Surgical Correction of With-the-Rule Astigmatism

Scleral Recession

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Astigmatism reduction during cataract surgery "wound revision"

- Controlling Astigmatism in Cataract Surgery Koch/Lindstrom Seminars in Ophthalmology Vol 7 pg 224-233 1992

- Astigmatism control for the Cataract surgeon: a comprehensive review of surgically tailored astigmatism reduction. William Maloney et al. J Cat Ref Surg Vol 15 1989

- Astigmatic keratotomy to correct astigmatism in cataract patients.
  William Maloney et al. J Cat Ref Surg Vol 16 May 1990

Wound Revision to reliably reduce 1.5-3.0D WTR astigmatism 1.5D or greater

FIGURE 22-2 Following a limbal incision, tissue gape produces flattening along the meridian of the incision and steepening 90 degrees away. (From Koch DD, Lindstrom RL: Controlling astigmatism in cataract surgery, *Semin Ophthalmol* 7:224-233, 1992.)

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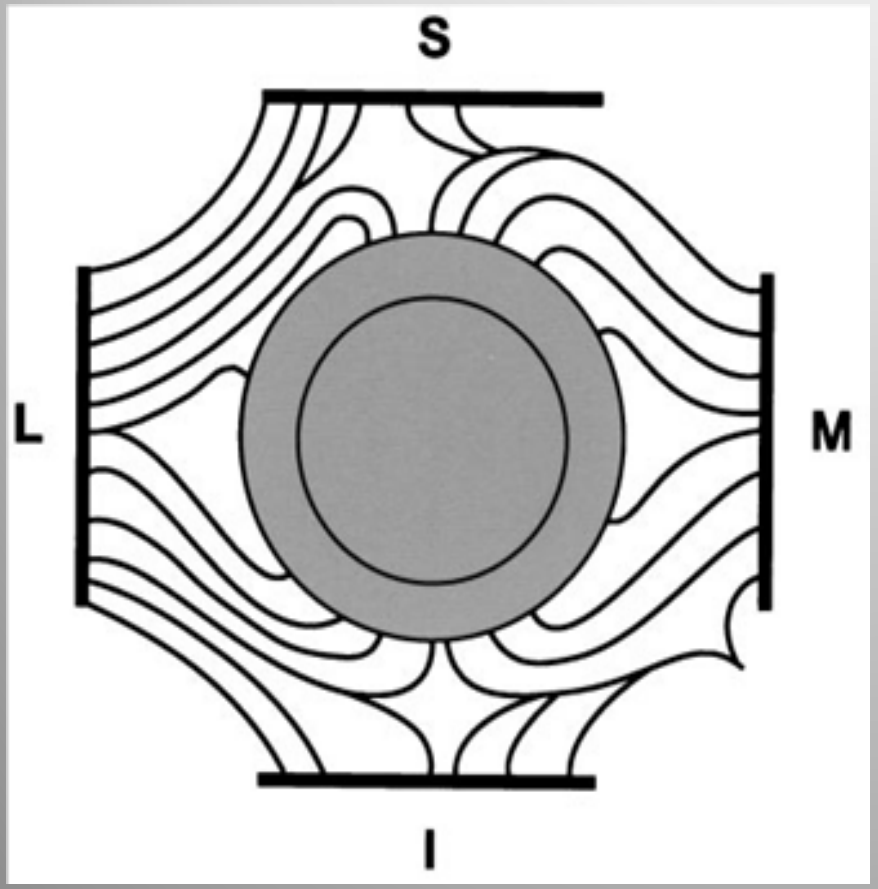
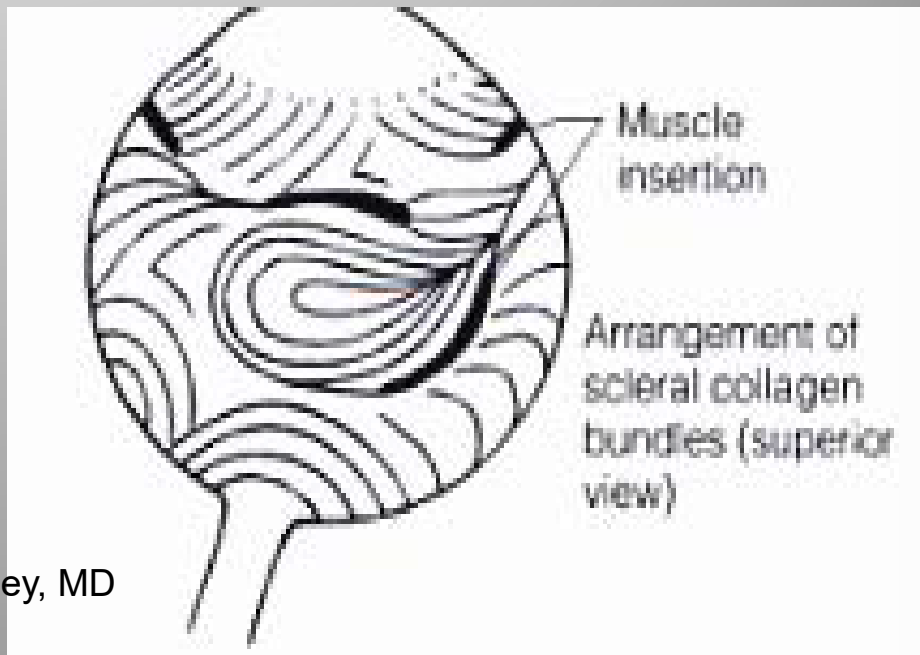
1992

Techniques of Five Surgeons

	For with the rule/oblique	For against the rule	Optical zone	Knife setting	Configuration	Incision lengths	Timing
Shepherd	AK	AK	7mm	90%	T	1mm/D	prior to phaco
Maloney	AK (poor results)	AK	7mm, 8mm	60%	T	1.5mm, 3.0mm	after phaco
Nordan	wound manipulation	AK	7mm	100%	T	3.5mm, 4.5mm	prior to phaco
Lindstrom	wound manipulation	AK	7mm	100%	Arc	30°, 45°, 60°, 90° arcs	after phaco
Grene	wound manipulation	AK	7mm	100%	T	3.5mm, 4.5mm	after phaco

Scleral bundle orientation – superior / inferior insert perpendicular to limbus – when cut (scleral tunnel), relaxes. Much less effect if incise (scleral tunnel) at nasal or temporal sclera at the limbus





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Accurate axis marking pre-op

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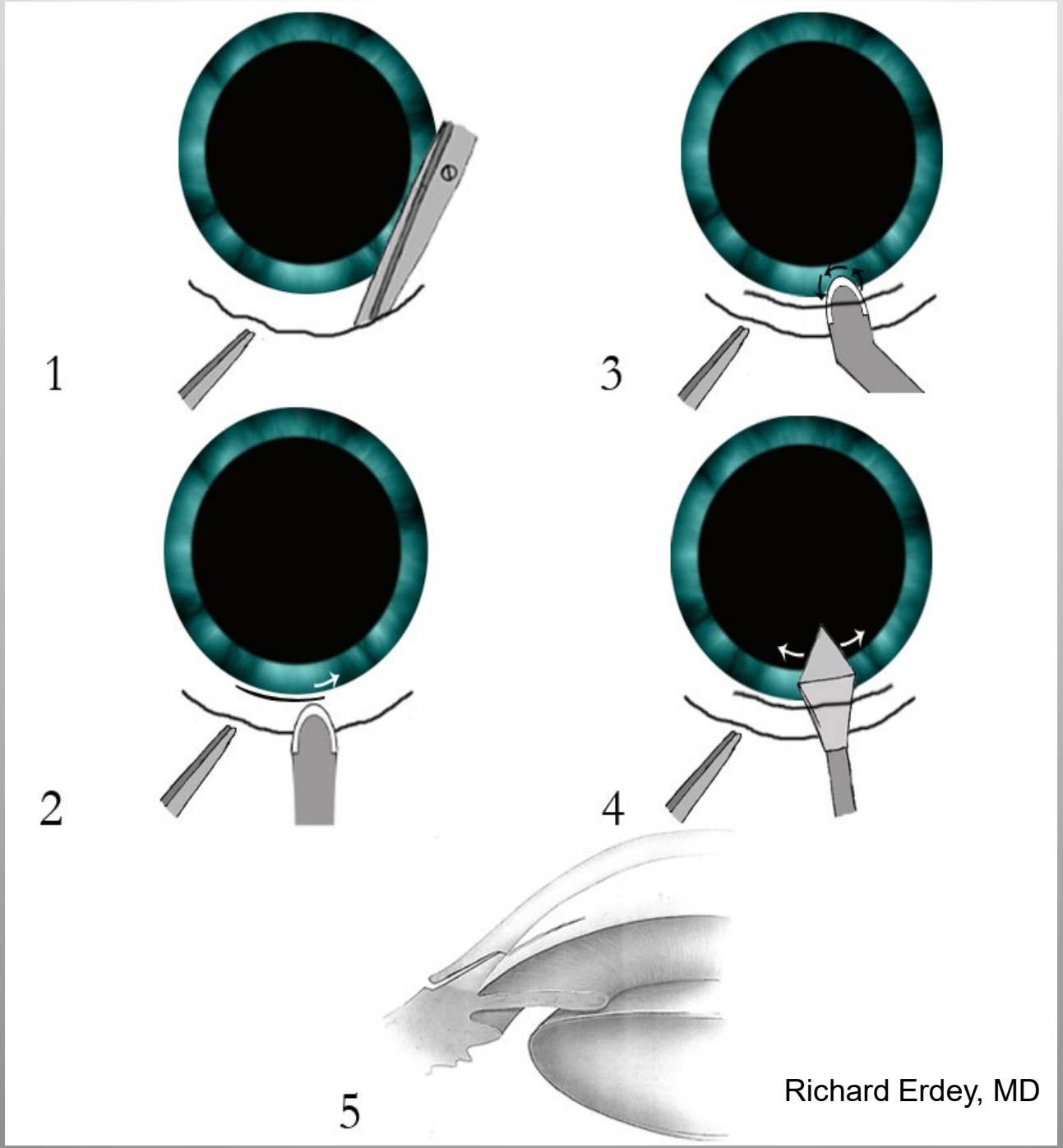
1
2
3
4
5
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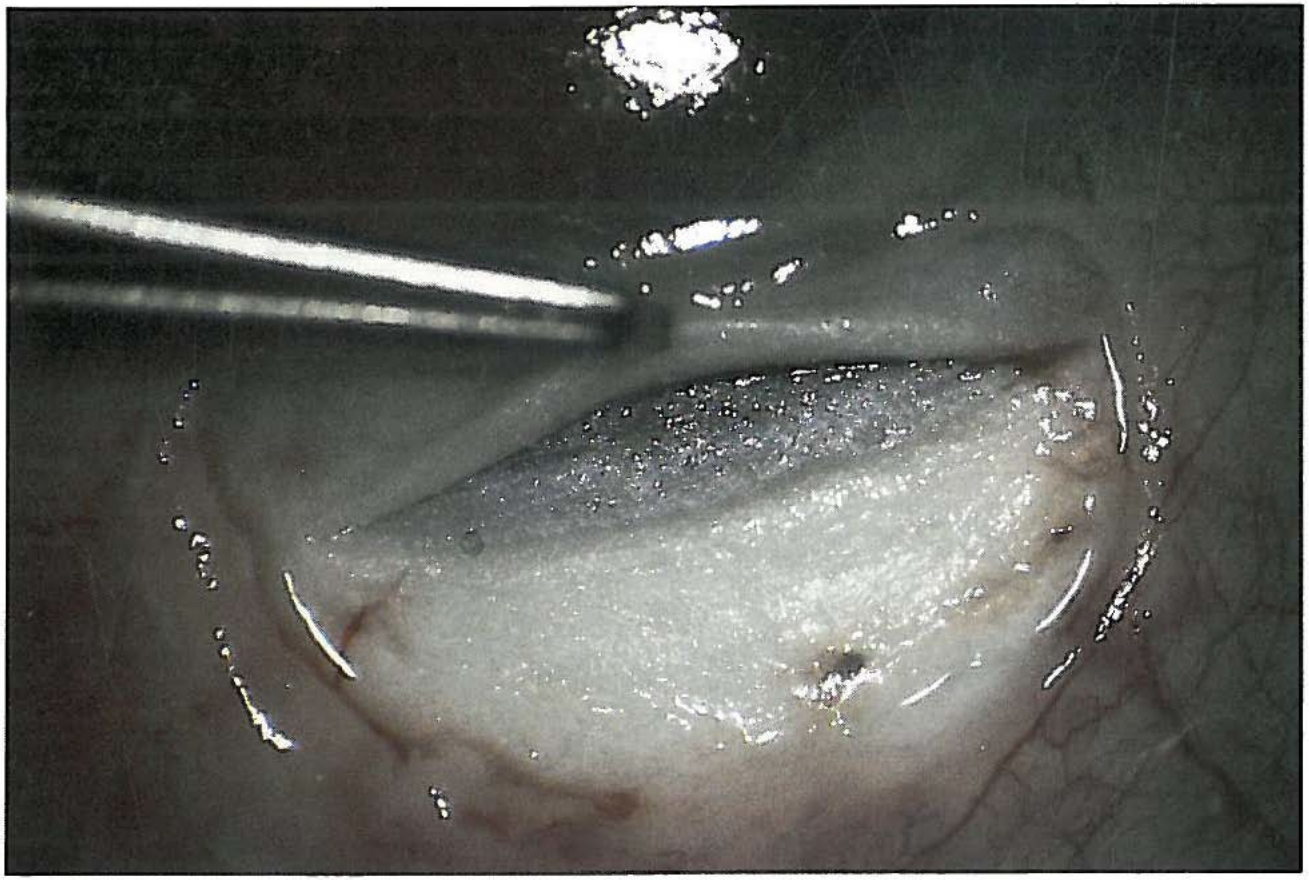
The Incision



