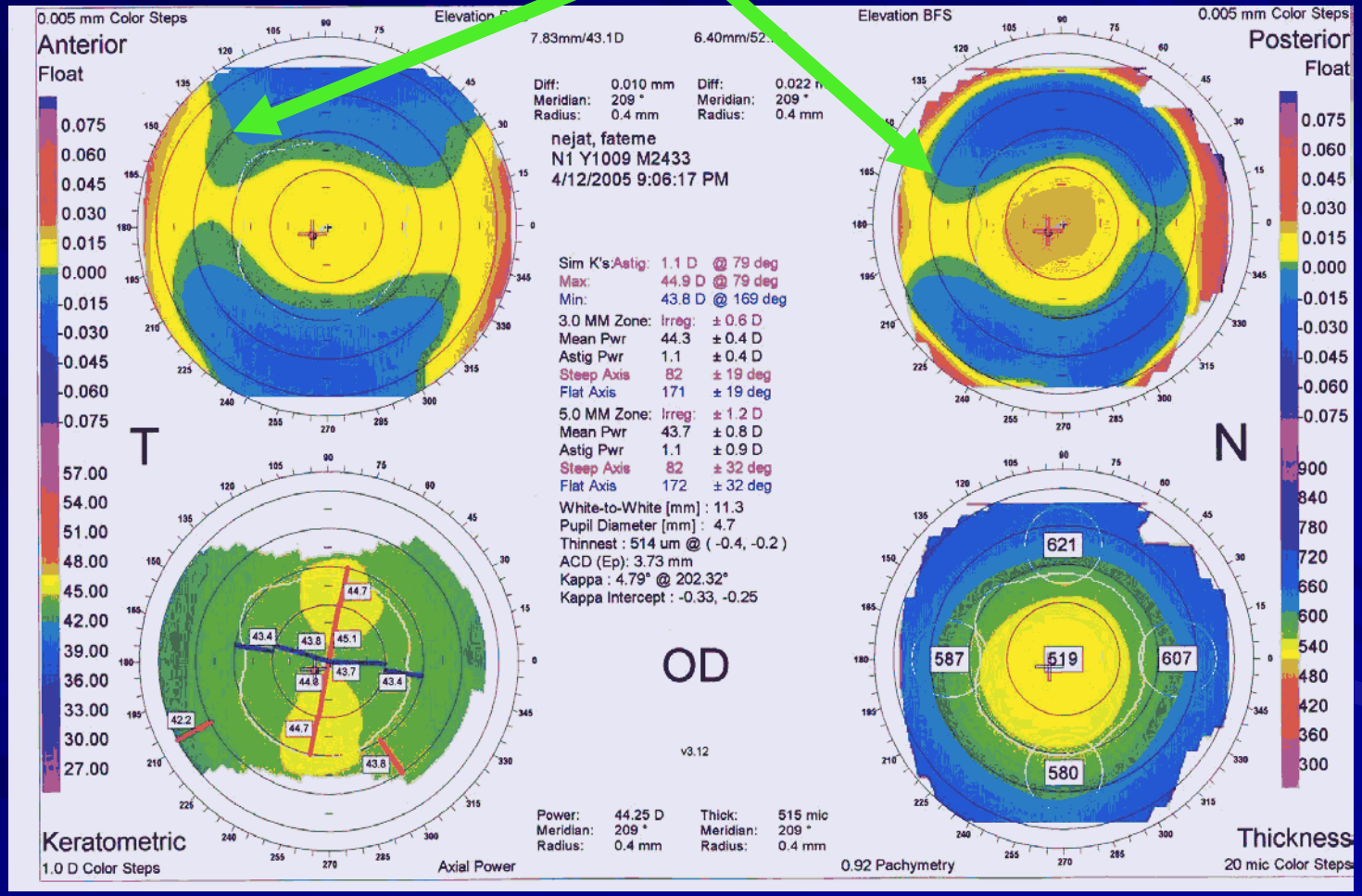
Prolateness of the normal cornea causes it to rise centrally above the reference sphere. The result is a Central Hill.

BFS-eye surface in mm



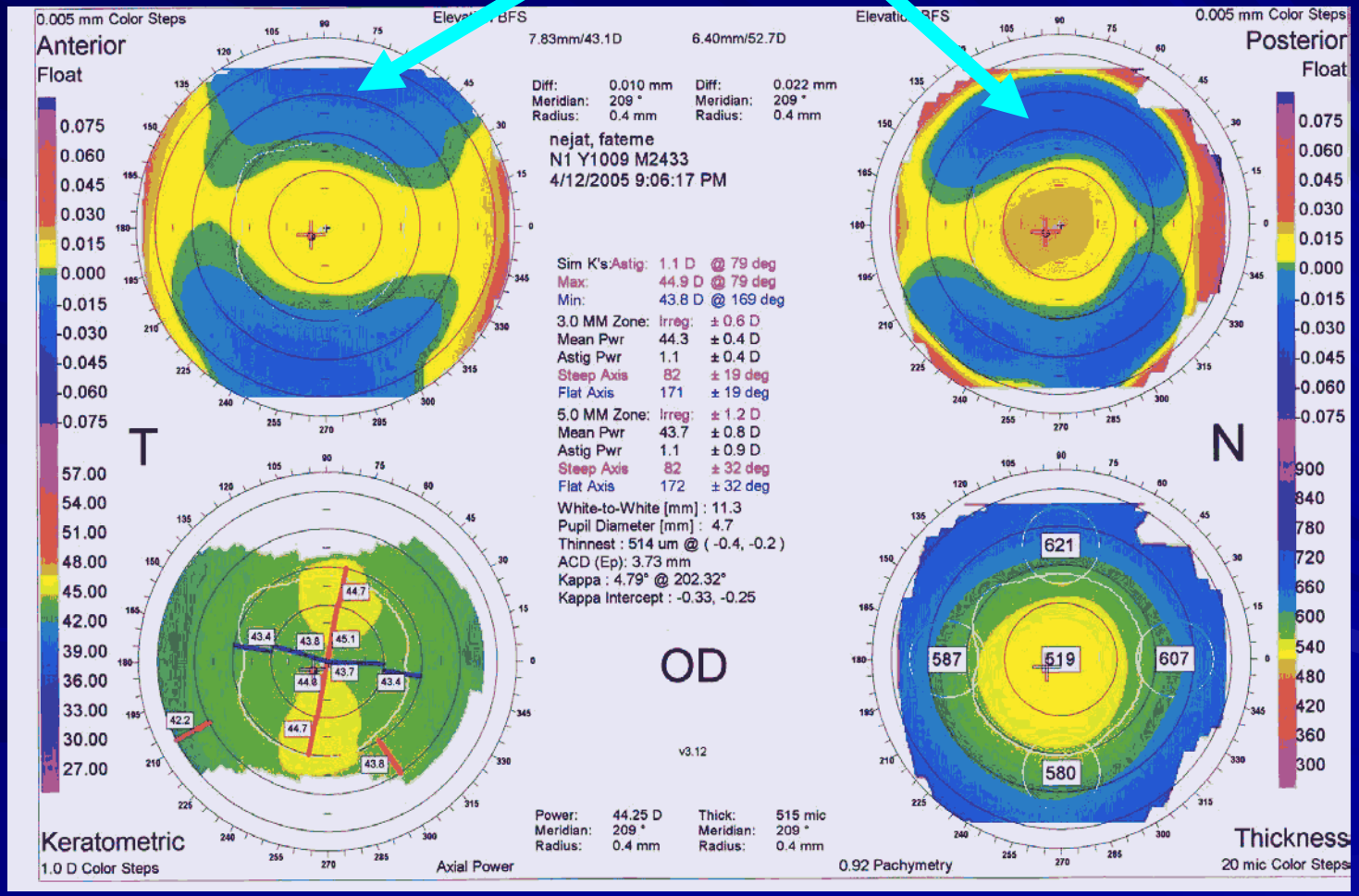
Best fit between eye surface and sphere :

GREEN



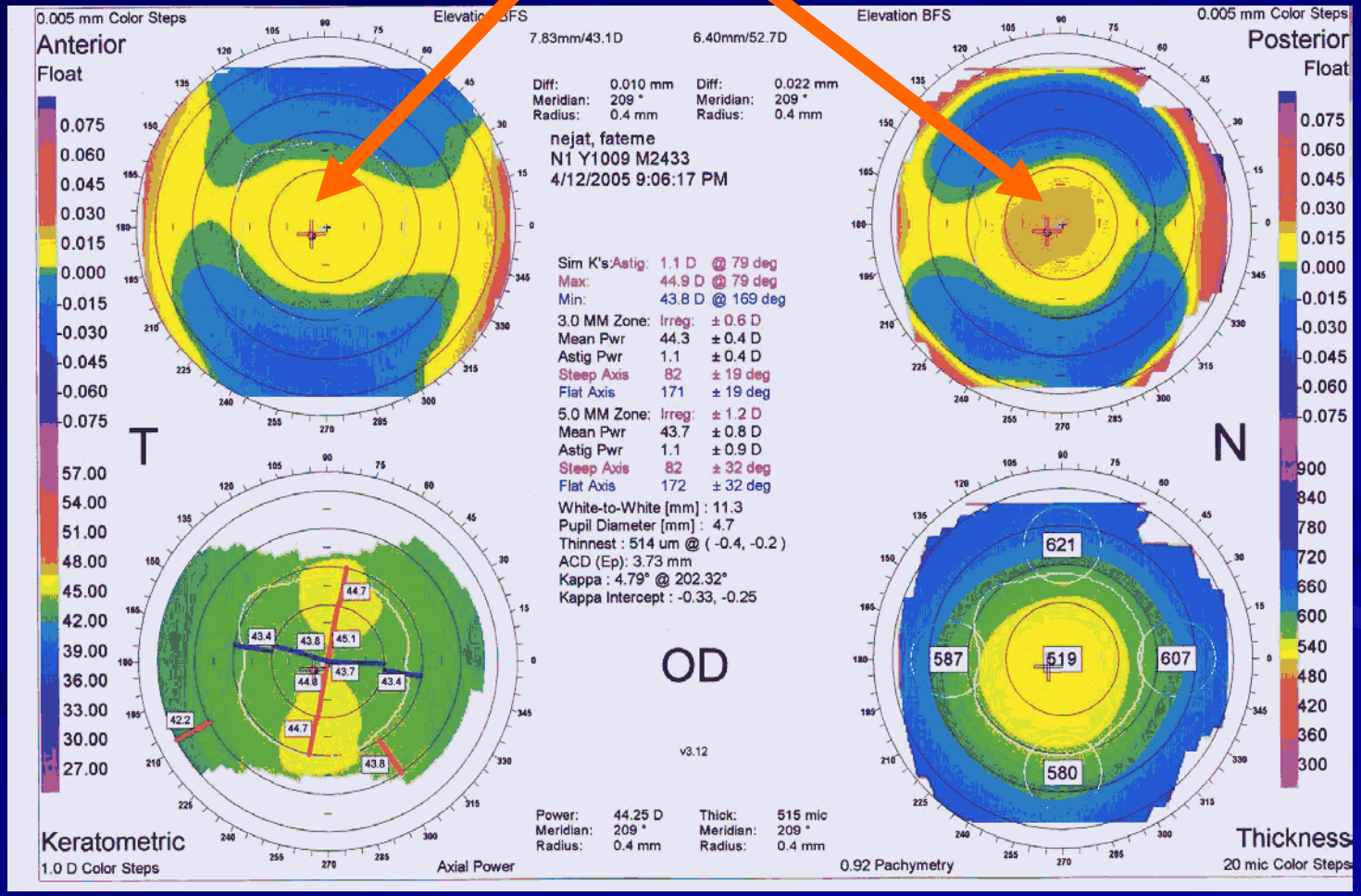
Area under this spherical ideal surface:

