Richard Erdey, MD
Erdey Searcy Eye Group

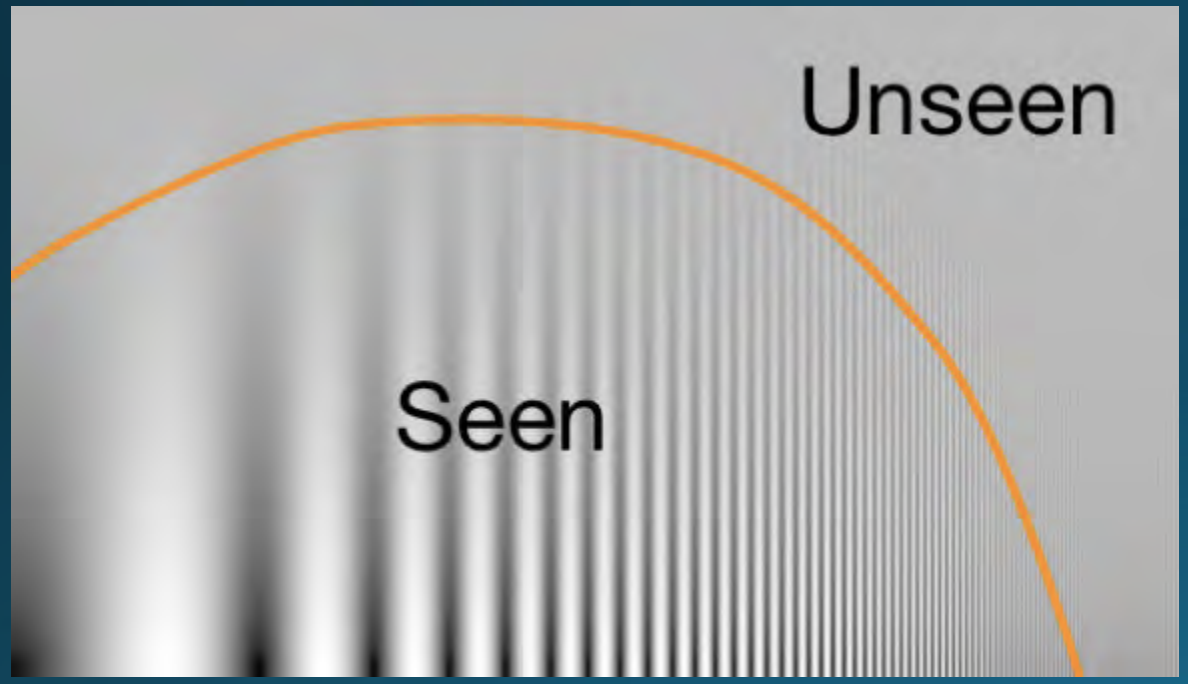
DALK: Surprising Sights Ahead!

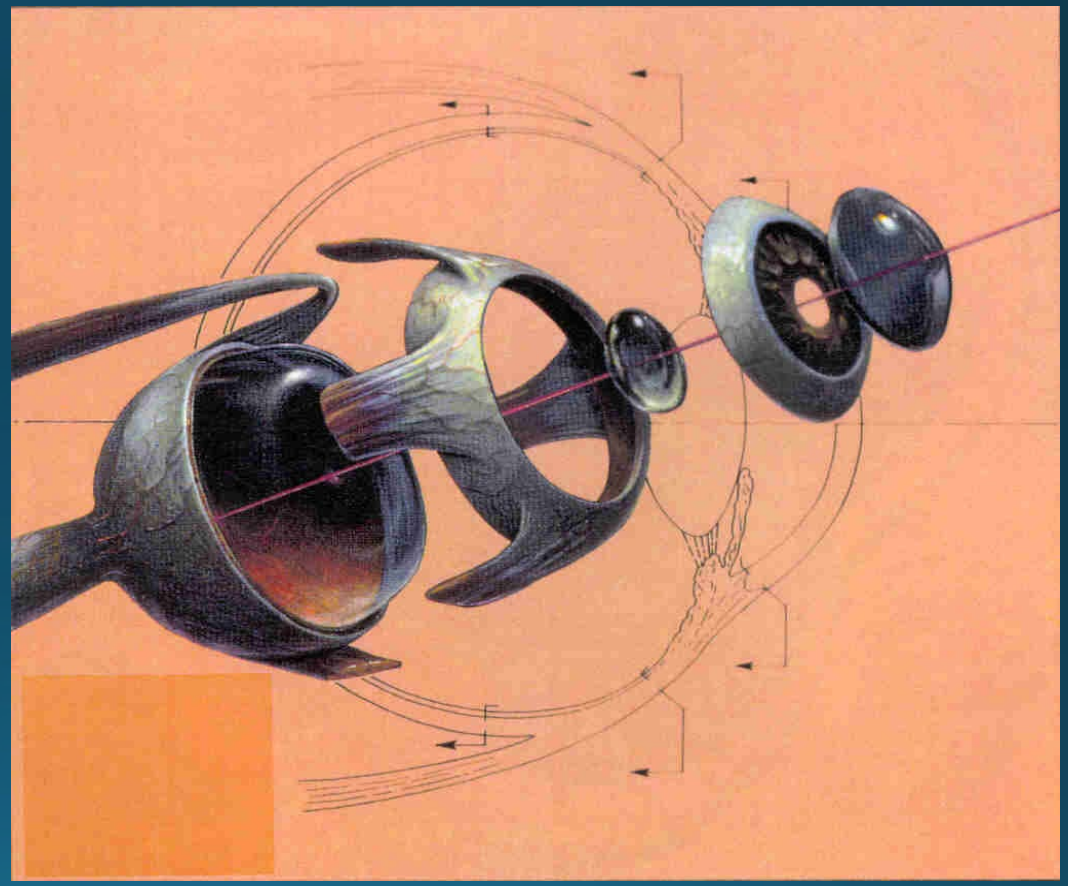
2025: Disclosures: Financial Interest surgeon fees

- DALK/PKP: $1100 Medicare/commercial $870 Medicaid
- Astigmatism management Fees
- ICL/LAL/Toric IOL's
- Cataract surgery

The EYE: “Contrast Sensitivity Detector” (Signal/Noise)

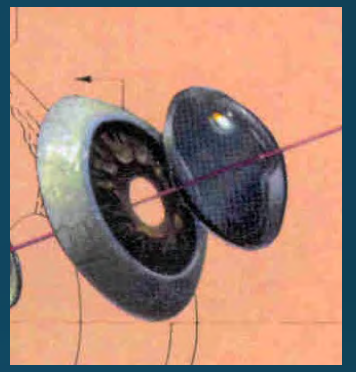
-





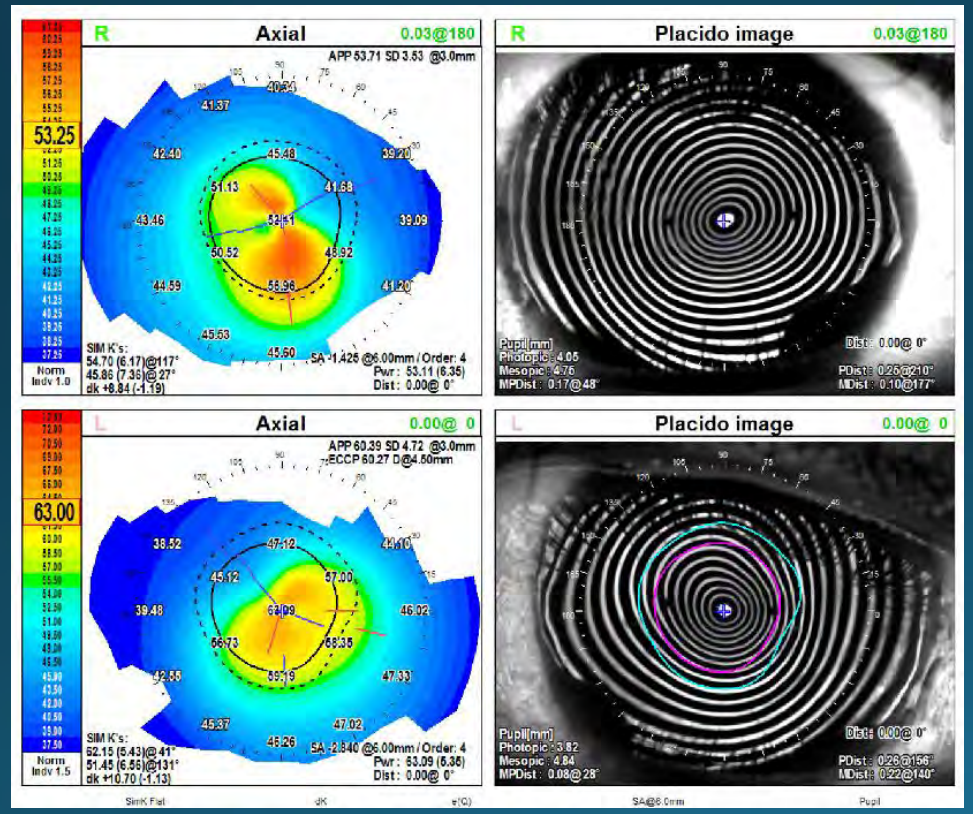
The Cornea:

- Average K's = 43.5D
- Excessively high /low K's = NOISE!



Warped cornea? Scleral / Hard CL's (improve or restore S/N)

65 YO Severe Keratoconus OU and cataracts intolerant of glasses/reduced tolerance Scleral CL's

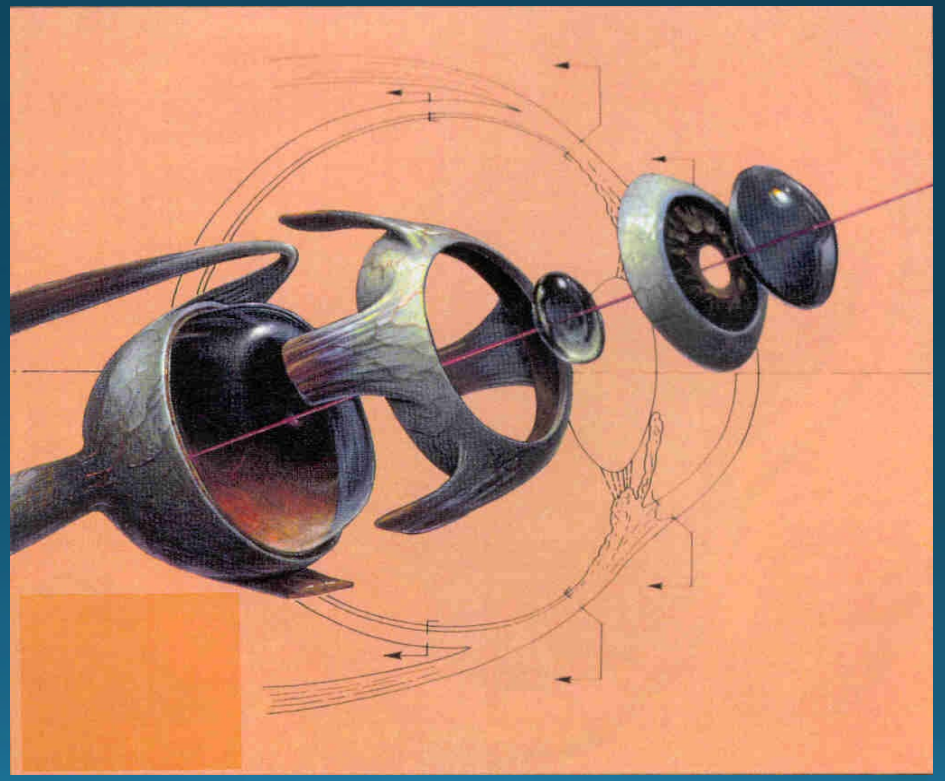


Uncorrected VA

- OD: 20/80
- OS: CF 3 ft

When Scleral / Hard CL's are not tolerated Variety of Cornea Methods:

- Replace when warped, opacified, infected or traumatized
- Modify (refractive error)



Change Corneal Shape: Methods

- Slice — Vertical: RK /AK (1980)/limbal relaxing incisions/Femtosecond Laser
- Dice: — Smile (2016)
- *Fillet:* — *Horizontal: Microkeratome/Femtosecond Laser/Crescent knife*
- *Ablate:* — *PRK/LASIK* (1995)
- Heat: — Conductive Keratoplasty (2004) Holmium Laser (2000)
- Stiffen: — ***Collagen Cross Linking (2016)***
- Suture: — Compression with 9-0, 10-0 nylon or prolene sutures
- ***Implants/Inlays:*** — ***Intacs***, (1998) Kamra (2015)/Raindrop (2016)
- Transplant: — Penetrating keratoplasty (PK) (1905)

DSEK (2005)/DMEK (2011)

Deep Anterior Lamellar Keratoplasty (DALK) (large dia 1960)

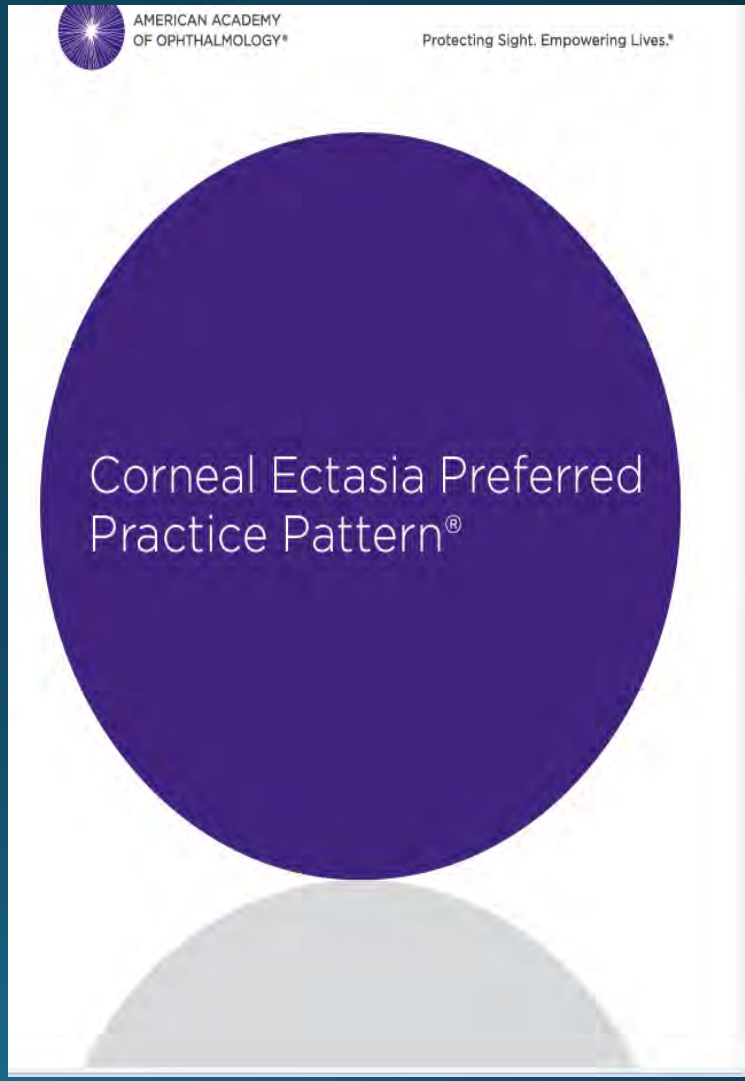
Keratoplasty: indications

- Keratoconus/globus
- Pellucid Marginal Degen
- LASIK/RK Ectasia
- Cornea Scars
- Cornea Dystrophy
- Infectious Keratitis
- Corneal Melt

Cornea Ectasia 2024

- https://www.aaojournal.org/article/S0161-6420(24)00010-1/pdf

- Keratoconus/globus
- Pellucid Marginal Degen
- LASIK/RK Ectasia



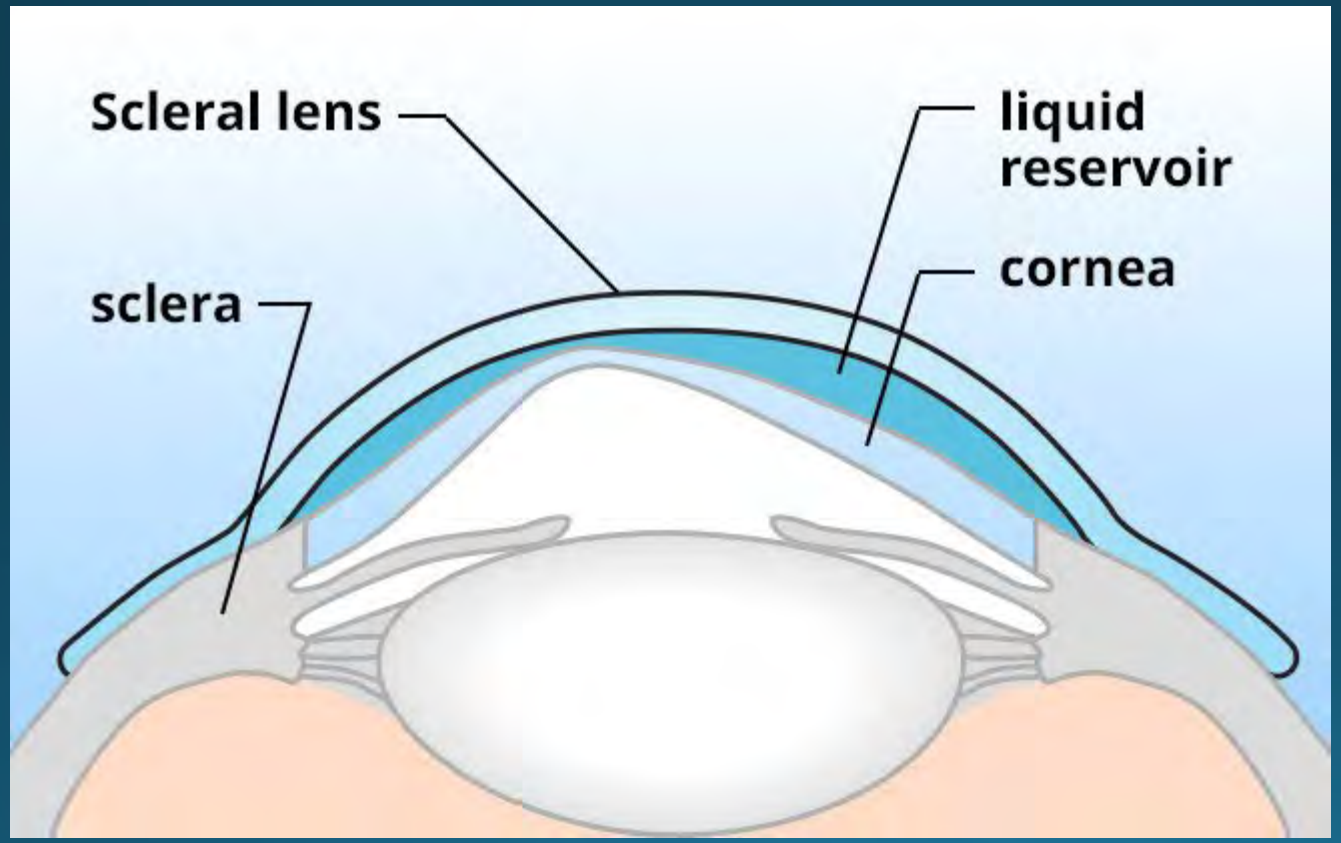
Keratoconus incidence 2025

- 2-4% or higher
- LASIK surgeons decline at least 10% - (abnormal topography)
- (Greece possibly 10% - John Kannellopoulos, MD)

Treatment corneal warpage 2024

- Scleral (RGP) Contact lenses
- CXL epi-off / epi-on
- Intacs / CTAK
- DALK 598 (attempted! - % converted to PKP?) (EBAA USA 2023)
- Penetrating Keratoplasty (PKP) 1,939 Keratoconus /14,486
- (EBAA USA 2023)