3-7. ***Shelf of the incision.*** *The shelf portion of the incision holds the iris back and helps prevent iris prolapse.*

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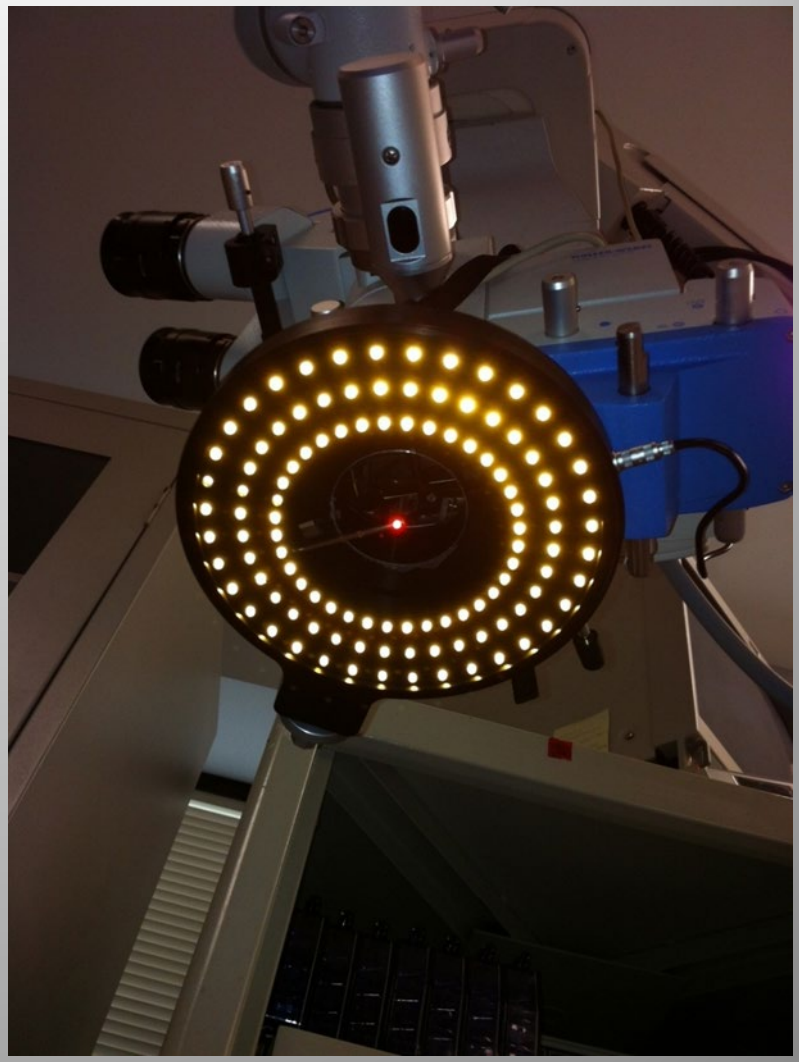
Intraoperative Keratometer



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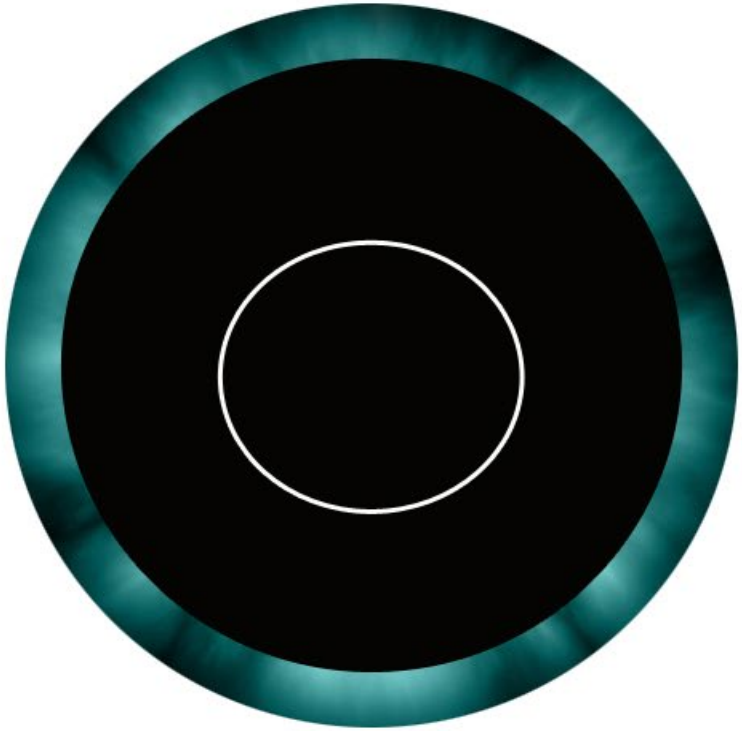
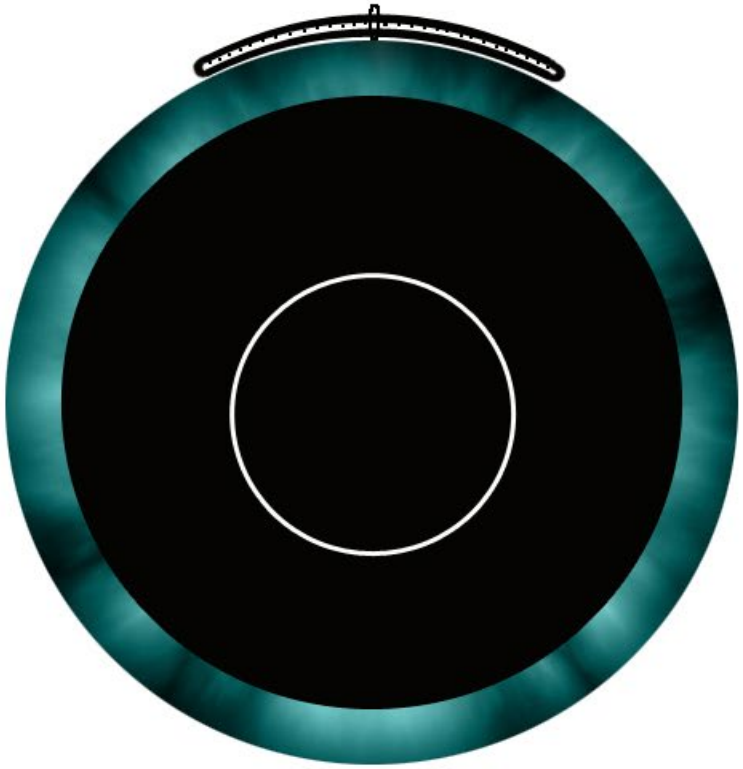


Astigmatsm. Steep at 90%



After Scleral Astigmatism Neutralized

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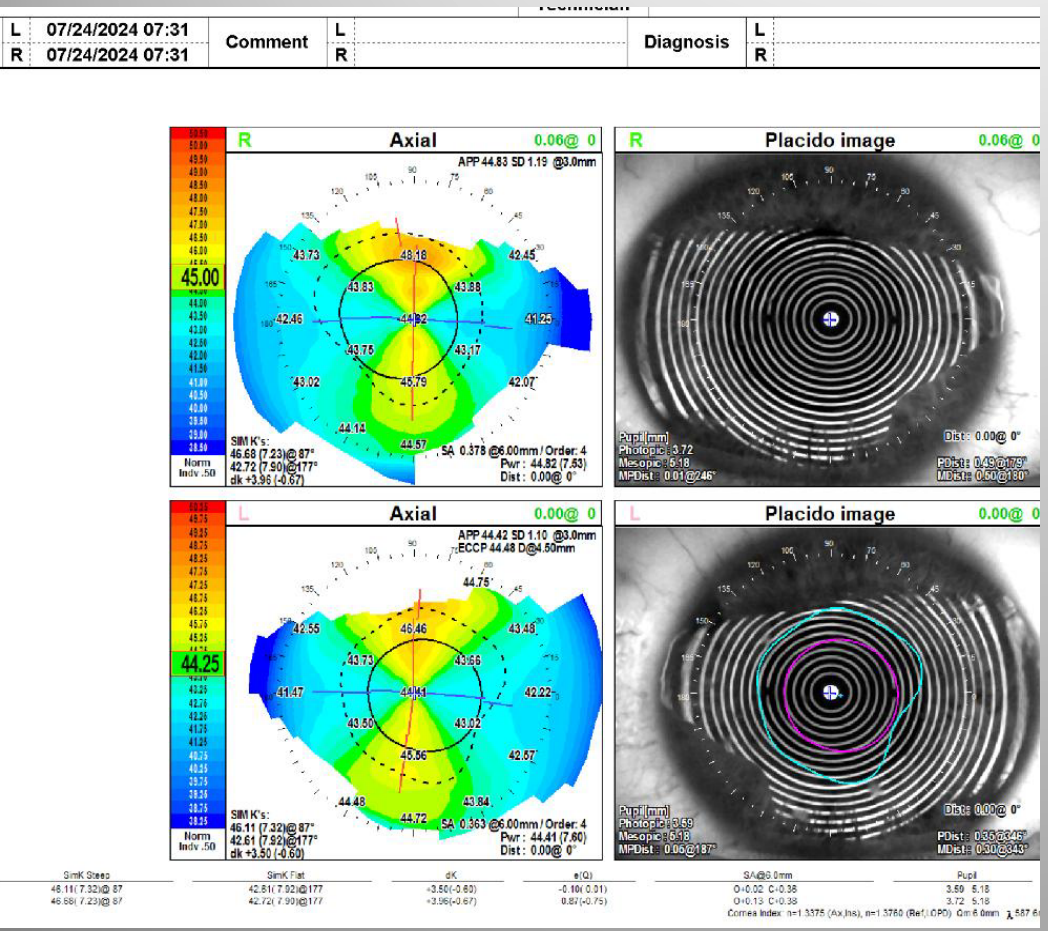
Scleral tunnel in phakic 28 yo to reduce with the rule astigmatism