BLUE

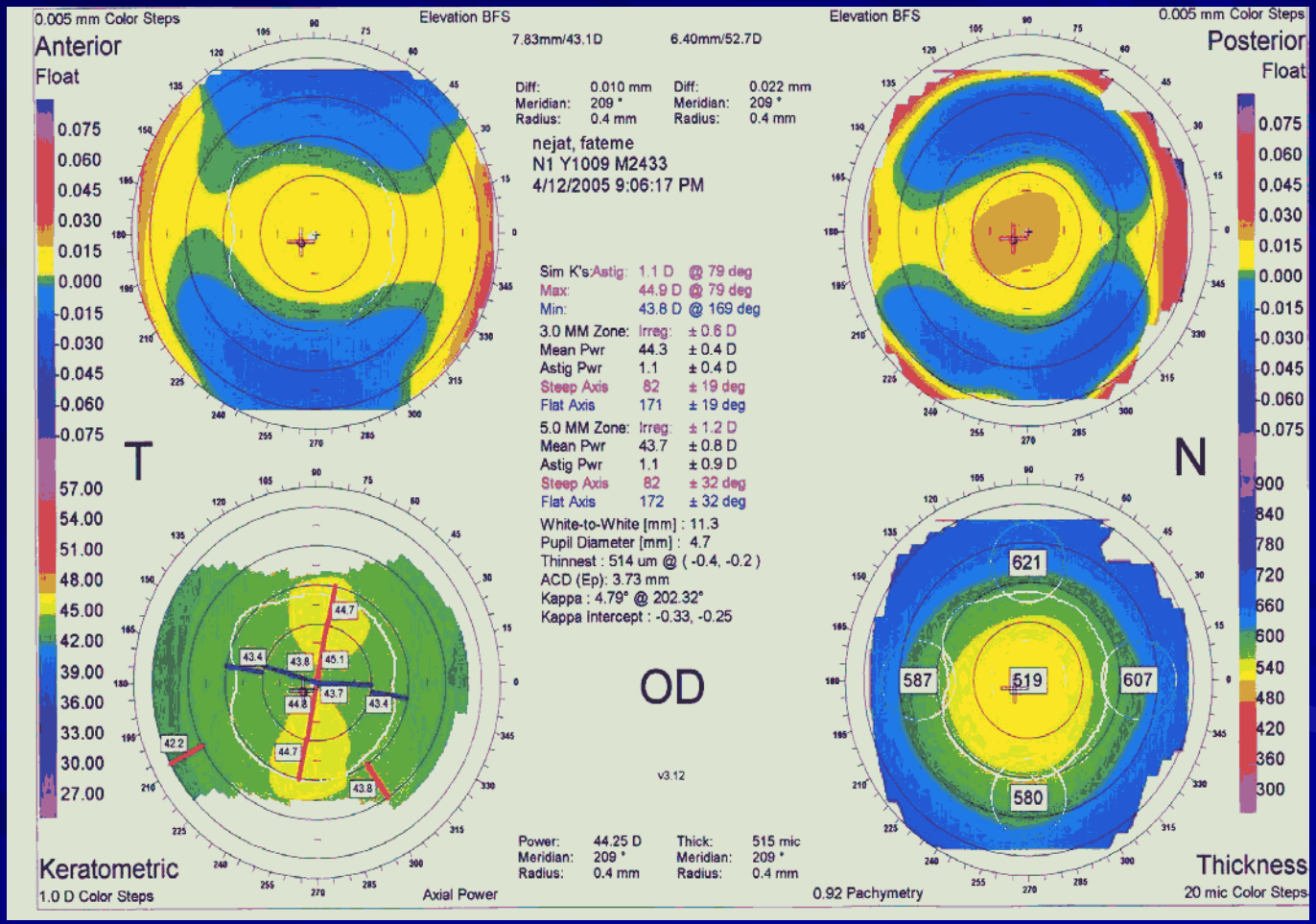


Area above this ideal sphere

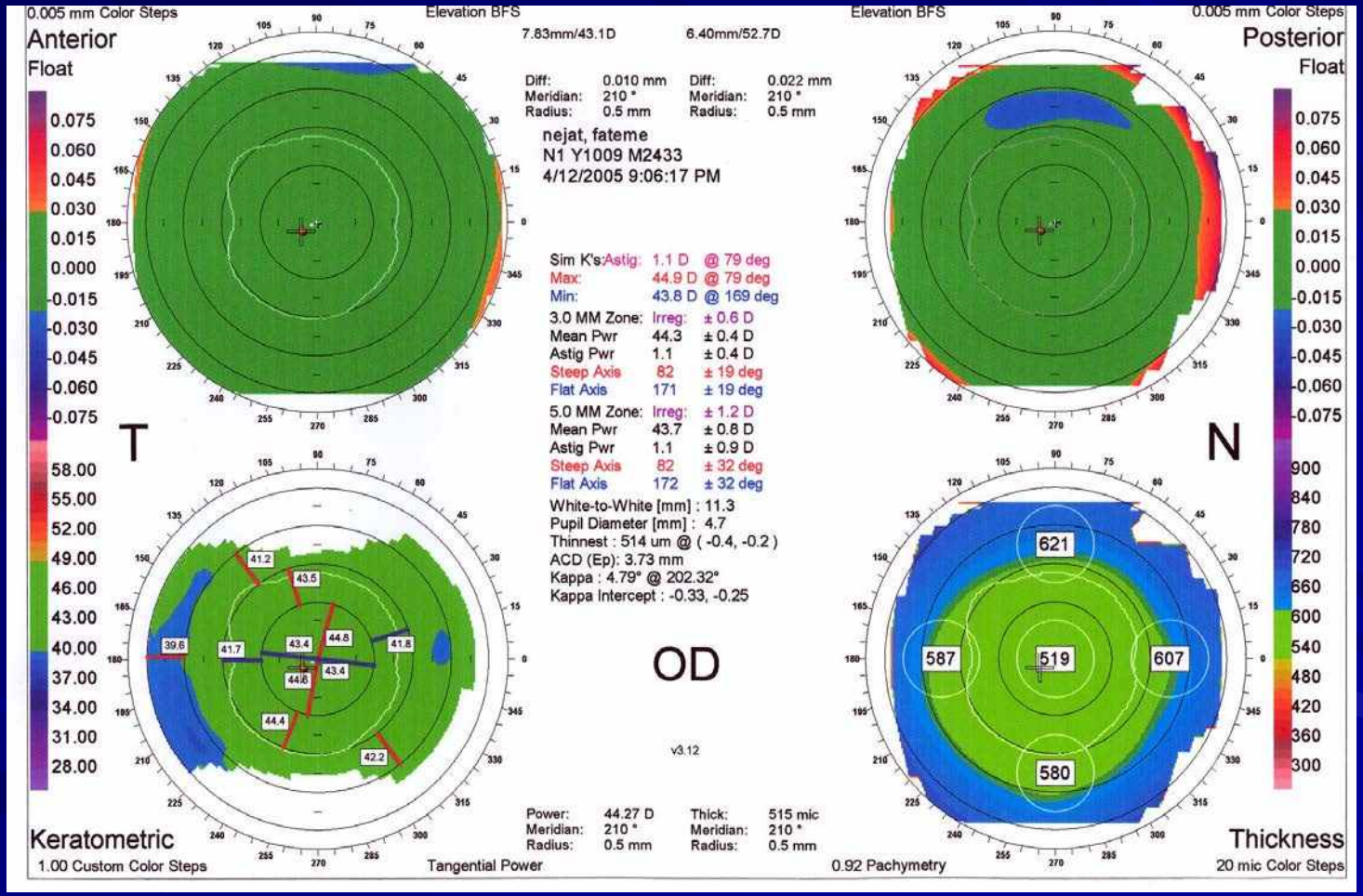
ORANGE-RED



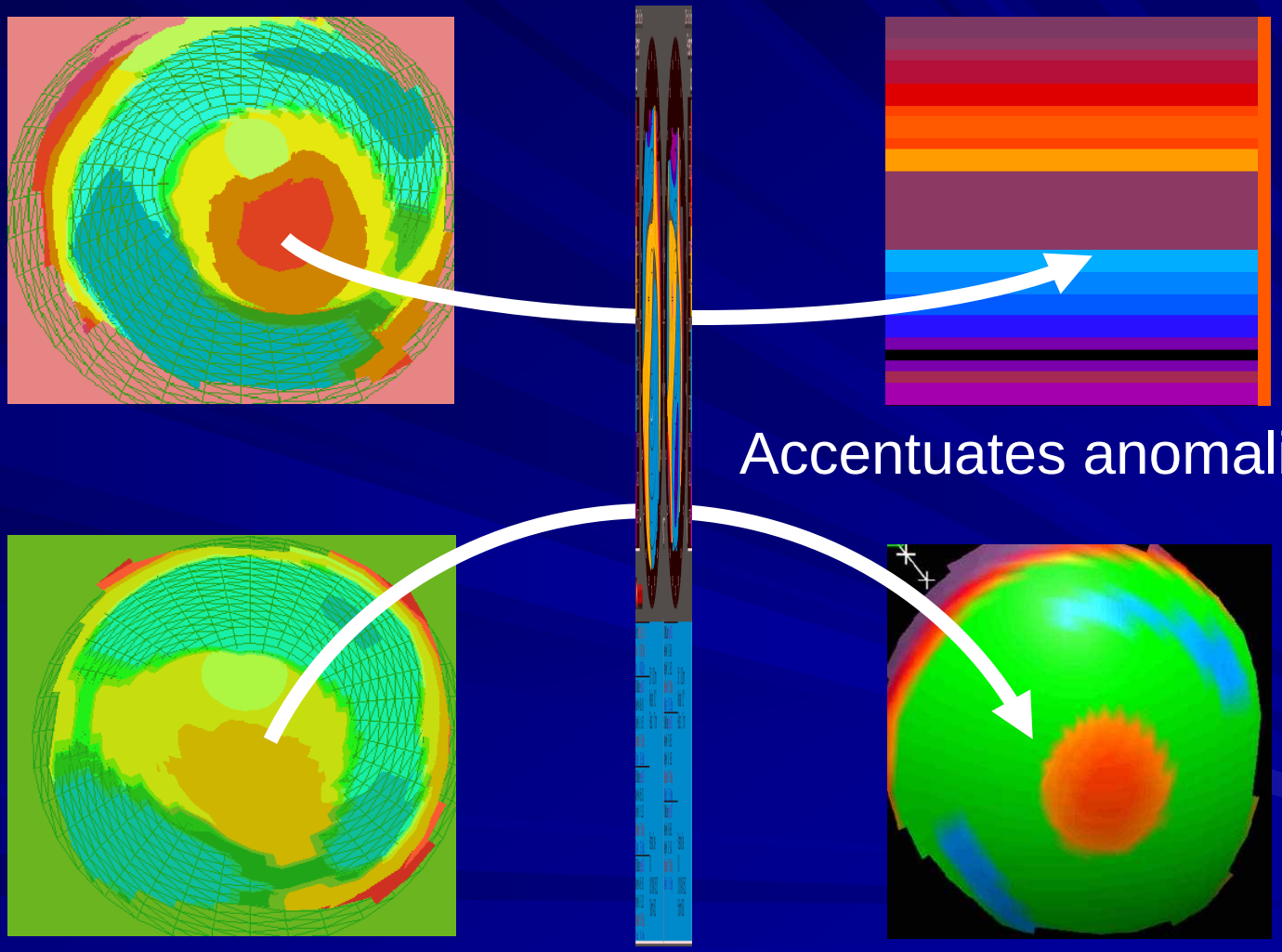
Quad Map


0.005 mm Color Steps
Elevation BFS
Anterior
Float
7.83mm/43.1D
6.40mm/52.7D
Diff: 0.010 mm
Meridian: 209 °
Radius: 0.4 mm
Diff: 0.022 mm
Meridian: 209 °
Radius: 0.4 mm
nejat, fateme
N1 Y1009 M2433
4/12/2005 9:06:17 PM
Sim K's:Astig: 1.1 D @ 79 deg
Max: 44.9 D @ 79 deg
Min: 43.8 D @ 169 deg
3.0 MM Zone: Irreg: ± 0.6 D
Mean Pwr 44.3 ± 0.4 D
Astig Pwr 1.1 ± 0.4 D
Steep Axis 82 ± 19 deg
Flat Axis 171 ± 19 deg
5.0 MM Zone: Irreg: ± 1.2 D
Mean Pwr 43.7 ± 0.8 D
Astig Pwr 1.1 ± 0.9 D
Steep Axis 82 ± 32 deg
Flat Axis 172 ± 32 deg
White-to-White [mm] : 11.3
Pupil Diameter [mm] : 4.7
Thinnest : 514 um @ (-0.4, -0.2)
ACD (Ep): 3.73 mm
Kappa : 4.79° @ 202.32°
Kappa Intercept : -0.33, -0.25
OD
v3.12
Power: 44.25 D
Meridian: 209 °
Radius: 0.4 mm
Thick: 515 mic
Meridian: 209 °
Radius: 0.4 mm
Elevation BFS
0.005 mm Color Steps
Posterior
Float
T
N
Keratometric
1.0 D Color Steps
Axial Power
0.92 Pachymetry
Thickness
20 mic Color Steps
621
587
619
607
580

Quad Map + Normal Band



Normal Band Scale

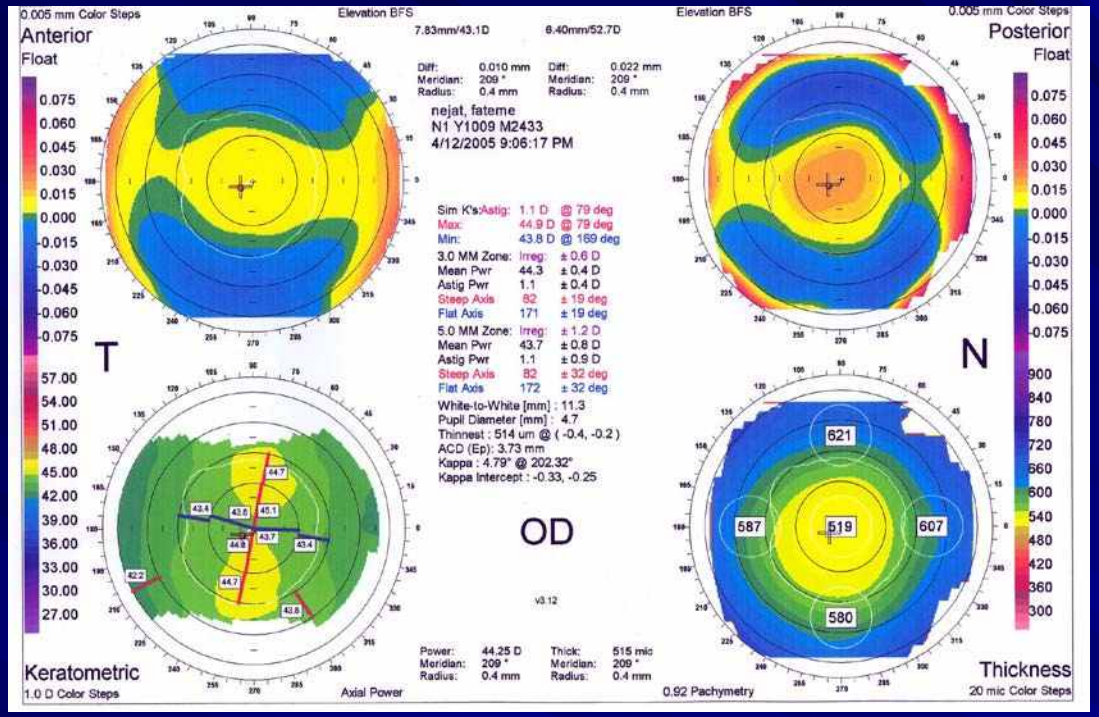


Accentuates anomalies

Filters small irregularities

Quad Map + Normal Band (NB)

- Anterior corneal elevation : NB = ± 25 μ of BFS
- Posterior corneal elevation : NB = ± 25 μ of BFS
- Keratometric mean curvature : NB = 40 to 48D
- Pachymetry : NB = 500 to 600 μ


0.005 mm Color Steps
Elevation BFS
Anterior
Float
7.83mm/43.1D
6.40mm/52.7D
Diff: 0.010 mm
Meridian: 209 °
Radius: 0.4 mm
Diff: 0.022 mm
Meridian: 209 °
Radius: 0.4 mm
nejat, fateme
N1 Y1009 M2433
4/12/2005 9:06:17 PM
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Flat Axis 171 ± 19 deg
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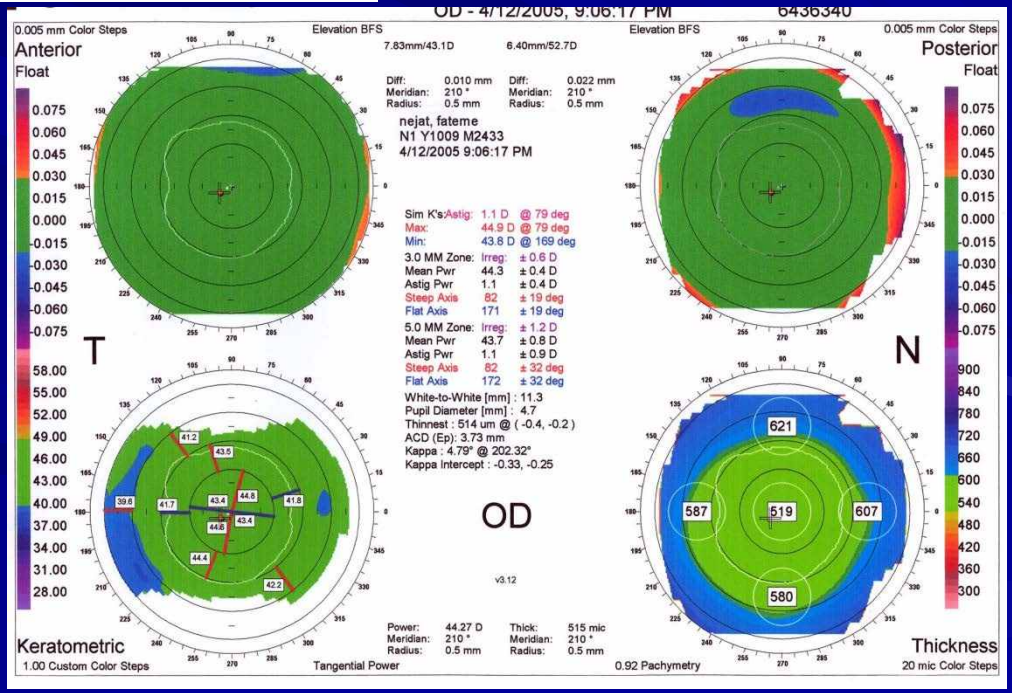
Kappa Intercept : -0.33, -0.25
OD
v3.12
Power: 44.25 D
Meridian: 209 °
Radius: 0.4 mm
Thick: 515 mic
Meridian: 209 °
Radius: 0.4 mm
Keratometric
1.0 D Color Steps
Axial Power
0.92 Pachymetry
Thickness
20 mic Color Steps
T
N
621
587
519
607
580


OD - 4/12/2005, 9:06:17 PM
6436340
0.005 mm Color Steps
Elevation BFS
Anterior
Float
7.83mm/43.1D
6.40mm/52.7D
Diff: 0.010 mm
Meridian: 210 °
Radius: 0.5 mm
Diff: 0.022 mm
Meridian: 210 °
Radius: 0.5 mm
nejat, fateme
N1 Y1009 M2433
4/12/2005 9:06:17 PM
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Max: 44.9 D @ 79 deg
Min: 43.8 D @ 169 deg
3.0 MM Zone: Irreg: ± 0.6 D
Mean Pwr 44.3 ± 0.4 D
Astig Pwr 1.1 ± 0.4 D
Steep Axis 82 ± 19 deg
Flat Axis 171 ± 19 deg
5.0 MM Zone: Irreg: ± 1.2 D
Mean Pwr 43.7 ± 0.8 D
Astig Pwr 1.1 ± 0.9 D
Steep Axis 82 ± 32 deg
Flat Axis 172 ± 32 deg
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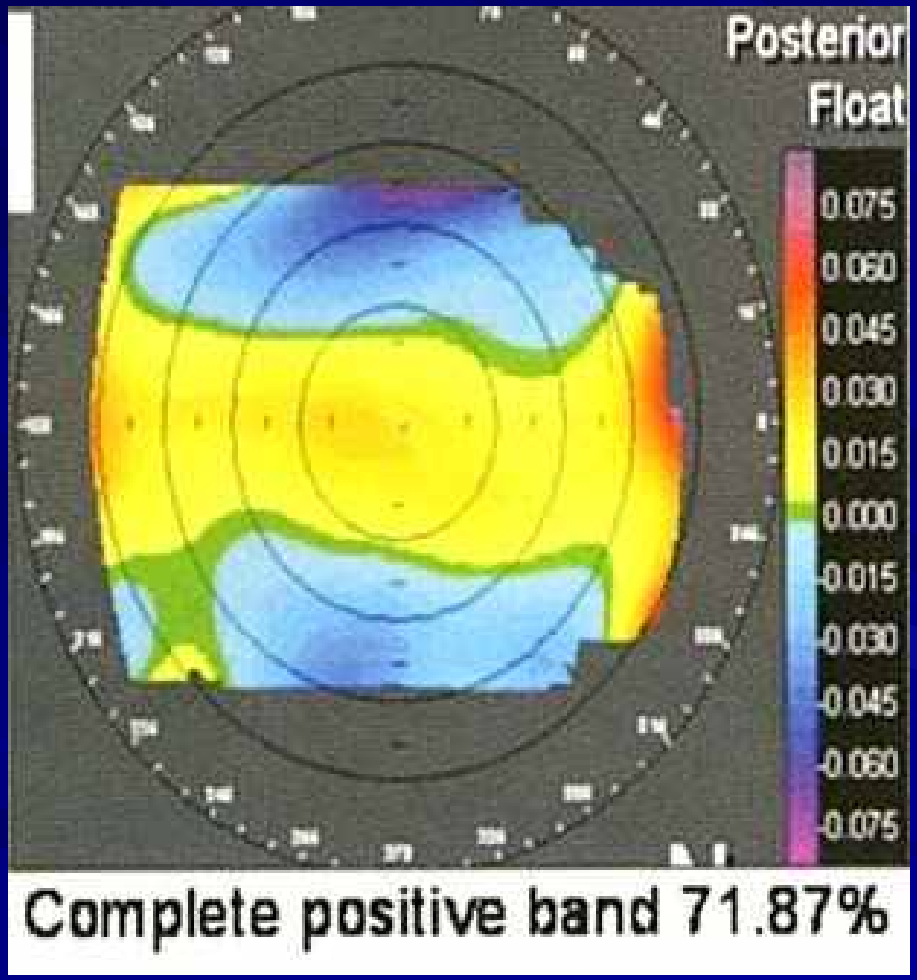
Thinnest : 514 um @ (-0.4, -0.2)
ACD (Ep): 3.73 mm
Kappa : 4.79° @ 202.32°
Kappa Intercept : -0.33, -0.25
OD
v3.12
Power: 44.27 D
Meridian: 210 °
Radius: 0.5 mm
Thick: 515 mic
Meridian: 210 °
Radius: 0.5 mm
Keratometric
1.00 Custom Color Steps
Tangential Power
0.92 Pachymetry
Thickness
20 mic Color Steps
T
N
621
587
519
607
580