Scleral Contact Lenses - Short term vs Lifetime use

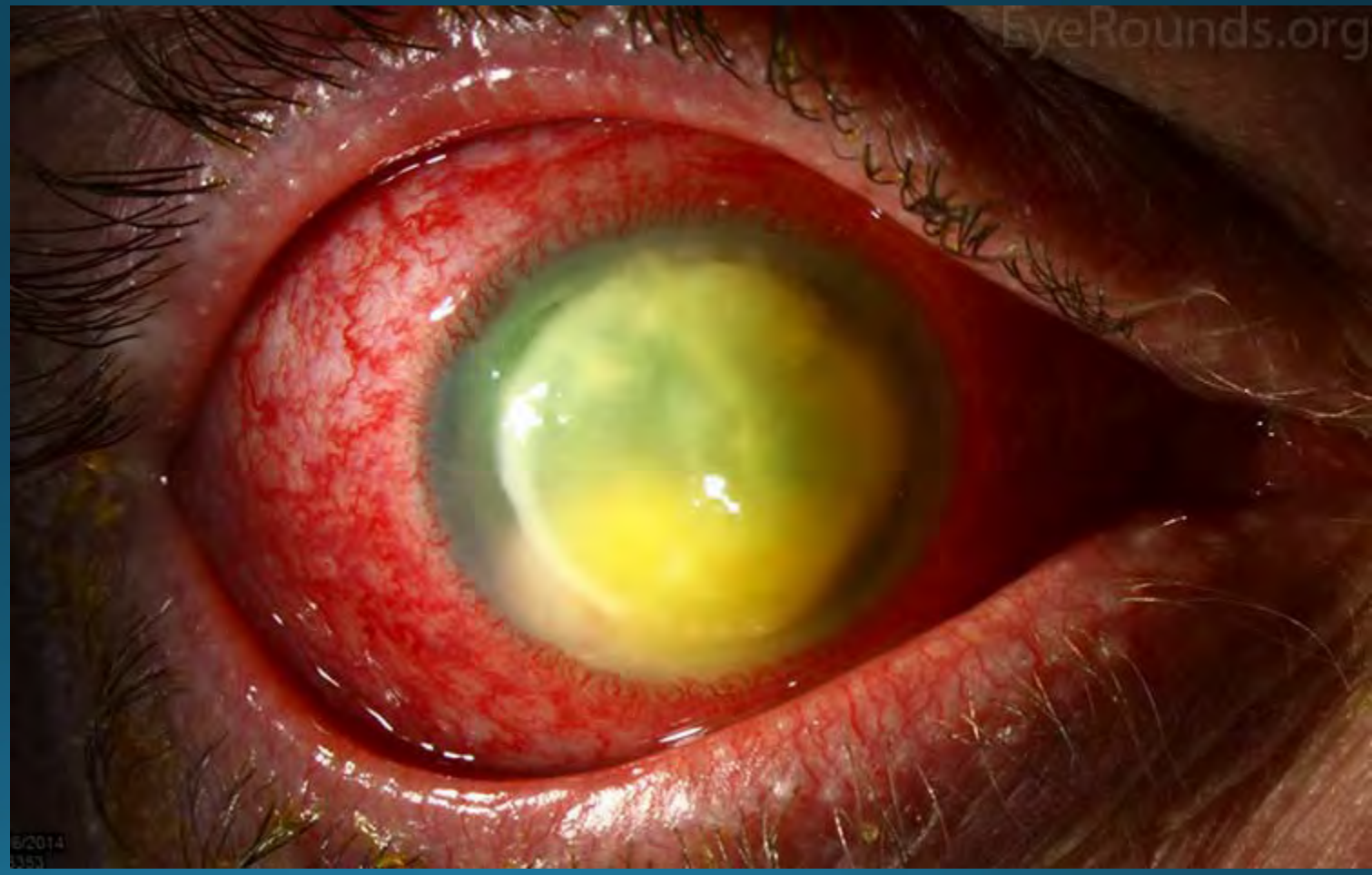


Scleral Contact Lenses - Lifetime

- Non-compliance
- Cumulative risk significant
- Cumulative cost

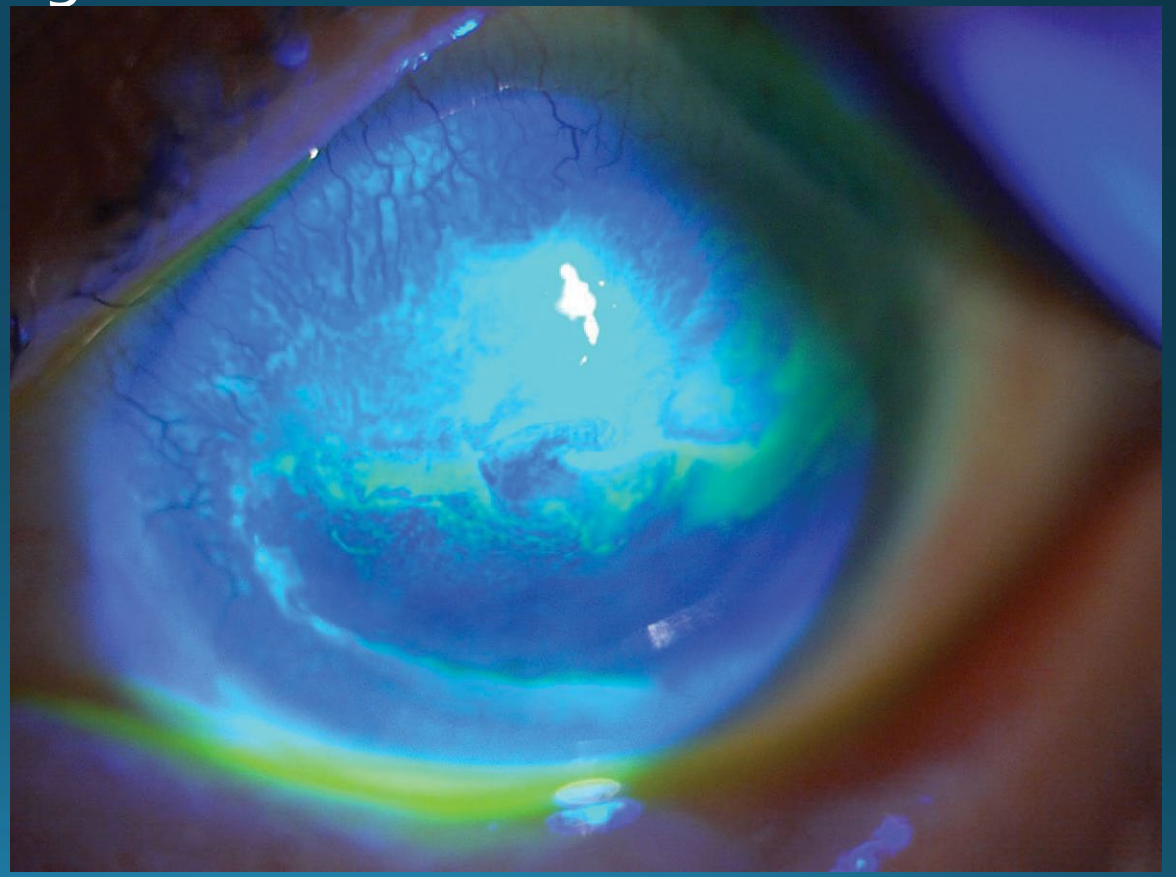
Scleral Contact Lenses - Lifetime

- Cumulative risk significant
- Microbial keratitis



Scleral Contact Lenses - Lifetime Cumulative risk stem cell failure

- Risk delayed reepithelialization /scarring after DALK



Scleral Contact Lenses - Lifetime

initial fit and materials $4,000/both eyes

annual replacement $2,000/pair

Early Detection subclinical keratoconus

Essential to prevent progression to advanced disease

18 yo female

- Baseline glasses 2022

  OD: -6.0 +2.5 x 90

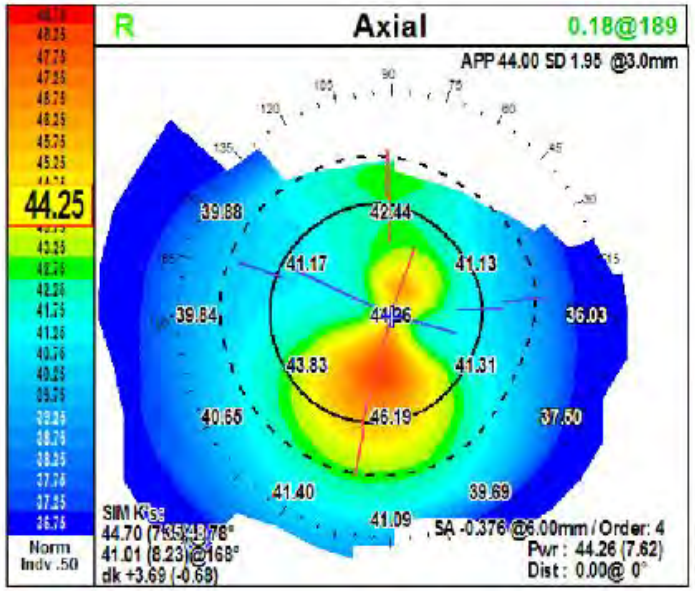
  OS: -5.25+3.0 x 80

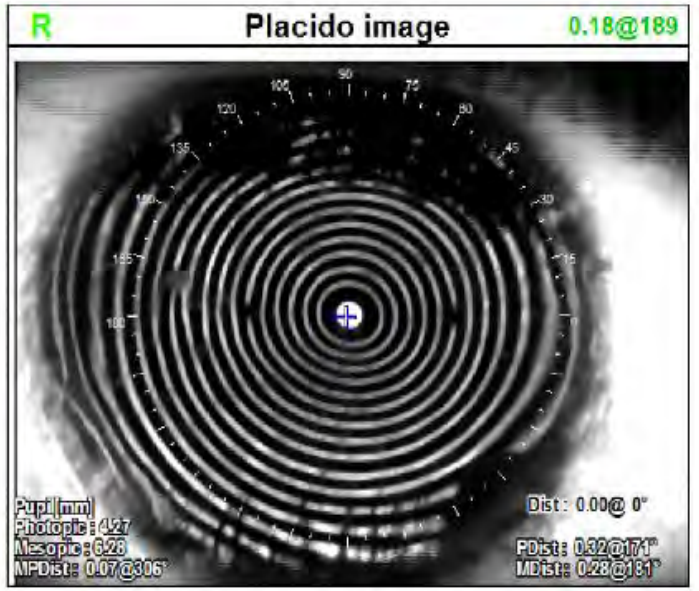
Now: March 2024

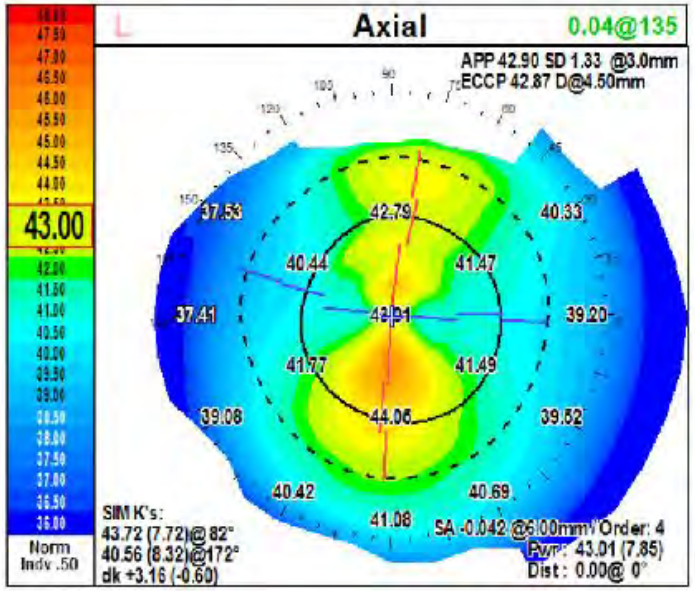
OD: - 8.0 + 4.0 x 80 20/25

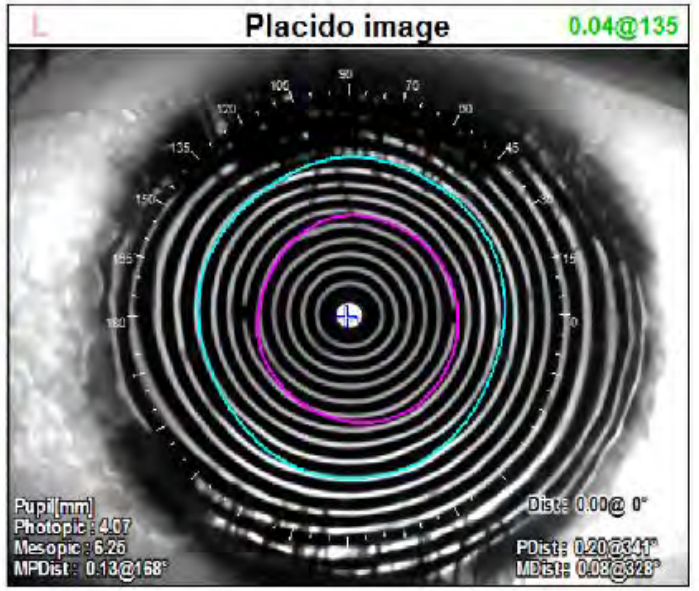
OS: -6.25 +3.25x 85 20/25

L	03/08/2024 10:40	Comment	L		Diagnosis	L	
R	03/08/2024 10:40		R			R	







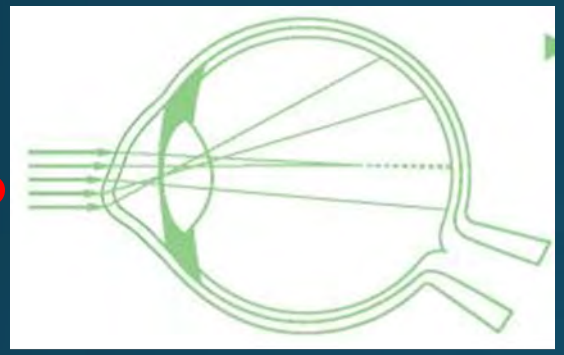


Options?

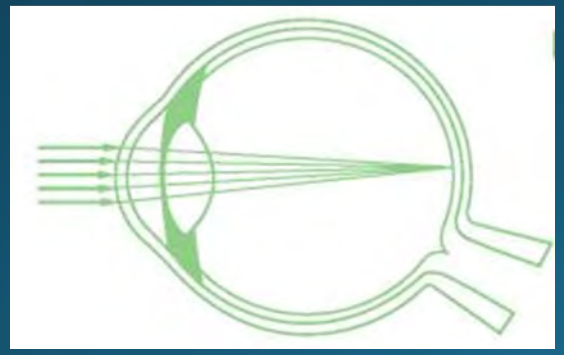
- Change glasses
- Contact lenses
- PRK
- Intacs
- Toric ICL
- CXL

Corneal Cross-linking Keratoconus/Ectasia

- Here??



- YES!!

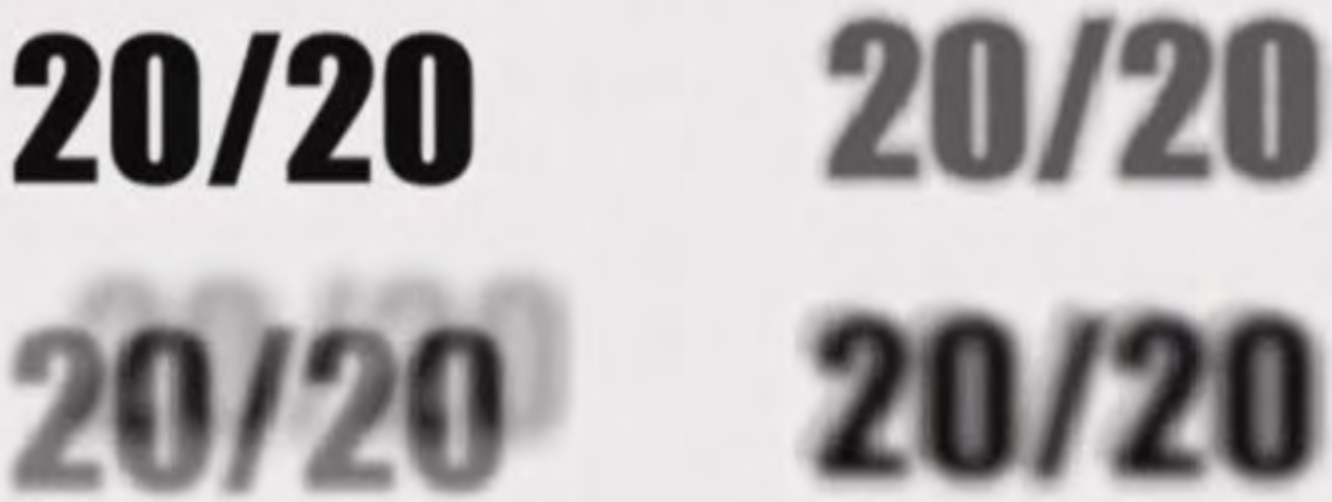


Goals: CXL warped corneas

- Stabilize
- Maintain Scleral/RGP Contact lens tolerance
- Incremental visual and topographic improvement over years in *some* cases

What is 20/20 Vision?

- All of the following represent 20/20 vision



Do I really want you to be my UBER driver?

Cornea Cross-Linking - risks

- Delayed reepithelialization
- Haze
- Scar
- Microbial keratitis

Cornea CXL – cost!

- CXL “covered” by most commercial insurances
- up to $8000/eye without insurance

“Surgeon”: 0402T $500-950

Avedro Device: $50,000

Photrexa (Riboflavin B2 $4100) + Click fee $550 = $4,650/eye

reimbursement J2787 $2130-4700

- Riboflavin: Cost $15 in Brazil!!

- Eye Bank invoice for cornea tissue: $3500/eye DALK/PKP

Cornea CXL + lifetime Scleral CL– $$$$

NOT A POPULATION-BASED SOLUTION

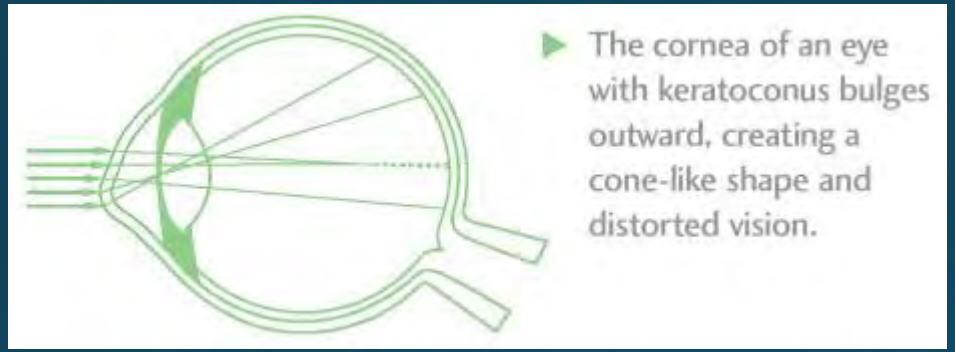
For Warped Corneas!

SUPERIOR value proposition!

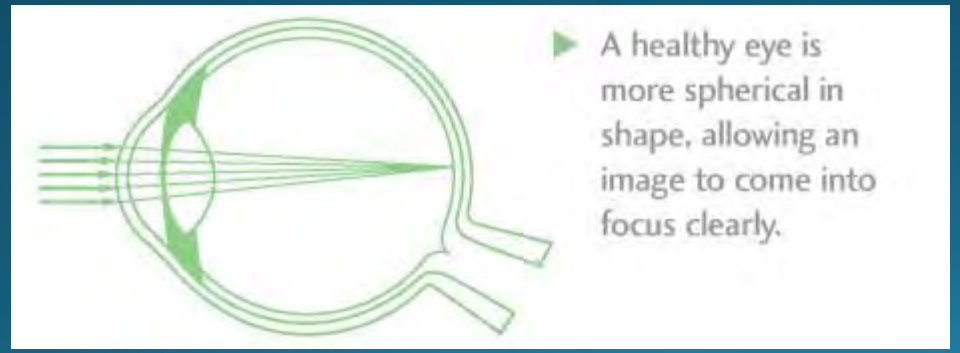
Advanced Corneal ectasia

LARGE-DIAMETER DALK (Keratoconus) Goal of Surgery:

-Make eye refractable with glasses.
-Clear visual axis of scarring, if present.
-Stop progression



The cornea of an eye with keratoconus bulges outward, creating a cone-like shape and distorted vision.

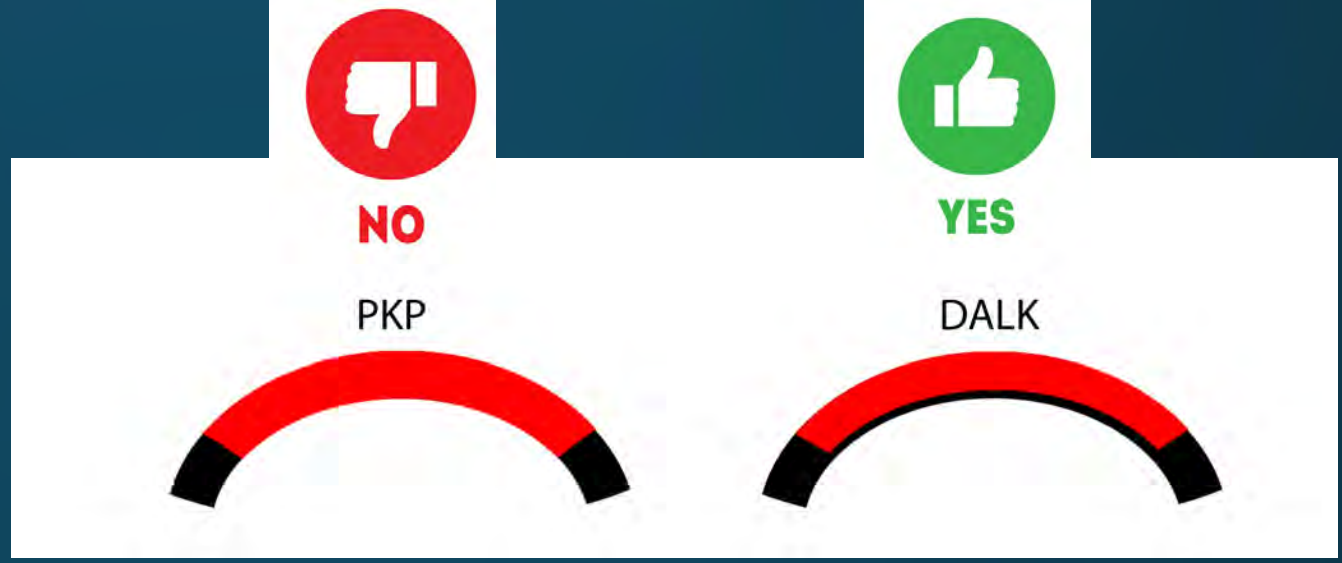


A healthy eye is more spherical in shape, allowing an image to come into focus clearly.

Keratoplasty procedures:

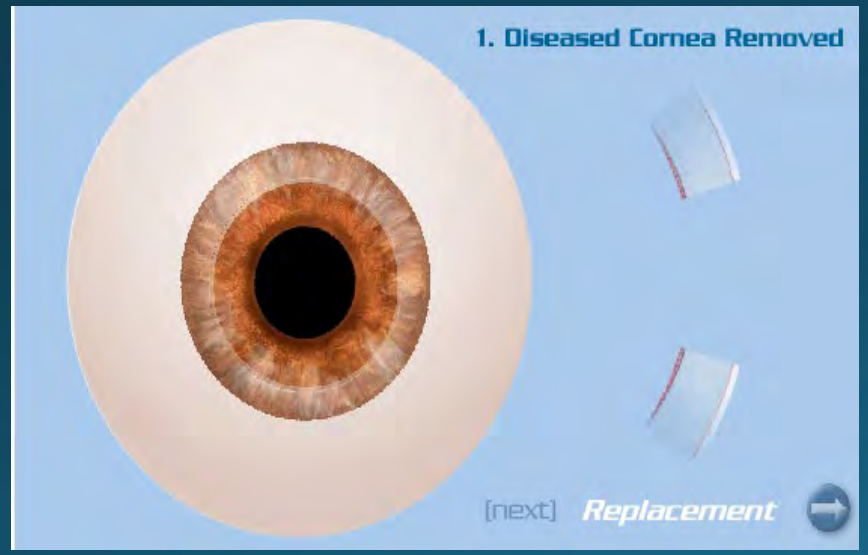
- Optically Restorative? (Lasik-Like)
- Predictable?
- Reversible?
- Stable?
- Safe?
- Last life-time??

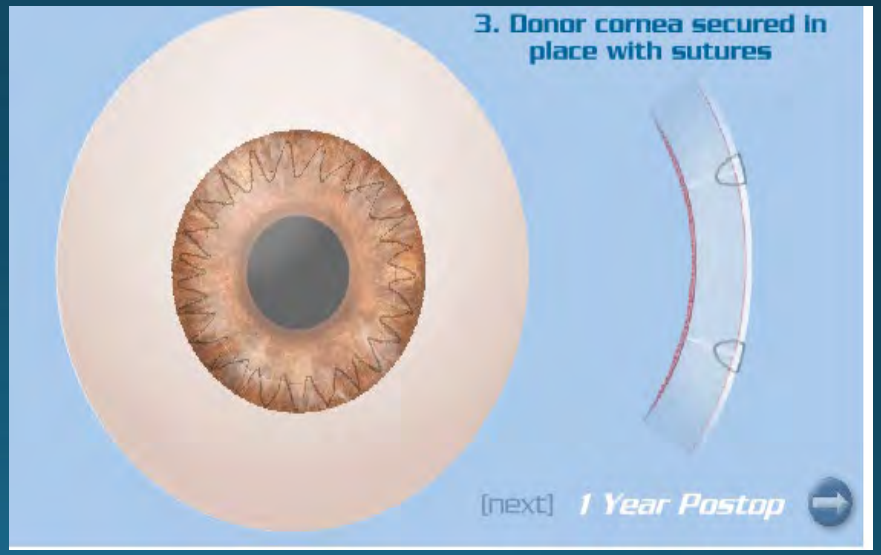
- "How quickly can I see?"