Pre-operative

OD Uncorrected VA 20/50

-1.25+3.0x93 20/20

OS Uncorrected VA 20/50

-1.0+3.0x80 20/20

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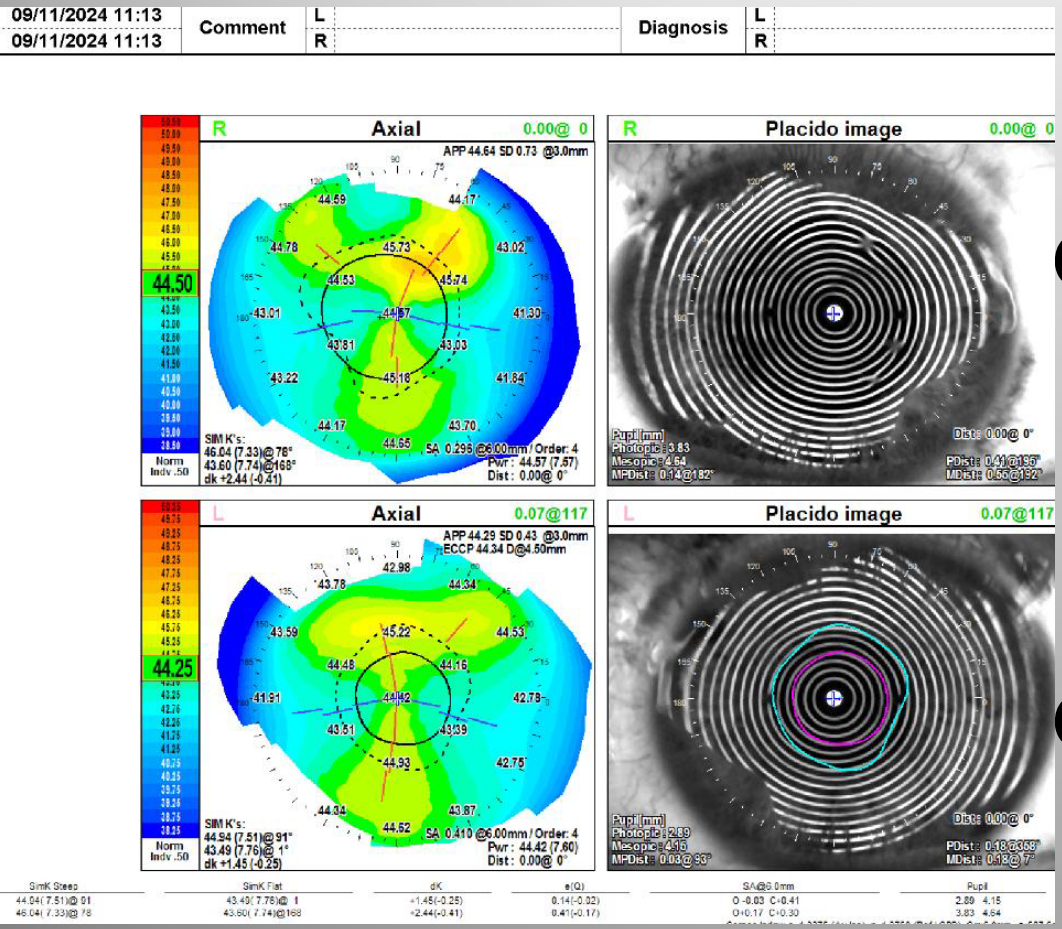
Scleral tunnel in phakic 28 yo uncut surgical video

- https://youtu.be/_crT2MQm4s4

Scleral tunnel in phakic 28 yo



Post-operative

OD Uncorrected VA 20/25

-1.0+1.50x87 20/20

OS Uncorrected VA 20/25

-1.0+1.75x78 20/20

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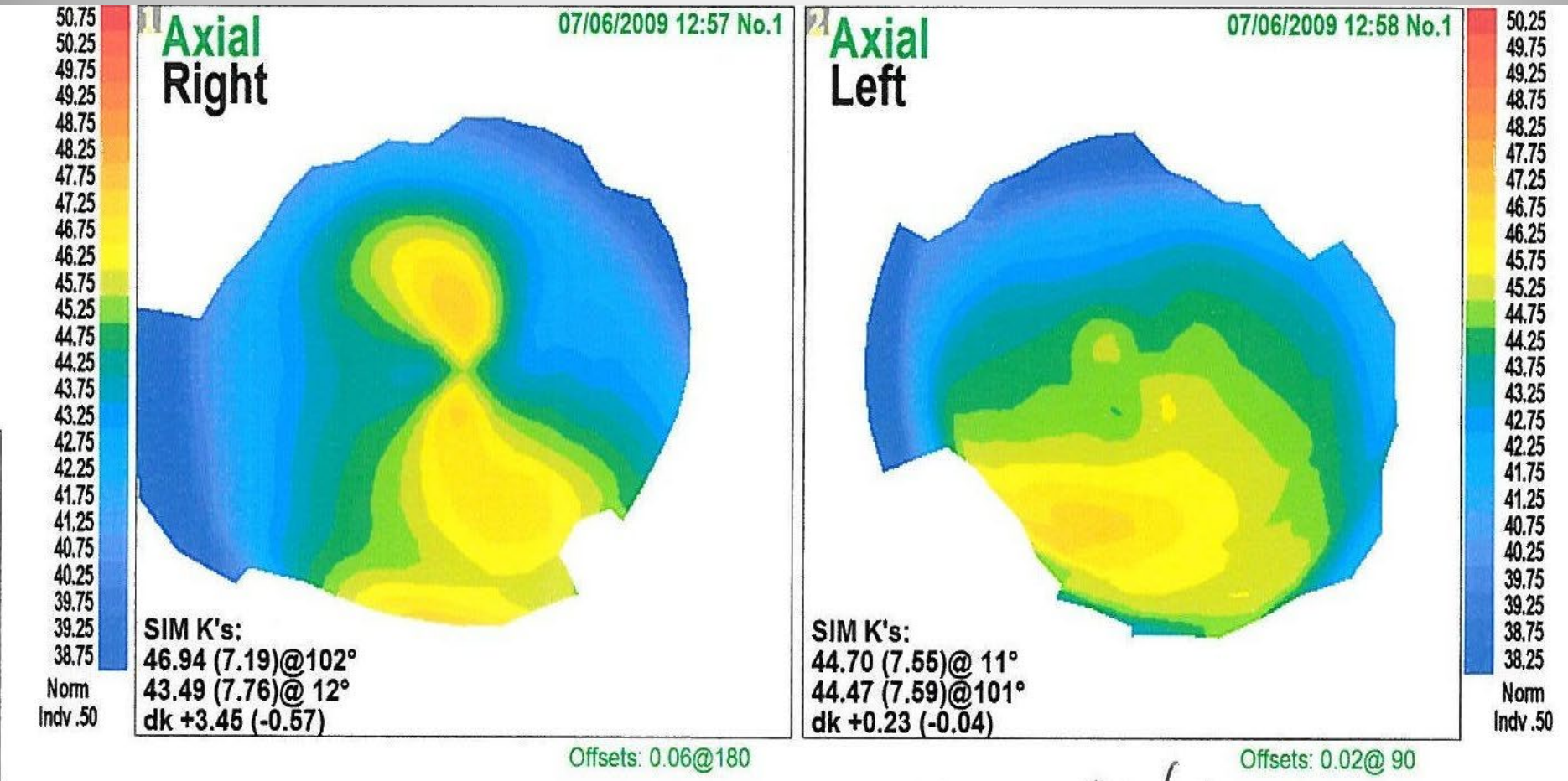
Scleral Tunnel incision to reduce with the rule astigmatism during cataract surgery

www.youtube.com/watch?v=uVp0YHUqPjs&feature=youtu.be

59 yo female with cataract OU



-2.75 +3.00 x106 +1.50 20/40

20/50

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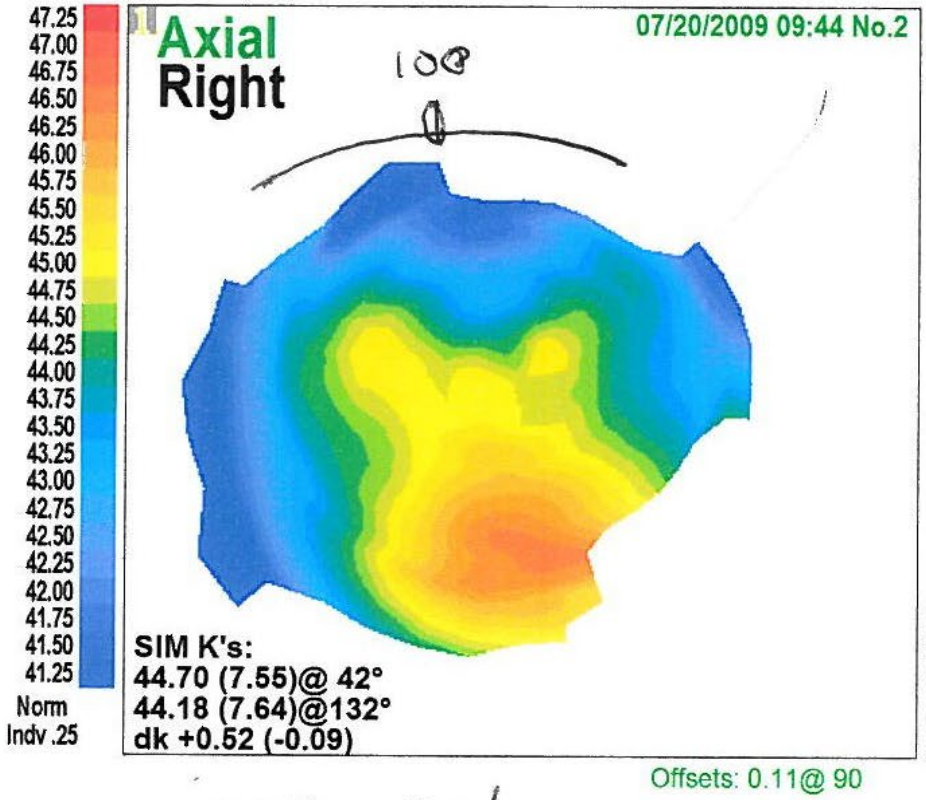
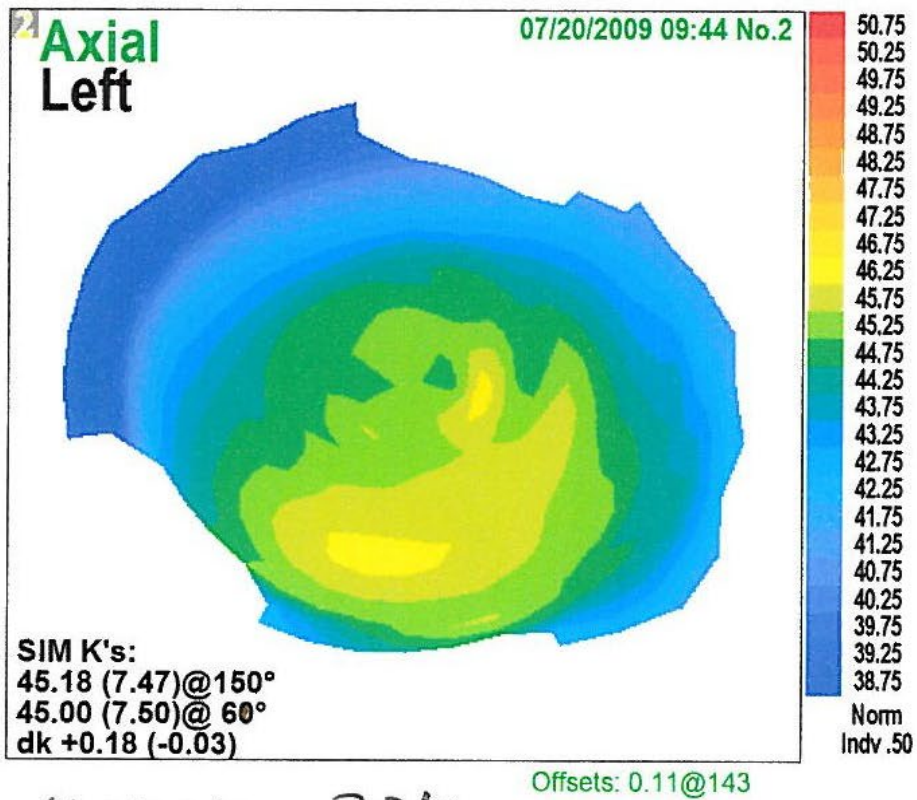
3 wks after PEIOL with Crystalens OU
Scleral Recession OD