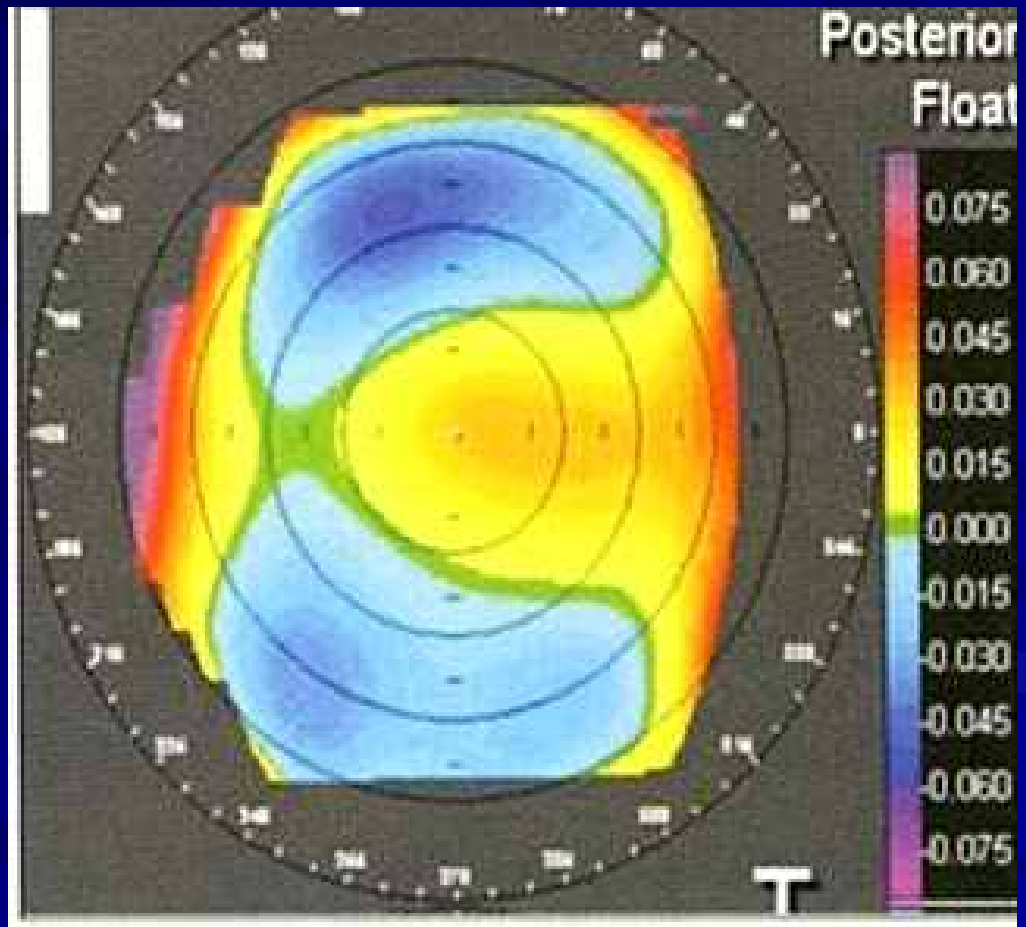
Orbscan IIz

elevation BFS posterior



Orbscan IIz

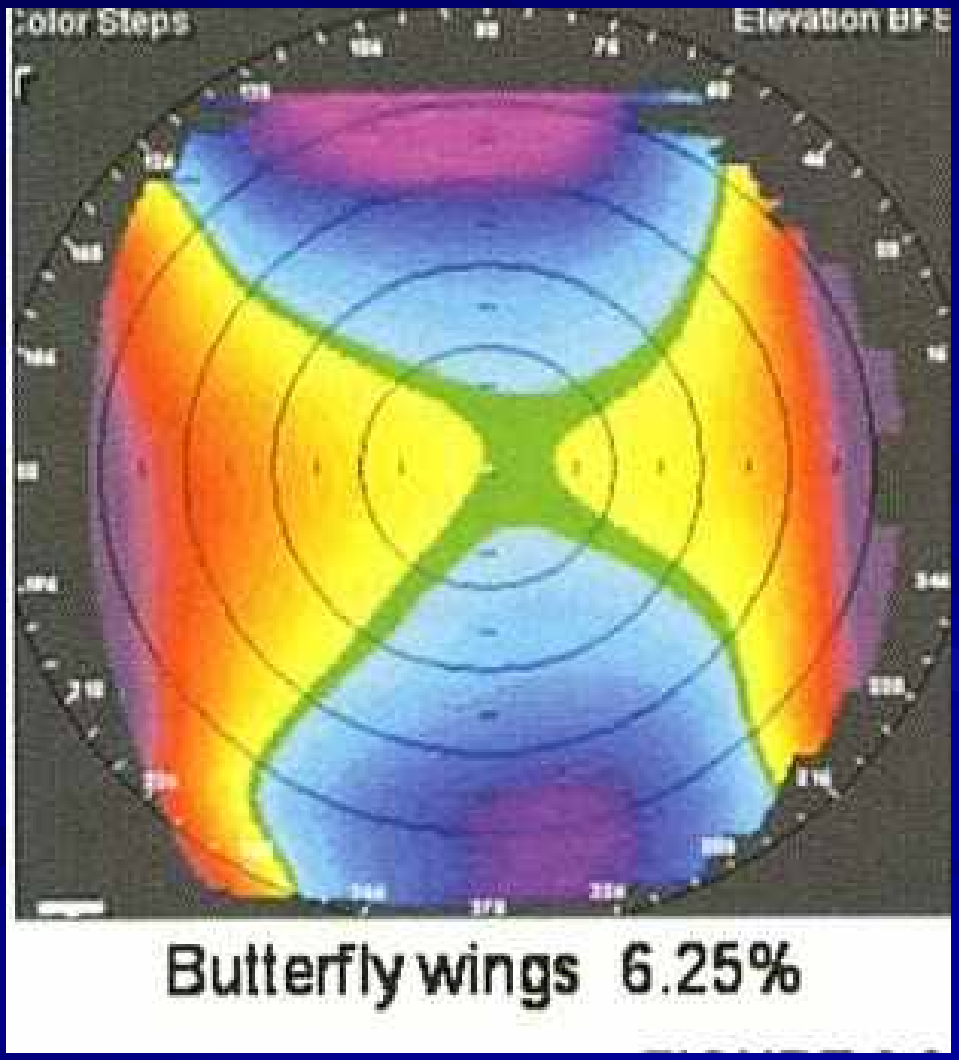
elevation BFS posterior



Incomplete positive band 18.75

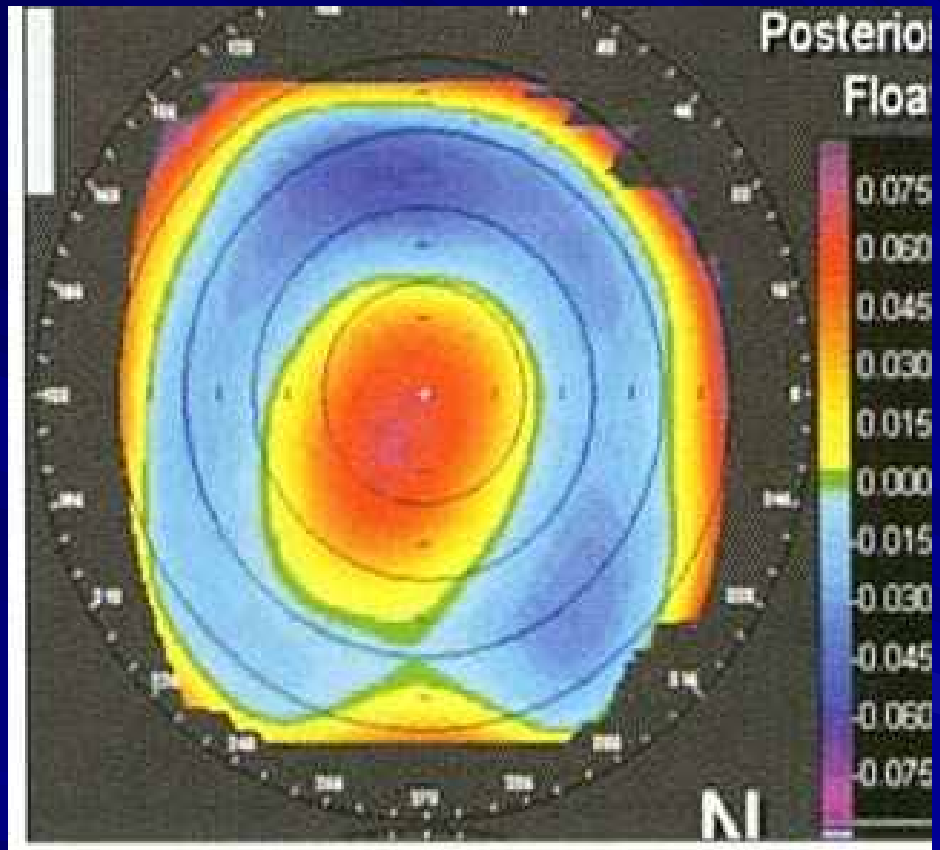
Orbscan IIz

elevation BFS posterior



Orbscan IIz

elevation BFS posterior



Central island 3.13%

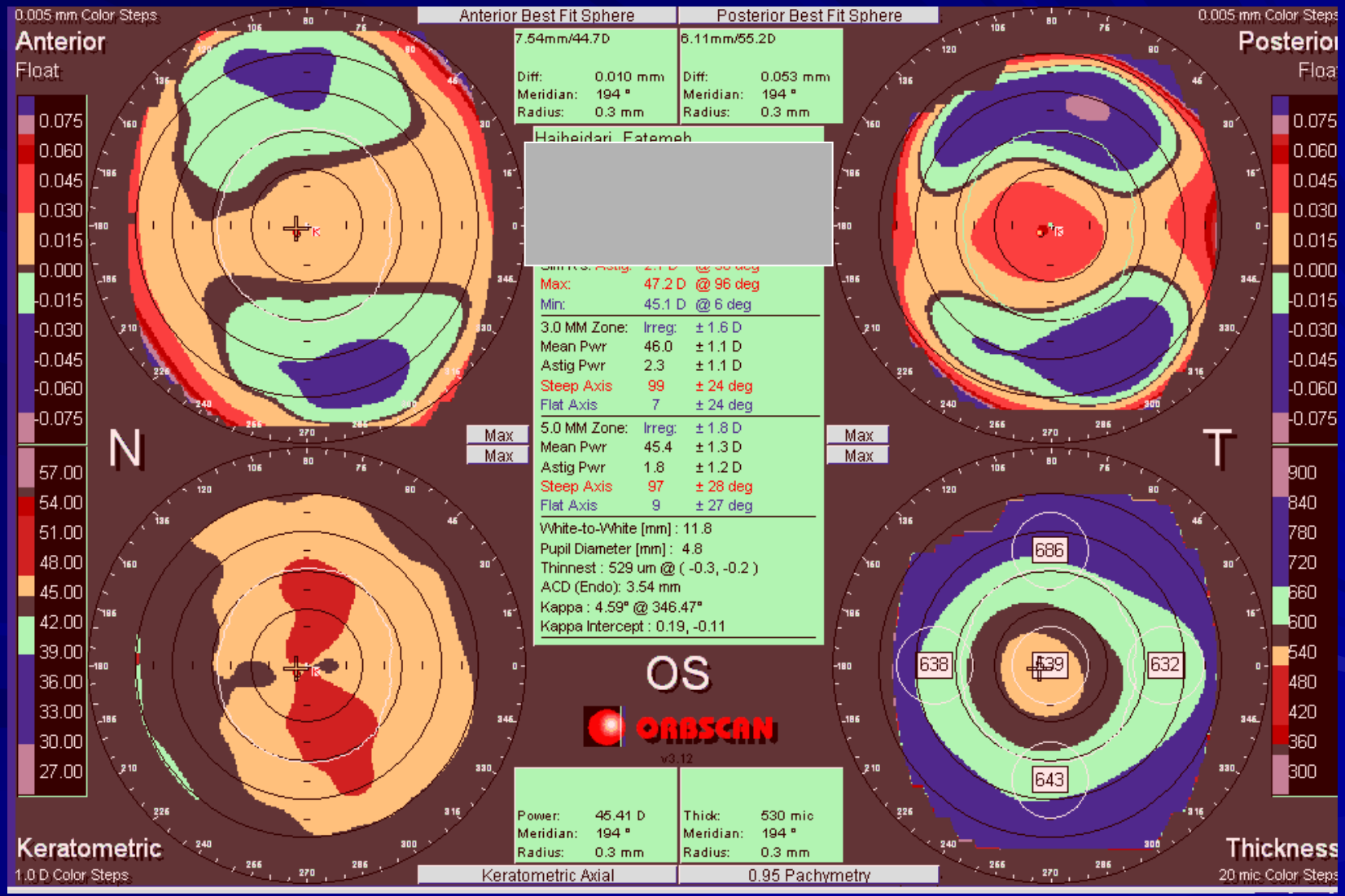
Quad Map + Normal Band (NB)

PREOPERATIVE LASIK SCREENING

Three Step Rule

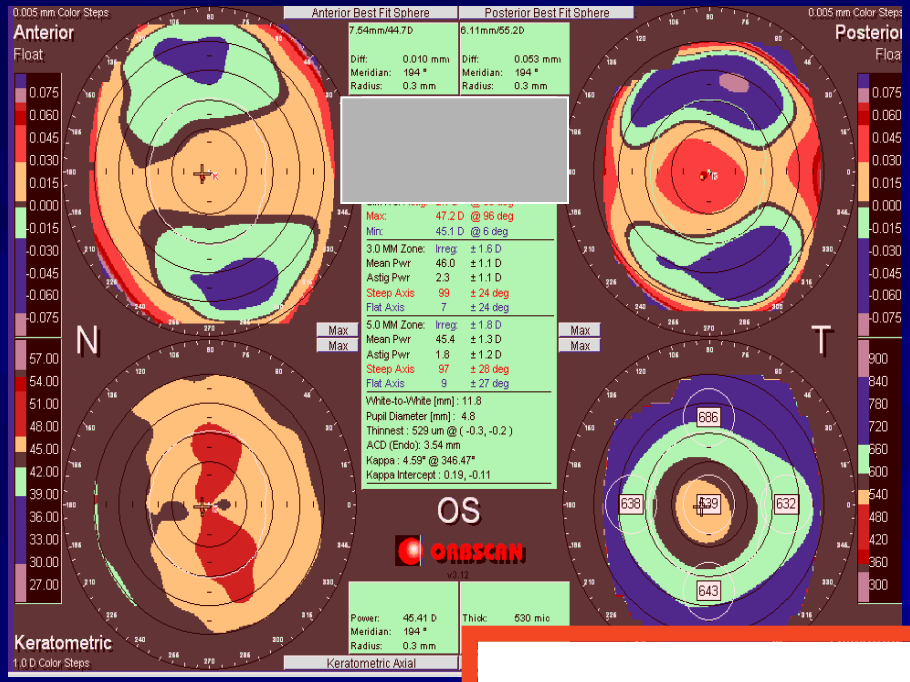
- One abnormal map: Caution
- Two abnormal maps: Concern
- Three abnormal maps: Contraindication

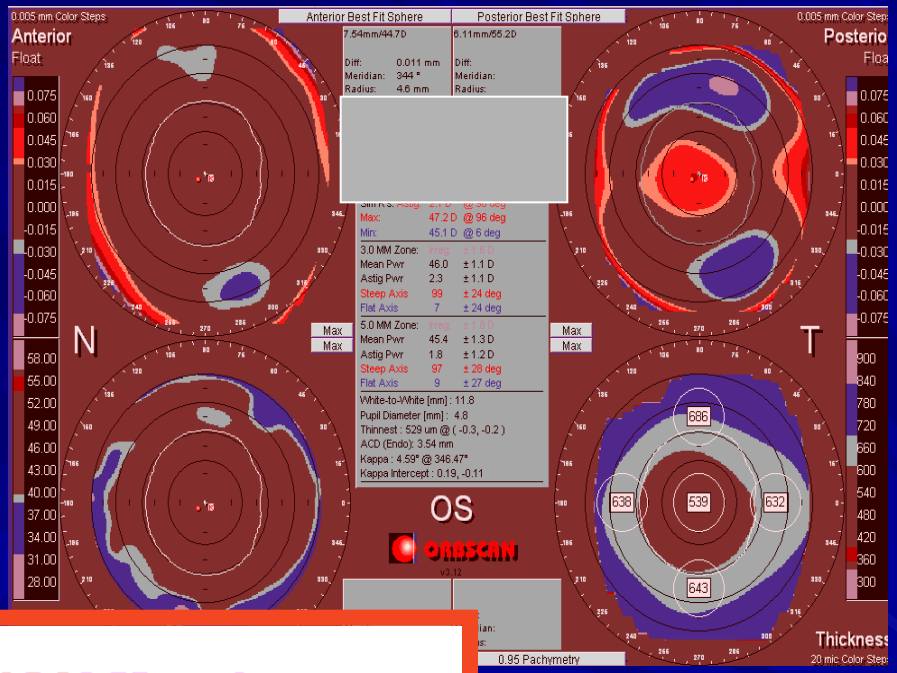
Quad Map


0.005 mm Color Steps
Anterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
Anterior Best Fit Sphere
7.54mm/44.7D
Diff: 0.010 mm
Meridian: 194 °
Radius: 0.3 mm
Posterior Best Fit Sphere
6.11mm/55.2D
Diff: 0.053 mm
Meridian: 194 °
Radius: 0.3 mm
0.005 mm Color Steps
Posterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
Max: 47.2 D @ 96 deg
Min: 45.1 D @ 6 deg
3.0 MM Zone: Irreg: ± 1.6 D
Mean Pwr 46.0 ± 1.1 D
Astig Pwr 2.3 ± 1.1 D
Steep Axis 99 ± 24 deg
Flat Axis 7 ± 24 deg
5.0 MM Zone: Irreg: ± 1.8 D
Mean Pwr 45.4 ± 1.3 D
Astig Pwr 1.8 ± 1.2 D
Steep Axis 97 ± 28 deg
Flat Axis 9 ± 27 deg
White-to-White [mm] : 11.8
Pupil Diameter [mm] : 4.8
Thinnest : 529 um @ (-0.3, -0.2)
ACD (Endo): 3.54 mm
Kappa : 4.59° @ 346.47°
Kappa Intercept : 0.19, -0.11
N
Max
Max
T
Max
Max
57.00
54.00
51.00
48.00
45.00
42.00
39.00
36.00
33.00
30.00
27.00
900
840
780
720
660
600
540
480
420
360
300
686
638
639
632
643
OS
ORBSCAN
v3.12
Power: 45.41 D
Meridian: 194 °
Radius: 0.3 mm
Thick: 530 mic
Meridian: 194 °
Radius: 0.3 mm
Keratometric
1.0 D Color Steps
Keratometric Axial
0.95 Pachymetry
Thickness
20 mic Color Steps

Quad Map + Normal Band (NB)