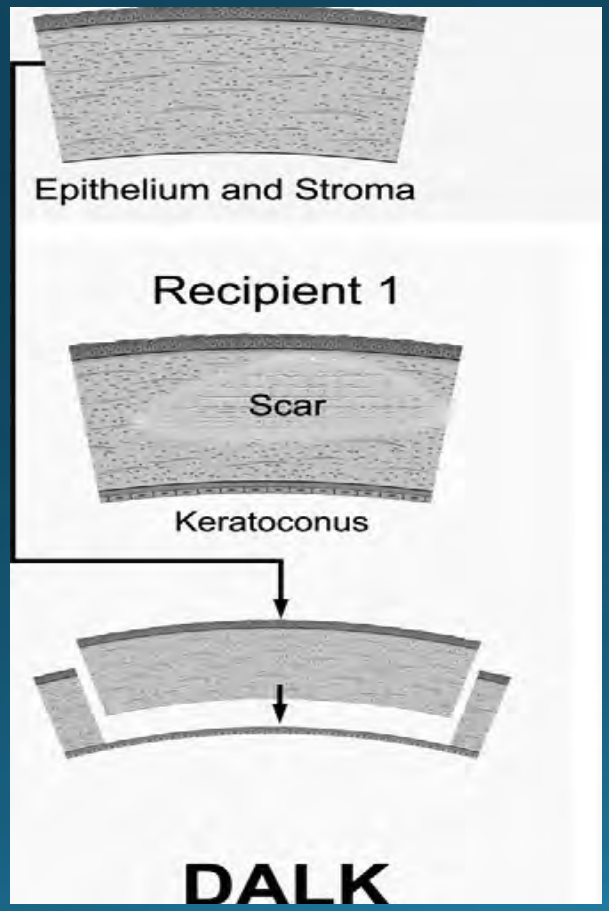
Penetrating Keratoplasty (PK)

What's wrong with it?

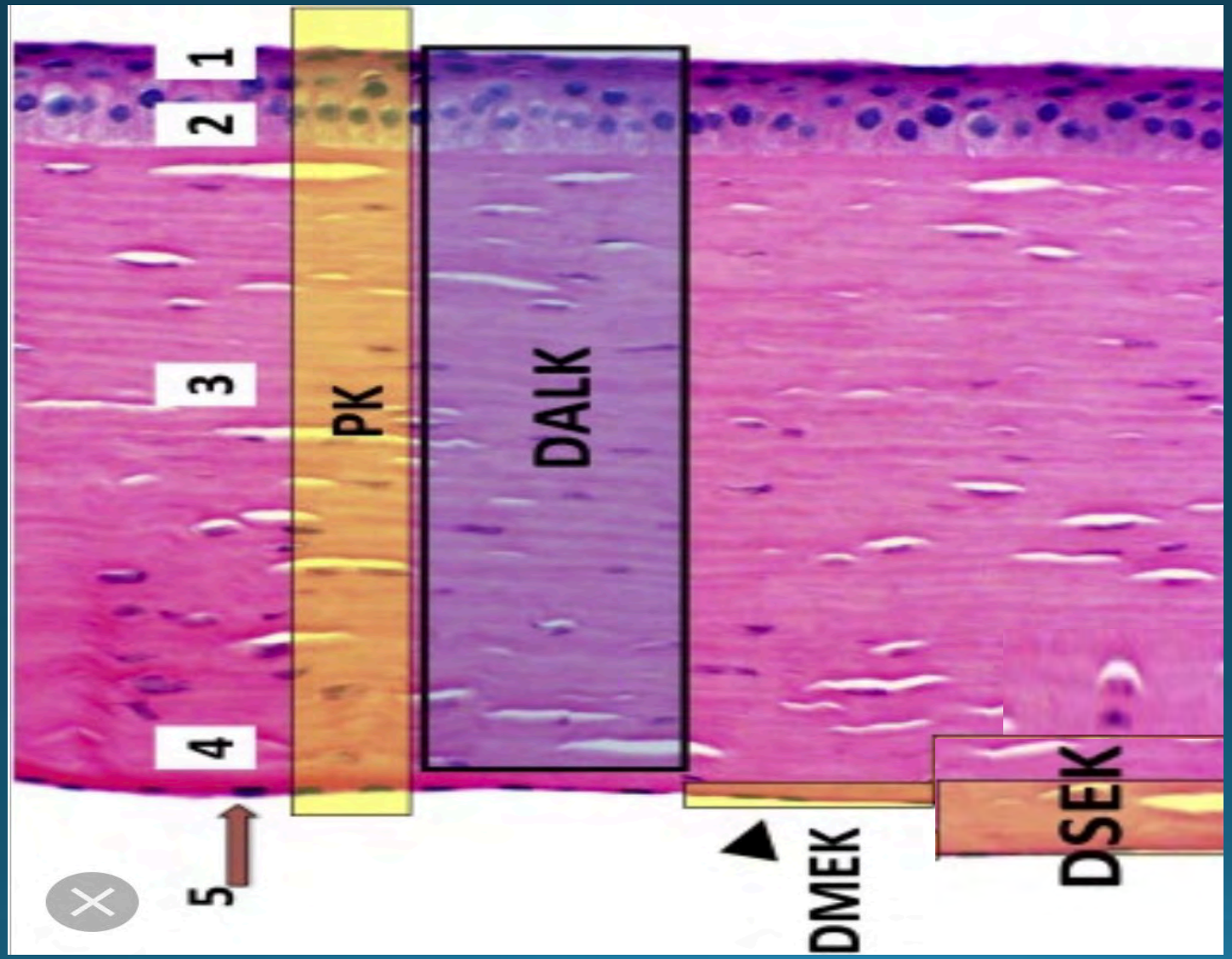




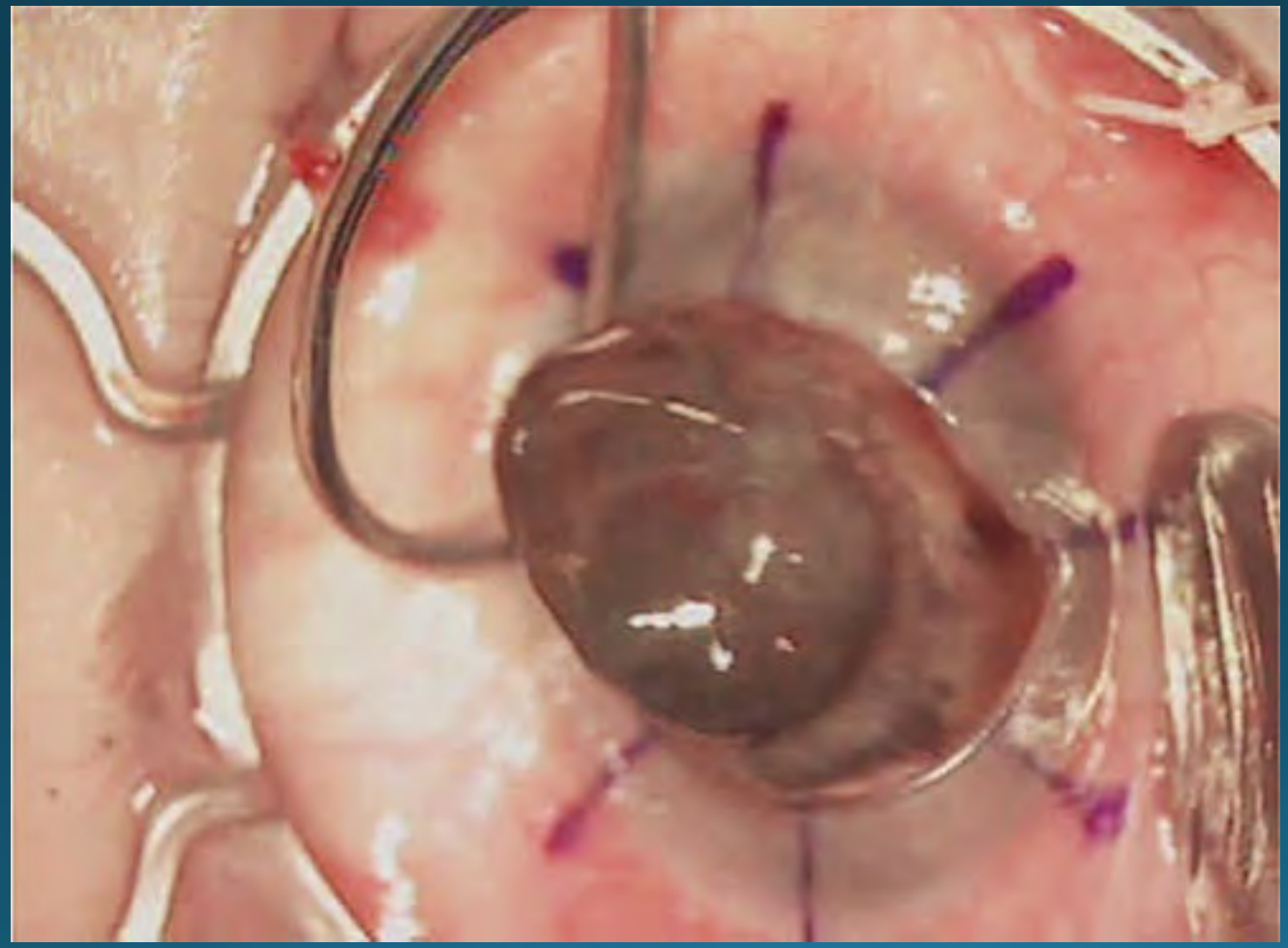
Deep Anterior Lamellar Keratoplasty (DALK) is BETTER, WHY?:



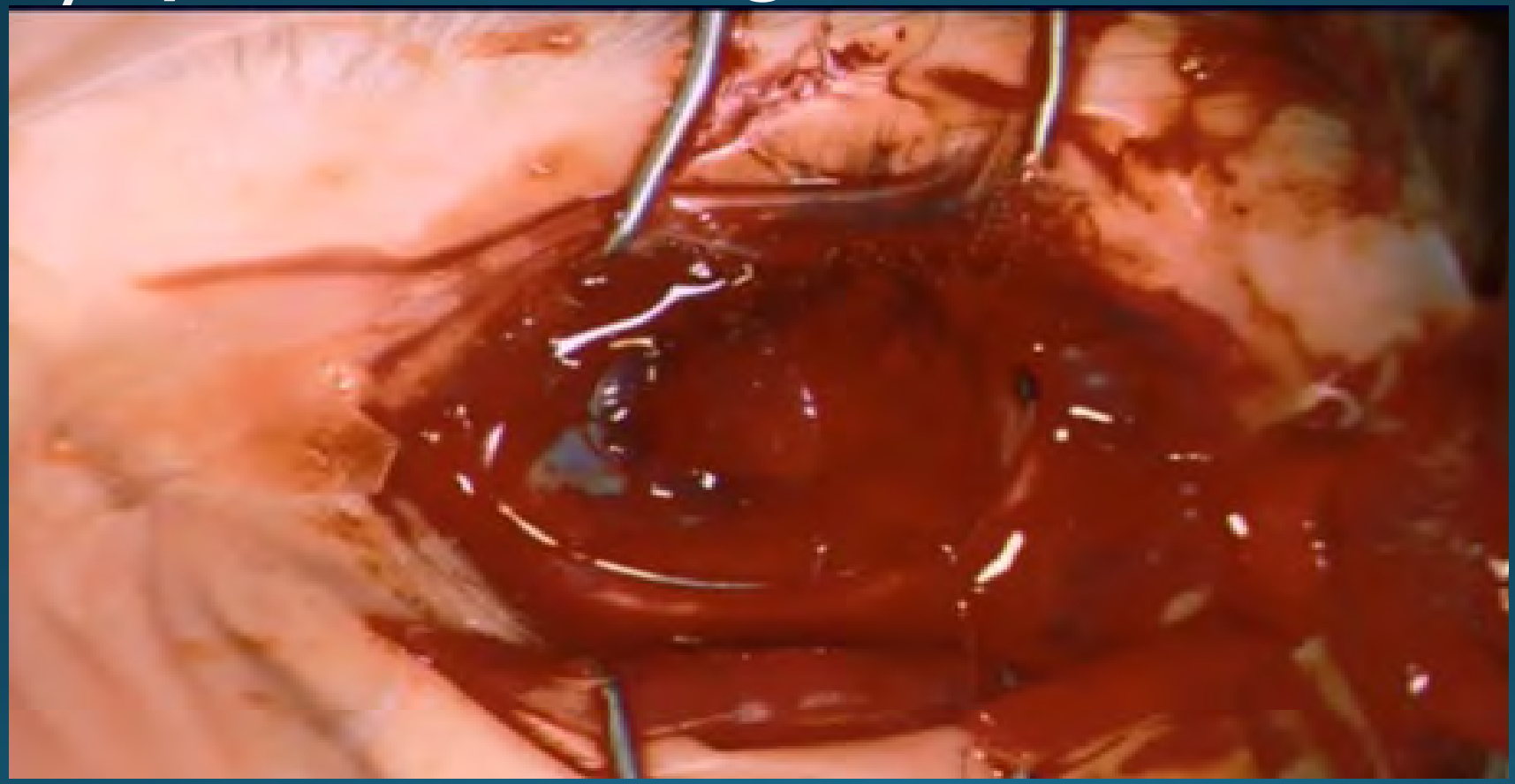
Cornea Transplantation: Variations:



PK: can be HAZARDOUS!!! unintended lensectomy

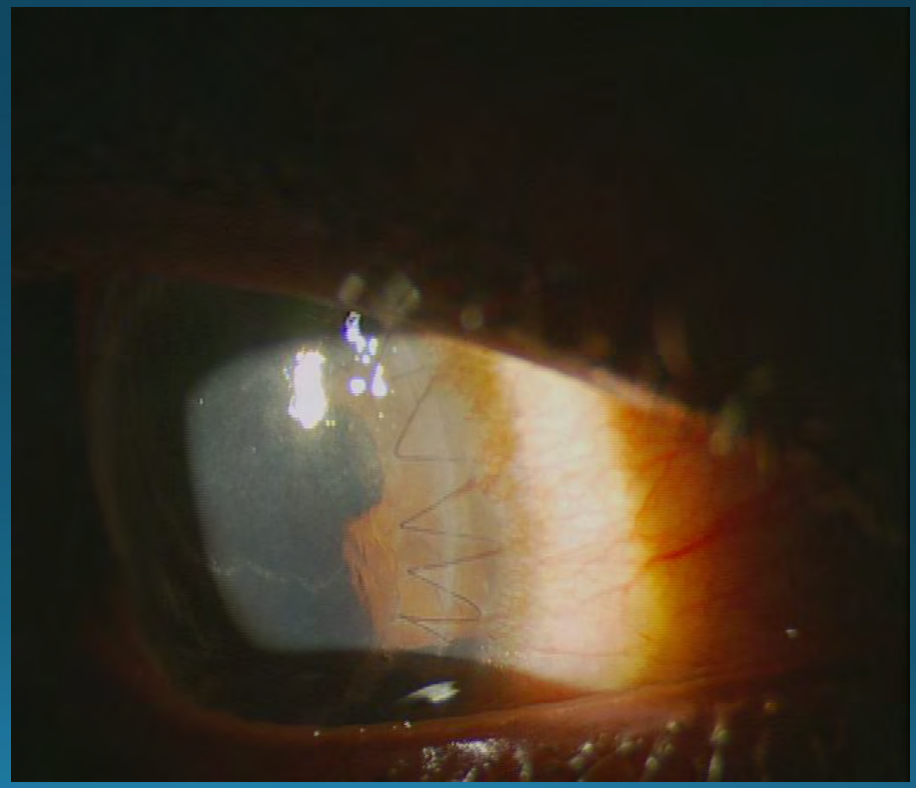


PK: can be VERY HAZARDOUS!!!
S. Daya, MD (UK) 0.56-1% UK

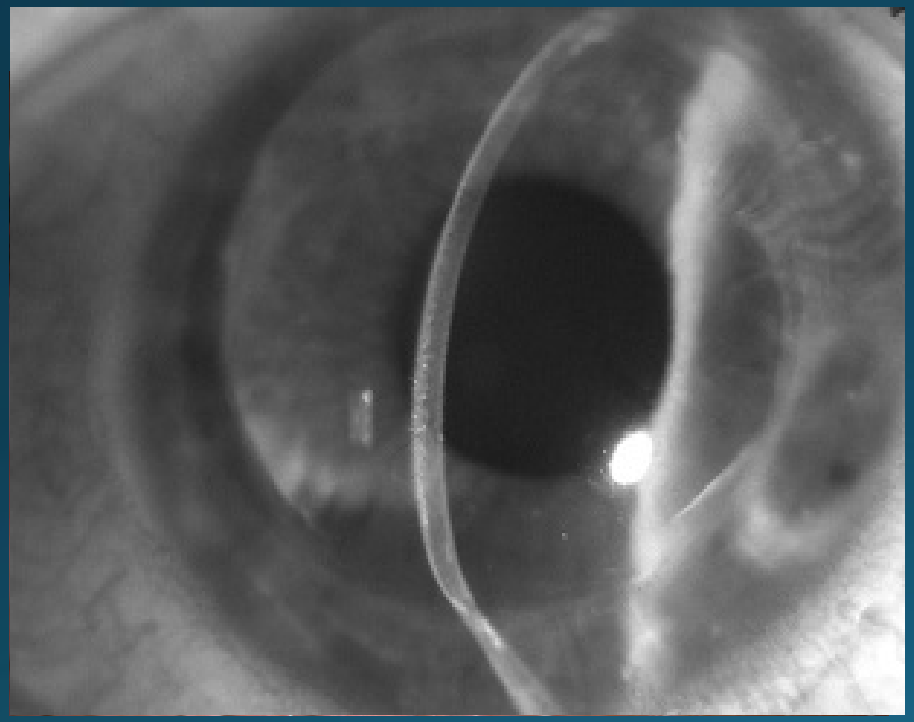


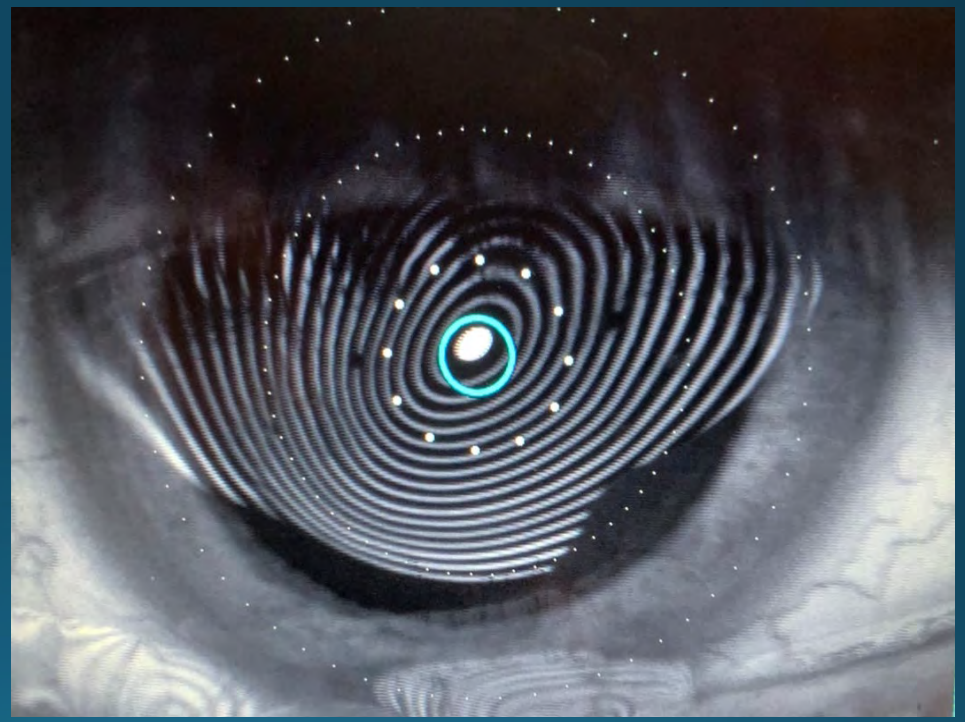
PK: Hazards…long-term

- Rejection and Failure
- Reduced survival of regrafts
- Glaucoma 19-30%
- Cataract
- Endophthalmitis
- Late Ectasia



Late Ectasia:
41 yo 2000 PK Keratoconus OD
2017 severe ectasia

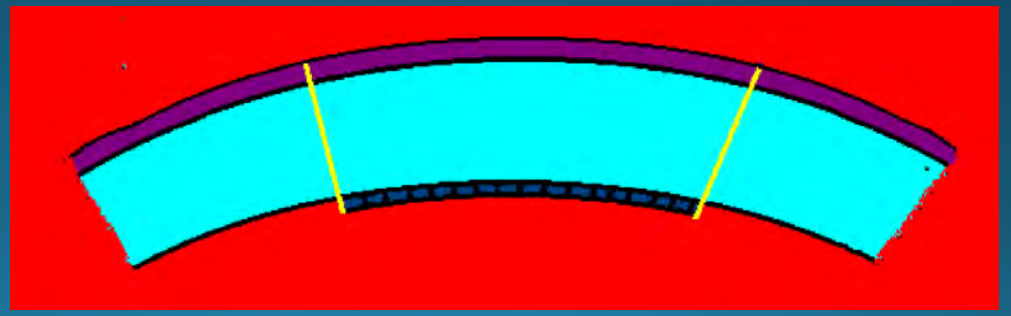




PK - Late trauma!

Case report (ASCRS listserv)
PK's – Scourges
Cornea Graft Rejection
17 yo severe keratoconus, atopic dermatitis

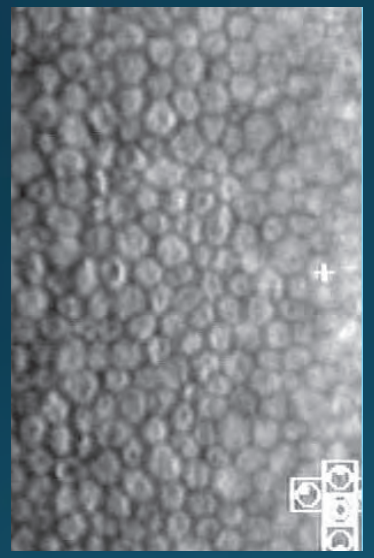
- PK x 3
- Graft rejection/failure each time
- Regraft?
- Immune suppression: cytoxan?
- Keratoprothesis?