UCDVA 20/20 =
UCNVA J2

UCDVA 20/20 =
UCNVA J1

BILAT UCNVA J1 OU

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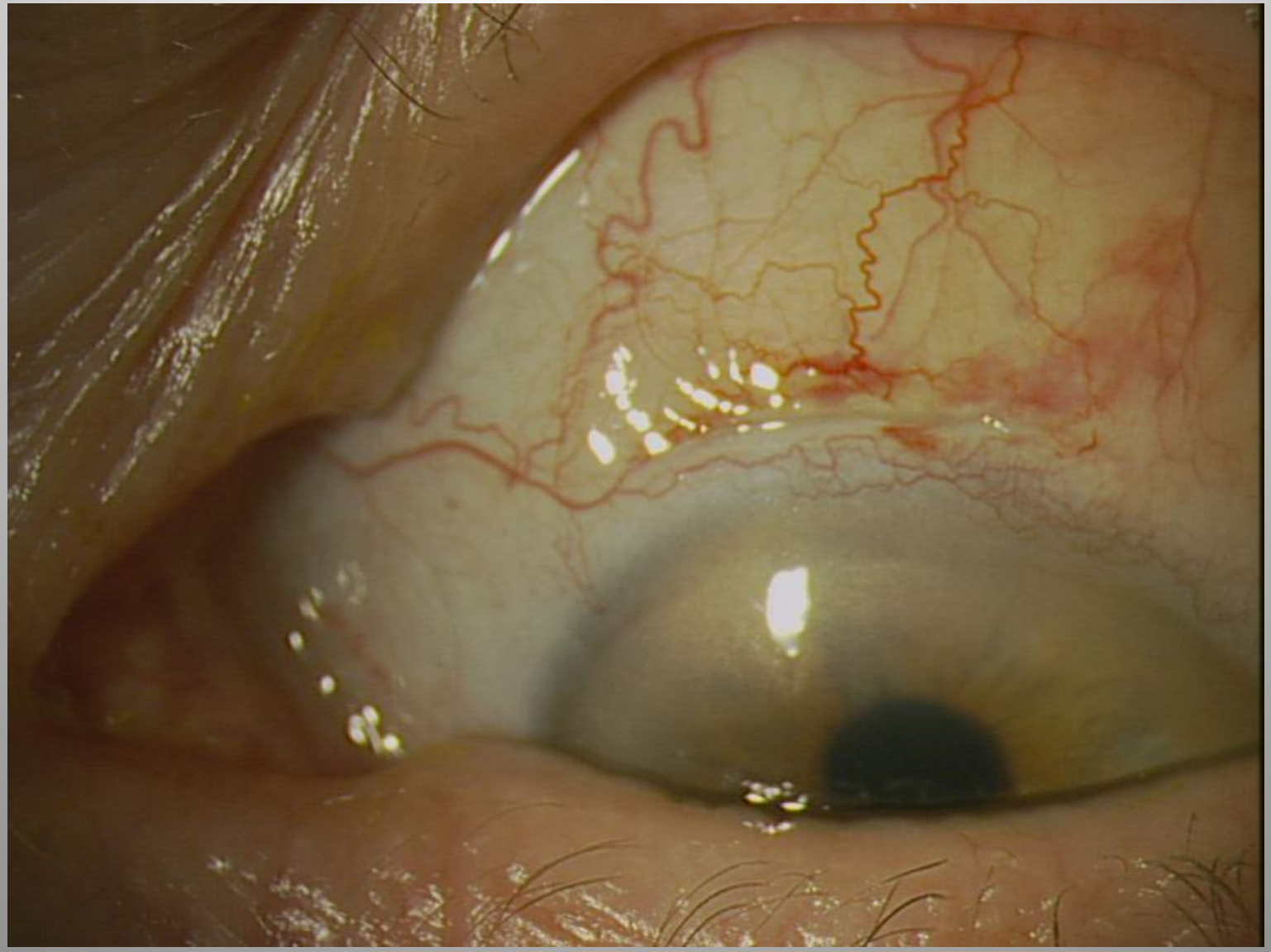

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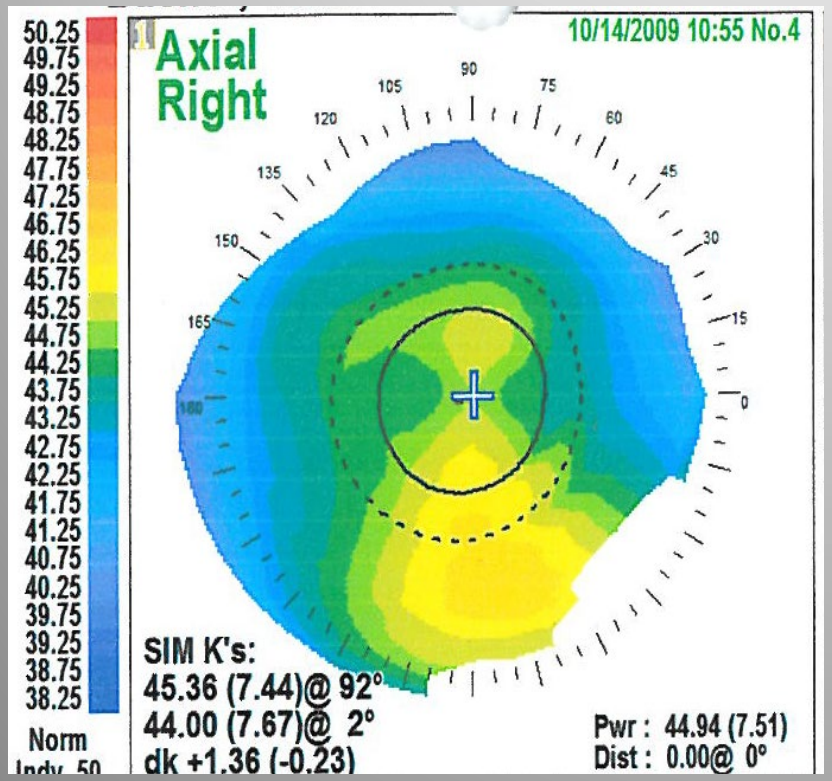
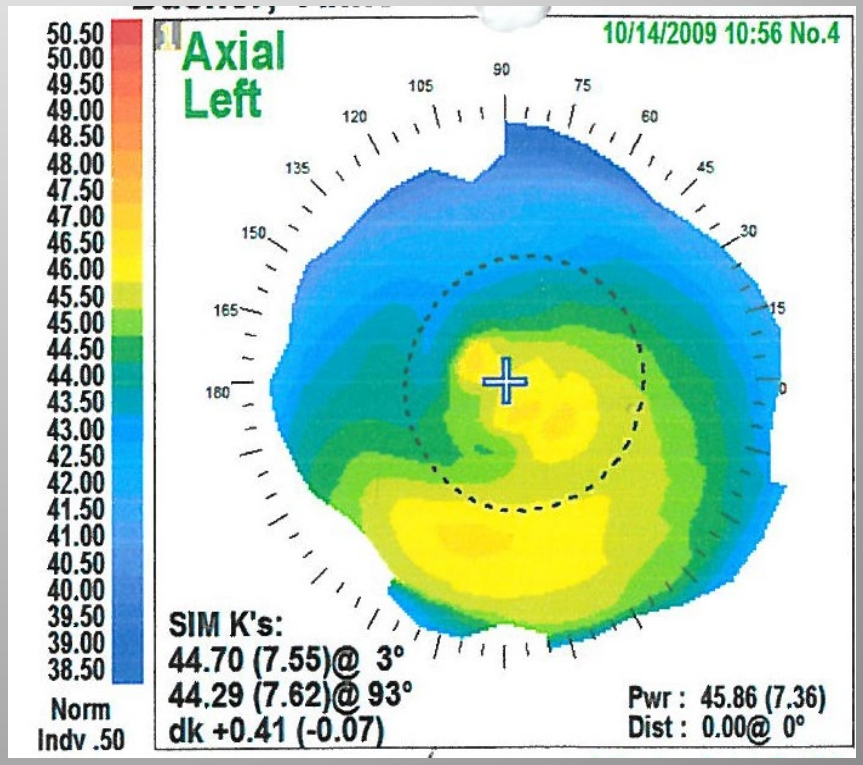
5 mos after PEIOL with Crystalens OU Scleral Recession OD