Three – step rule



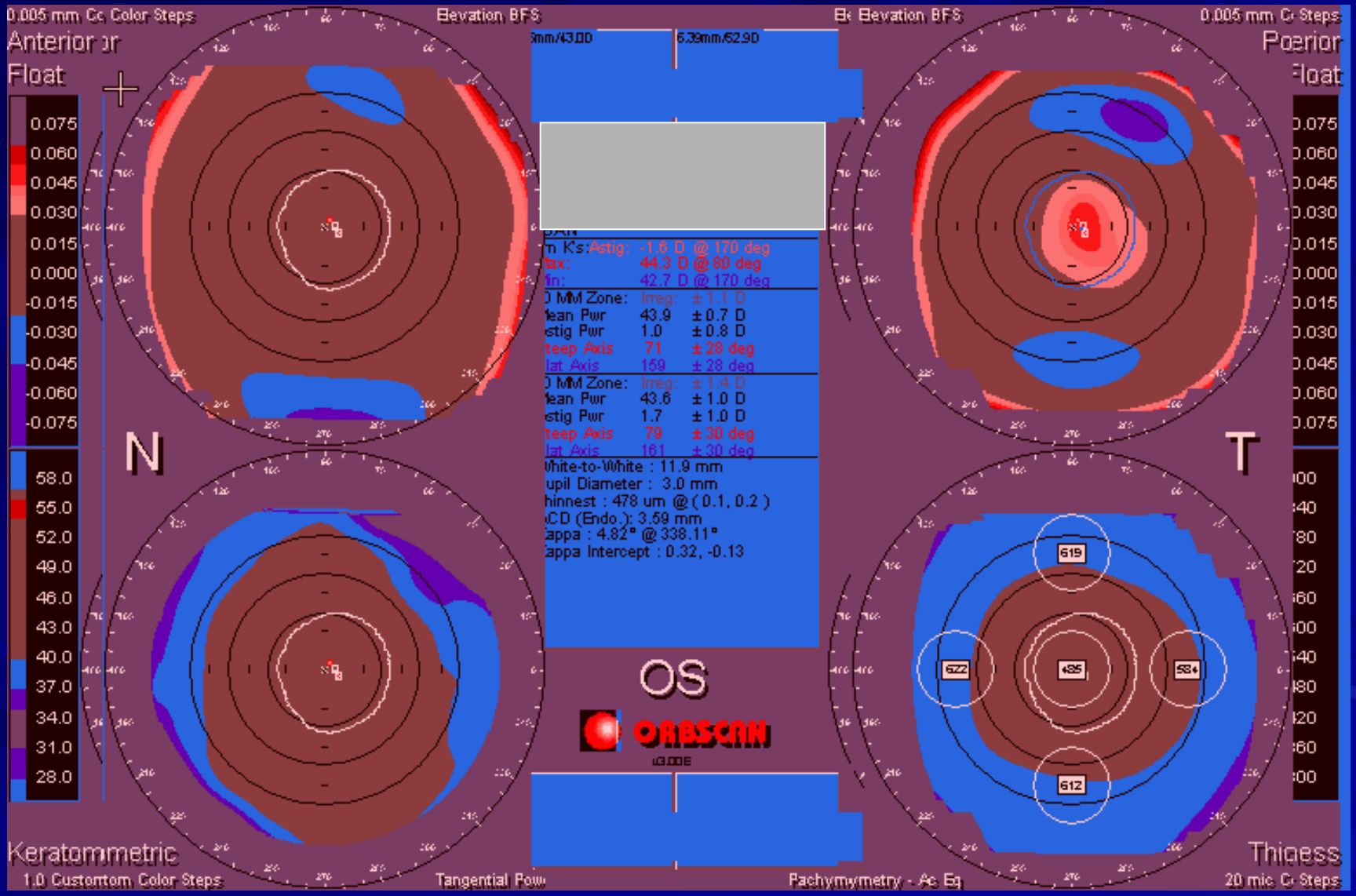


PREOPERATIVE LASIK SCREENING

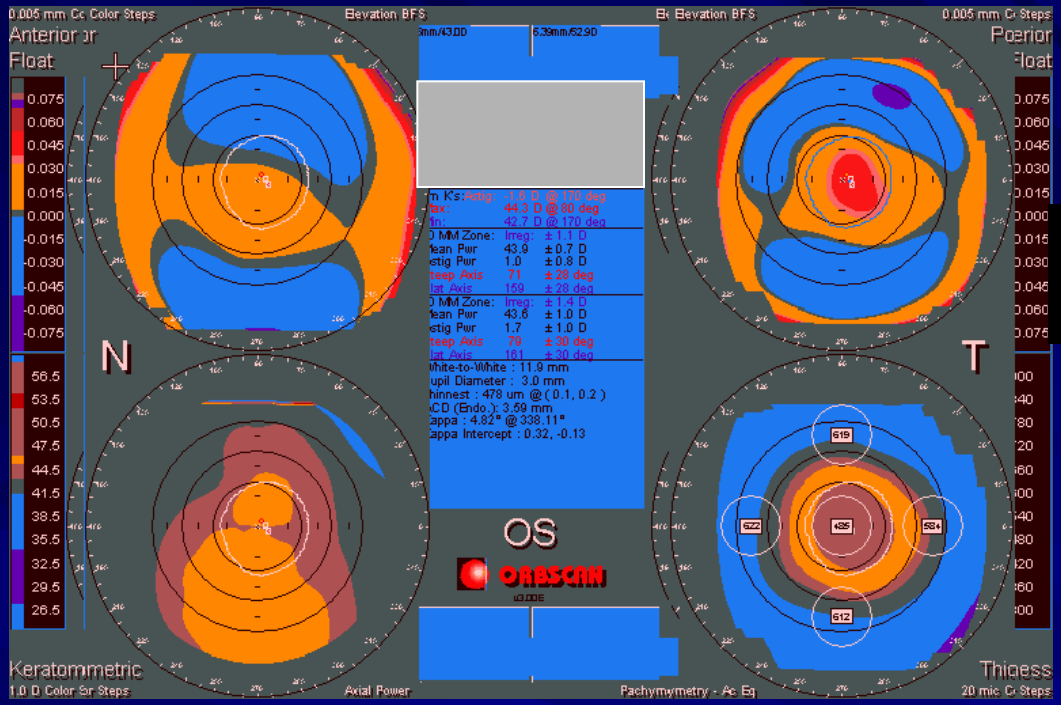
Three Step Rule

- One abnormal map: Caution
- Two abnormal maps: Concern
- Three abnormal maps: Contraindication

Quad Map + Normal Band (NB)



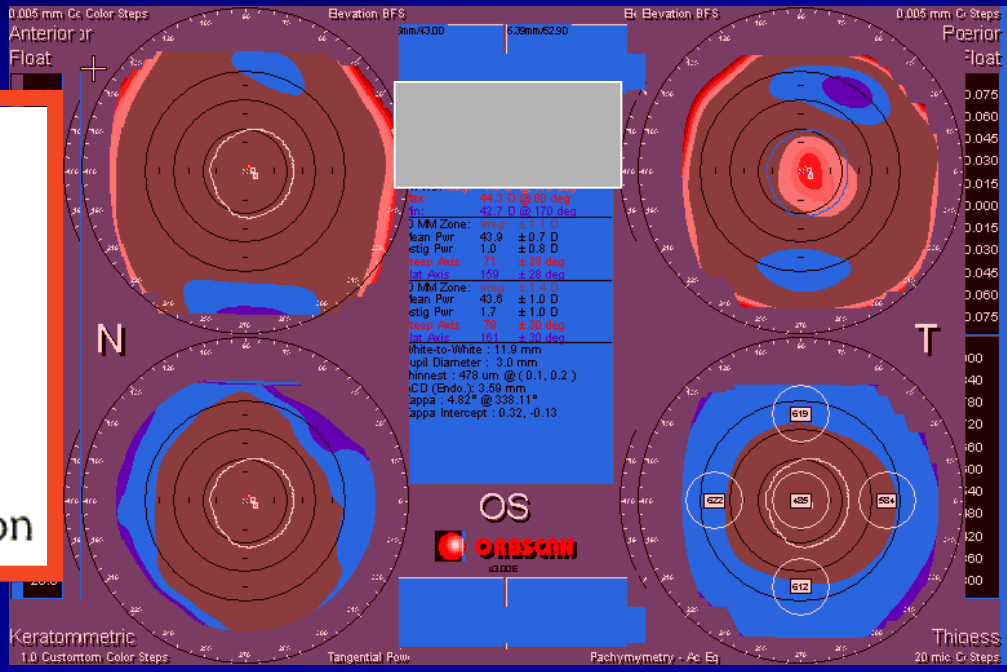
Three – step rule



PREOPERATIVE LASIK SCREENING

Three Step Rule

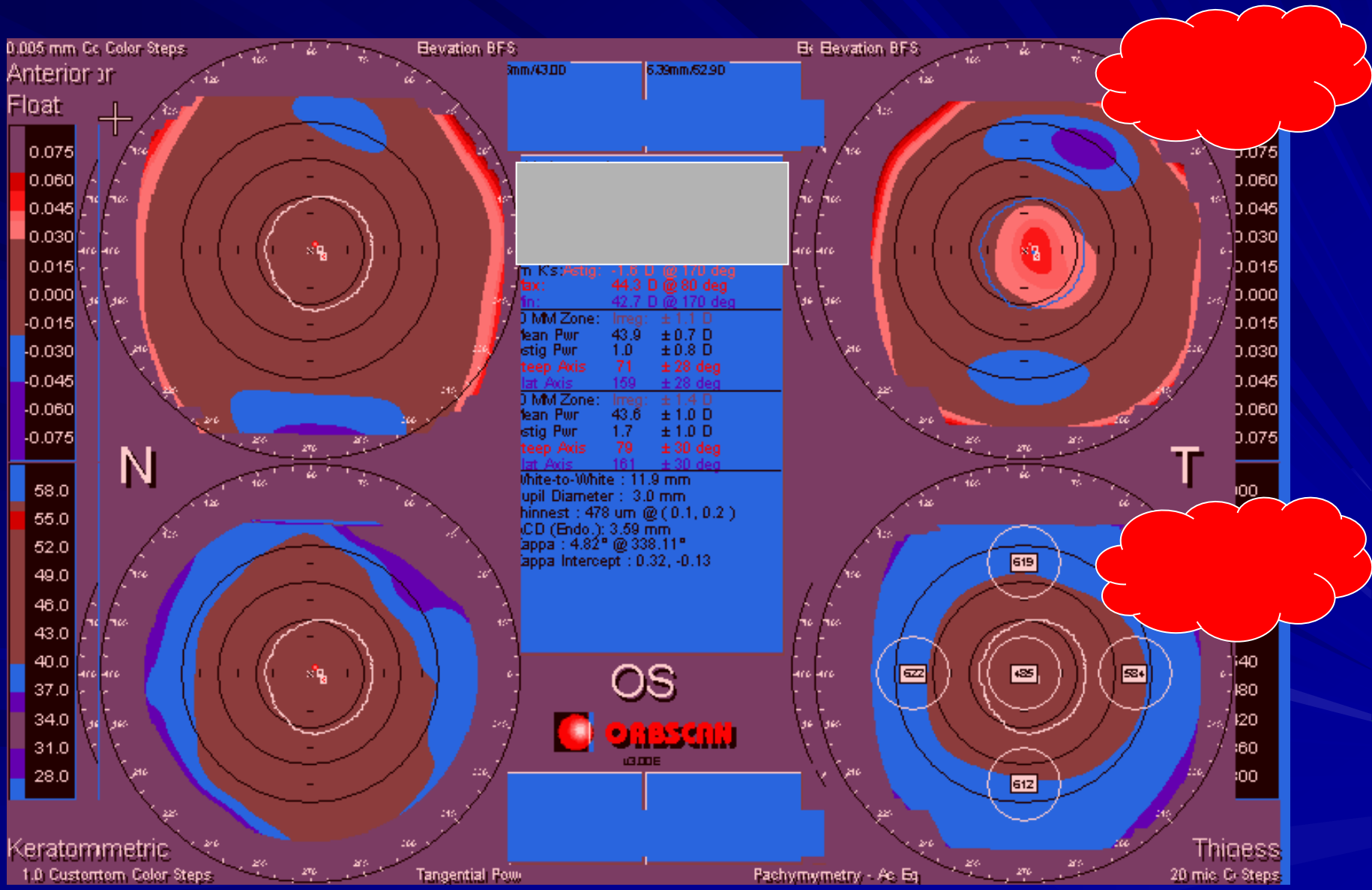
- One abnormal map: Caution
- Two abnormal maps: Concern
- Three abnormal maps: Contraindication



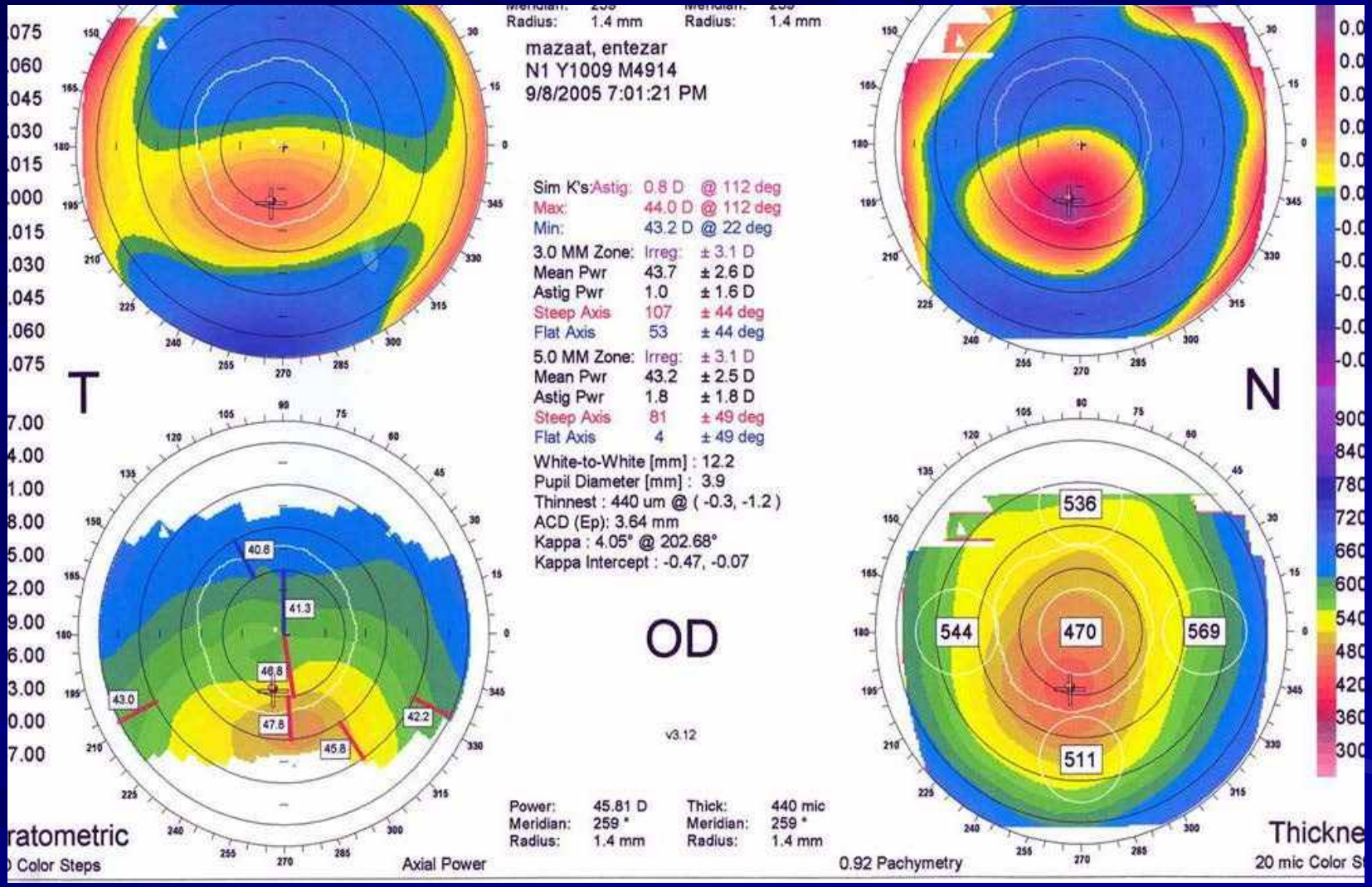
Quad Map

Anterior
Float
Elevation BFS
Elevation BFS
Posterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
N
T
56.5
53.5
50.5
47.5
44.5
41.5
38.5
35.5
32.5
29.5
26.5
Mean K's:Astig: -1.6 D @ 170 deg
Max: 44.3 D @ 80 deg
Min: 42.7 D @ 170 deg
3 MM Zone: Irreg: ± 1.1 D
Mean Pwr 43.9 ± 0.7 D
Astig Pwr 1.0 ± 0.8 D
Steep Axis 71 ± 28 deg
Flat Axis 159 ± 28 deg
3 MM Zone: Irreg: ± 1.4 D
Mean Pwr 43.6 ± 1.0 D
Astig Pwr 1.7 ± 1.0 D
Steep Axis 79 ± 30 deg
Flat Axis 161 ± 30 deg
White-to-White : 11.9 mm
Pupil Diameter : 3.0 mm
Thinnest : 478 um @ (0.1, 0.2)
ACD (Endo.): 3.59 mm
Kappa : 4.82° @ 338.11°
Kappa Intercept : 0.32, -0.13
OS
ORBSCAN
522
485
534
612
Keratometric
Axial Power
Pachymetry - Ac Eq
Thickness

Quad Map + Normal Band (NB)