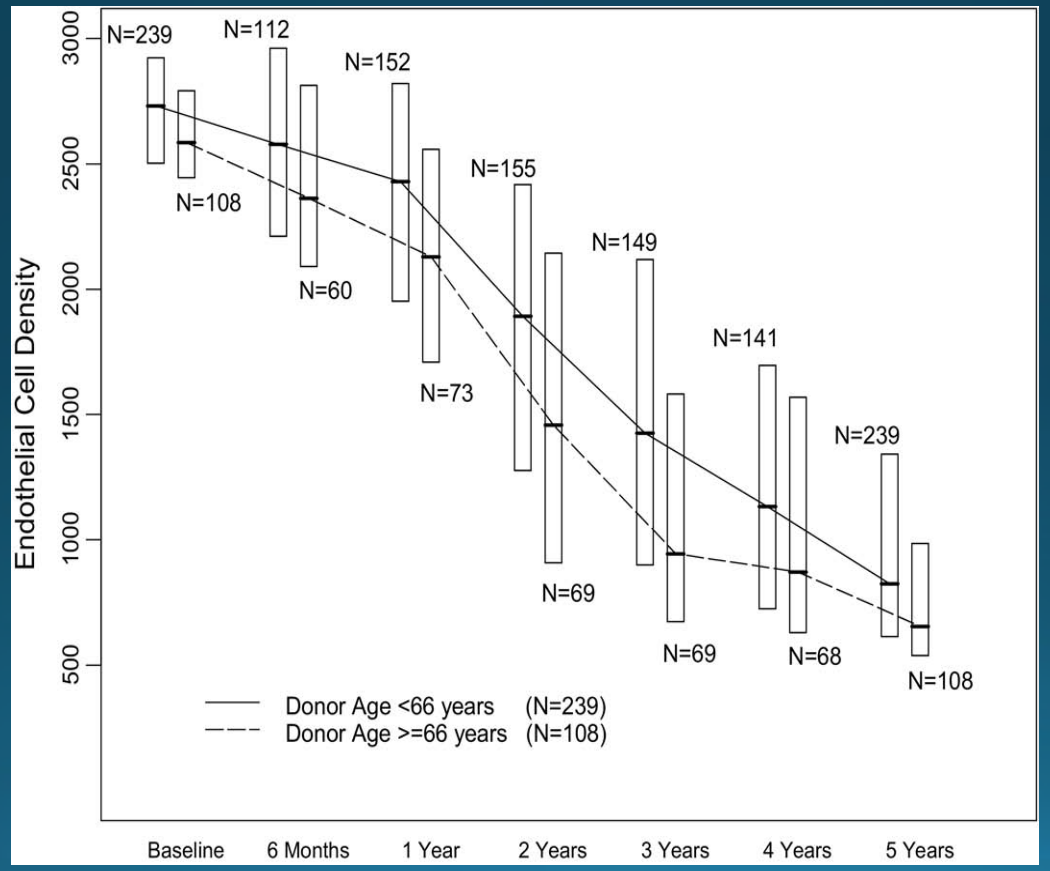


Cornea Donor Study: PKP endothelial cell counts

Cornea Donor Study Investigator Group

Ophthalmology 2008





Failed PKP Grafts
EBAA – USA 2023

- 3,273 repeat PKP! /14,486

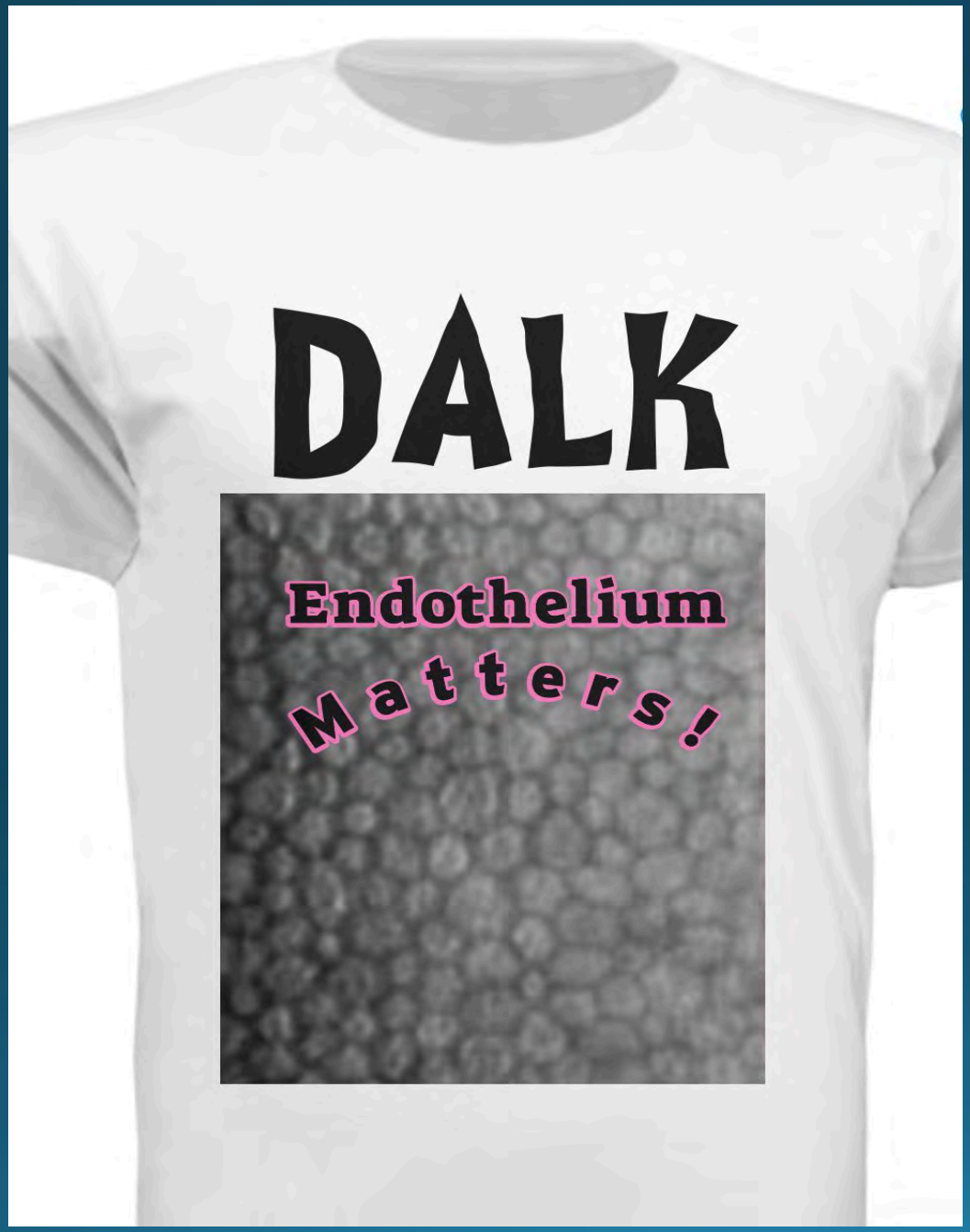
- "Gift that keeps giving"????

... there is no reasons for replacing an healthy

endothelium... EVER!!!

ALL perforations during stromal dissection....can be fixed !!!

V. Sarnicola, ESCRS, 2009

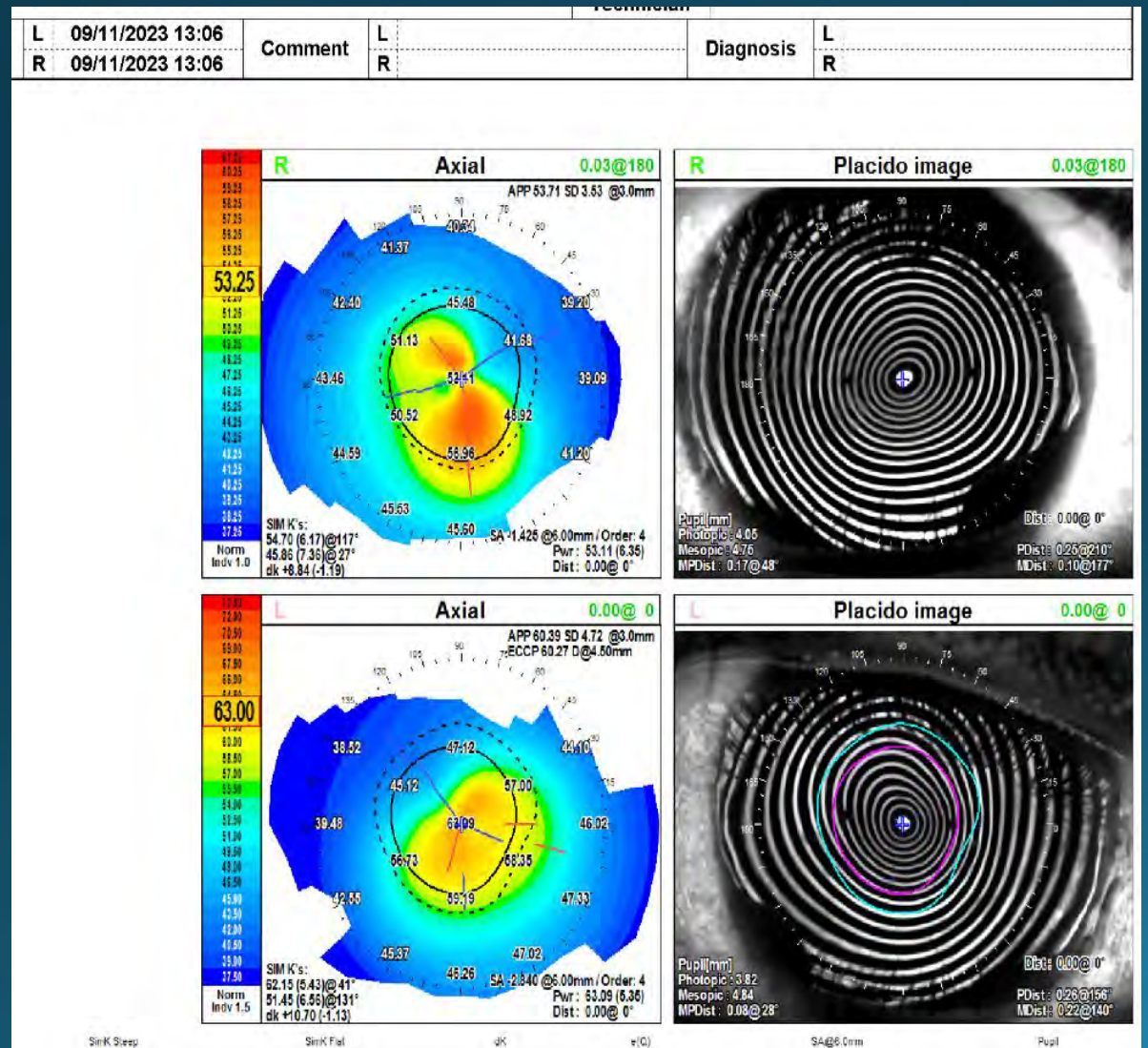

DALK
Endothelium
Matters!

Deep Anterior Lamellar Keratoplasty (DALK) Conversion to PK? Since 2012
Richard Erdey, MD

"*ALL PERFORATIONS CAN BE FIXED*" Sarnicola 2009

- 455 attempted = 0 conversion to PK!
- Micro/Macroperforations fixed
- All large dia grafts 9.5-10mm

33 YO Male Firefighter/Paramedic
Severe Keratoconus OU
intolerant of glasses/ decreased tolerance Scleral CL's



Uncorrected VA

OD: 20/300

-18.5+5.75x80 20/150

- OS: 20/200

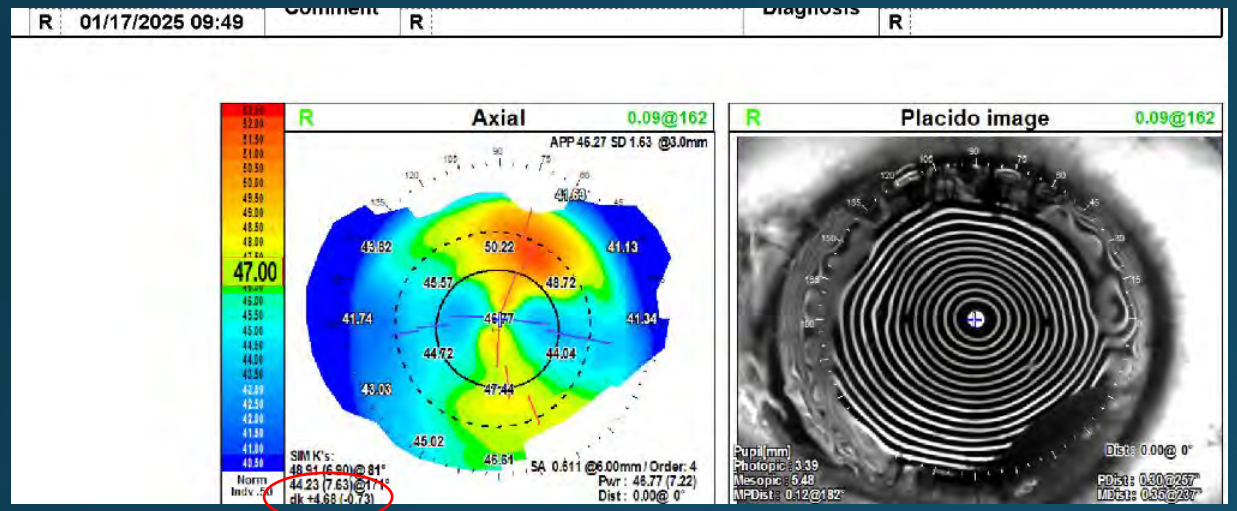
Richard Erdey MD

Case 10: 33 YO Severe Keratoconus OU

2/11/2025 OD: adjust running suture under intraoperative keratometer

12/17/2024 OD: DALK 9.5mm bed/9.5mm donor

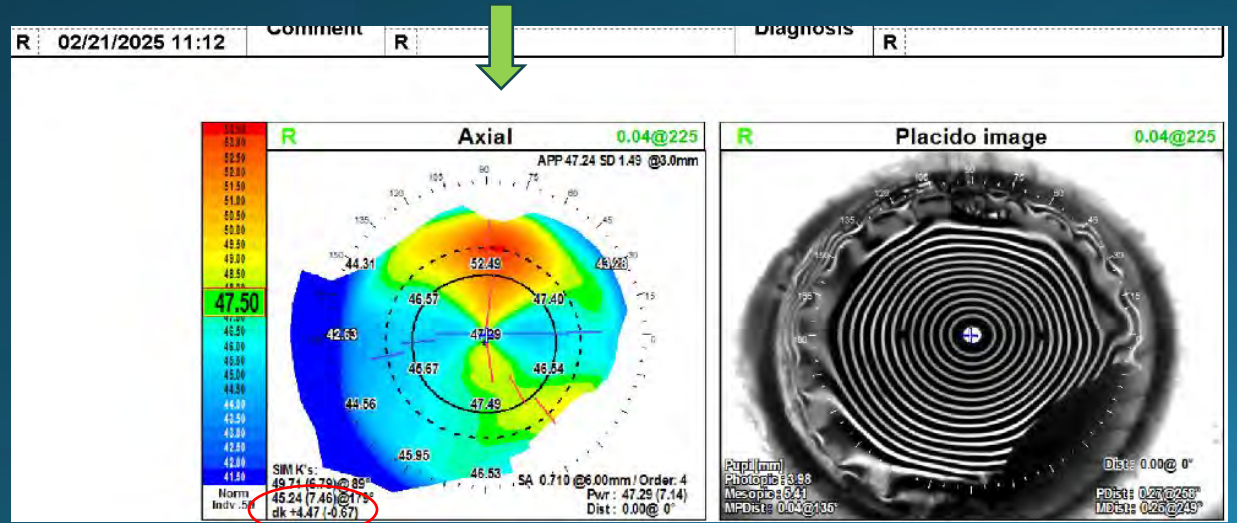
Macro-perforation successful Descemet's dissection: Case Time 3.5hrs!



1/17/2025

OD:Uncorrected VA 20/200

-8.0+5.75x80 20/20



2/21/2025 Optical Rehab after only 2 mos!

After suture adjustment:

OD: 20/200

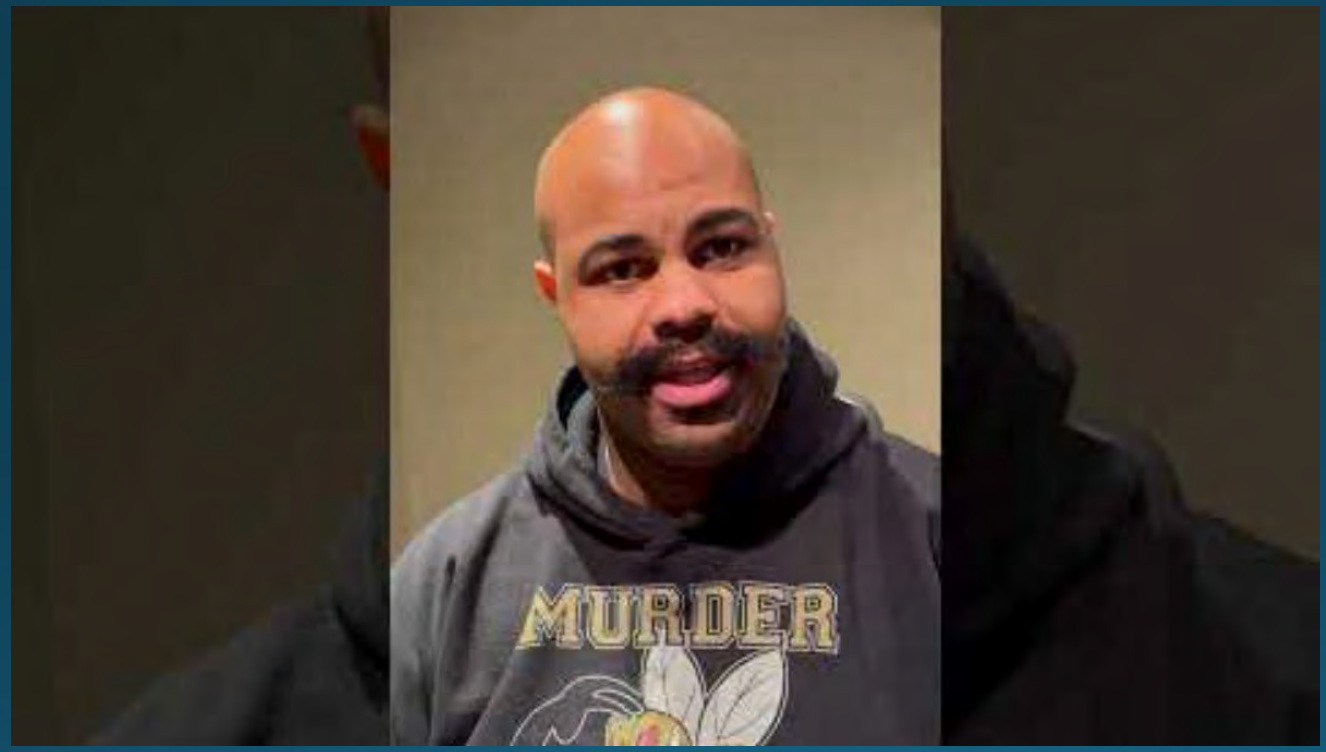
-9.0+4.0x90 20/20

Referred for soft toric CL fit OD

PLAN: DALK LEFT EYE

Richard Erdey MD

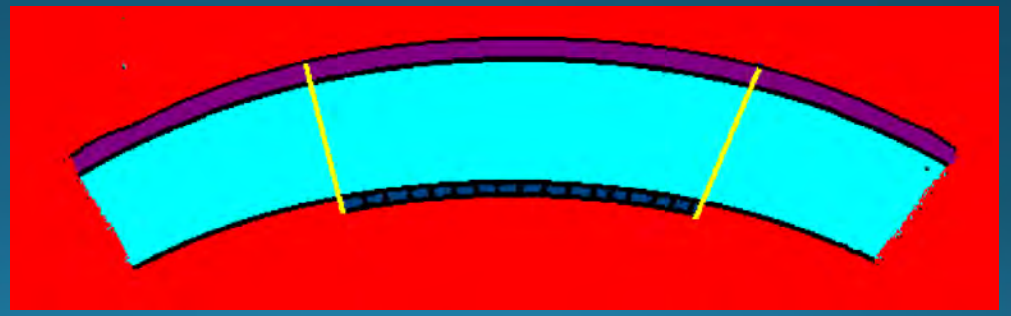
Testimonial: 33 YO Male Firefighter/Paramedic Severe Keratoconus OU
2/11/2025 OD: adjust running suture under intraoperative keratometer
12/17/2024 OD: DALK 9.5mm bed/9.5mm donor



- https://youtube.com/shorts/SZK02KWD6pM

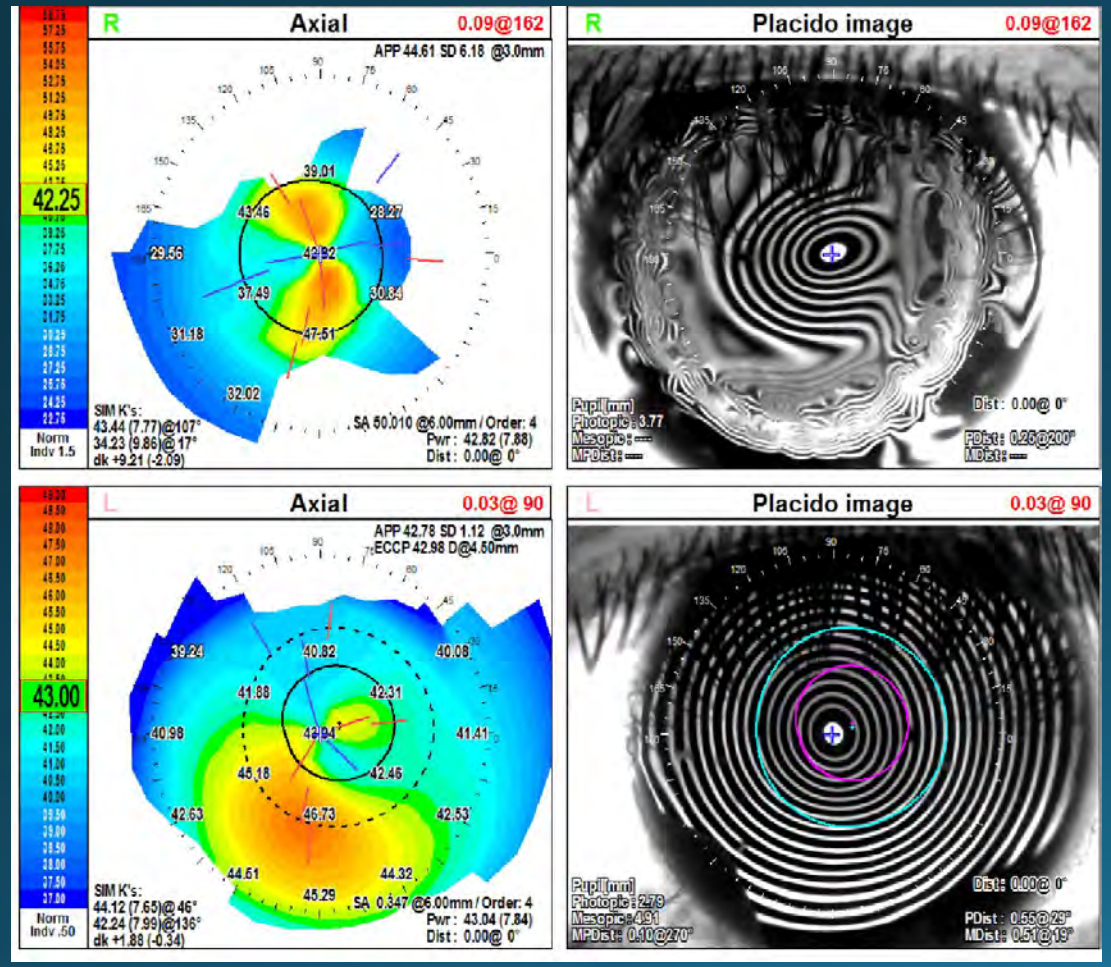
Case report (ASCRS listserv)
PK's – Scourges
Cornea Graft Rejection
17 yo severe keratoconus, atopic dermatitis

3 failed grafts



PK: Poor optics "Optical Cripple" without RGP CLs

OD:26y referred: "failed CXL" PK 8.25mm 7 mos earlier



- OD -2.0+6.0x116 20/70
- OS: -3.75+2.0x26 20/20

Why DALK?