UCDVA 20/20- UCNVA J3



UCDVA 20/20 UCNVA J1



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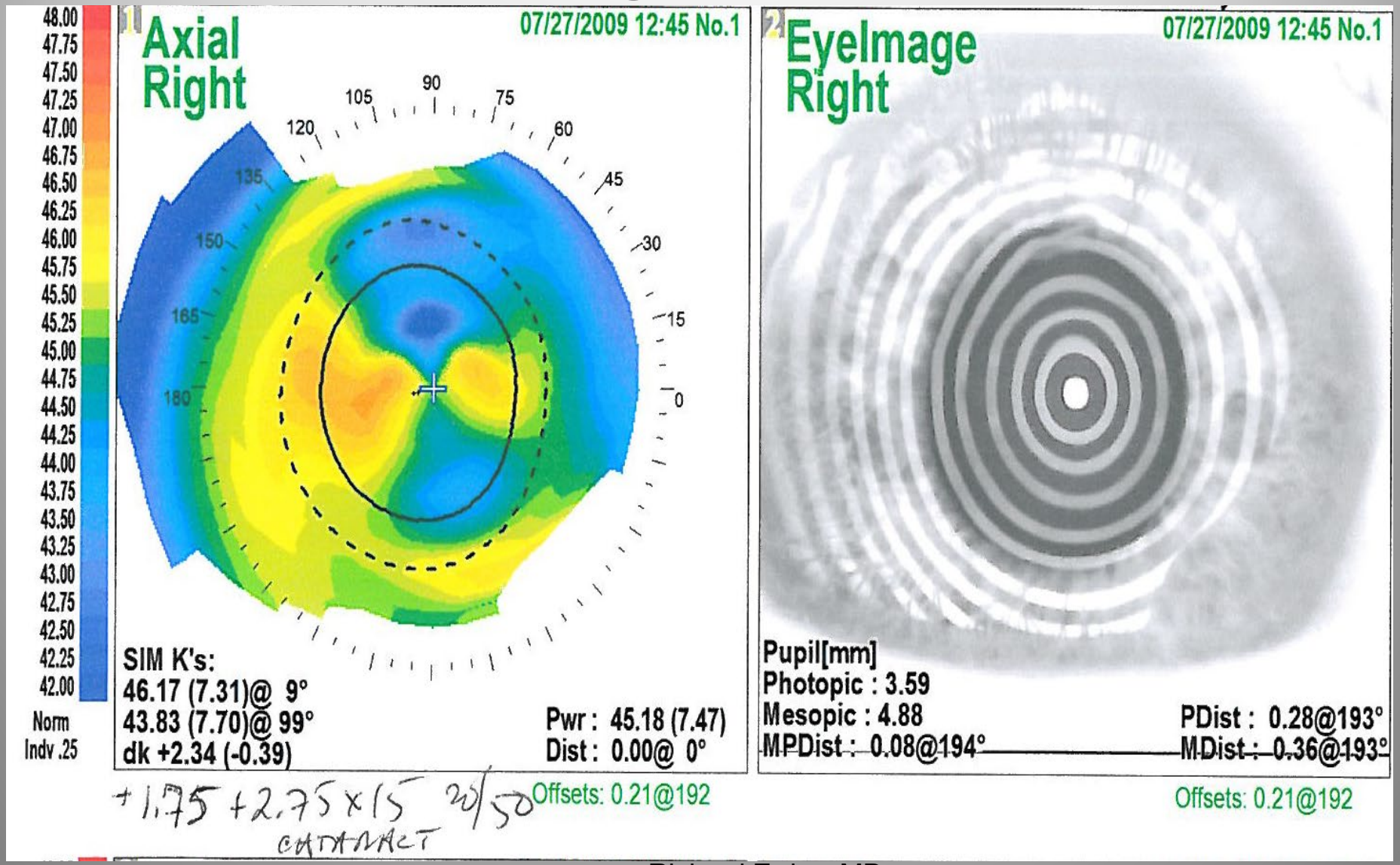
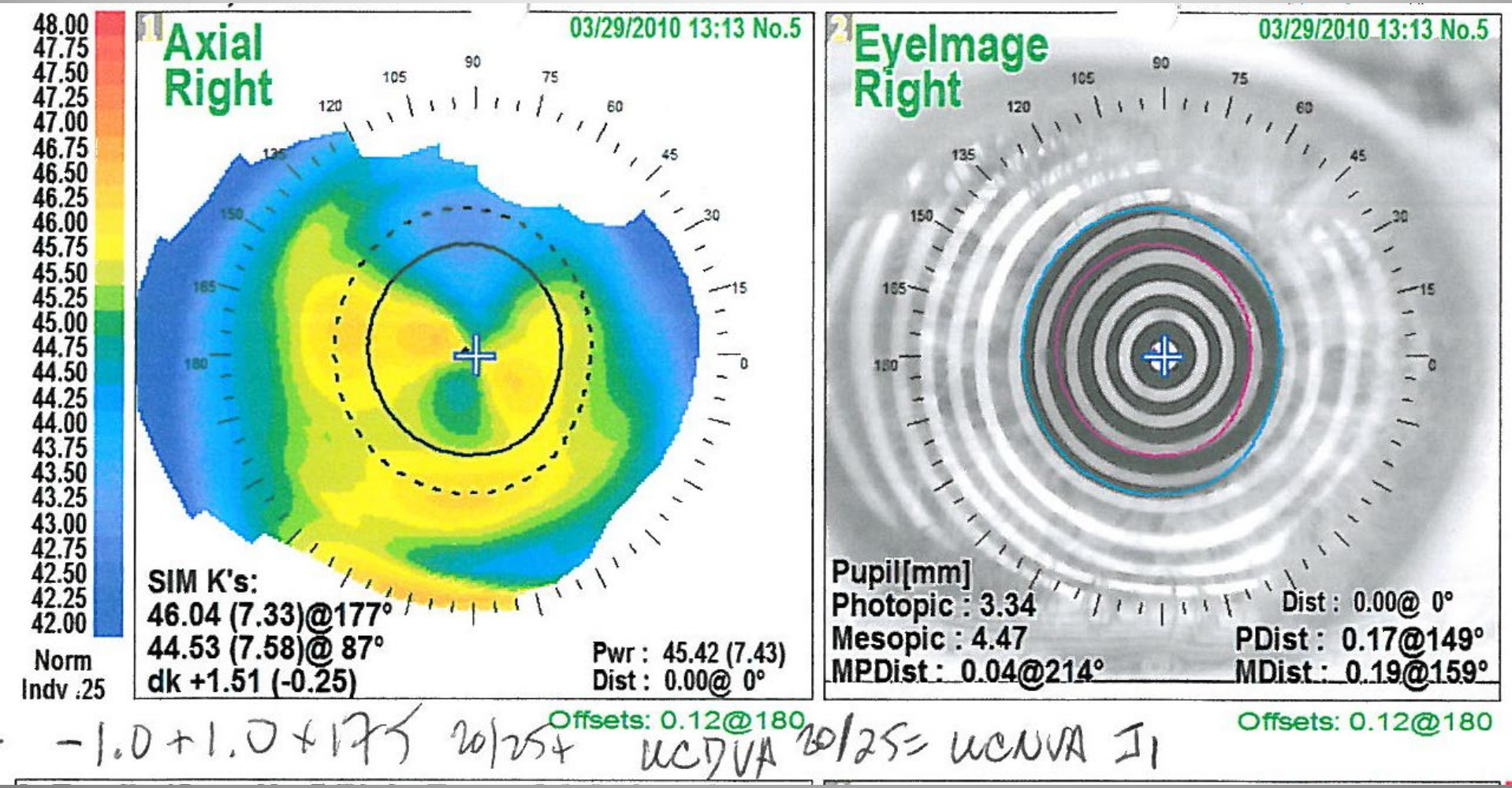
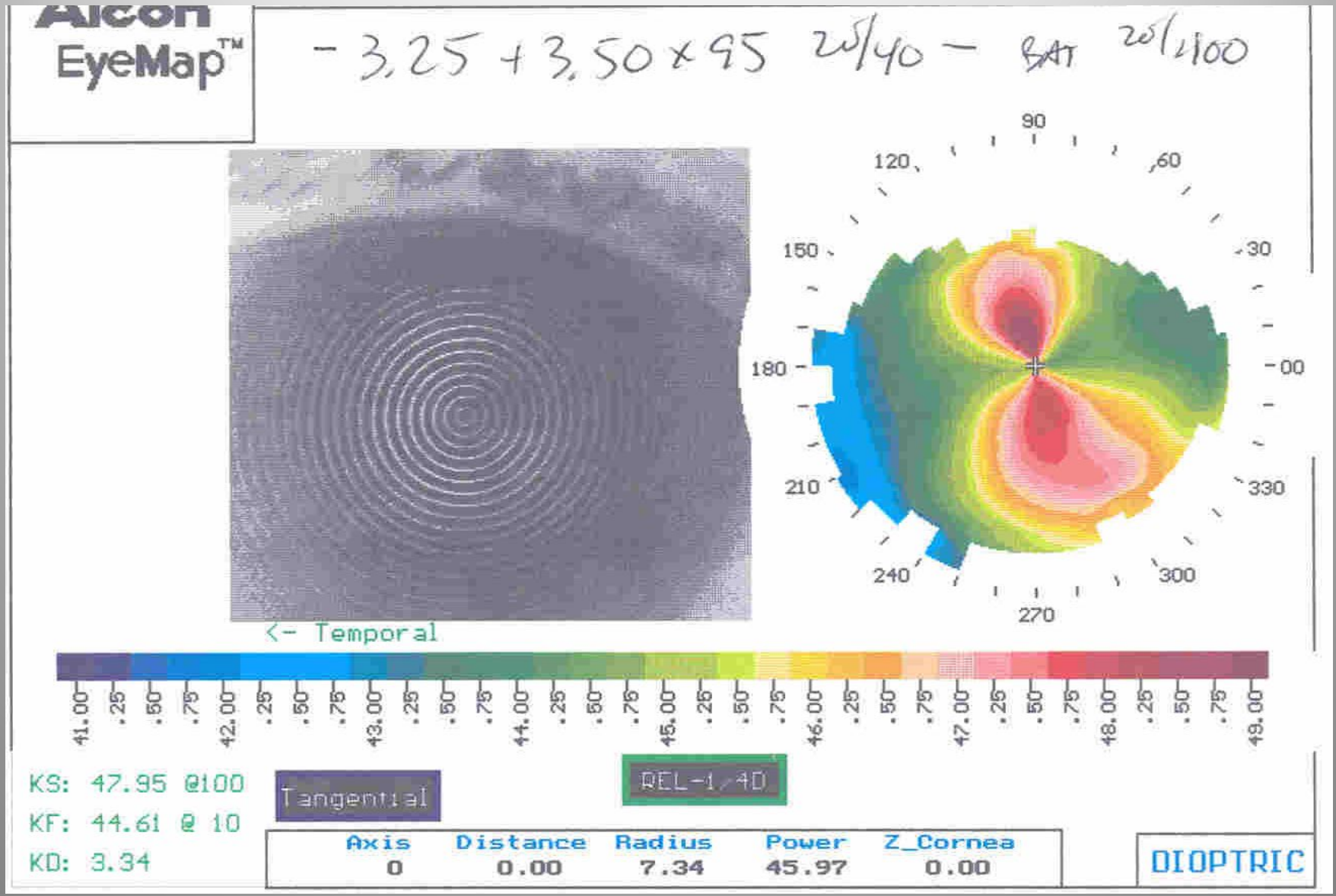
Case: A-T-R Astigmatism with cataract



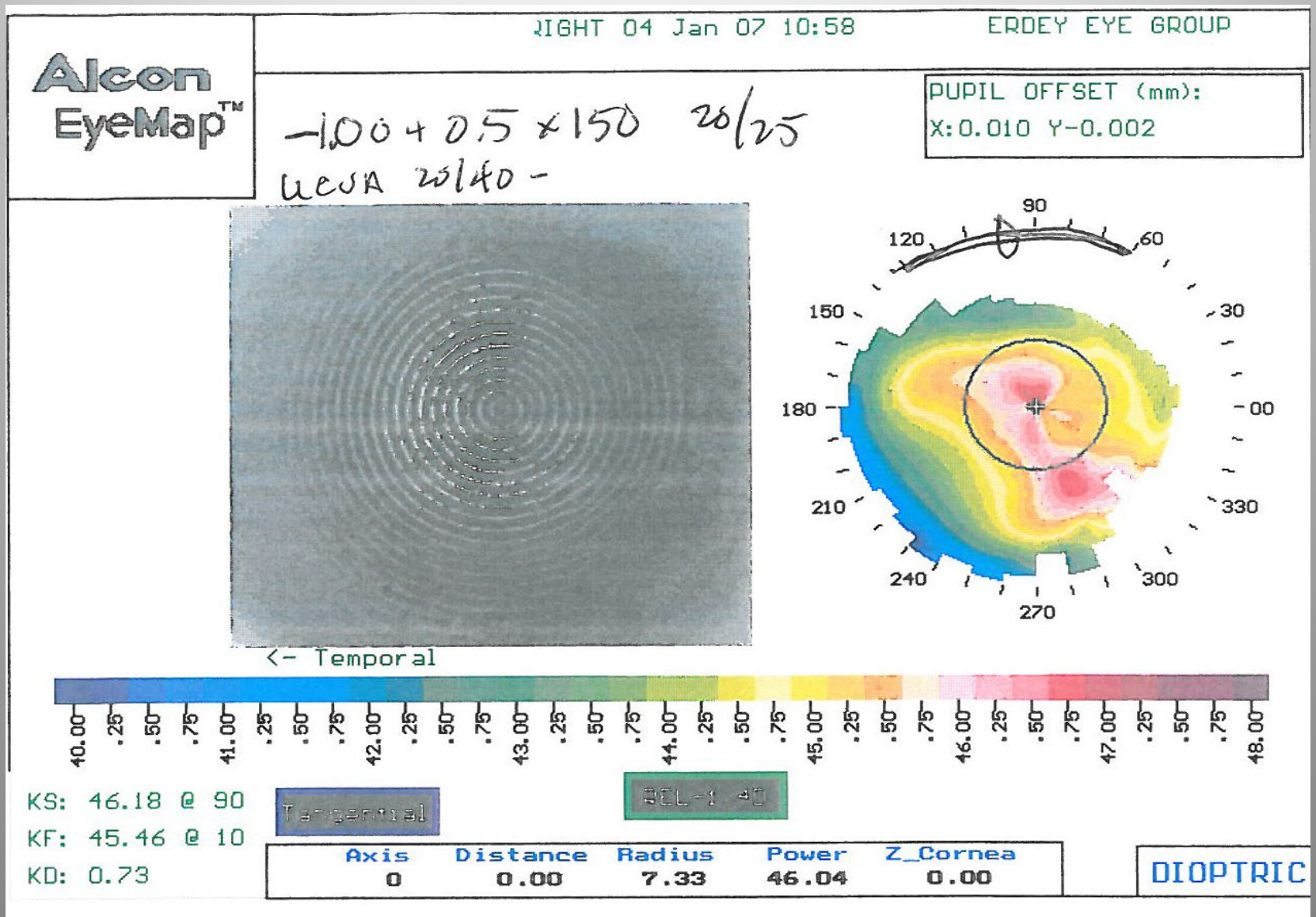
ATR cylinder Scleral Recession – temporal incision 7.5mos post-op.
Conclusion: not indicated for ATR astigmatism due to undercorrection and possible induction of irregular astigmatism,