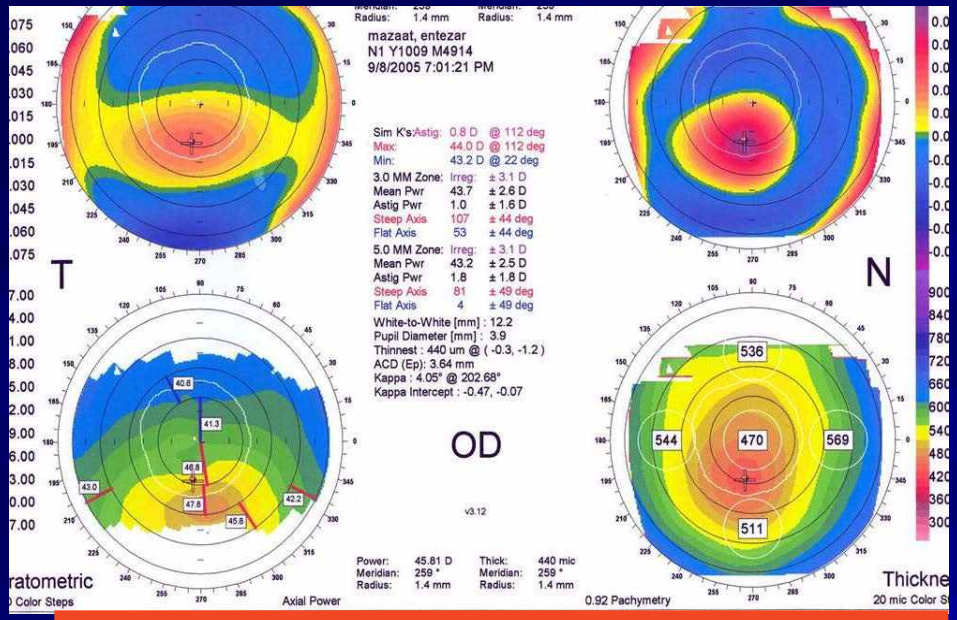


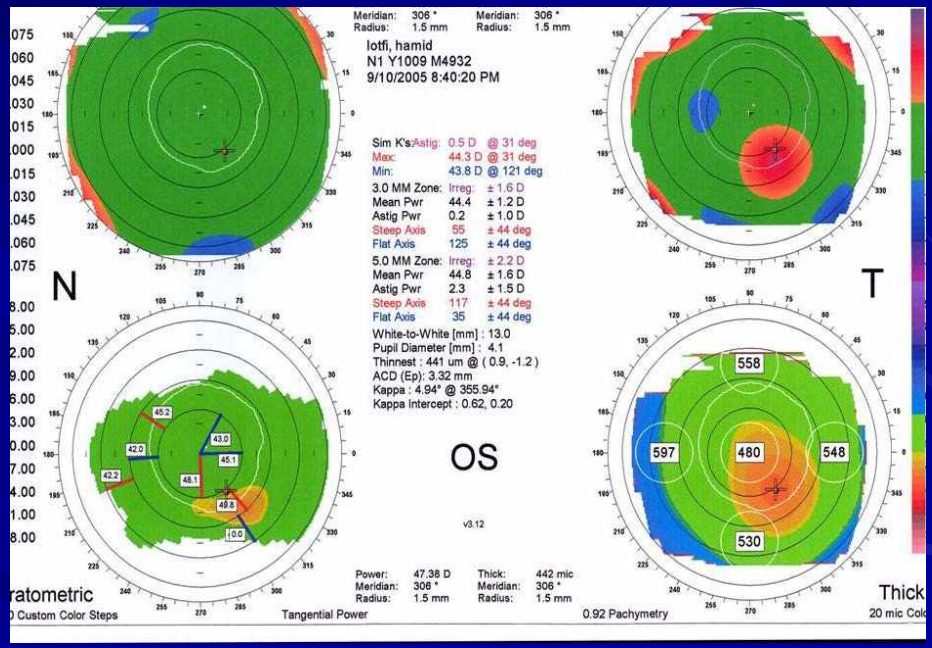
Quad Map


Radius: 1.4 mm
Radius: 1.4 mm
mazaat, entezar
N1 Y1009 M4914
9/8/2005 7:01:21 PM
Sim K's: Astig: 0.8 D @ 112 deg
Max: 44.0 D @ 112 deg
Min: 43.2 D @ 22 deg
3.0 MM Zone: Irreg: ± 3.1 D
Mean Pwr 43.7 ± 2.6 D
Astig Pwr 1.0 ± 1.6 D
Steep Axis 107 ± 44 deg
Flat Axis 53 ± 44 deg
5.0 MM Zone: Irreg: ± 3.1 D
Mean Pwr 43.2 ± 2.5 D
Astig Pwr 1.8 ± 1.8 D
Steep Axis 81 ± 49 deg
Flat Axis 4 ± 49 deg
White-to-White [mm] : 12.2
Pupil Diameter [mm] : 3.9
Thinnest : 440 um @ (-0.3, -1.2)
ACD (Ep): 3.64 mm
Kappa : 4.05° @ 202.68°
Kappa Intercept : -0.47, -0.07
T
N
OD
v3.12
40.6
41.3
46.8
43.0
47.8
42.2
45.8
536
544
470
569
511
Power: 45.81 D
Meridian: 259 °
Radius: 1.4 mm
Thick: 440 mic
Meridian: 259 °
Radius: 1.4 mm
ratometric
Color Steps
Axial Power
0.92 Pachymetry
Thickne
20 mic Color S

Quad Map + Normal Band (NB)

Three – step rule



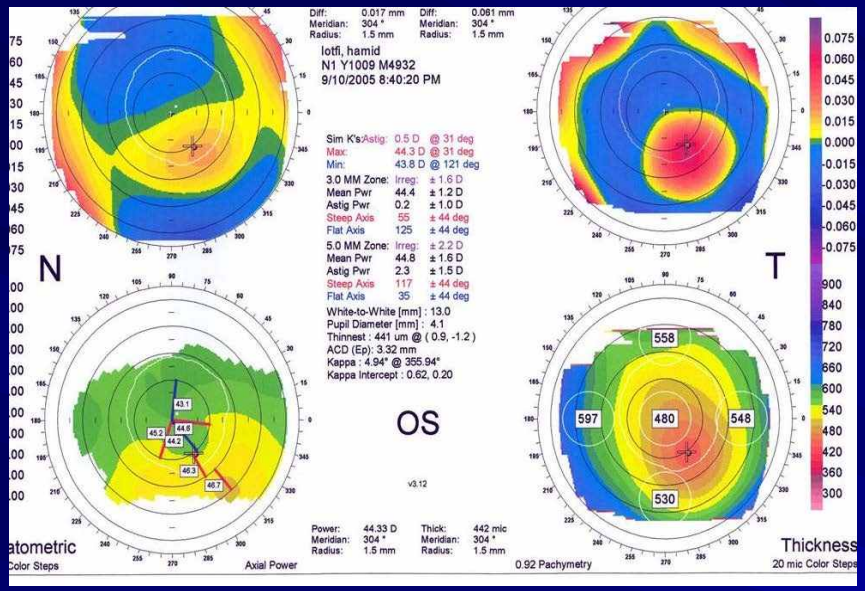


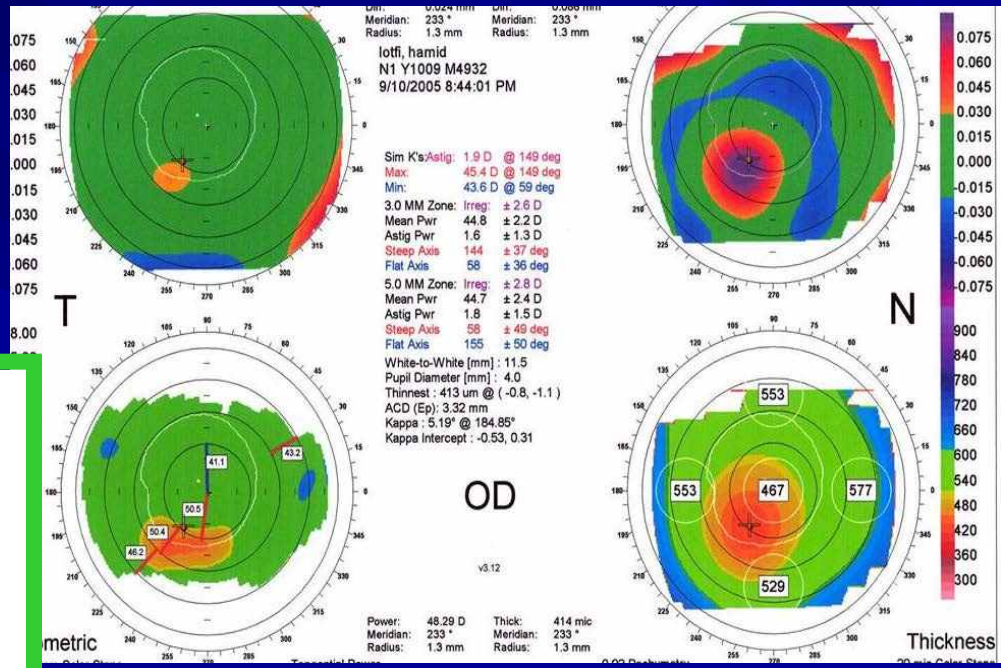
PREOPERATIVE LASIK SCREENING

Three Step Rule

- One abnormal map: Caution
- Two abnormal maps: Concern
- Three abnormal maps: Contraindication

Three – step rule



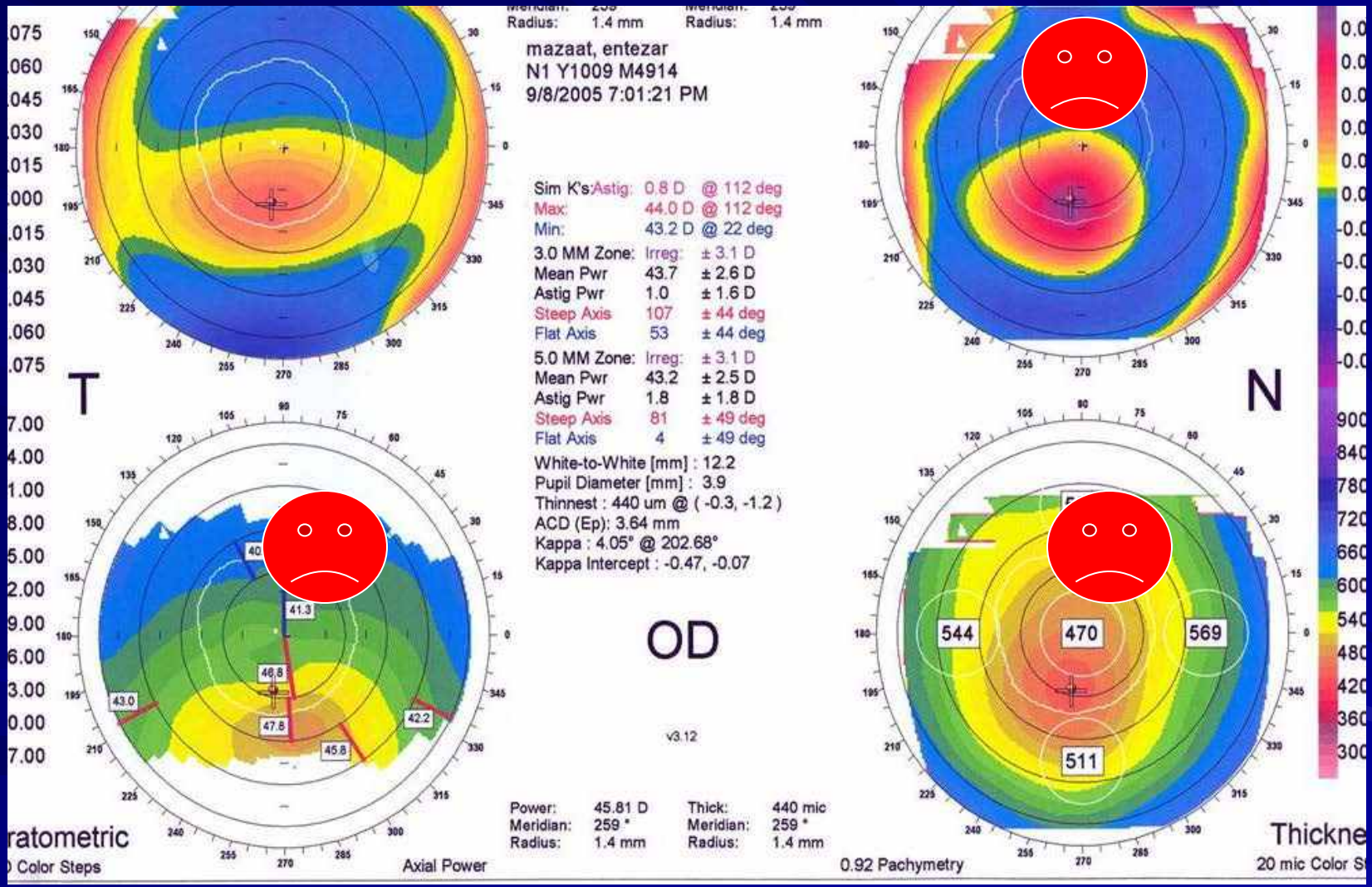


PREOPERATIVE LASIK SCREENING

Three Step Rule

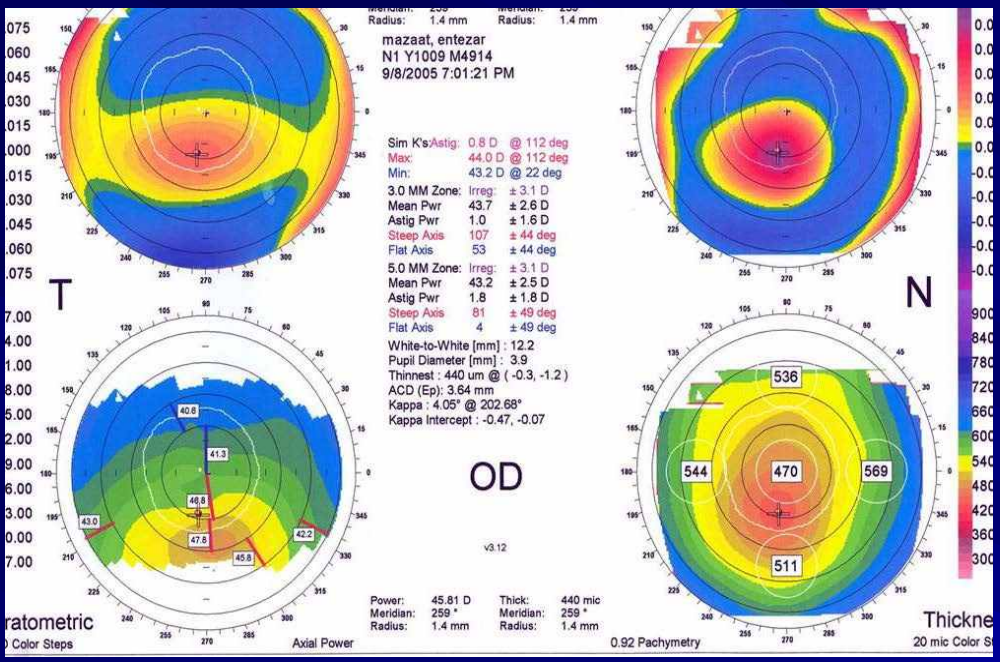
- One abnormal map: Caution
- Two abnormal maps: Concern
- Three abnormal maps: Contraindication

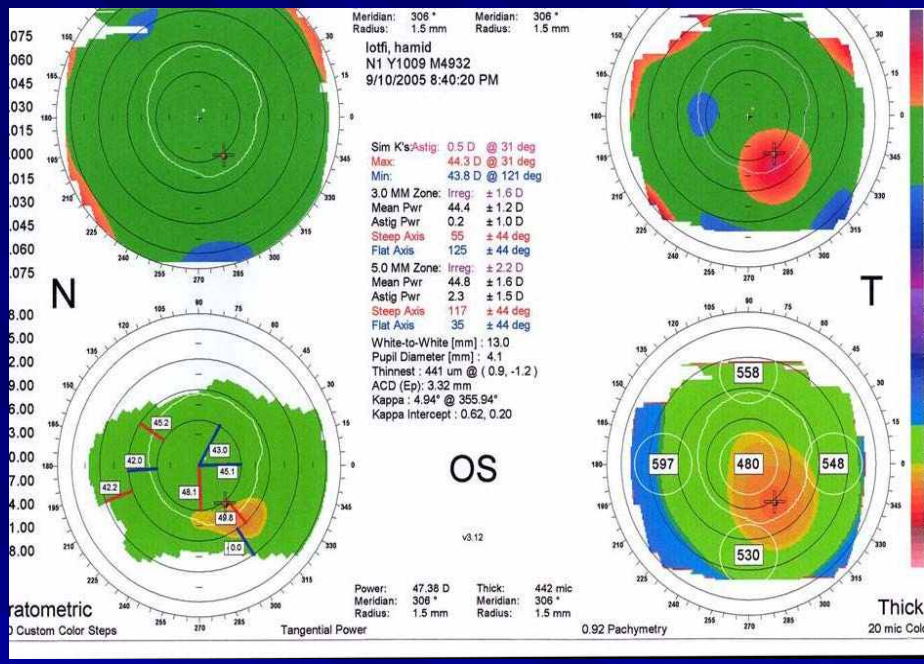
Quad Map


Radius: 1.4 mm
Radius: 1.4 mm
mazaat, entezar
N1 Y1009 M4914
9/8/2005 7:01:21 PM
Sim K's:Astig: 0.8 D @ 112 deg
Max: 44.0 D @ 112 deg
Min: 43.2 D @ 22 deg
3.0 MM Zone: Irreg: ± 3.1 D
Mean Pwr 43.7 ± 2.6 D
Astig Pwr 1.0 ± 1.6 D
Steep Axis 107 ± 44 deg
Flat Axis 53 ± 44 deg
5.0 MM Zone: Irreg: ± 3.1 D
Mean Pwr 43.2 ± 2.5 D
Astig Pwr 1.8 ± 1.8 D
Steep Axis 81 ± 49 deg
Flat Axis 4 ± 49 deg
White-to-White [mm] : 12.2
Pupil Diameter [mm] : 3.9
Thinnest : 440 um @ (-0.3, -1.2)
ACD (Ep): 3.64 mm
Kappa : 4.05° @ 202.68°
Kappa Intercept : -0.47, -0.07
T
N
OD
v3.12
544
470
569
511
41.3
46.8
43.0
47.8
42.2
45.8
Power: 45.81 D
Meridian: 259 °
Radius: 1.4 mm
Thick: 440 mic
Meridian: 259 °
Radius: 1.4 mm
ratometric
Color Steps
Axial Power
0.92 Pachymetry
Thickne
20 mic Color S

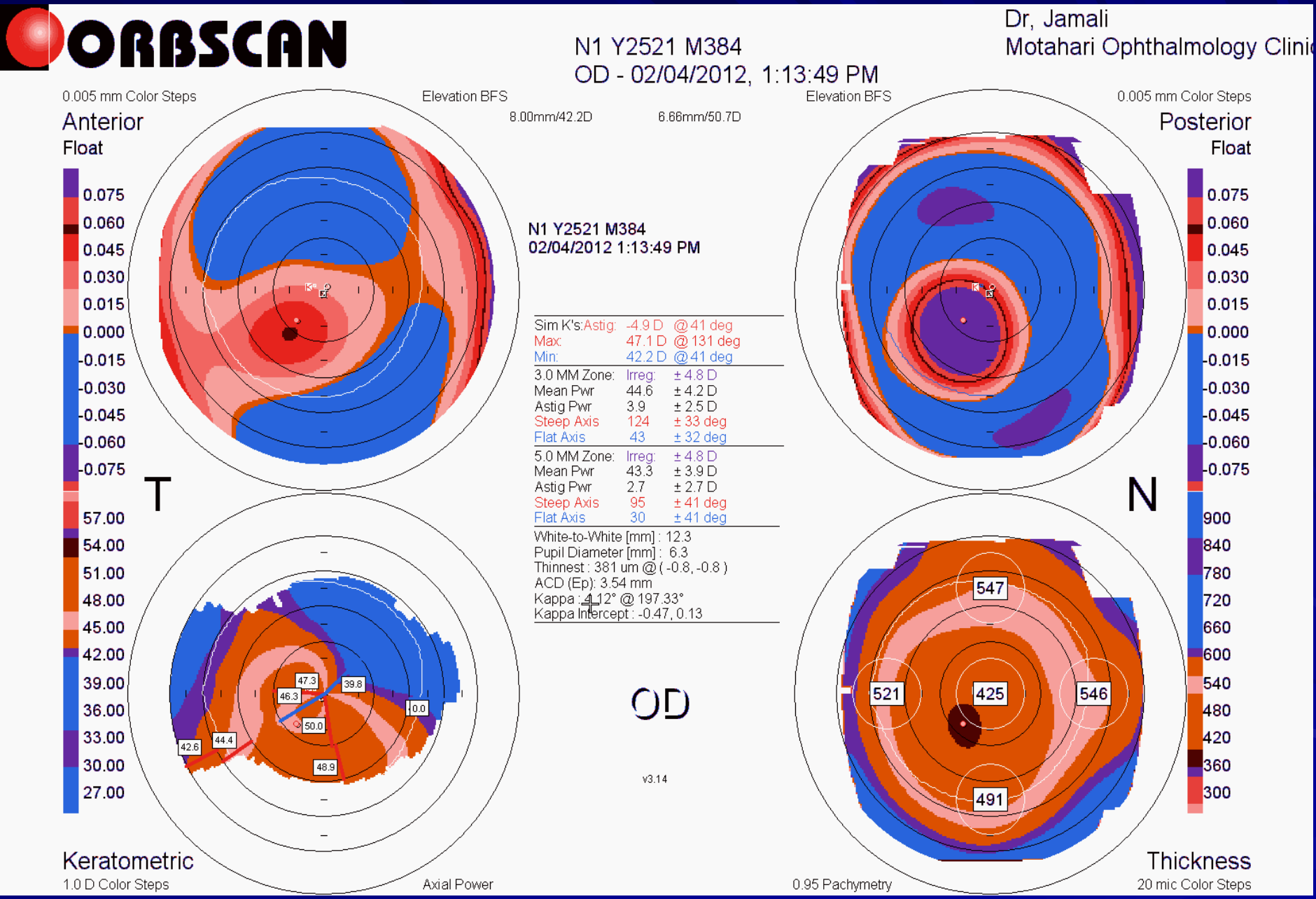
Quad Map + Normal Band (NB)