Deep Anterior Lamellar Keratoplasty (DALK) – Advantages over PK

- **NO ENDOTHELIAL Cell Ct decay/rejection!!**
- Closed surgery – safer
- Reduce steroid induced glaucoma
- Reduce secondary cataract
- Faster healing
- superior wound coaptation
- Superior optics (less HOA) – staged refractive surgery (suture-out astigmatism more regular)
- No long term ectasia
- Larger pool of donor tissue

Long Term Survival of DALK LAST A LIFETIME!

CORNEA
The Journal of Cornea and External Disease
www.corneajnl.com

CLINICAL SCIENCE

Long-Term Graft Survival in Deep Anterior Lamellar Keratoplasty

Vincenzo Sarnicola, MD, Patricia Toro, MD,* Caterina Sarnicola, Enrica Sarnicola, and Andrew Ruggiero, PhD†*

Purpose: To determine corneal graft survival rates up to 10 years in a large consecutive series of deep anterior lamellar keratoplasties (DALKs).

Methods: A retrospective, consecutive, noncomparative cases series of DALK procedures in a total of 806 eyes of 711 patients with stromal diseases and healthy endothelium performed between 2000 and 2009. Inclusion criterion was surgery performed by a single surgeon (660 eyes), with at least 6 months of follow-up. Graft survival was analyzed using the Kaplan–Meier method. Endothelial loss was analyzed with the Gaussian distribution and the χ^2 methods. Follow-up time, and preoperative and postoperative endothelial cell density (ECD) were considered in the analyses.

Results: Six hundred sixty eyes of 502 patients met the entry criteria. Mean length of follow-up was 4.5 years (range,

Recent advances in surgical techniques have promoted a paradigm shift in the surgical treatment of corneal disease. Penetrating keratoplasty (PK) is now being replaced by various types of lamellar techniques that aim to replace only damaged tissue, while maintaining healthy tissue intact. Current techniques and advances in instrumentation have contributed to improved clinical outcomes of lamellar keratoplasty (LK) that can match those of PK surgery. Compared with conventional PK, new LK techniques provide safer "closed system" surgeries with less morbidity and better clinical outcomes.[1–3] The introduction of several new dissection techniques, the optical visualization of dissection depth during surgery, and the availability of various lasers may provide new possibilities for managing anterior corneal disorders. In fact, we may be currently witnessing the most dramatic change in the concept of keratoplasty from that of

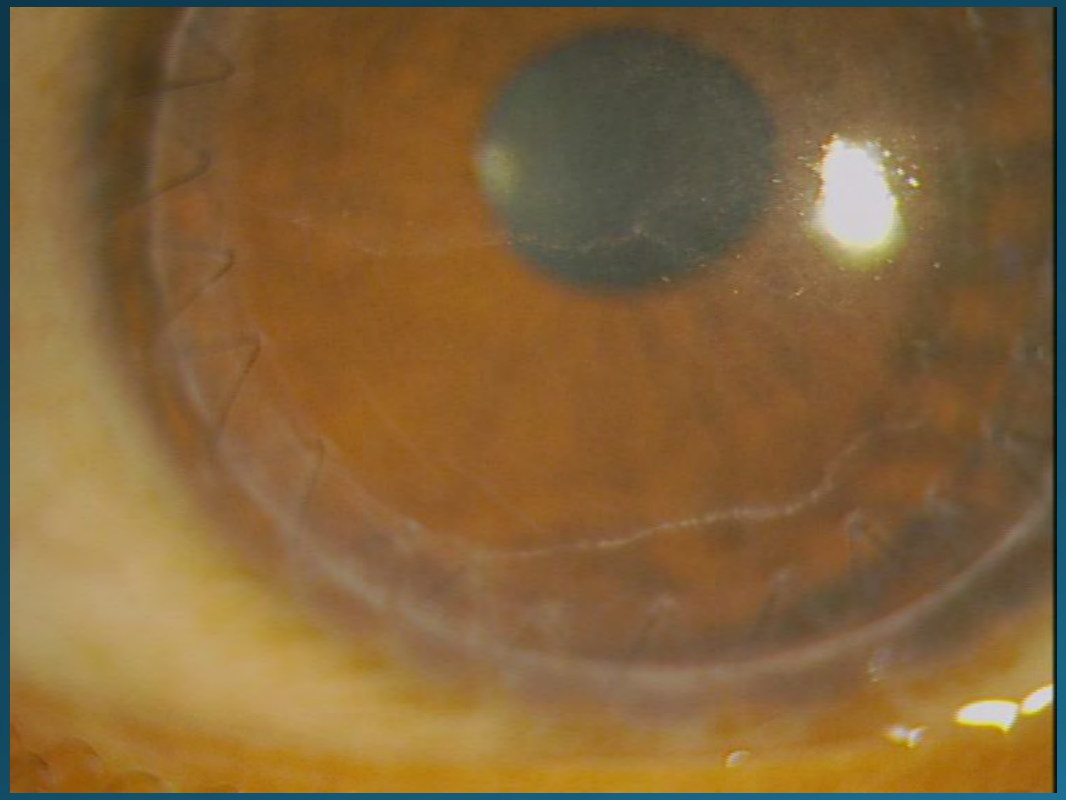
Cornea. 2012;31(6):621-626

Malbran: DALK (9.5-11mm) dia: 65 yrs follow up

- Not a single case of late ectasia
- large dia lamellar grafts are STABLE
- Under 8.5mm DALK: rare late ectasia reported

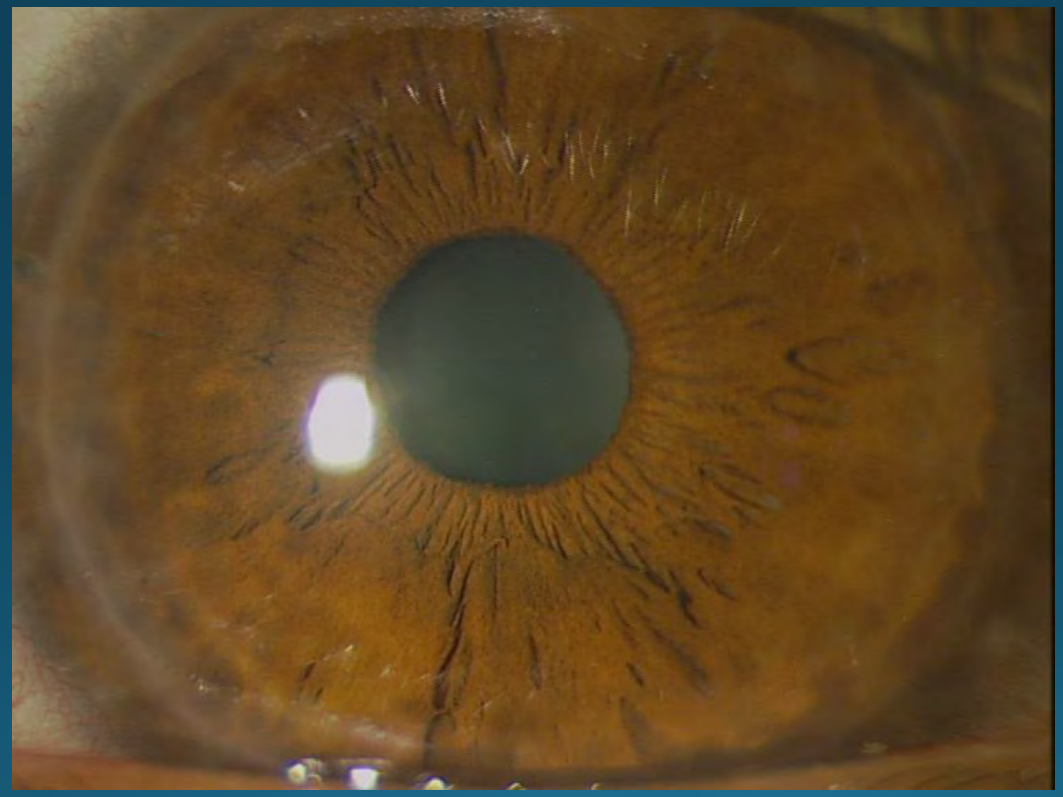
DALK – long term complications: Do lamellar grafts reject?

epithelial

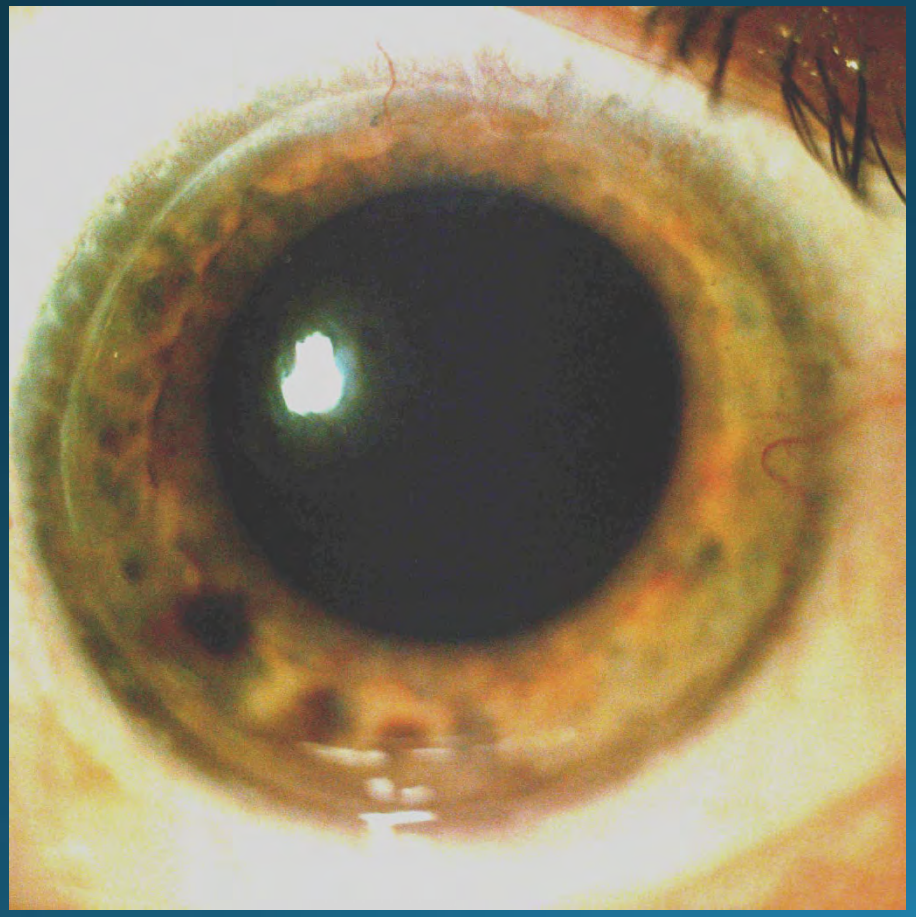


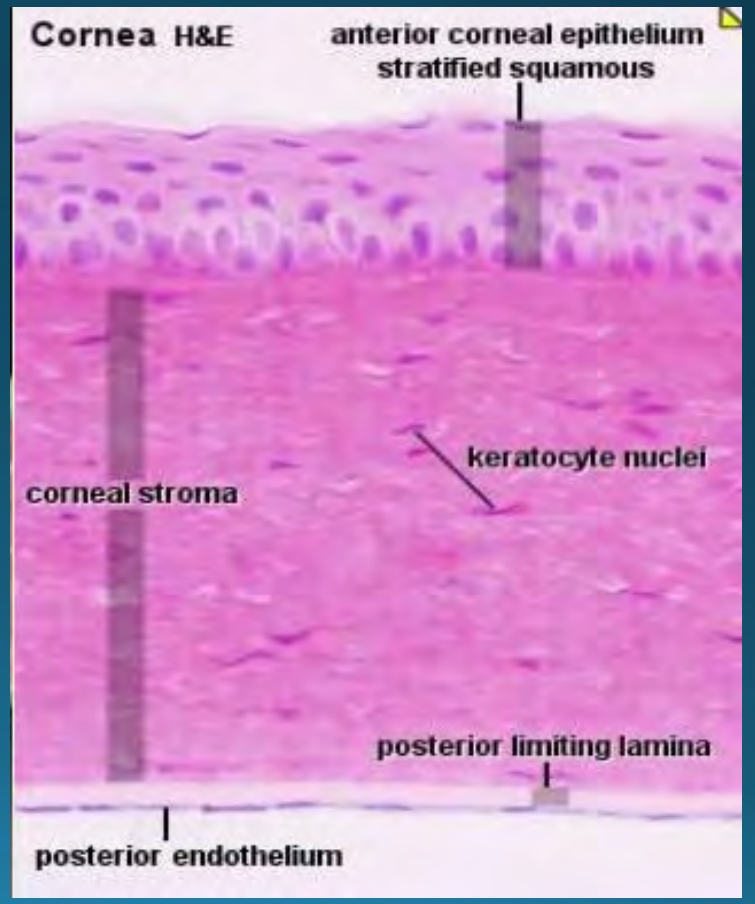
stromal

DALK: Rejection – epithelial or stromal after treatment with Pred Forte

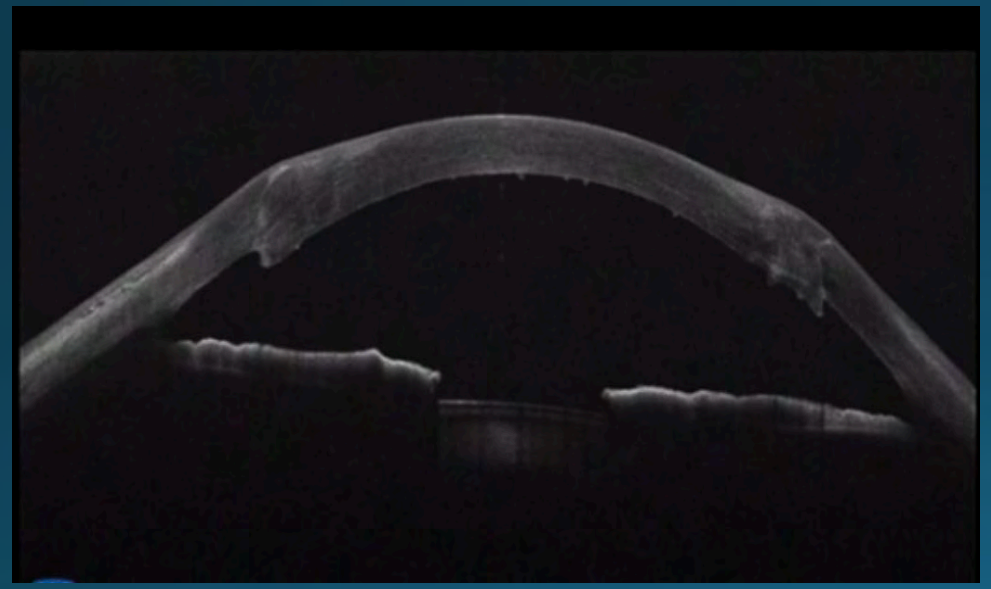


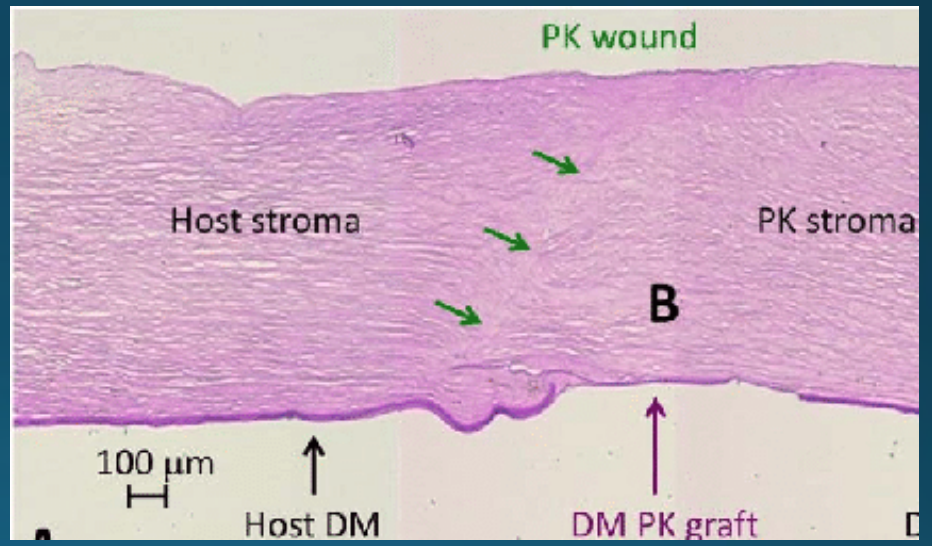
Long term: repopulate with host cellular elements