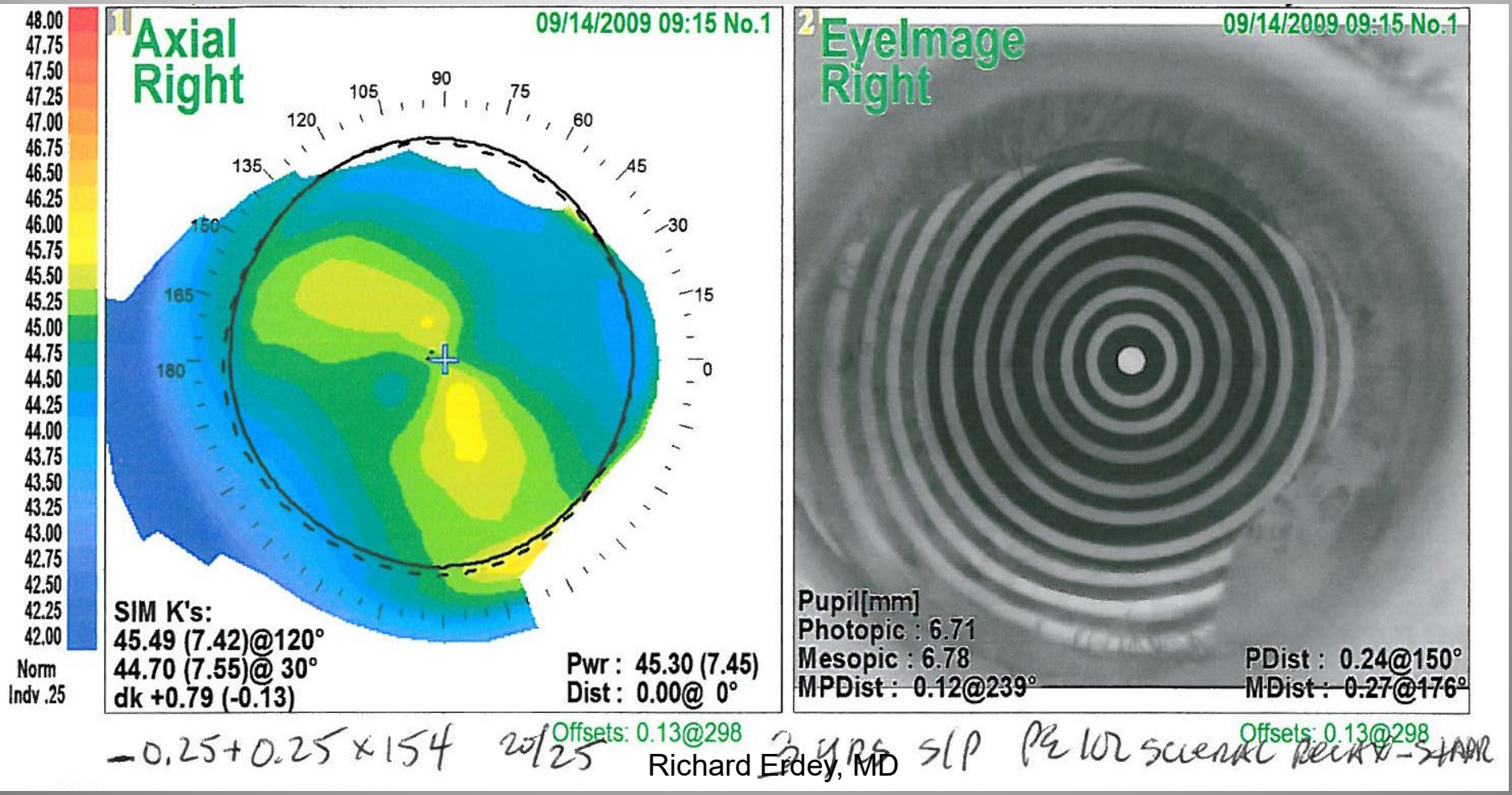
Cataract with astigmatism pre-op OD



3 mos after cat ext with IOL scleral recession



3 yrs post-op


48.00
47.75
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43.75
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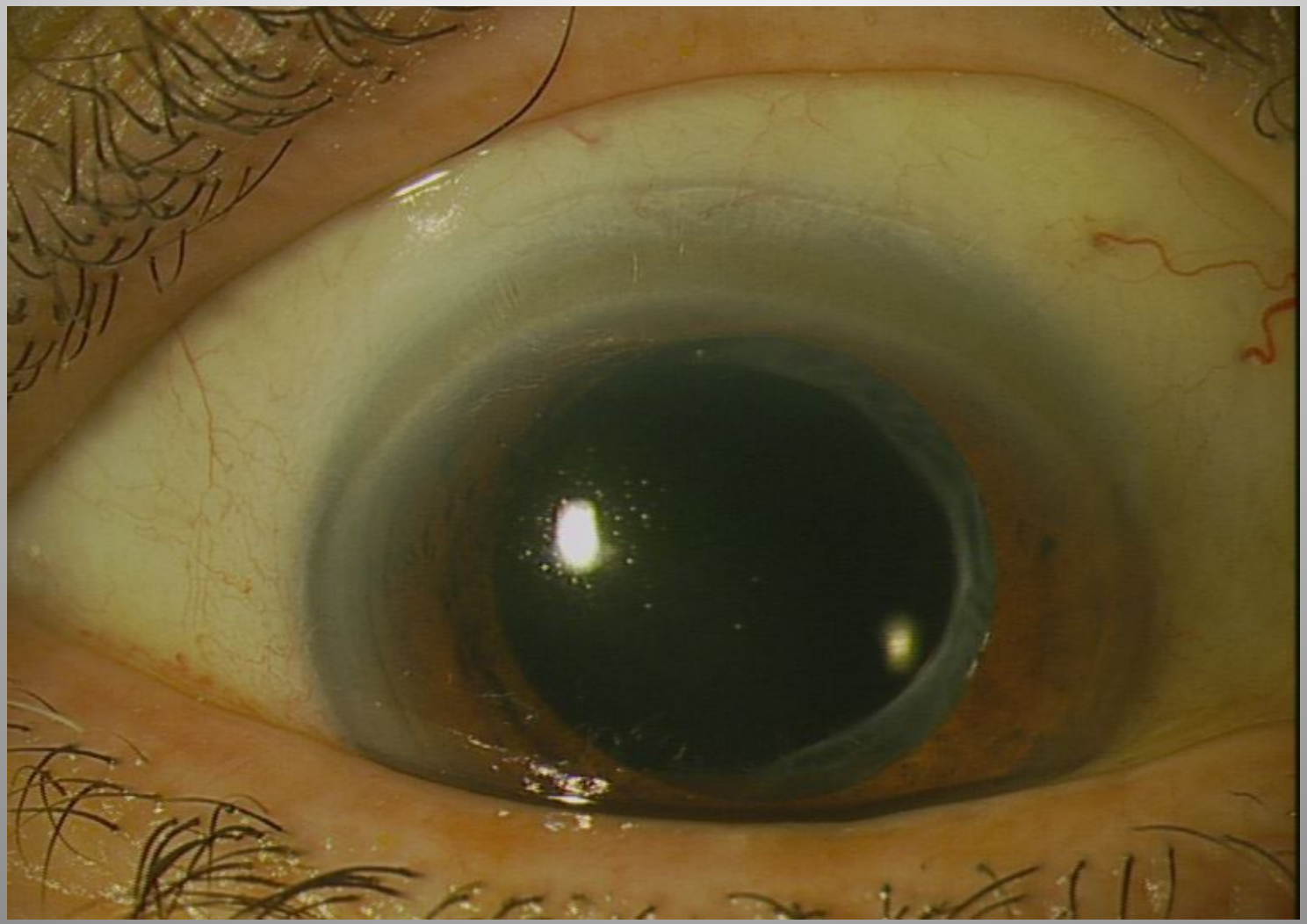
43.25
43.00
42.75
42.50
42.25
42.00
Norm
Indv .25
1
Axial
Right
09/14/2009 09:15 No.1
90
105
75
120
60
135
45
150
30
165
15
180
0
SIM K's:
45.49 (7.42)@120°
44.70 (7.55)@ 30°
dk +0.79 (-0.13)
Pwr : 45.30 (7.45)
Dist : 0.00@ 0°
Offsets: 0.13@298
2
Eyelmage
Right
09/14/2009 09:15 No.1
Pupil[mm]
Photopic : 6.71
Mesopic : 6.78
MPDist : 0.12@239°
PDist : 0.24@150°
MDist : 0.27@176°
Offsets: 0.13@298
-0.25+0.25×154
20/25
3 yrs s/p