Three – step rule

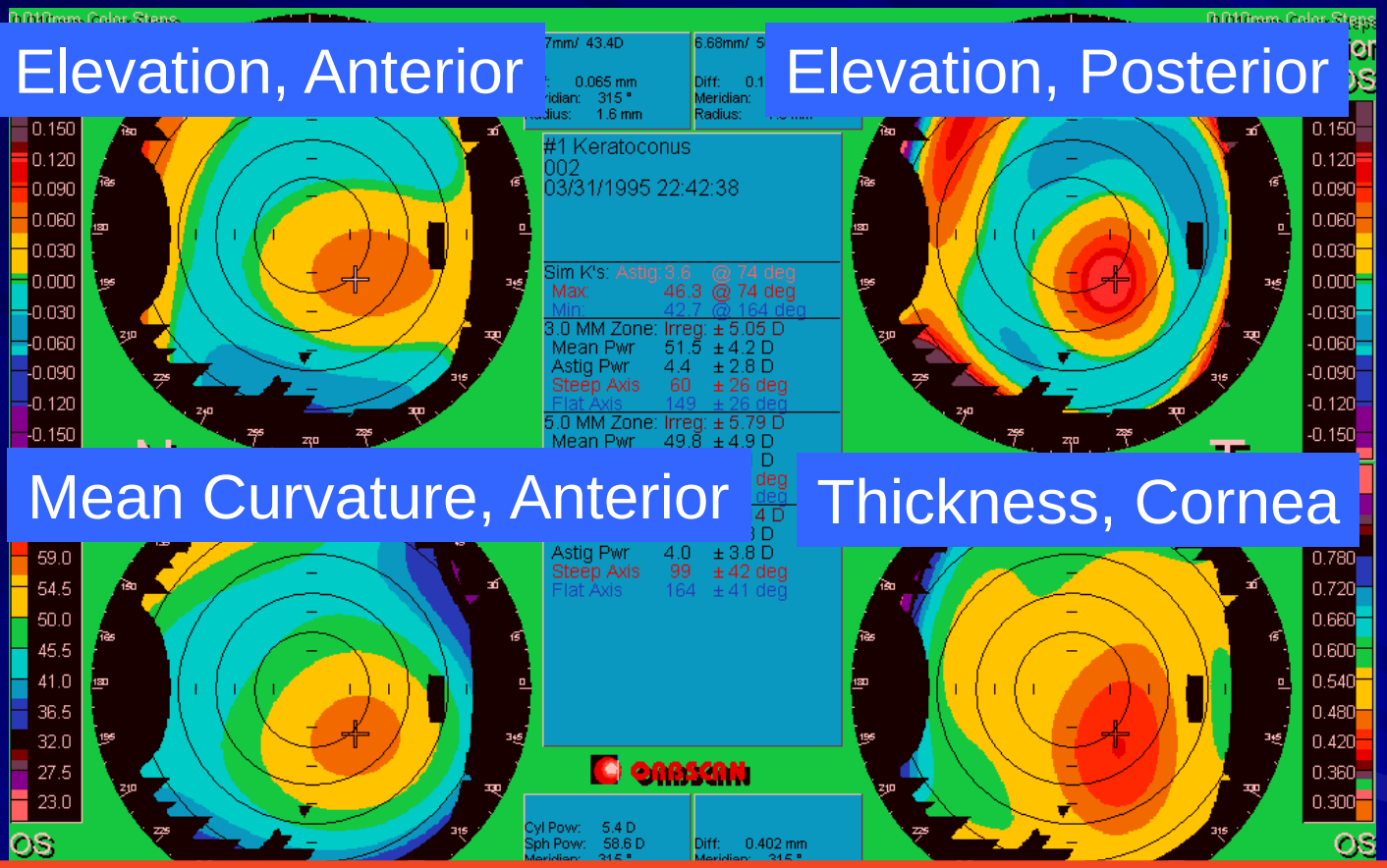




Three Abnormal Maps: Contraindication


ORBSCAN
N1 Y2521 M384
OD - 02/04/2012, 1:13:49 PM
Dr, Jamali
Motahari Ophthalmology Clinic
0.005 mm Color Steps
Elevation BFS
8.00mm/42.2D
6.66mm/50.7D
Elevation BFS
0.005 mm Color Steps
Anterior
Float
Posterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
T
N
N1 Y2521 M384
02/04/2012 1:13:49 PM
Sim K's:Astig: -4.9 D @ 41 deg
Max: 47.1 D @ 131 deg
Min: 42.2 D @ 41 deg
3.0 MM Zone: Irreg: ± 4.8 D
Mean Pwr 44.6 ± 4.2 D
Astig Pwr 3.9 ± 2.5 D
Steep Axis 124 ± 33 deg
Flat Axis 43 ± 32 deg
5.0 MM Zone: Irreg: ± 4.8 D
Mean Pwr 43.3 ± 3.9 D
Astig Pwr 2.7 ± 2.7 D
Steep Axis 95 ± 41 deg
Flat Axis 30 ± 41 deg
White-to-White [mm] : 12.3
Pupil Diameter [mm] : 6.3
Thinnest : 381 um @ (-0.8, -0.8)
ACD (Ep): 3.54 mm
Kappa : 4.12° @ 197.33°
Kappa Intercept : -0.47, 0.13
57.00
54.00
51.00
48.00
45.00
42.00
39.00
36.00
33.00
30.00
27.00
47.3
46.3
39.8
0.0
50.0
42.6
44.4
48.9
OD
v3.14
547
521
425
546
491
900
840
780
720
660
600
540
480
420
360
300
Keratometric
1.0 D Color Steps
Axial Power
0.95 Pachymetry
Thickness
20 mic Color Steps

Keratoconus: Recommended Quad



As all four maps are free of axial artifacts, accurate cone locations can be determined in each. Notice that the four cone locations nearly identical

Forme Fruste K.C

- Average post BFS : 52.53 D (50.2 to 55.3)
- Ratio of radii of Ant to post curvature of cornea ≥ 1.21 and ≤ 1.27
- Average pachymetry difference 7mm to thinnest point 127μ (96 to 206μ) = 100μ

Posterior elevation map

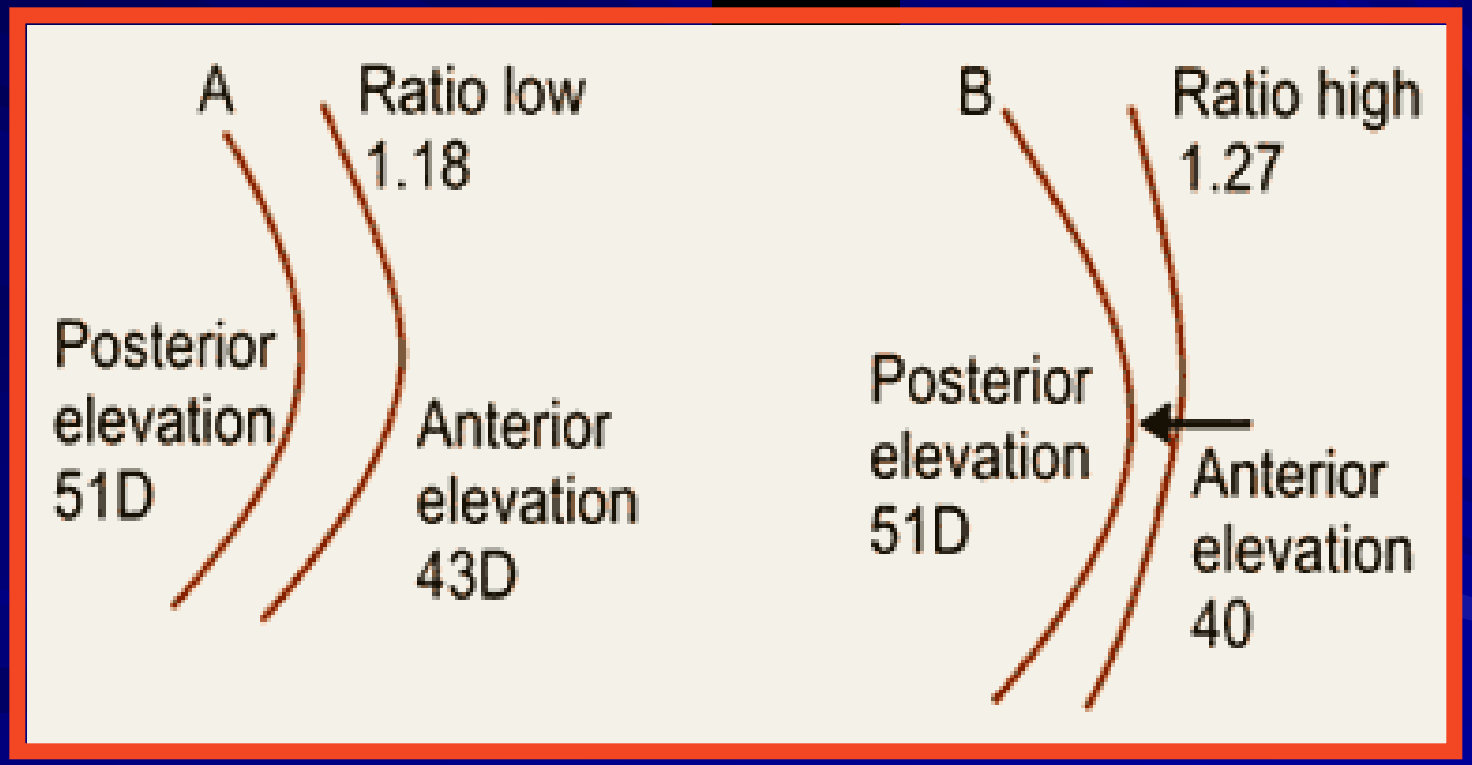
- Posterior BFS > 55D: *RED FLAG*
- BUT may be seen in:
  - small cornea : WTW < 11mm
  - a very steep cornea
  - Asian eye
  - More prolateness
- Posterior BFS :53 -55D : *YELLOW FLAG*

Risk Factors for Lasik Candidates :

- Ratio of radii of ant to post curvatures cornea : >1.21 and <1.27
- Post BFS : > 50 D
- Difference thickness (pachymetry 7mm to thinnest pachymetry : > 90 μ)
- Post corneal elevation : > 50 μ

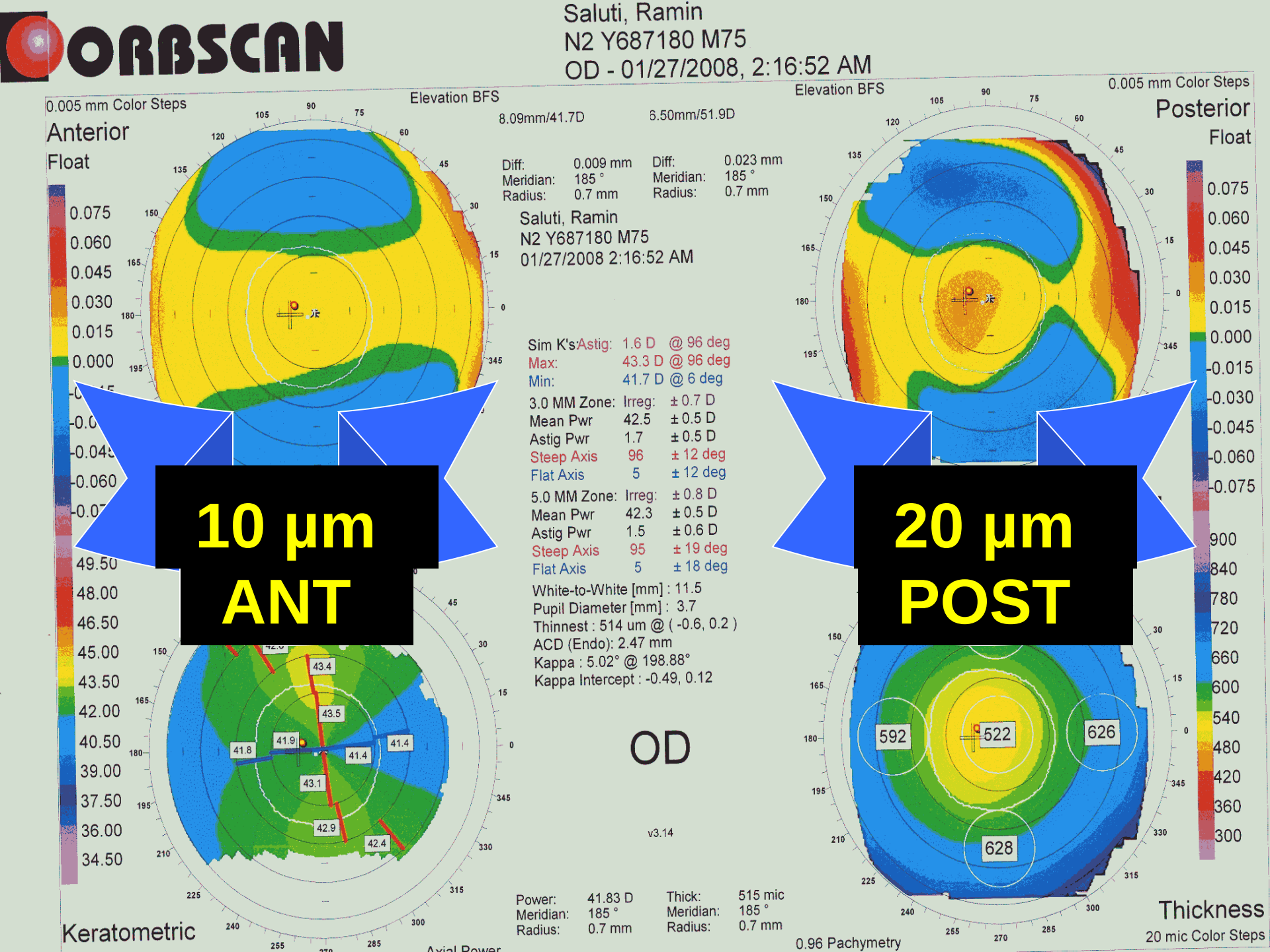
Ratio of radii of Ant to post curvature of cornea