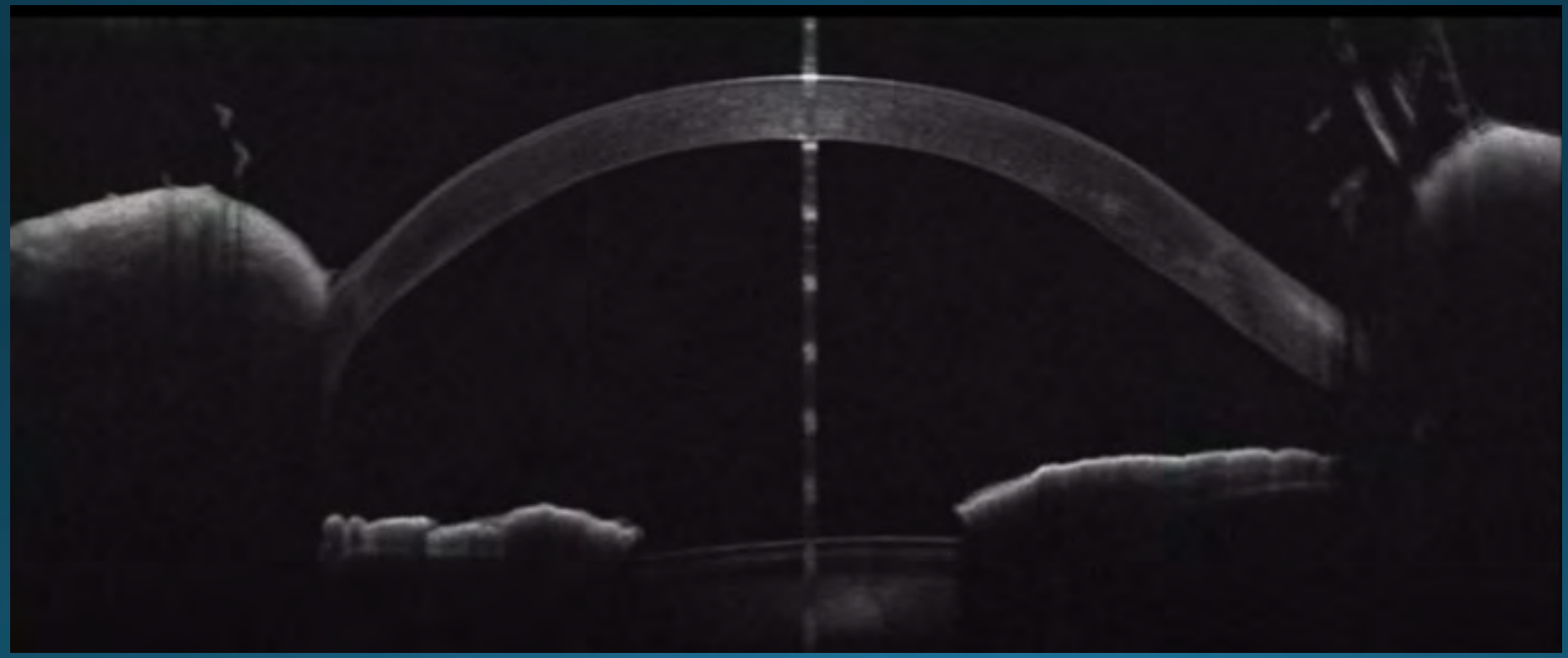


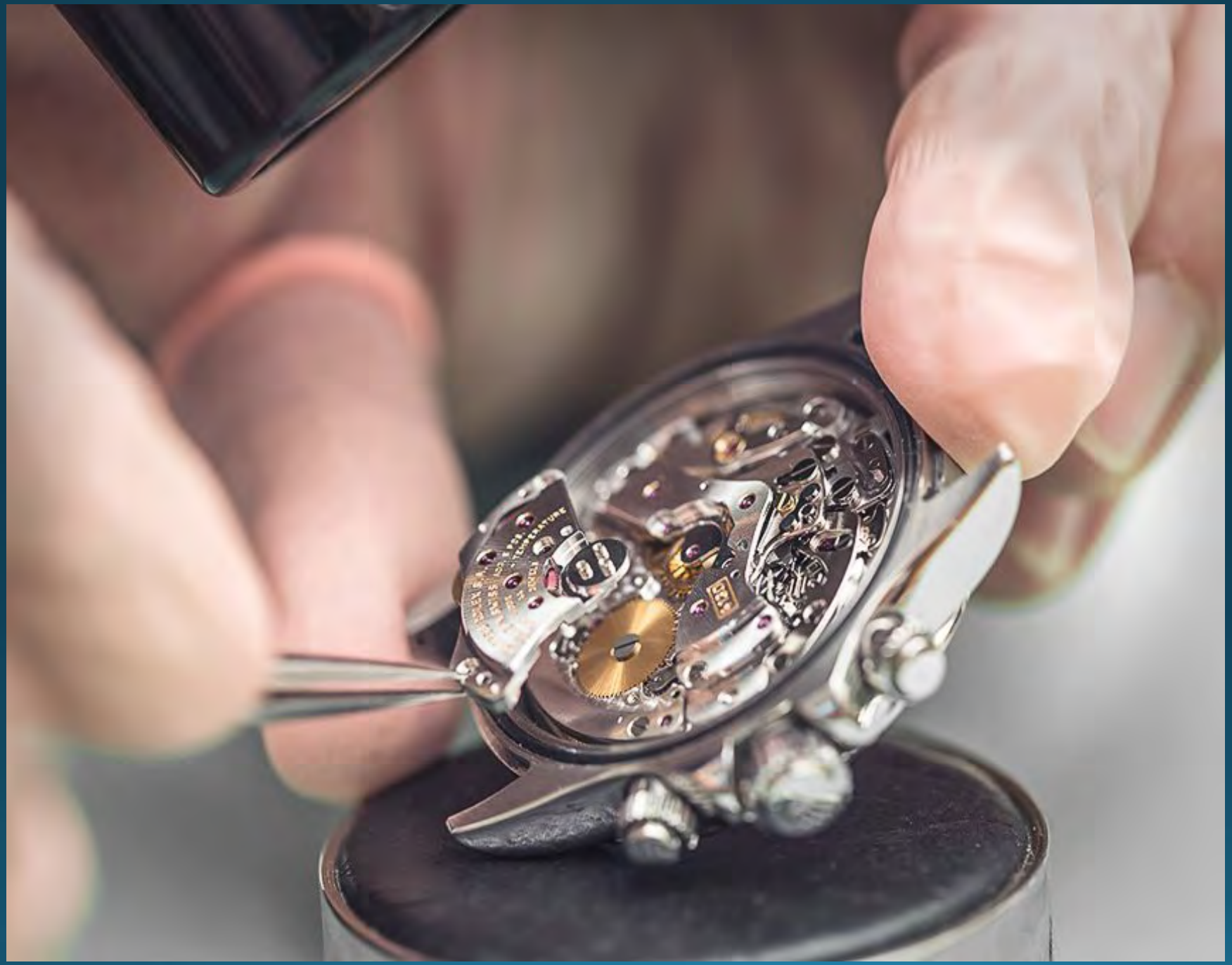
PKP



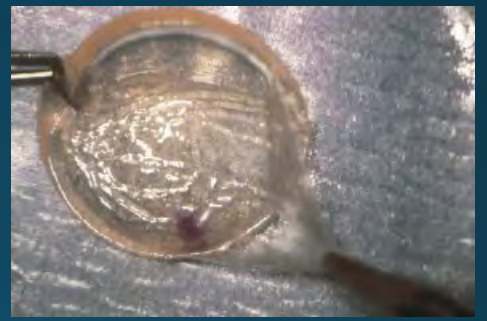


DALK: Superior Wound Coaptation and surface regularity

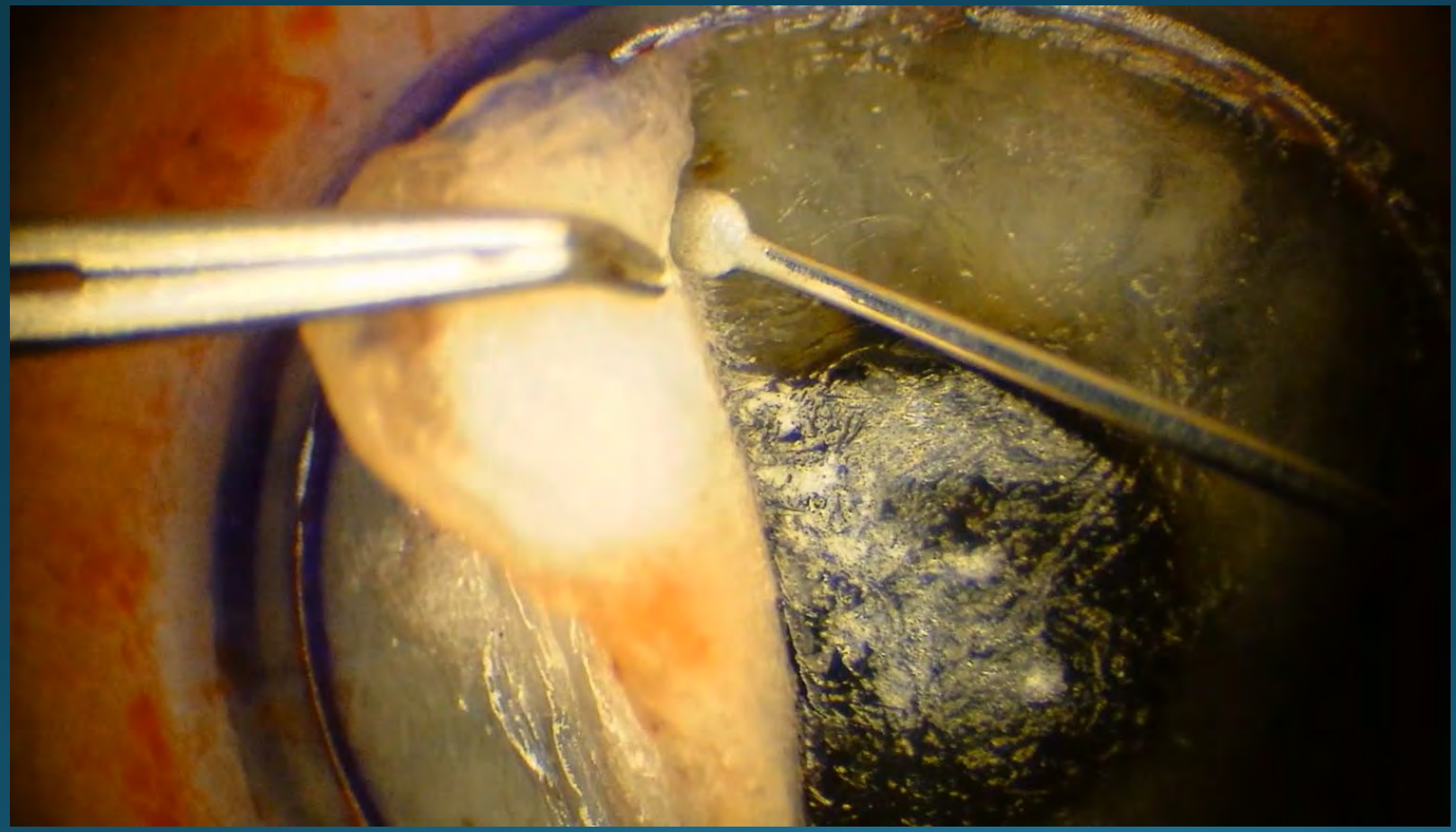




We prefer use of a second O.R. to prepare the donor tissue while DALK performed in other O.R.



DALK – Big Bubble
Descemets membrane dissection



DALK– Big Bubble 9.5mm dia Descemets membrane dissection unedited surgical video – full case

- https://youtu.be/rUe2bEdC8ho pt 1
- https://youtu.be/3D_A07NU6vg pt 2
- https://youtu.be/qqKPgMSJQrI pt 3

CORNEA
The Journal of Cornea and External Disease

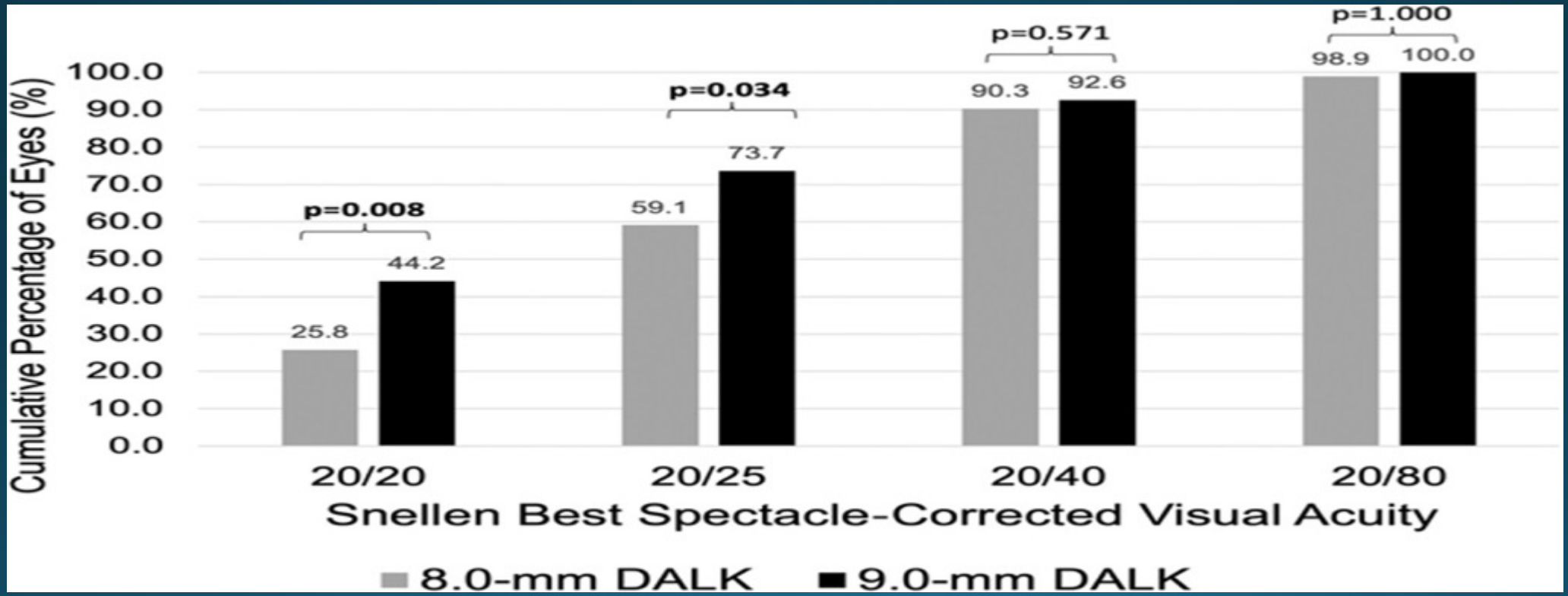
CLINICAL SCIENCE

Outcomes of Conventional 8.0-mm Versus Large 9.0-mm Diameter Deep Anterior Lamellar Keratoplasty for Keratoconus

Lucisano, Andrea MD*; Lionetti, Giovanna MD*; Yu, Angeli Christy MD†,‡,§; Giannaccare, Giuseppe MD*; D'Angelo, Sergio MD¶; Busin, Massimo MD†,‡,§; Scorcia, Vincenzo MD*

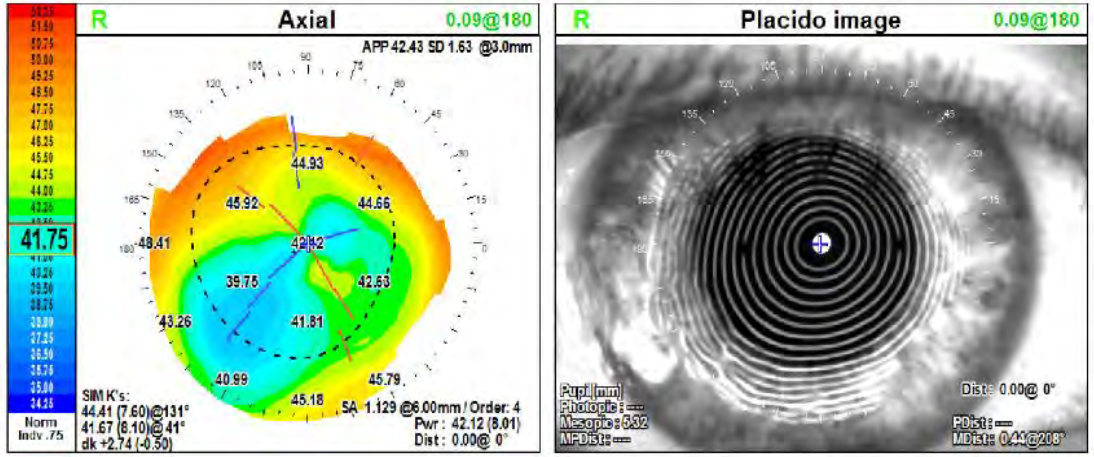
Author Information

Cornea 42(7):p 815-820, July 2023. | ***DOI:*** 10.1097/ICO.0000000000003082


Cumulative Percentage of Eyes (%)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
p=0.008
25.8
44.2
p=0.034
59.1
73.7
p=0.571
90.3
92.6
p=1.000
98.9
100.0
20/20
20/25
20/40
20/80
Snellen Best Spectacle-Corrected Visual Acuity
8.0-mm DALK
9.0-mm DALK

Case: OD: Small dia (8.0mm) DALK (performed elsewhere)
52 yo fm LASIK Ectasia
2008 LASIK OU

L	01/06/2025 10:48	Comment	L		Diagnosis	L	
R	01/06/2025 10:48		R			R	



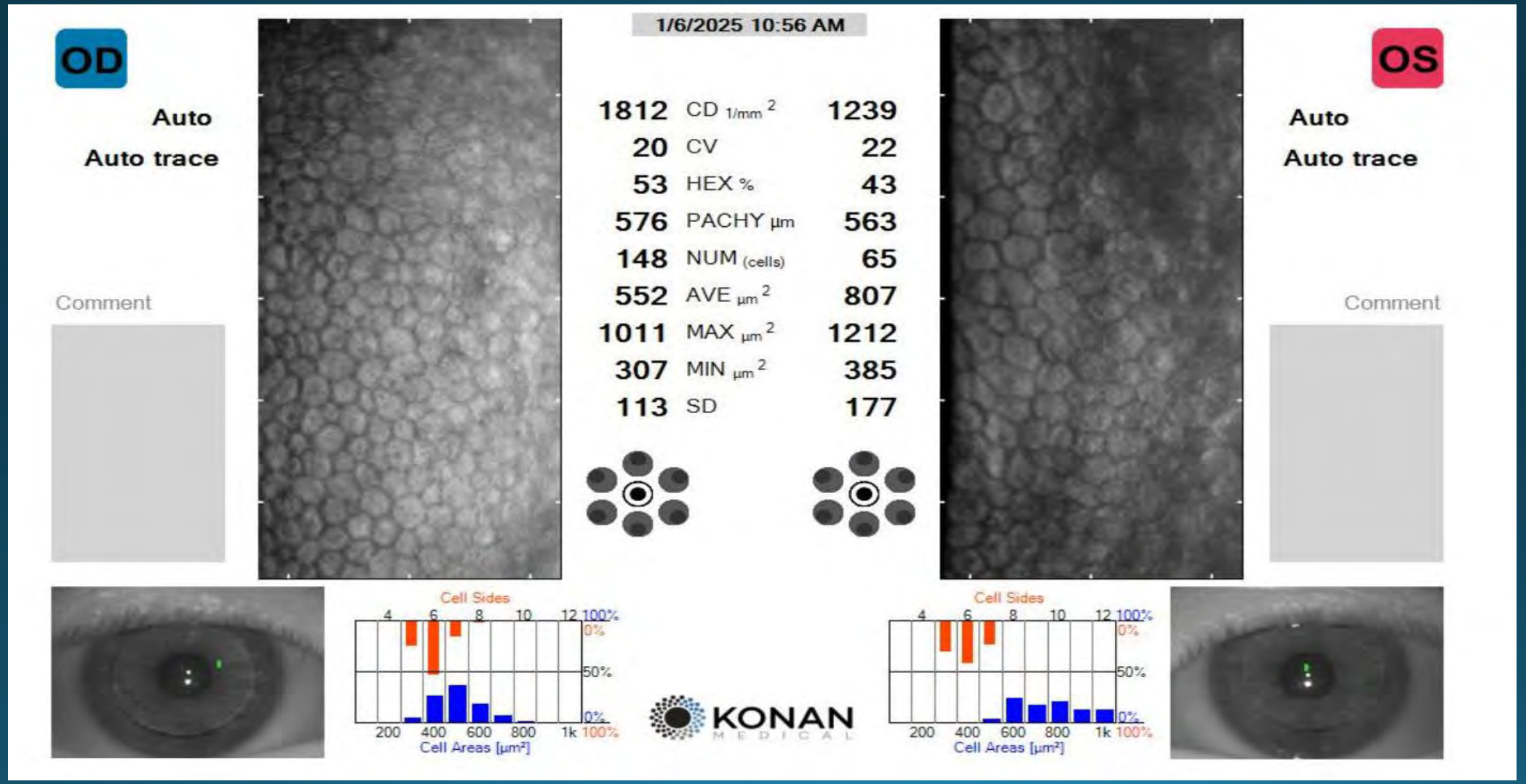
Unhappy with VA OU RX: scleral CL's

- 1/2025 -12.0 + 6.50 x 130 20/40 (sutures out)
- 2/2024 DALK 8.0mm (performed elsewhere)

- 1/2025 -13.0 + 6.0 x 90 20/50 (sutures out)
- 6/2022 PKP (attempted DALK) (performed elsewhere)

Endothelial Cell Counts:

OD (DALK) wnl OS: PKP 2 yrs ago – cell count decay



Large Diameter (9.5-10mm) DALK: Astigmatism Management

Pre-operative

Intraoperative

Post-operative Astigmatism Management

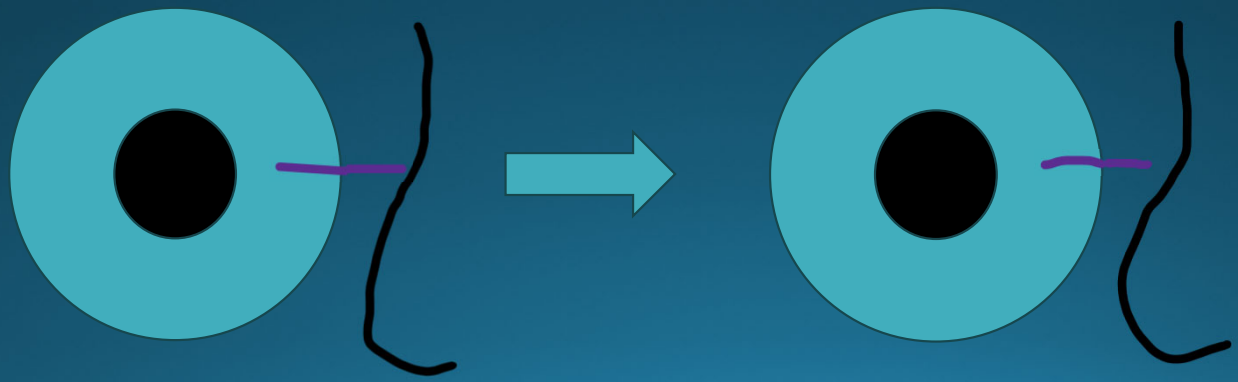
Large diameter DALK- Reduce suture-out astigmatism?

LATERALITY MATCH DONOR - RECIPIENT

- Eye Bank: COLEB and LEBWCO: Gentian violet nasal limbal marking at donor harvesting: registration of donor button in recipient bed.

ie. Right eye donor to Right eye recipient

DONOR RECIPIENT



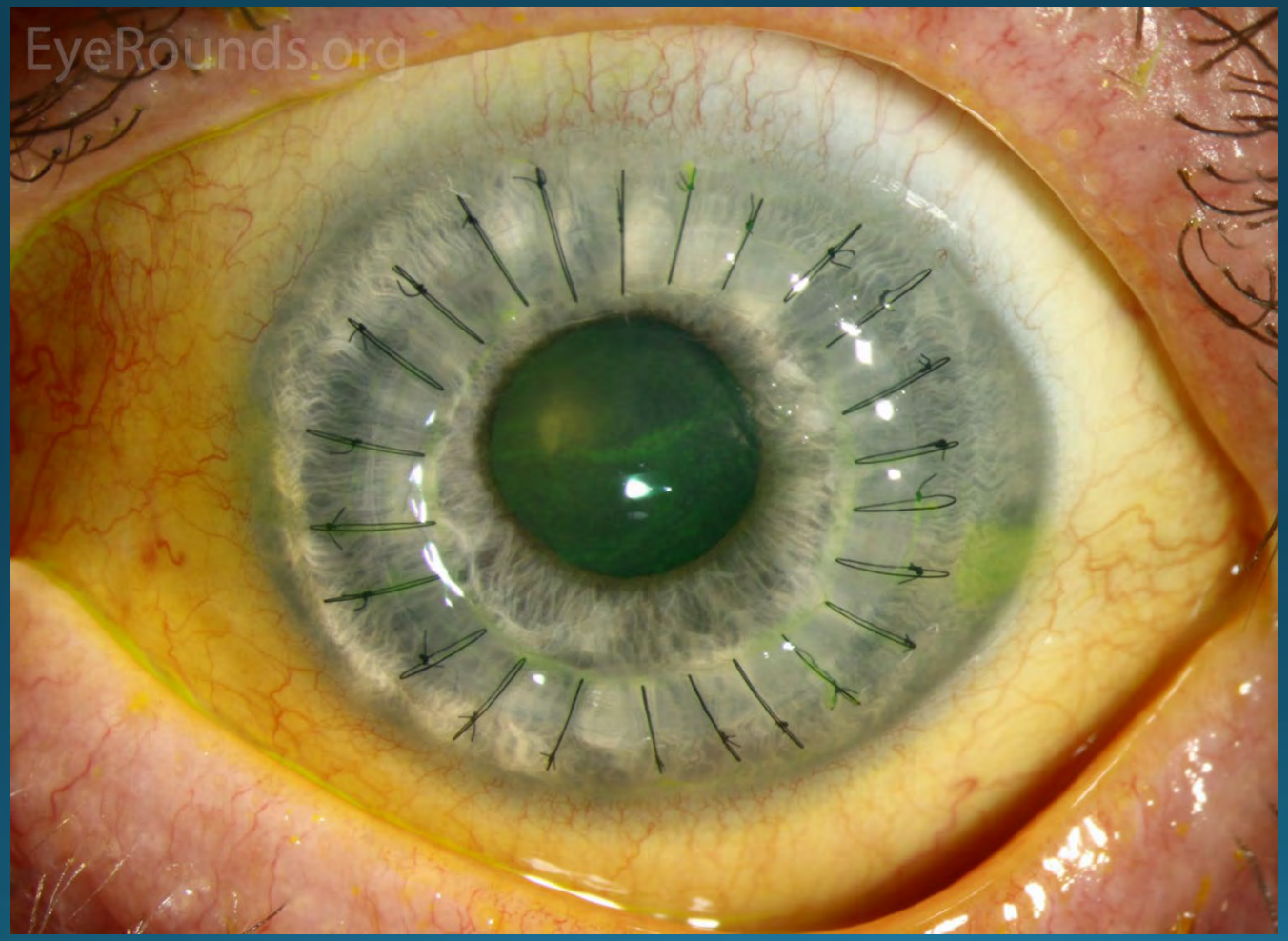
Large Diameter (9.5-10mm) DALK: Astigmatism Management

Pre-operative

Intraoperative

Post-operative

Small Dia DALK - interrupted sutures NOT adjustable



Astigmatism Management: Is large dia (9.5-10.0mm)DALK running suture adjustable intraoperatively?