3 yrs after scleral recession

9/14/2009



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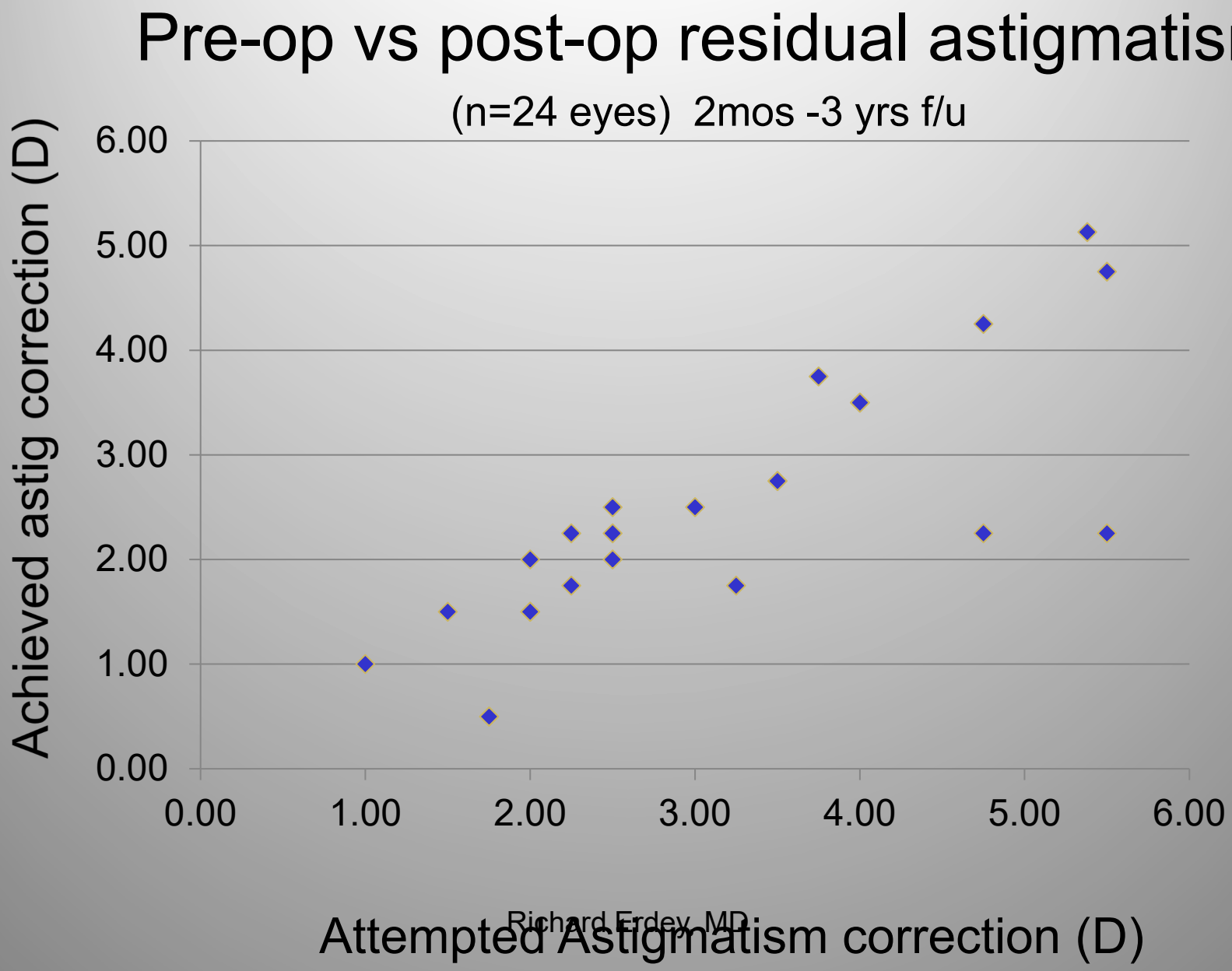
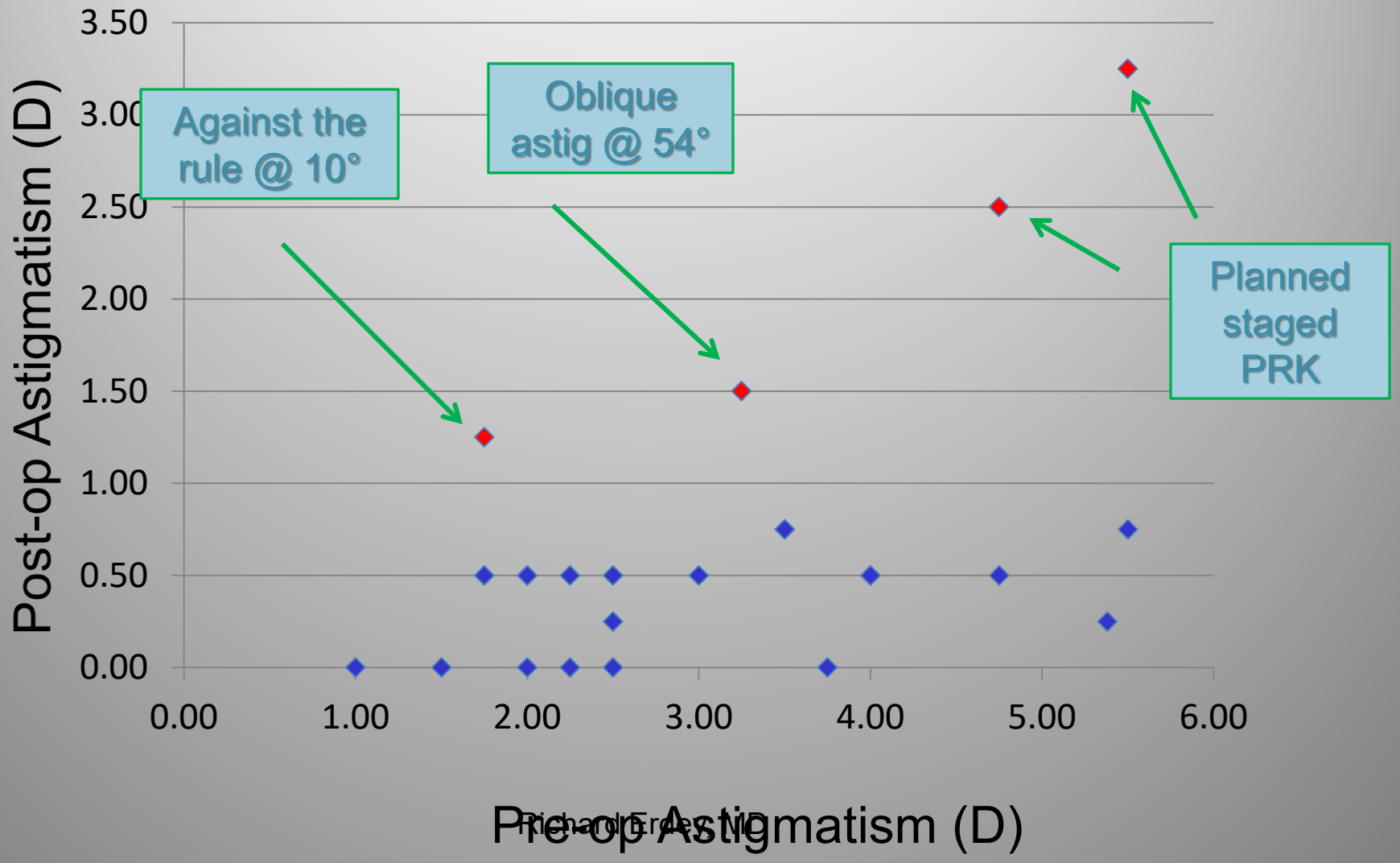
Scleral Recession combined with cataract surgery

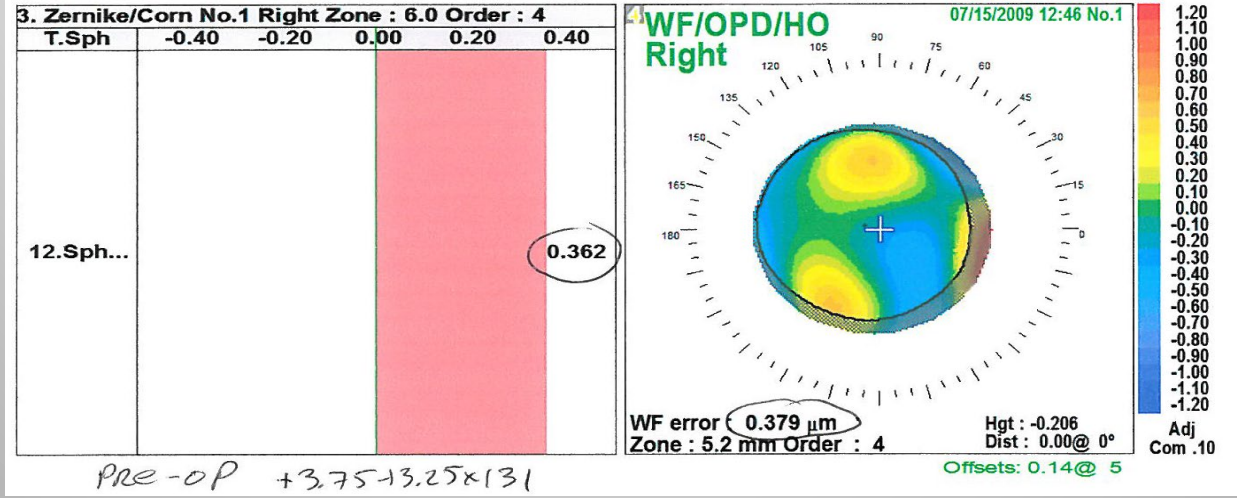


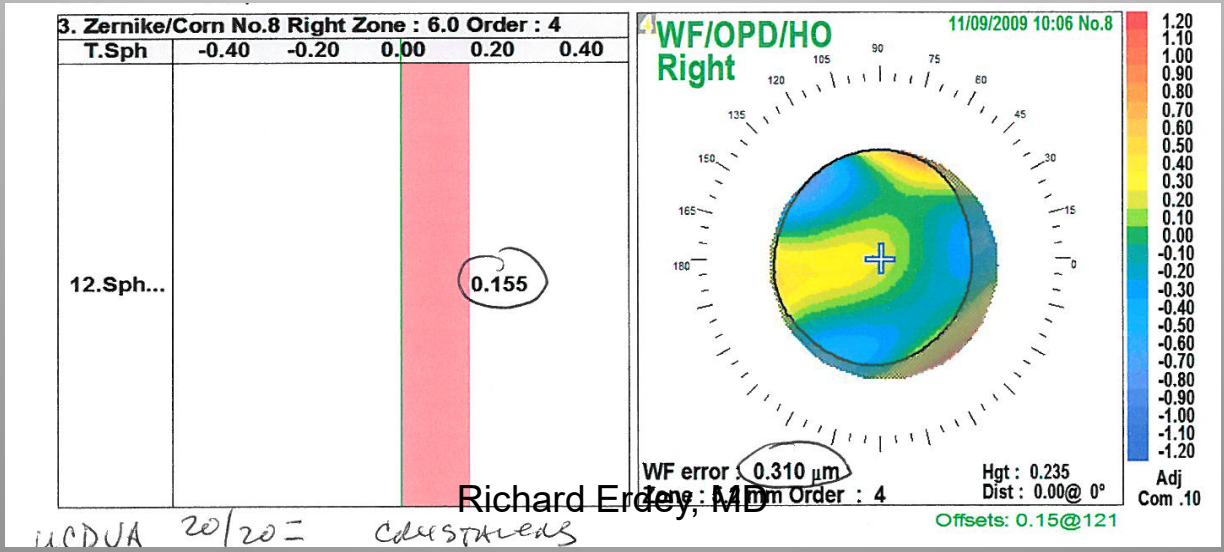
Scleral Recession combined with cataract surgery