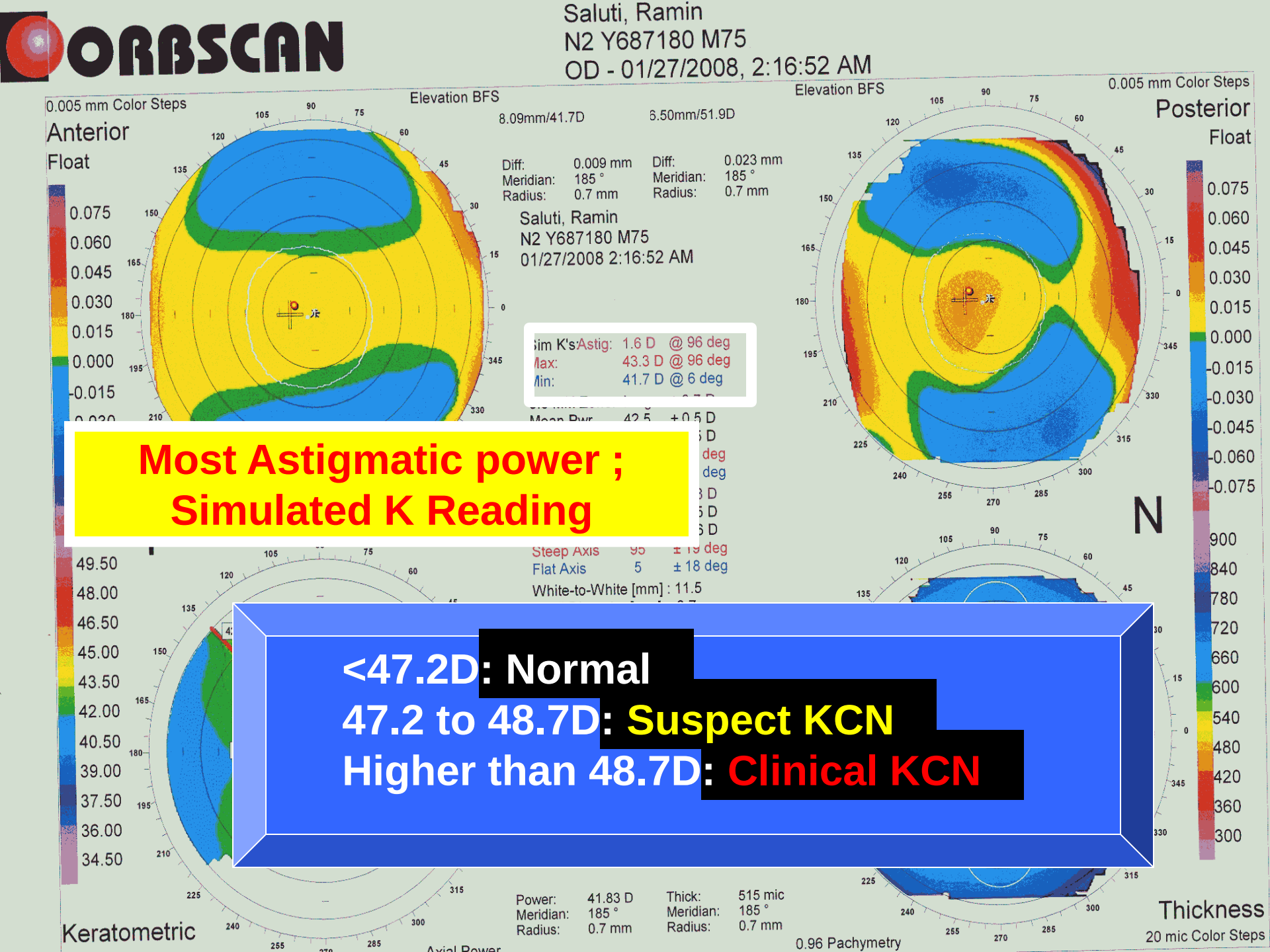
≥ 1.21 and ≤ 1.27

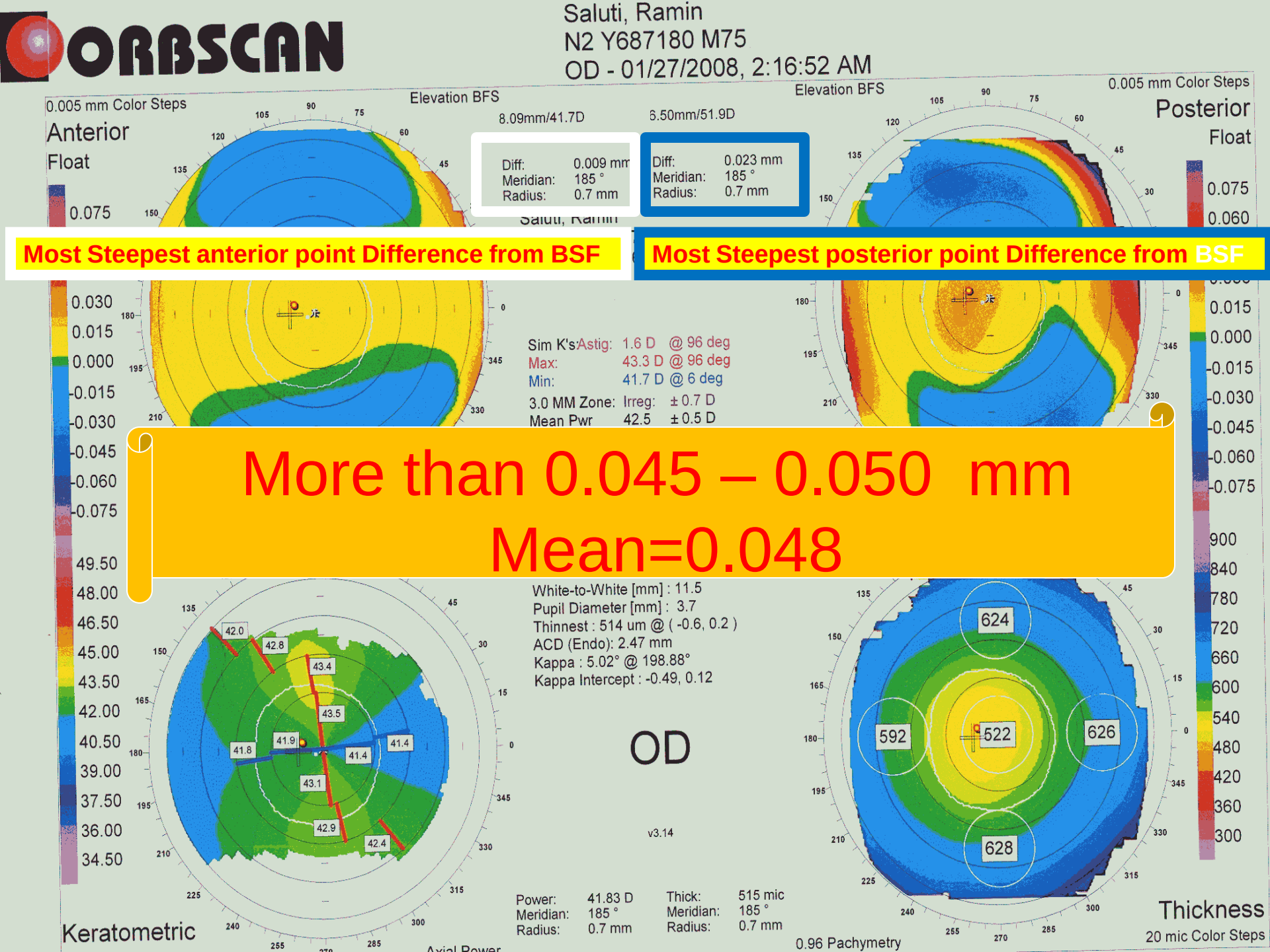


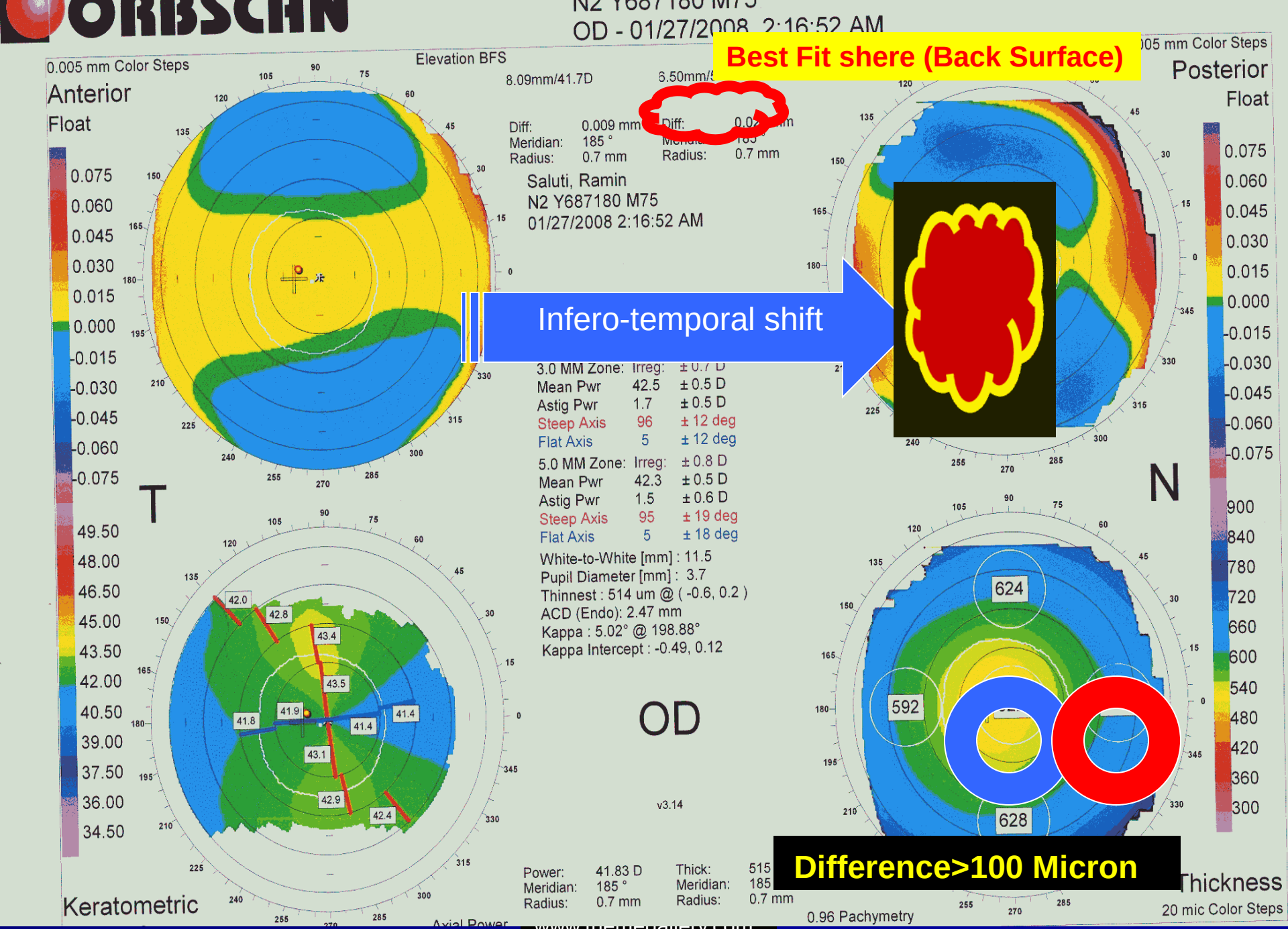
Orbscan Risk of Ectasia index:

1.Number of abnormal maps
2.Posterior surface float
3.3 mm and 5 mm irregularity
4.peripheral thickness changes
5.Astigmatism variance between eyes
6.Steep k's –mean power map


ORBSCAN
Saluti, Ramin
N2 Y687180 M75
OD - 01/27/2008, 2:16:52 AM
0.005 mm Color Steps
Anterior
Float
Elevation BFS
8.09mm/41.7D
6.50mm/51.9D
Diff: 0.009 mm
Meridian: 185 °
Radius: 0.7 mm
Diff: 0.023 mm
Meridian: 185 °
Radius: 0.7 mm
Saluti, Ramin
N2 Y687180 M75
01/27/2008 2:16:52 AM
Sim K's: Astig: 1.6 D @ 96 deg
Max: 43.3 D @ 96 deg
Min: 41.7 D @ 6 deg
3.0 MM Zone: Irreg: ± 0.7 D
Mean Pwr 42.5 ± 0.5 D
Astig Pwr 1.7 ± 0.5 D
Steep Axis 96 ± 12 deg
Flat Axis 5 ± 12 deg
5.0 MM Zone: Irreg: ± 0.8 D
Mean Pwr 42.3 ± 0.5 D
Astig Pwr 1.5 ± 0.6 D
Steep Axis 95 ± 19 deg
Flat Axis 5 ± 18 deg
White-to-White [mm] : 11.5
Pupil Diameter [mm] : 3.7
Thinnest : 514 um @ (-0.6, 0.2)
ACD (Endo): 2.47 mm
Kappa : 5.02° @ 198.88°
Kappa Intercept : -0.49, 0.12
OD
v3.14
10 µm
ANT
20 µm
POST
Keratometric
Axial Power
Power: 41.83 D
Meridian: 185 °
Radius: 0.7 mm
Thick: 515 mic
Meridian: 185 °
Radius: 0.7 mm
0.96 Pachymetry
Elevation BFS
0.005 mm Color Steps
Posterior
Float
Thickness
20 mic Color Steps
592
522
626
628

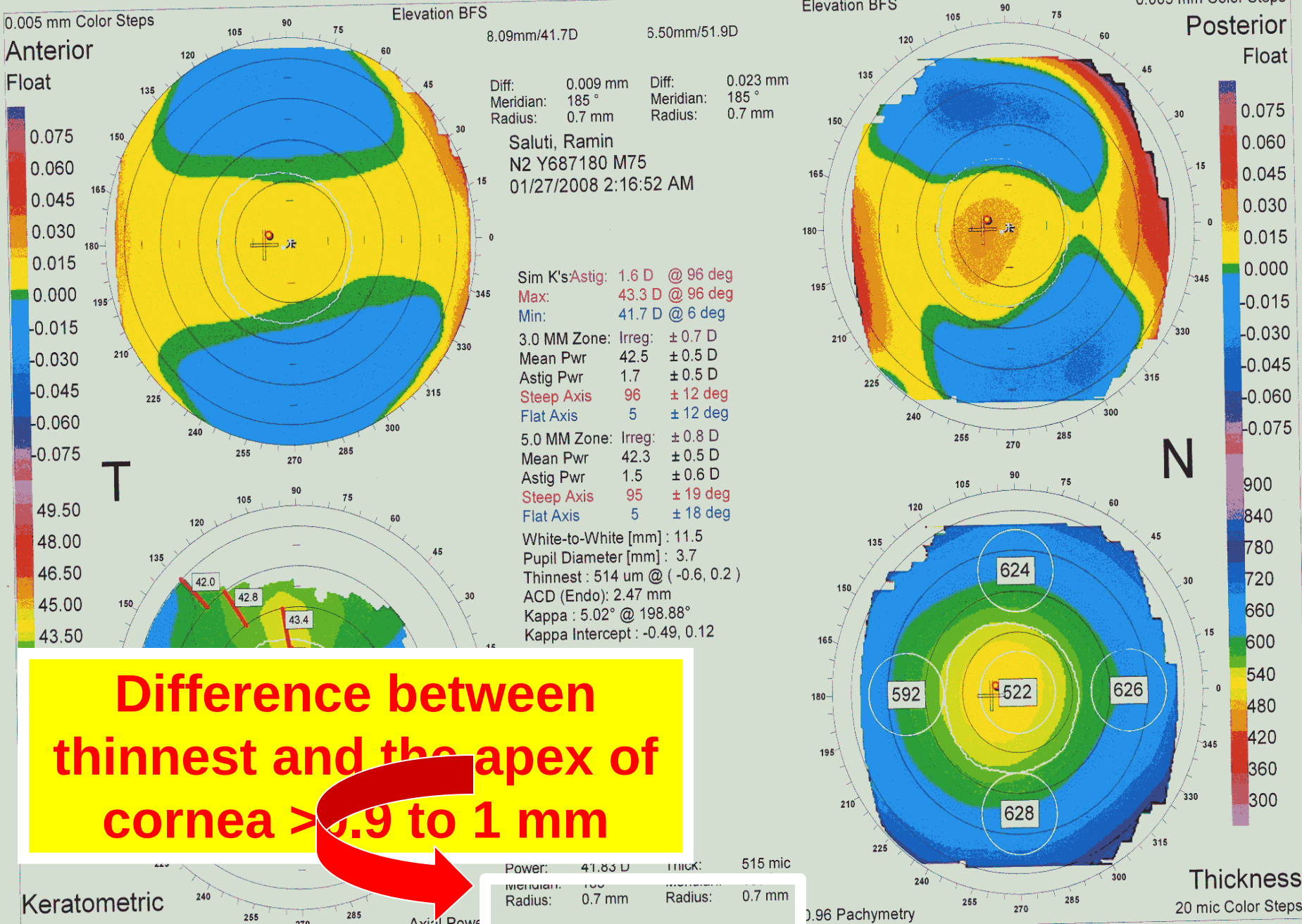

ORBSCAN
Saluti, Ramin
N2 Y687180 M75
OD - 01/27/2008, 2:16:52 AM
0.005 mm Color Steps
Anterior
Float
Elevation BFS
8.09mm/41.7D
6.50mm/51.9D
Diff: 0.009 mm
Meridian: 185 °
Radius: 0.7 mm
Diff: 0.023 mm
Meridian: 185 °
Radius: 0.7 mm
Saluti, Ramin
N2 Y687180 M75
01/27/2008 2:16:52 AM
Elevation BFS
0.005 mm Color Steps
Posterior
Float
Sim K's Astig: 1.6 D @ 96 deg
Max: 43.3 D @ 96 deg
Min: 41.7 D @ 6 deg
Most Astigmatic power ;
Simulated K Reading
Steep Axis 95 ± 19 deg
Flat Axis 5 ± 18 deg
White-to-White [mm] : 11.5
N
<47.2D: Normal
47.2 to 48.7D: Suspect KCN
Higher than 48.7D: Clinical KCN
Keratometric
Axial Power
Power: 41.83 D
Meridian: 185 °
Radius: 0.7 mm
Thick: 515 mic
Meridian: 185 °
Radius: 0.7 mm
0.96 Pachymetry
Thickness
20 mic Color Steps


ORBSCAN
Saluti, Ramin
N2 Y687180 M75
OD - 01/27/2008, 2:16:52 AM
0.005 mm Color Steps
Anterior
Float
Elevation BFS
8.09mm/41.7D
Diff: 0.009 mm
Meridian: 185 °
Radius: 0.7 mm
Most Steepest anterior point Difference from BSF
Elevation BFS
6.50mm/51.9D
Diff: 0.023 mm
Meridian: 185 °
Radius: 0.7 mm
Most Steepest posterior point Difference from BSF
0.005 mm Color Steps
Posterior
Float
0.075
0.060
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
Sim K's:Astig: 1.6 D @ 96 deg
Max: 43.3 D @ 96 deg
Min: 41.7 D @ 6 deg
3.0 MM Zone: Irreg: ±0.7 D
Mean Pwr 42.5 ±0.5 D
More than 0.045 – 0.050 mm
Mean=0.048
49.50
48.00
46.50
45.00
43.50
42.00
40.50
39.00
37.50
36.00
34.50
900
840
780
720
660
600
540
480
420
360
300
White-to-White [mm] : 11.5
Pupil Diameter [mm] : 3.7
Thinnest : 514 um @ (-0.6, 0.2)
ACD (Endo): 2.47 mm
Kappa : 5.02° @ 198.88°
Kappa Intercept : -0.49, 0.12
42.0
42.8
43.4
43.5
41.9
41.8
41.4
41.4
43.1
42.9
42.4
624
592
522
626
628
OD
v3.14
Power: 41.83 D
Meridian: 185 °
Radius: 0.7 mm
Thick: 515 mic
Meridian: 185 °
Radius: 0.7 mm
Keratometric
Axial Power
0.96 Pachymetry
Thickness
20 mic Color Steps