- Yes!
- Running suture adjustment under Mastel intraoperative keratometer after suture is tied, and knot rotated into the stroma at the end of case

Early Visual Rehabilitation Following Keratoplasty Utilizing Single Continuous Suture Technique

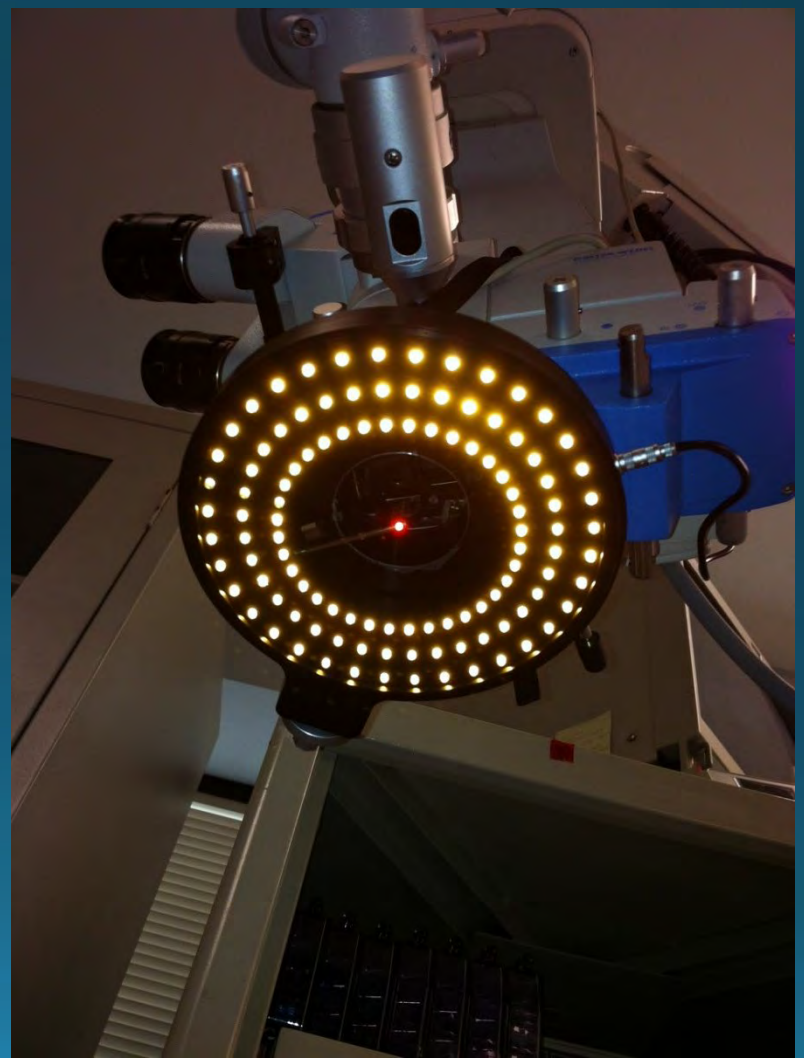
- Dr Erdey's preferred technique since 1991
- Before reliable Topographers or intraoperative keratometers were available

Ophthalmic Surgery 22 (4). April, 1991. Temnycky GO, Lindahl KJ, Aquavella JV, Erdey RA

Intraoperative Keratometers - Mastel

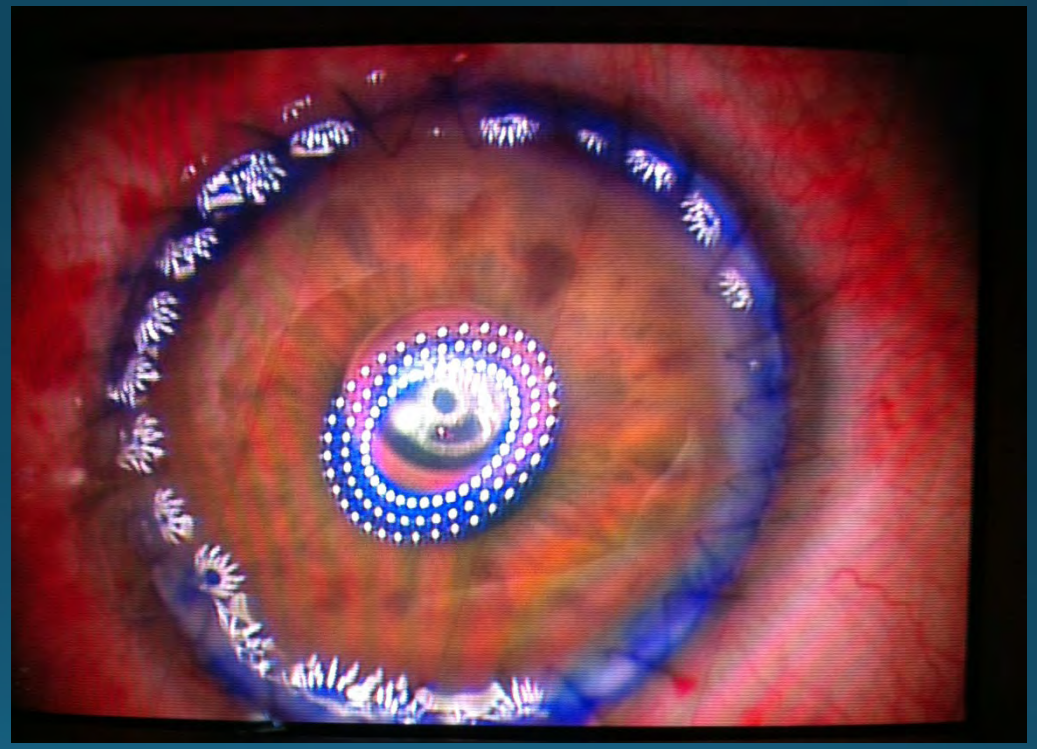
original

Later Generation



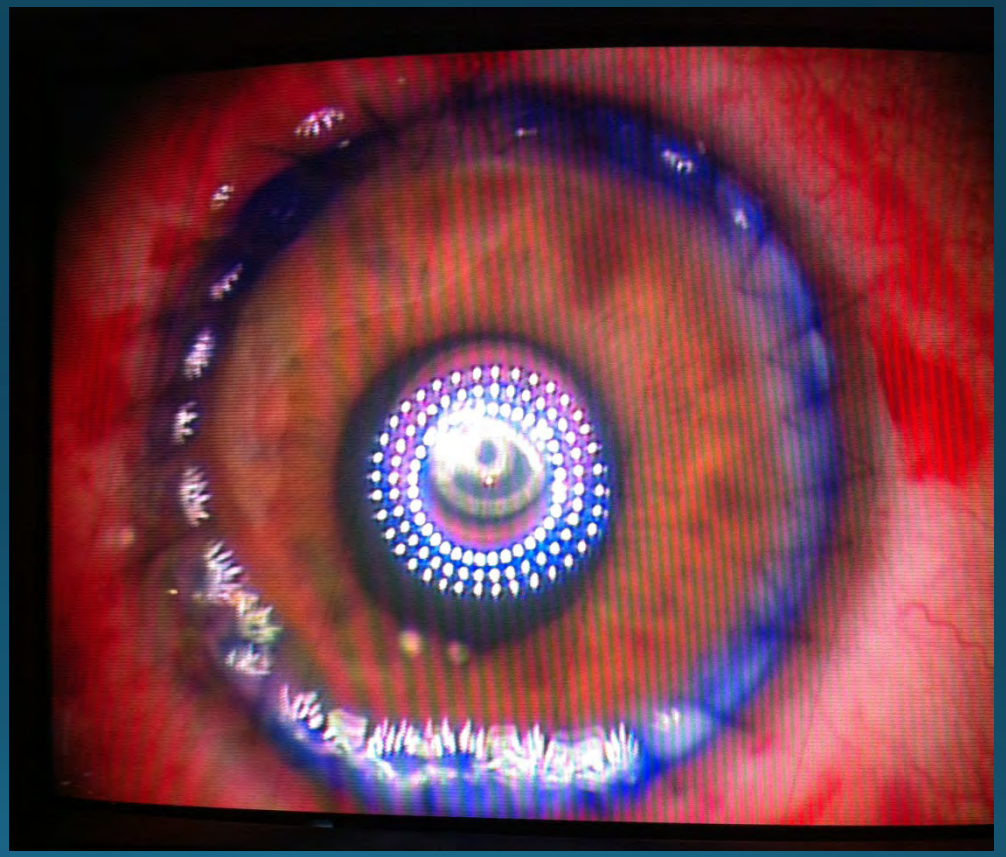
Intraoperative Keratometer

DALK – before suture adjustment



Intraoperative Keratometer

DALK – after suture adjustment:
improves early optical rehabilitation



Large Diameter (9.5-10mm) DALK: Astigmatism Management

Pre-operative

Intraoperative

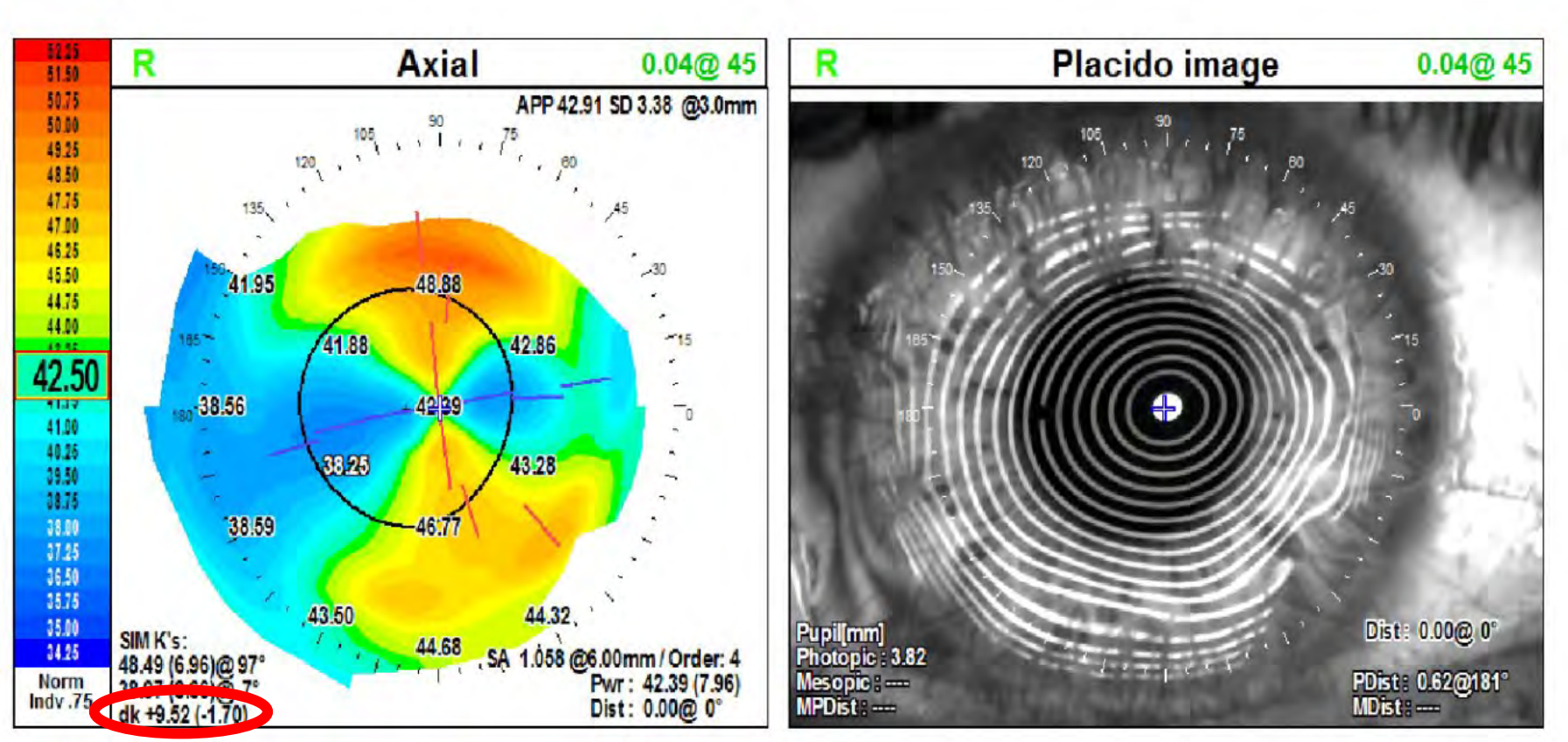
Post-operative

Is astigmatism after DALK Adjustable in the post-op period?

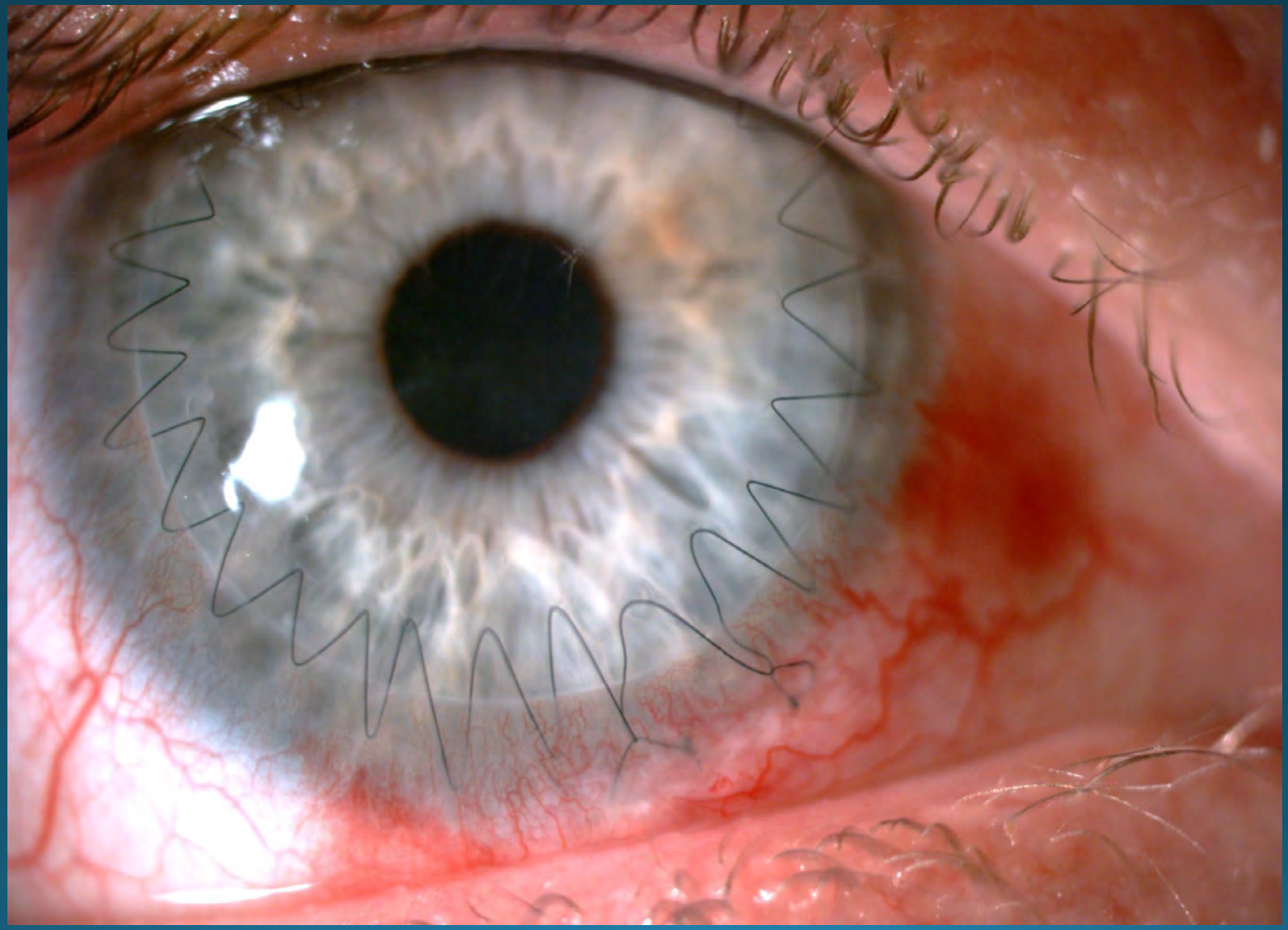
- Yes! Running suture adjustment can be adjusted again during the post-op period if cornea demonstrates high astigmatism after graft has deterguessed
- Patient is brought back to the operating room and the suture is again adjusted under intraoperative keratometer
- This can be repeated multiple times if required. Some pts may require up to two separate suture adjustments to achieve near sphericity.
- They can then have glasses or soft contact lens dispensed for early visual rehabilitation

Case 1
18yo Keratoconus 5 wks after DALK
almost 10 D w-t-r astigmatism

Right Eye

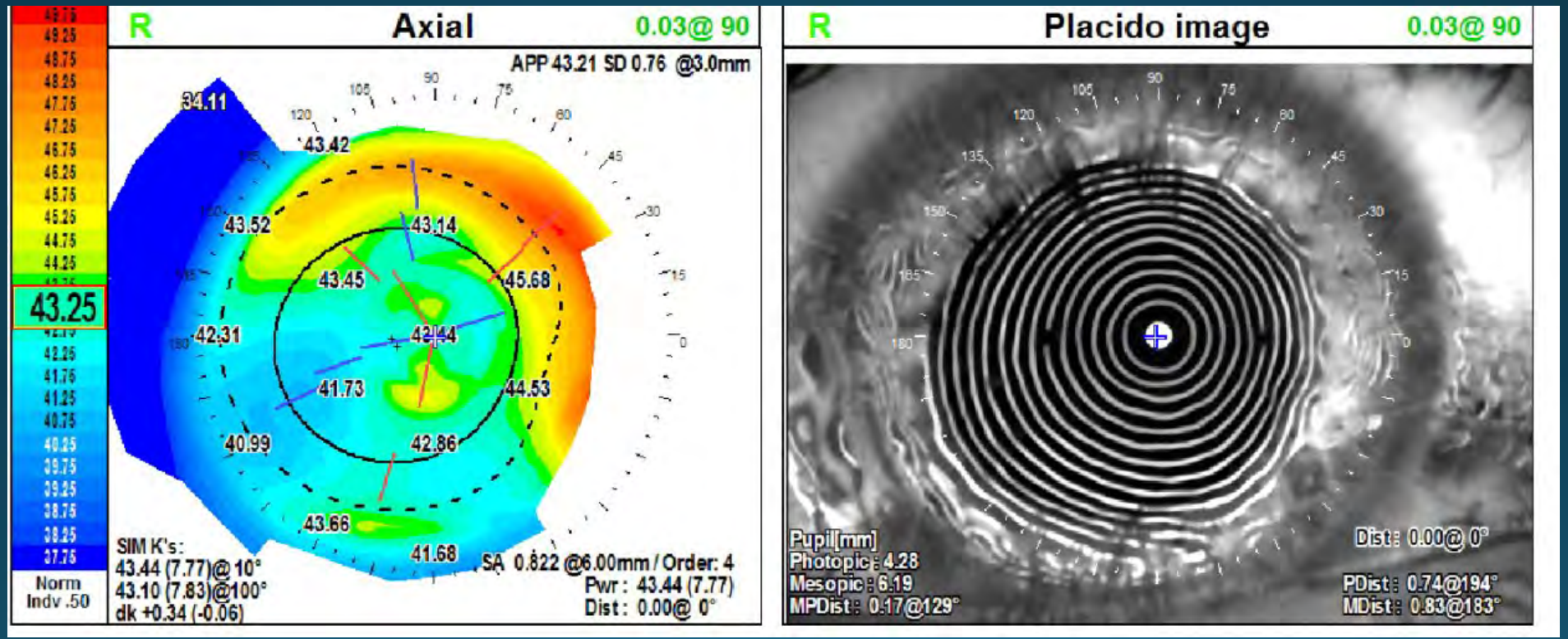


Case 1: Running suture cheese-wired @ 4-5 o'clock
added 2 interrupted 10-0 nylon sutures and readjusted suture tension under intraoperative keratometer



Case 1:
2 wks after running suture adjustment:
Uncorrected VA 20/40 +0.5+0.75x78 20/30

Right Eye



Richard Erdey MD

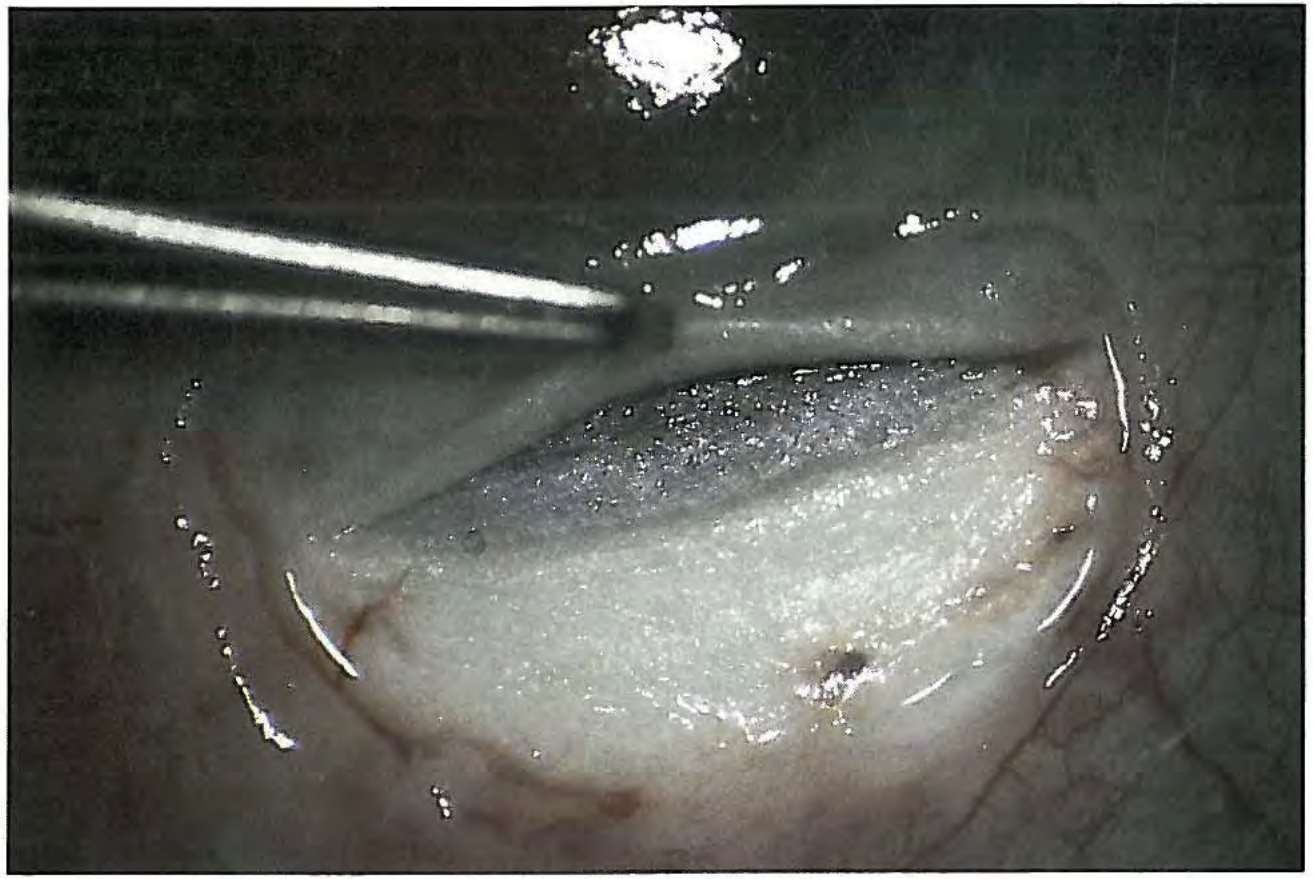
Suture “out” large diameter DALK

- Final corneal shape may reveal orthogonal astigmatism

Is DALK Astigmatism Adjustable after suture removal?

- Yes! With single or paired scleral tunnel lamellar incisions made on steep axis.
- Caveat: AVOID penetration into the anterior chamber at end of tunnel
- Why? I've experienced 2 cases where penetration into the ac caused late decemet's membrane detachment resistant to multiple attempts at air rebubbling. One required PKP, the other was reattached after 4 rebubble attempts, did well for 2 yrs then developed endothelial failure requiring DMEK.
- While you get a bit more meridional flattening with full thickness scleral tunnel penetration into the ac it is NOT worth this unnecessary risk!
- Non-penetrating incisions still work surprisingly well.

.