Pre-op vs. post-op residual astigmatism



3 mos after scleral recession OD
Cornea spherical aberration vs HOA





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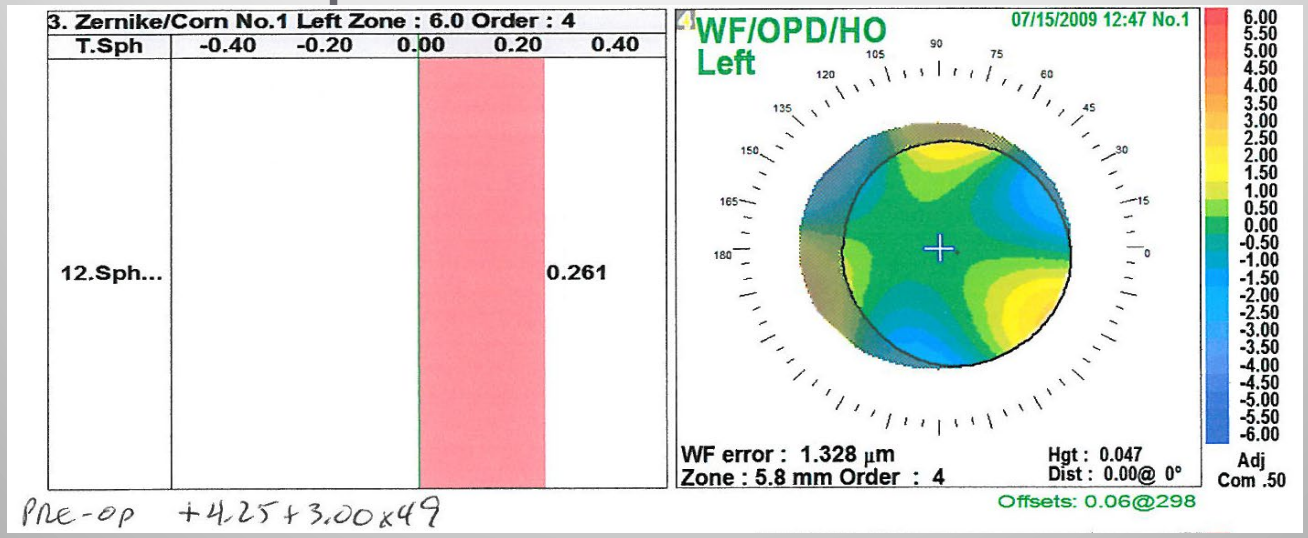
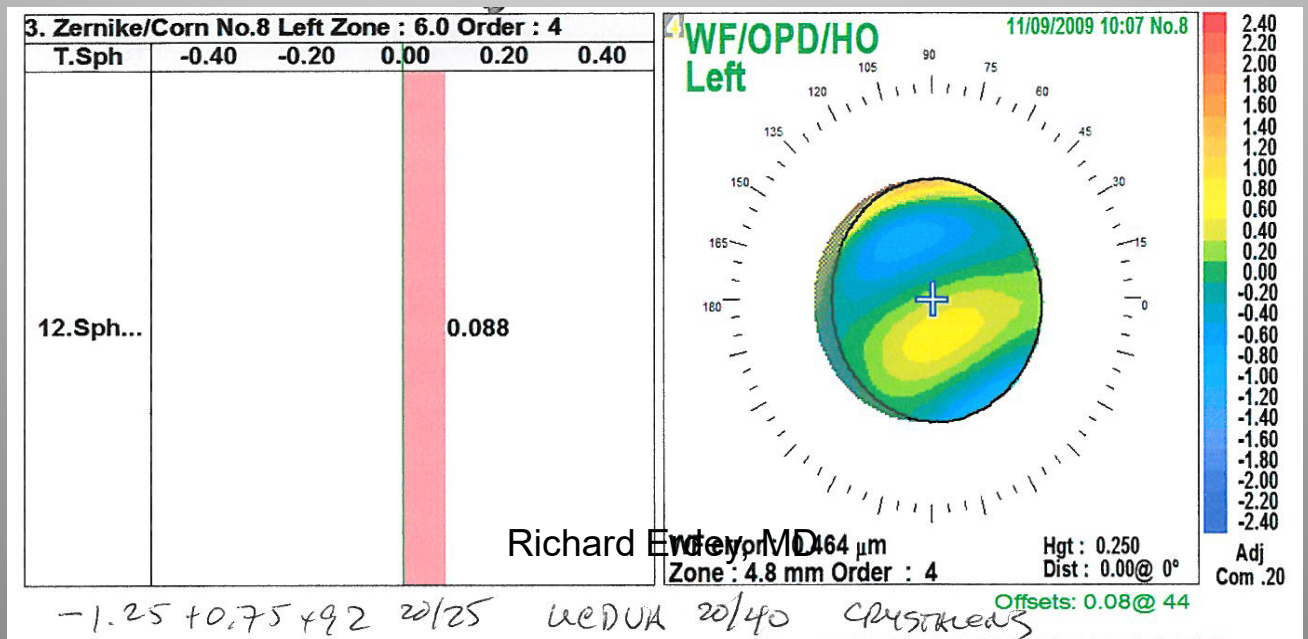
3 mos after scleral recession OS
Cornea spherical aberration vs HOA





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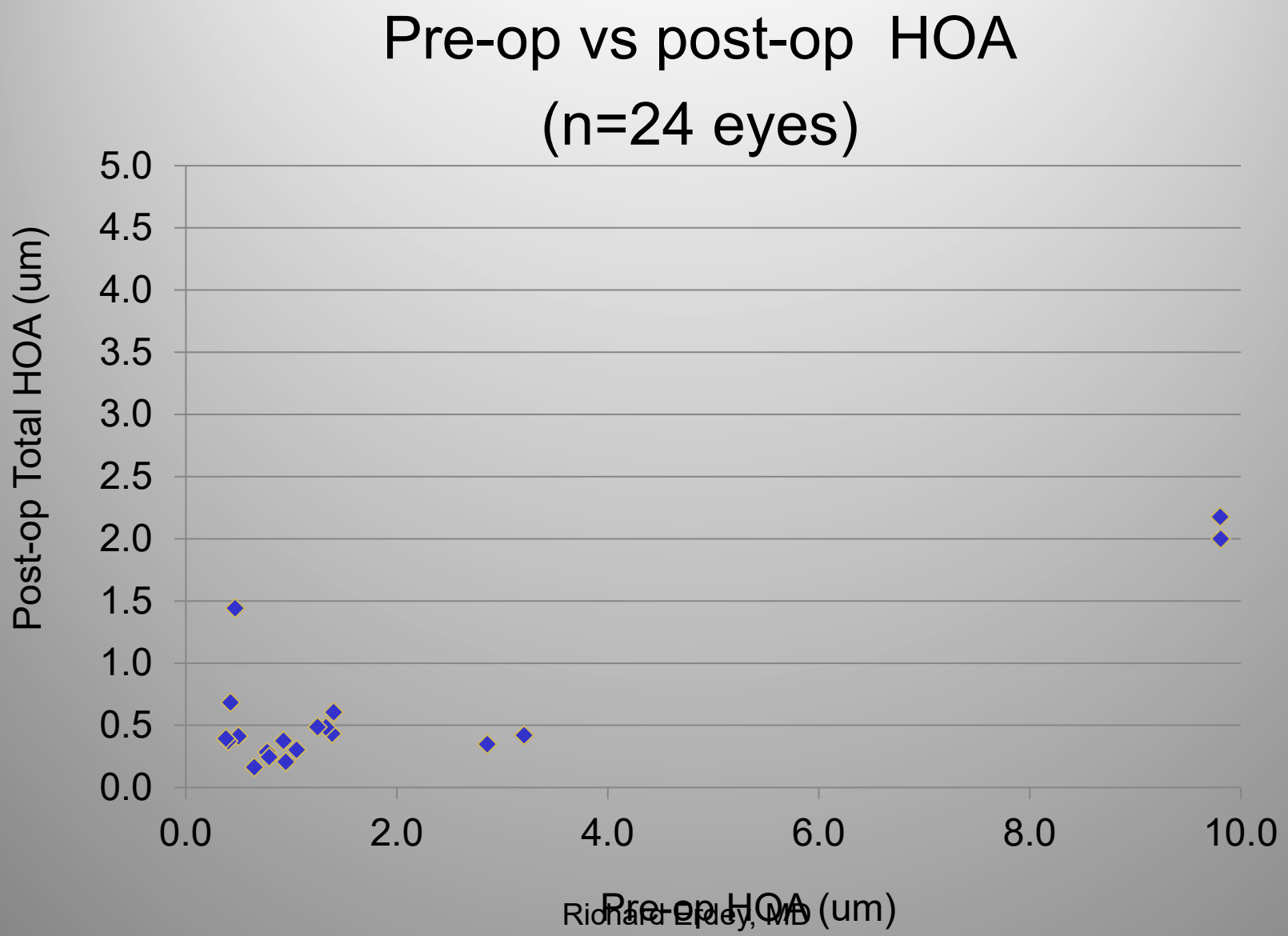
Scleral Recession combined with cataract surgery



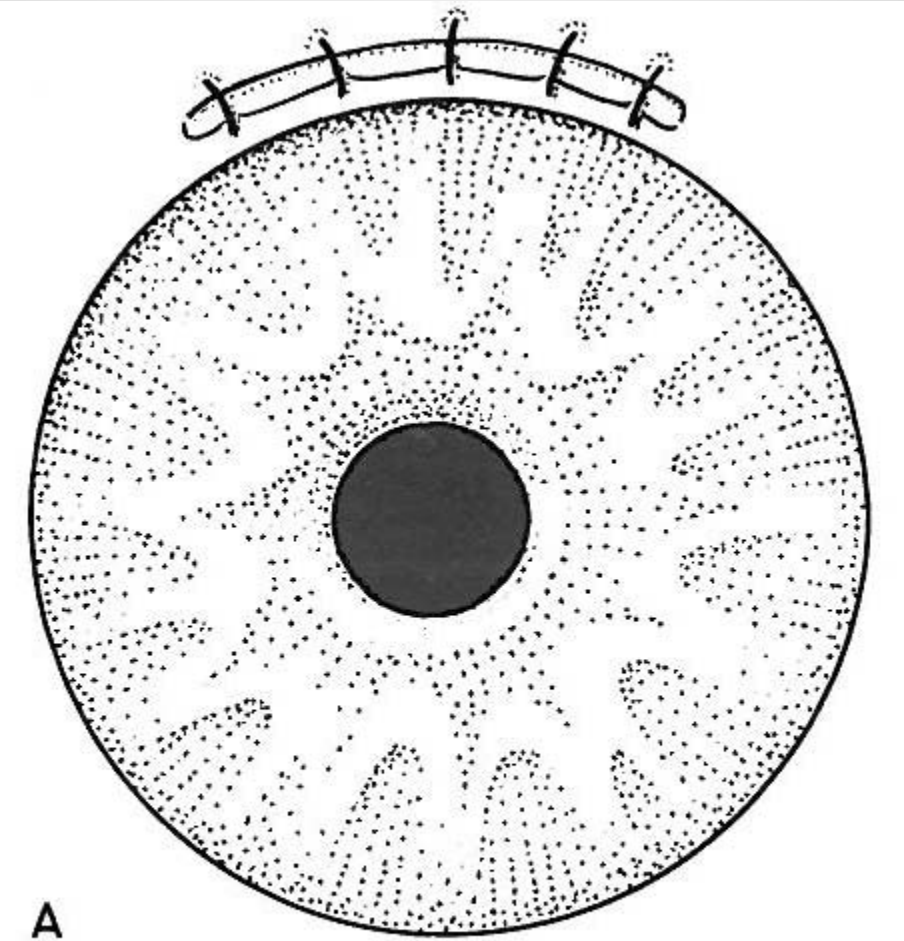
Scleral Recession combined with cataract surgery study: Results

- With the rule astigmatism 20/24 eyes
- Against the rule (4 eyes/24)undercorrects
- None had LVC/LRI enhancement
- One wearing toric soft cl on one eye
- higher order aberrations: much less
- Post-op topography more “natural”

Scleral Recession: risks

- Wound leak (0)
- Overcorrection (0)

Scleral Recession: potential advantage - reversible



Scleral Recession Conclusion:

- Indications: Cataract, ICL, can be used successfully with cataract and mild keratoconus or prior PKP, DALK,
- 1-3.5 D cylinder (with the rule)
- Caution (against the rule)
- Consider personal nomogram incision size and location

Scleral Recession study Conclusion:

- Safe
- Lamellar technique, spares cornea
- Efficacious (with the rule cylinder)
- Rapid results
- Reproducible with experience
- Does not regress
- Reversible

Scleral Recession study Conclusion:

- Does not induce (and may decrease) Higher Order Aberration (HOA)
- Very Cost effective. Reduce dependence on toric IOL's (costly)

Scleral Recession: Barriers to wide adaptation

- Comfort constructing superior scleral tunnel incision
- Gain experience with qualitative keratometer
- Most US ophthalmology residencies teach temporal clear cornea incisions last decade