ORBSCAN
N2 Y687180 M75
OD - 01/27/2008 2:16:52 AM
Best Fit shere (Back Surface)
0.005 mm Color Steps
Anterior
Float
Elevation BFS
8.09mm/41.7D
6.50mm/
Diff: 0.009 mm
Meridian: 185 °
Radius: 0.7 mm
Diff:
Radius: 0.7 mm
Saluti, Ramin
N2 Y687180 M75
01/27/2008 2:16:52 AM
Posterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
Infero-temporal shift
T
N
3.0 MM Zone: Irreg: ± 0.7 D
Mean Pwr 42.5 ± 0.5 D
Astig Pwr 1.7 ± 0.5 D
Steep Axis 96 ± 12 deg
Flat Axis 5 ± 12 deg
5.0 MM Zone: Irreg: ± 0.8 D
Mean Pwr 42.3 ± 0.5 D
Astig Pwr 1.5 ± 0.6 D
Steep Axis 95 ± 19 deg
Flat Axis 5 ± 18 deg
White-to-White [mm] : 11.5
Pupil Diameter [mm] : 3.7
Thinnest : 514 um @ (-0.6, 0.2)
ACD (Endo): 2.47 mm
Kappa : 5.02° @ 198.88°
Kappa Intercept : -0.49, 0.12
OD
v3.14
49.50
48.00
46.50
45.00
43.50
42.00
40.50
39.00
37.50
36.00
34.50
42.0
42.8
43.4
43.5
41.9
41.8
41.4
41.4
43.1
42.9
42.4
624
592
628
Power: 41.83 D
Meridian: 185 °
Radius: 0.7 mm
Thick: 515
Meridian: 185
Radius: 0.7 mm
Difference>100 Micron
Keratometric
Axial Power
0.96 Pachymetry
Thickness
20 mic Color Steps
900
840
780
720
660
600
540
480
420
360
300
www.theiregallery.com

ORBSCAN

Saluti, Ramin
N2 Y687180 M75
OD - 01/27/2008, 2:16:52 AM



Difference between thinnest and the apex of cornea > 0.9 to 1 mm

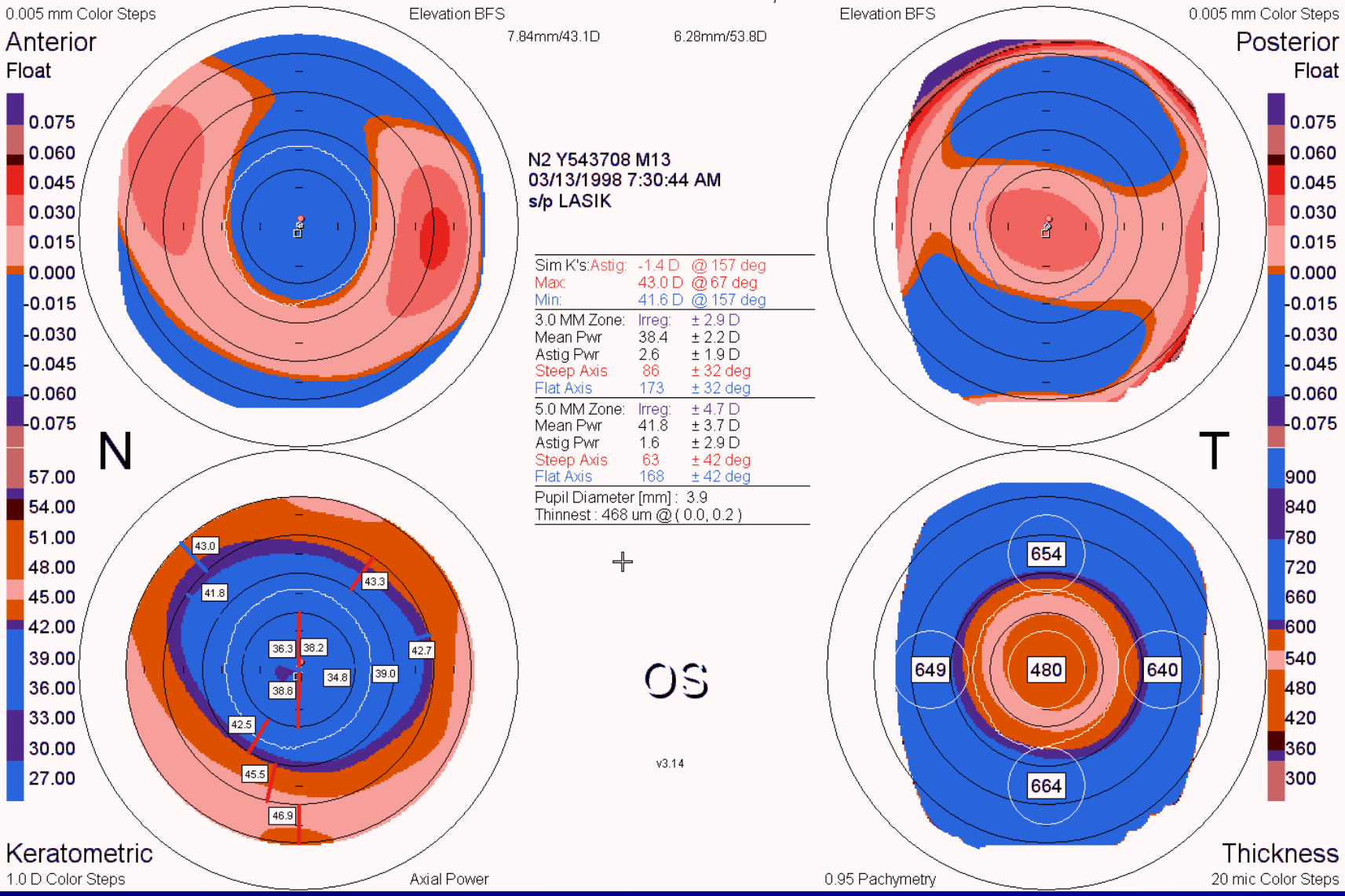
- -Marked vertical or oblique asymmetry on elevation ant. or post maps
- -Infero-temporal displacement of highest point on ant and post elevation
- -Highest point on post elevation is either the thinnest, the point of max. curvature,
- or coincides with the highest point on anterior elevation

Keratoconus Identification with the Orbscan

- -Mean central thickness < 500 microns
- -Thinnest point < 470 microns
- -Difference of > 100 microns from thinnest point to 7 mm zone
- -Marked eccentric location of the thinnest point

ORBSCAN

N2 Y543708 M13
OS - 03/13/1998, 7:30:44 AM



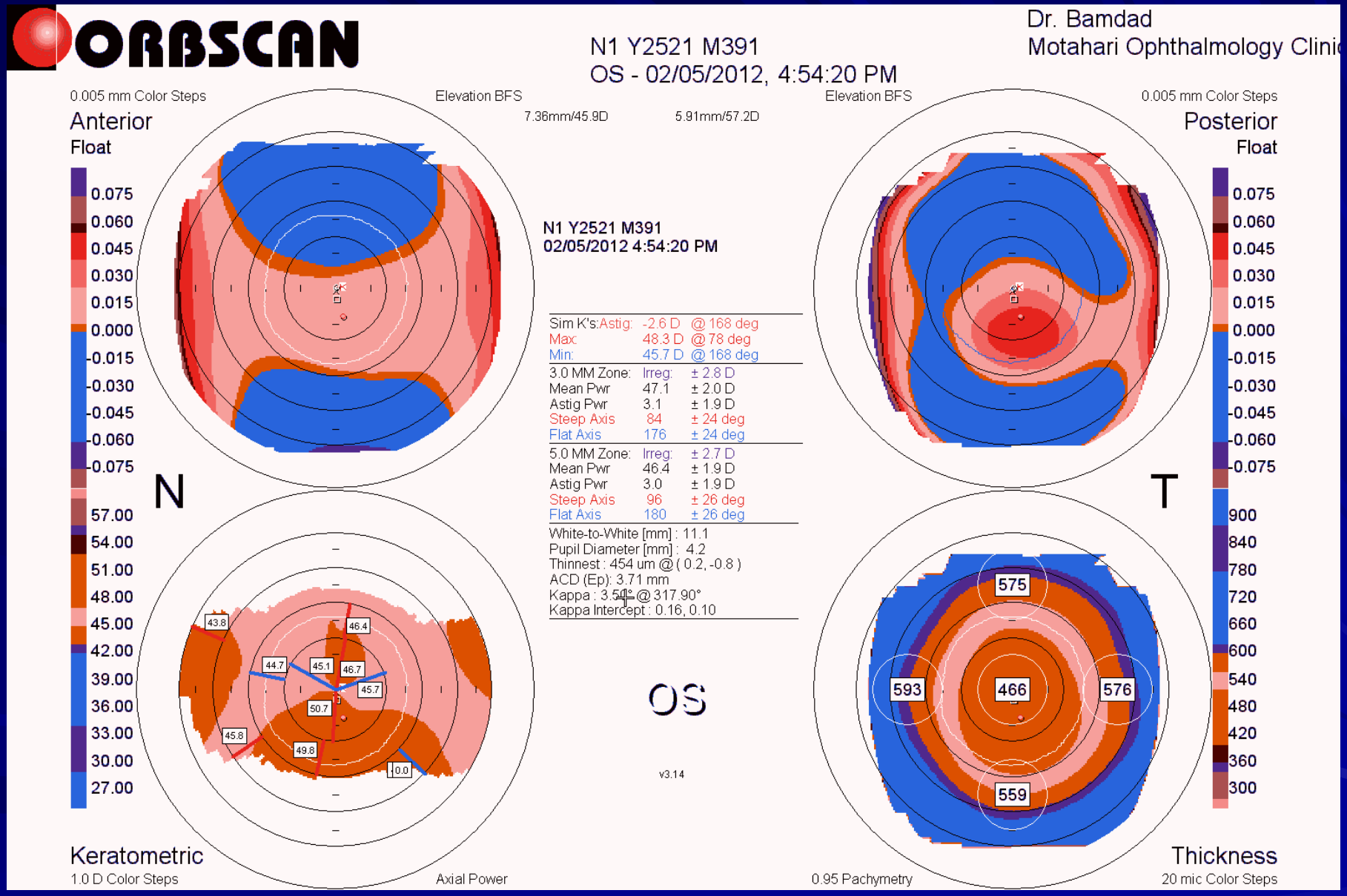
N2 Y543708 M13
03/13/1998 7:30:44 AM
s/p LASIK

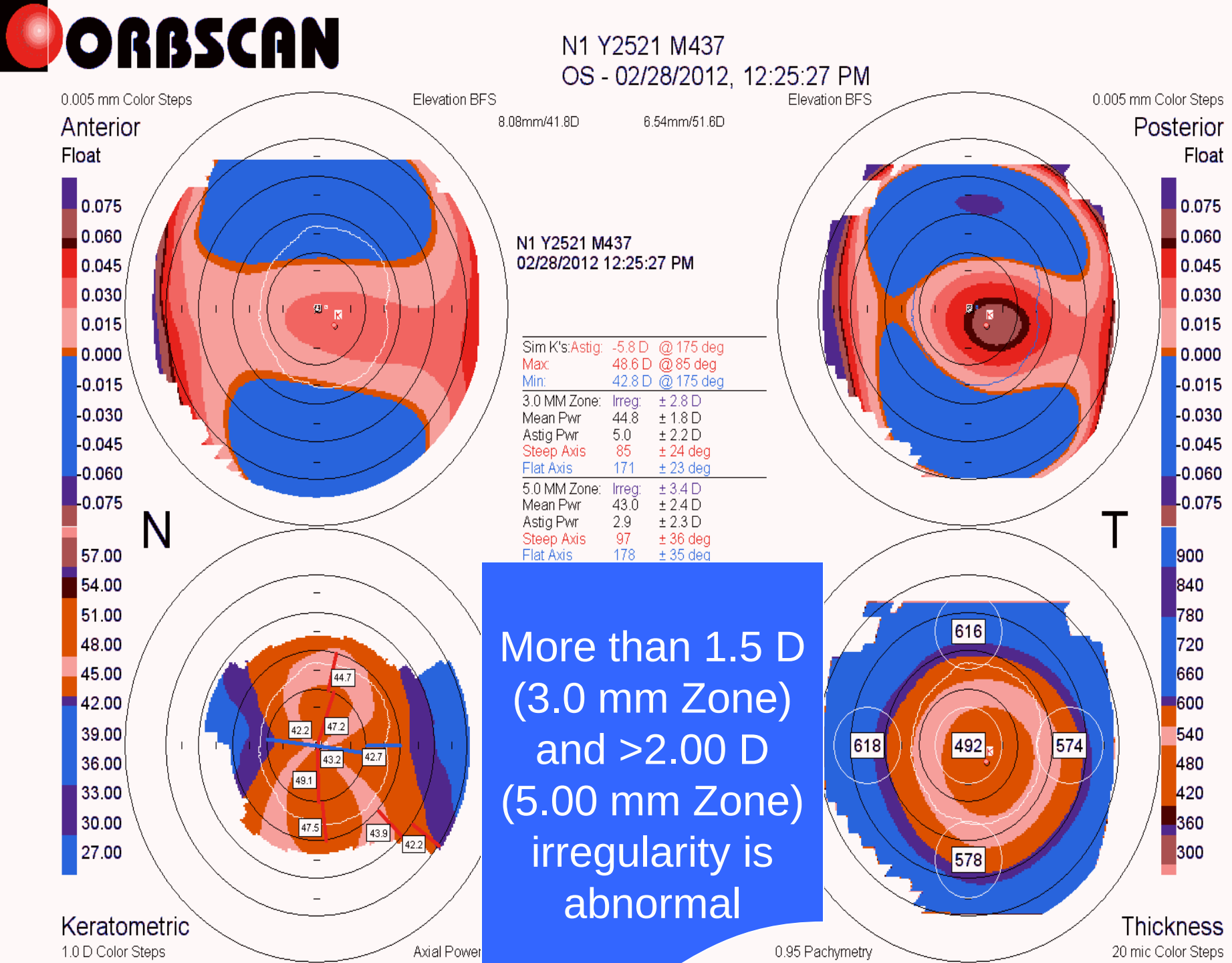
Sim K's:Astig:	-1.4 D	@ 157 deg
Max:	43.0 D	@ 67 deg
Min:	41.6 D	@ 157 deg
3.0 MM Zone:	Irreg:	± 2.9 D
Mean Pwr	38.4	± 2.2 D
Astig Pwr	2.6	± 1.9 D
Steep Axis	86	± 32 deg
Flat Axis	173	± 32 deg
5.0 MM Zone:	Irreg:	± 4.7 D
Mean Pwr	41.8	± 3.7 D
Astig Pwr	1.6	± 2.9 D
Steep Axis	63	± 42 deg
Flat Axis	168	± 42 deg

Pupil Diameter [mm] : 3.9
Thinnest : 468 um @ (0.0, 0.2)

OS

v3.14


ORBSCAN
N1 Y2521 M391
OS - 02/05/2012, 4:54:20 PM
Dr. Bamdad
Motahari Ophthalmology Clinic
0.005 mm Color Steps
Elevation BFS
7.36mm/45.9D
5.91mm/57.2D
Elevation BFS
0.005 mm Color Steps
Anterior
Float
Posterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
N
T
57.00
54.00
51.00
48.00
45.00
42.00
39.00
36.00
33.00
30.00
27.00
900
840
780
720
660
600
540
480
420
360
300
N1 Y2521 M391
02/05/2012 4:54:20 PM
Sim K's:Astig: -2.6 D @ 168 deg
Max: 48.3 D @ 78 deg
Min: 45.7 D @ 168 deg
3.0 MM Zone: Irreg: ± 2.8 D
Mean Pwr 47.1 ± 2.0 D
Astig Pwr 3.1 ± 1.9 D
Steep Axis 84 ± 24 deg
Flat Axis 176 ± 24 deg
5.0 MM Zone: Irreg: ± 2.7 D
Mean Pwr 46.4 ± 1.9 D
Astig Pwr 3.0 ± 1.9 D
Steep Axis 96 ± 26 deg
Flat Axis 180 ± 26 deg
White-to-White [mm] : 11.1
Pupil Diameter [mm] : 4.2
Thinnest : 454 um @ (0.2, -0.8)
ACD (Ep): 3.71 mm
Kappa : 3.54° @ 317.90°
Kappa Intercept : 0.16, 0.10
43.8
46.4
44.7
45.1
46.7
45.7
50.7
45.8
49.8
0.0
575
593
466
576
559
OS
v3.14
Keratometric
1.0 D Color Steps
Axial Power
0.95 Pachymetry
Thickness
20 mic Color Steps


ORBSCAN
N1 Y2521 M437
OS - 02/28/2012, 12:25:27 PM
0.005 mm Color Steps
Elevation BFS
8.08mm/41.8D
6.54mm/51.6D
Elevation BFS
0.005 mm Color Steps
Anterior
Float
Posterior
Float
0.075
0.060
0.045
0.030
0.015
0.000
-0.015
-0.030
-0.045
-0.060
-0.075
N1 Y2521 M437
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Sim K's:Astig: -5.8 D @ 175 deg
Max: 48.6 D @ 85 deg
Min: 42.8 D @ 175 deg
3.0 MM Zone: Irreg: ± 2.8 D
Mean Pwr 44.8 ± 1.8 D
Astig Pwr 5.0 ± 2.2 D
Steep Axis 85 ± 24 deg
Flat Axis 171 ± 23 deg
5.0 MM Zone: Irreg: ± 3.4 D
Mean Pwr 43.0 ± 2.4 D
Astig Pwr 2.9 ± 2.3 D
Steep Axis 97 ± 36 deg
Flat Axis 178 ± 35 deg
N
T
57.00
54.00
51.00
48.00
45.00
42.00
39.00
36.00
33.00
30.00
27.00
44.7
42.2
47.2
43.2
42.7
49.1
47.5
43.9
42.2
616
618
492
574
578
900
840
780
720
660
600
540
480
420
360
300
More than 1.5 D (3.0 mm Zone) and >2.00 D (5.00 mm Zone) irregularity is abnormal
Keratometric
1.0 D Color Steps
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Orbscan indices for risk of keratectasia

	Normal	Suspect	abnormal
Posterior BFS	<52D	52-55D	>55D
Difference (most elevated point to BFS) – posterior	<40µm	40-50µm	>50µm
Ratio of ant BFSmm/post BFSmm	<1.21	1.21 – 1.27	>1.27
Inferior temporal displacement of highest point (anterior & posterior elevation maps)			
Correlation of signs in anterior elevation on power map, thinnest point on pachymetry with highest point on posterior elevation			
Irregularity >1.5 in the 3mm optical zone & >2.0 in 5mm optical zone			
Axial & tongenital topography map (Rabinowitz-Mc Donnel index):	<47.2 D	47.2-48.7D	>48.7D
Irregular profile	-	-	> 3D difference in central 3mm
Astigmatism variance between eyes	-	-	> 1D
Topography pattern	-	-	Assymetric bow-tie , broken bow-tie (Lazy-c)
Kr mean power map >46D or total mean power map >45D			
Pachymetry map			
Thinnest point	>470 µm	-	<470µm
Thinnest point is outside the central 5mm of cornea			
Difference between pachymetry in 7mm & thinnest pachymetry	<90µm	90-100 µm	>100µm
Difference between pachymetry in 7mm & central reading	-	<30µm	<20µm
Thinnest point >30µm thinner than the central reading			