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

Case #3: 48 yo m Severe Keratoconus OU

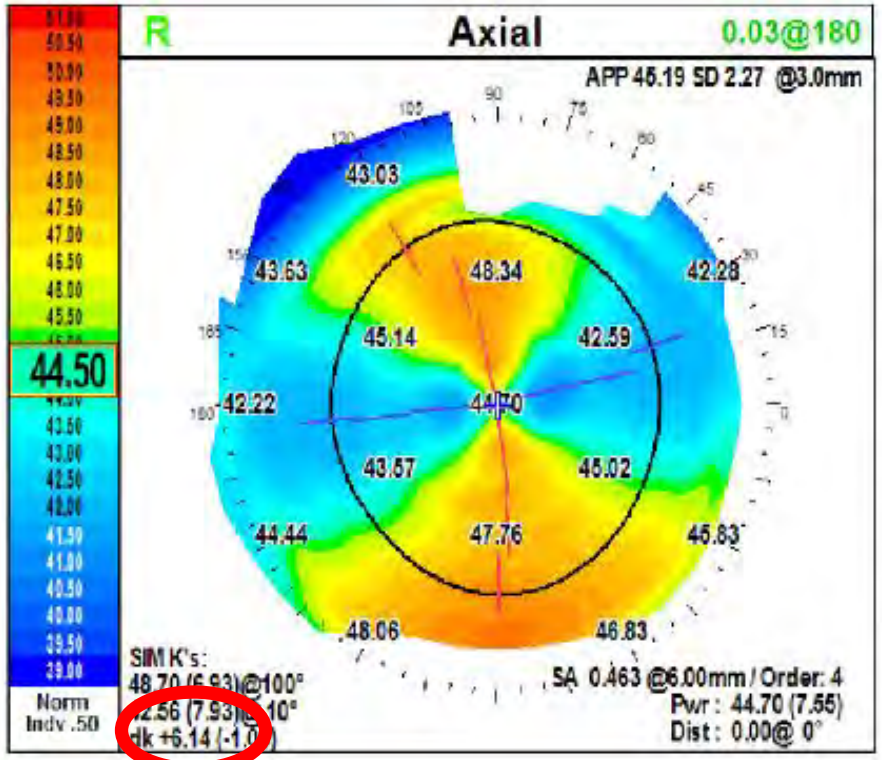
11/2024: topo below: increased astigmatism 6D

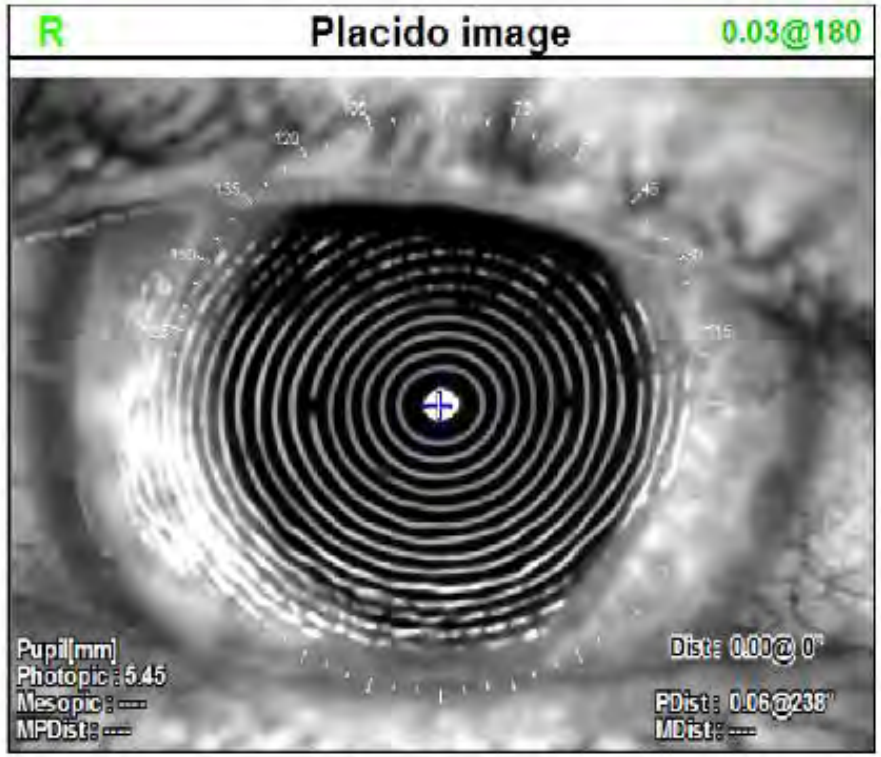
9/2024 running suture removed

3/2024 OD: DALK 10.0mm bed/10.0mm donor laterality matched, nasal marked 24 bite running suture

2012/2013: CXL OU x 2

L	11/07/2024 09:00	Comment	L		Diagnosis	L	
R	11/07/2024 09:00		R			R	





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Case #3: 48 yo m Severe Keratoconus OU

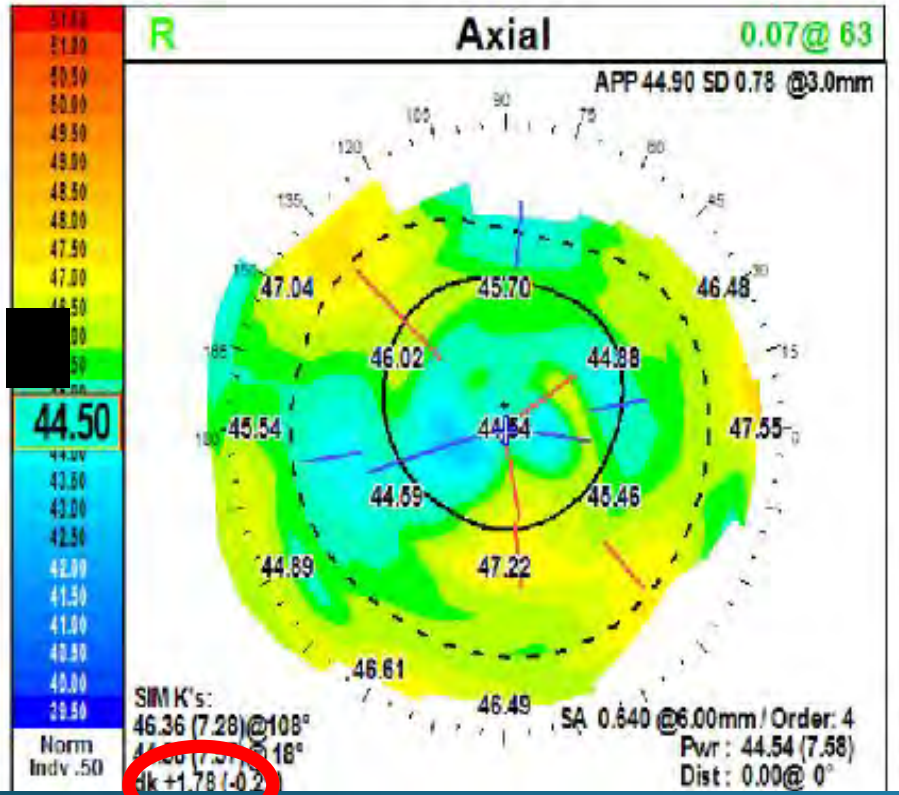
12/16/2024 OD: -8.25+0.75 x 90 dramatically reduced astigmatism!

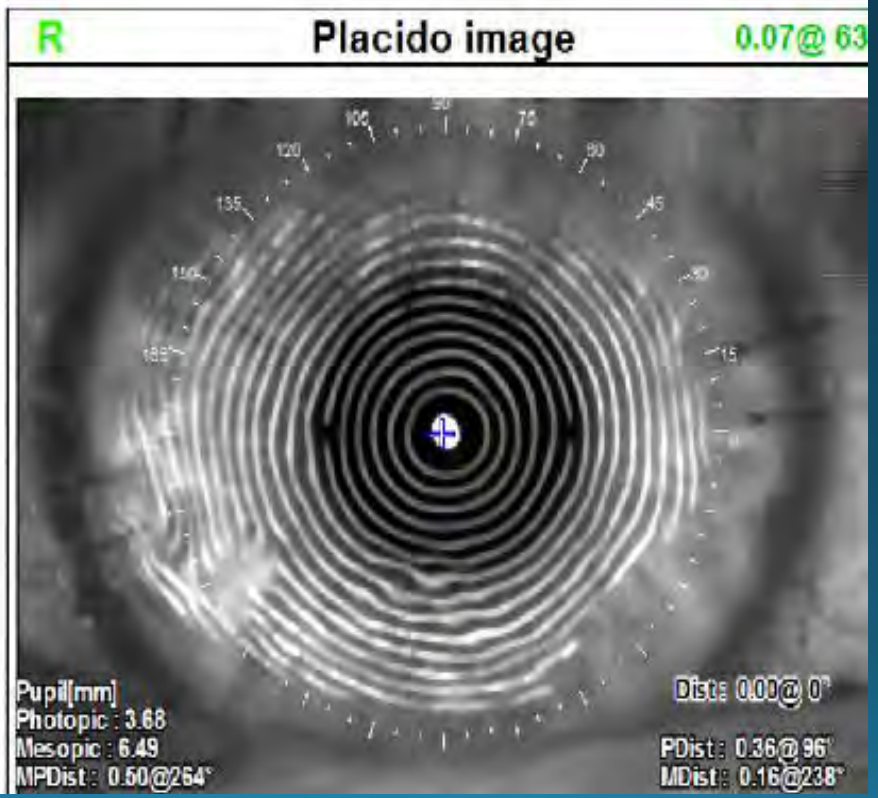
12/3/2024 Paired Astigmatic Keratotomy Scleral Tunnel (non-penetrating) superior/inferior

3/2024 OD: DALK 10.0mm bed/10.0mm donor 24 bite running suture

2012/2013: CXL OU x 2

R	12/16/2024 10:01	Comment	R		Diagnosis	R	
L			L			L	





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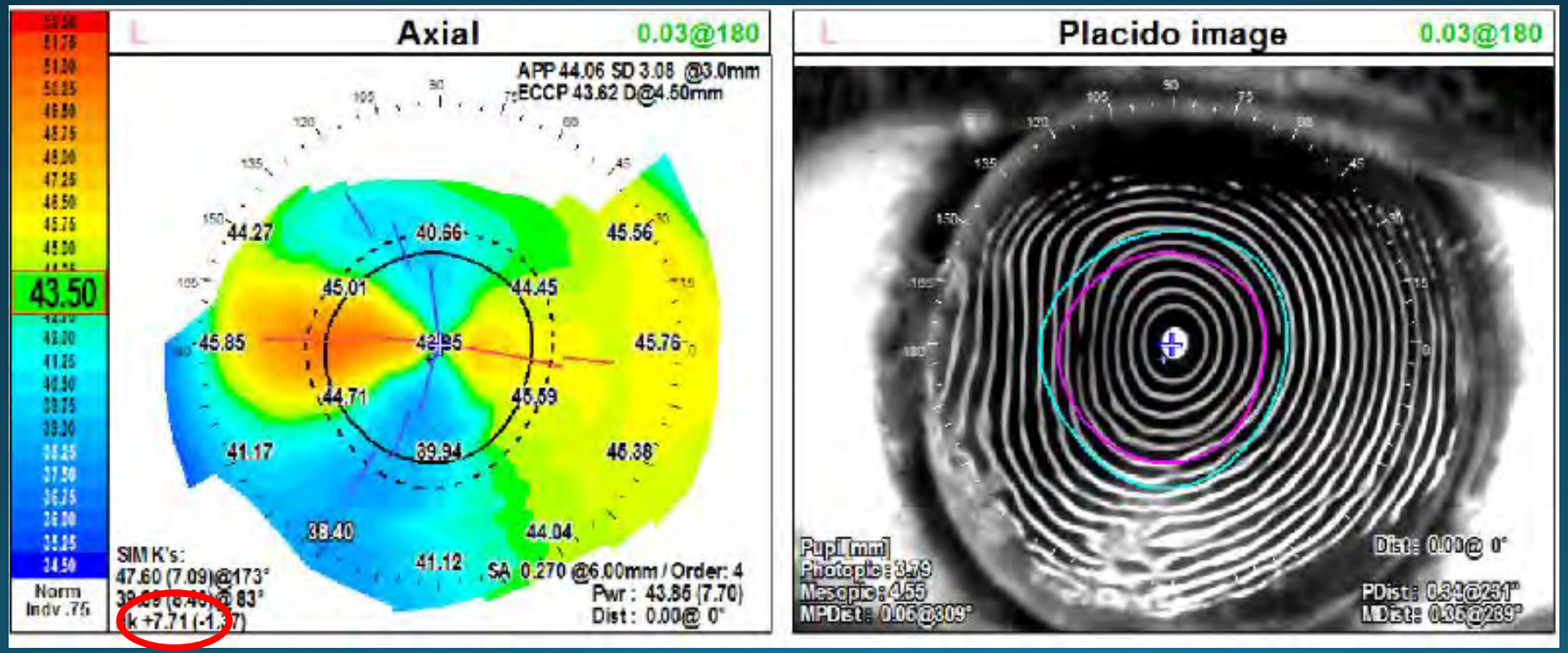
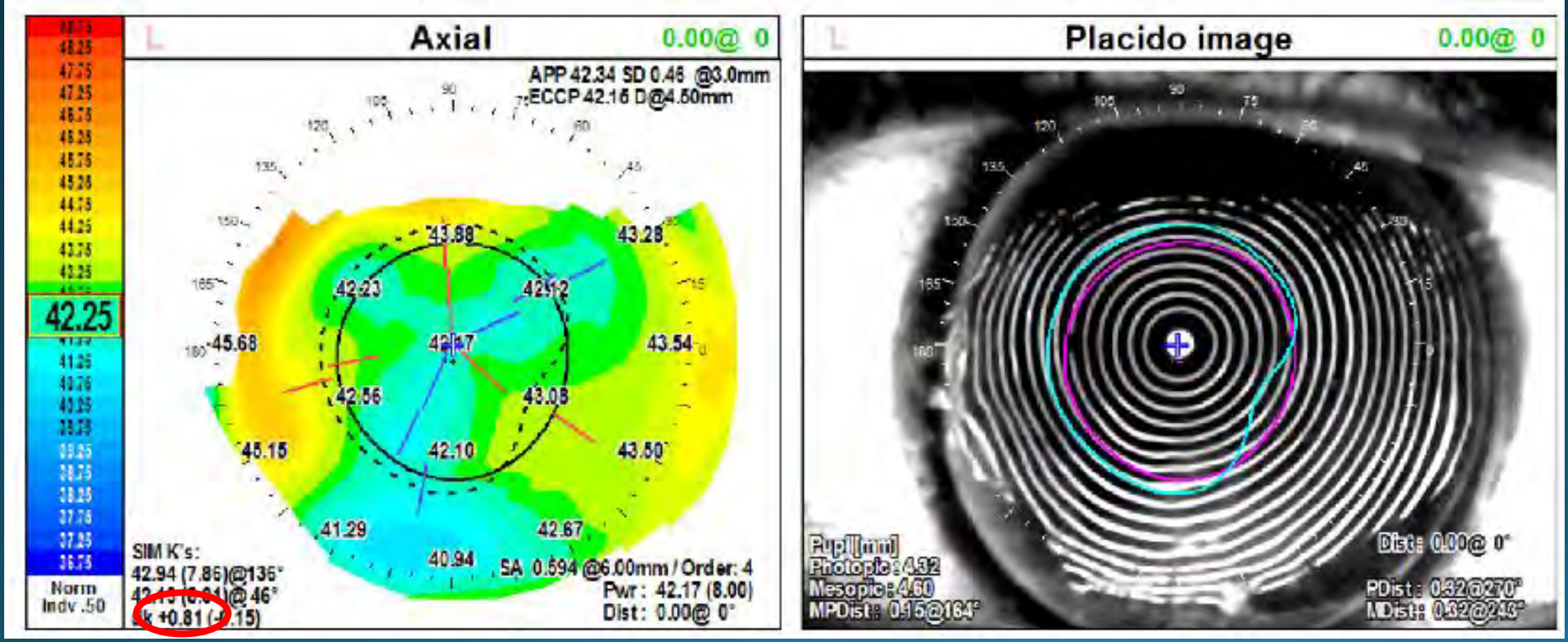
Case #5: 30 yo fm Severe Keratoconus OU

- 10/2024 -5.5 +7.25 x 177 20/30 suture "out"
- 12/2023 DALK OS



Case #5: 31 yo fm Severe Keratoconus OU

- 1/20/2025 uncorrected VA 20/25-3 !!
- 1/6/2025 Astigmatic Keratotomy: nasal scleral tunnel w interrupted 10– nylon sutures superior/inferior
- 12/2023 DALK OS



Richard Erdey MD

When suture out…about a yr

Optical :

- Glasses
- Soft CL's

Refractive Surgical Stage:

- AK single/paired scleral tunnel
- LVC
- ICL
- Toric/LAL

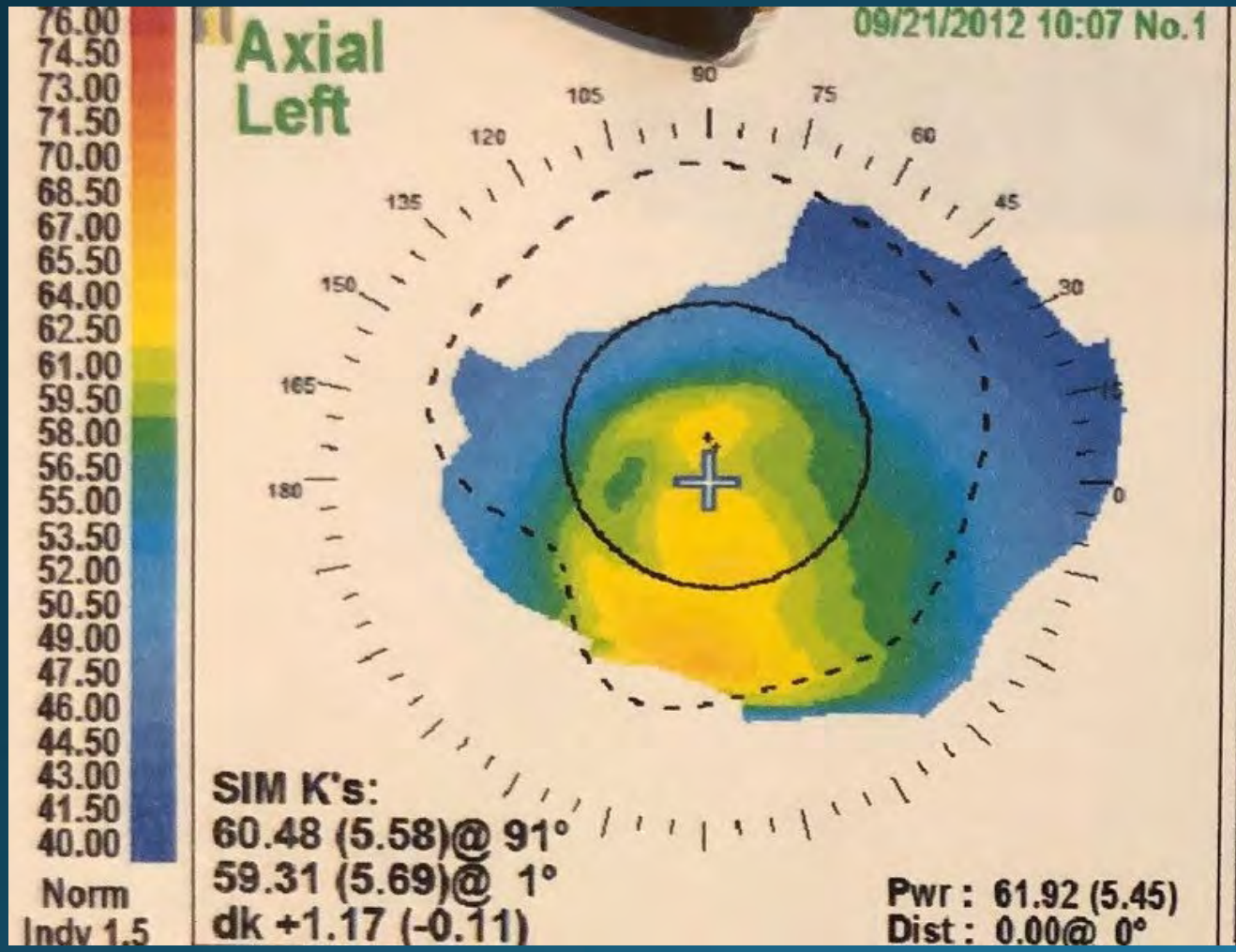
Large Dia DALK: long term refractive stability?

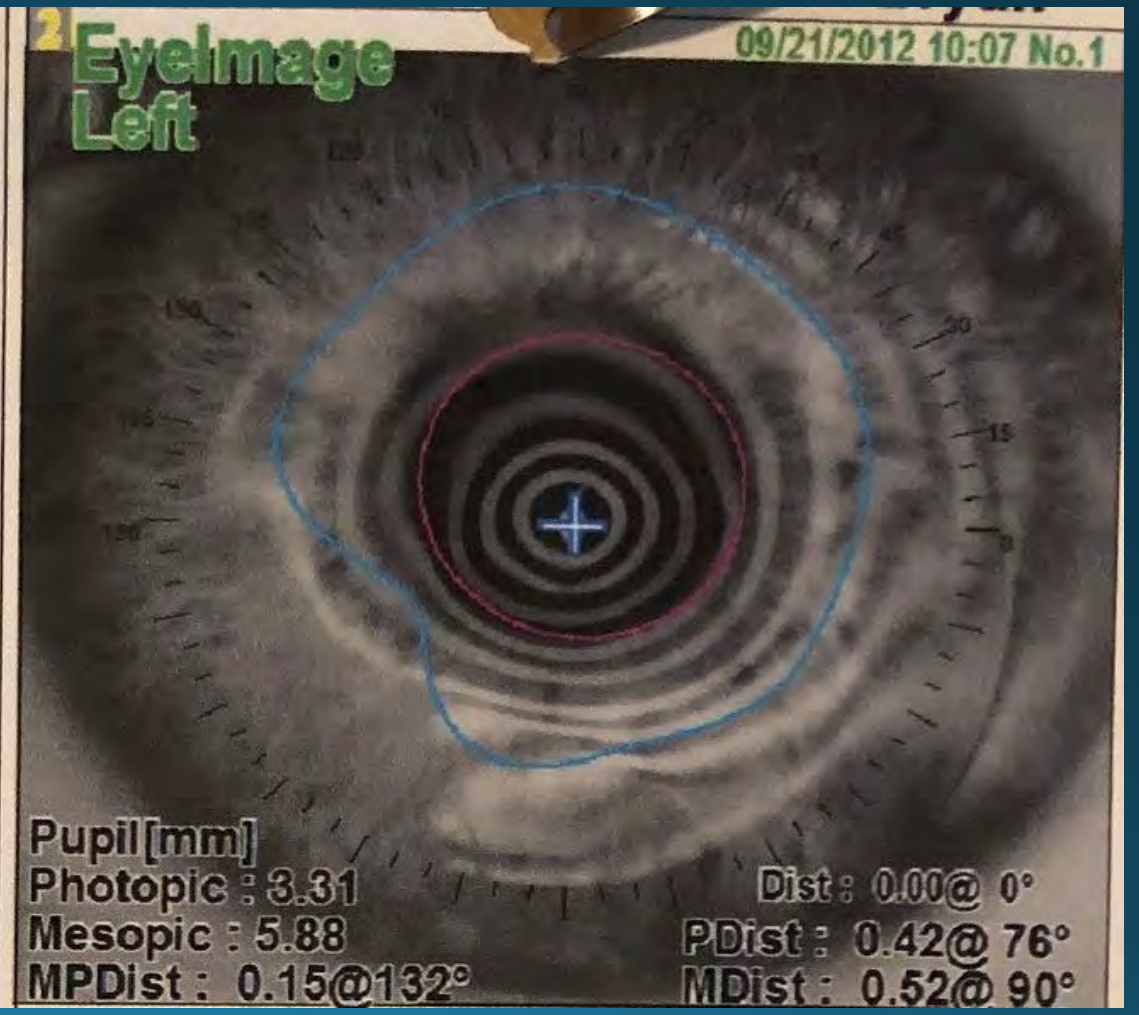
Left Eye

CASE

Dec. 2012 23yo male Keratoconus -19.0+6.25x93 20/300

DALK 9.5mm pre-descemets dissection





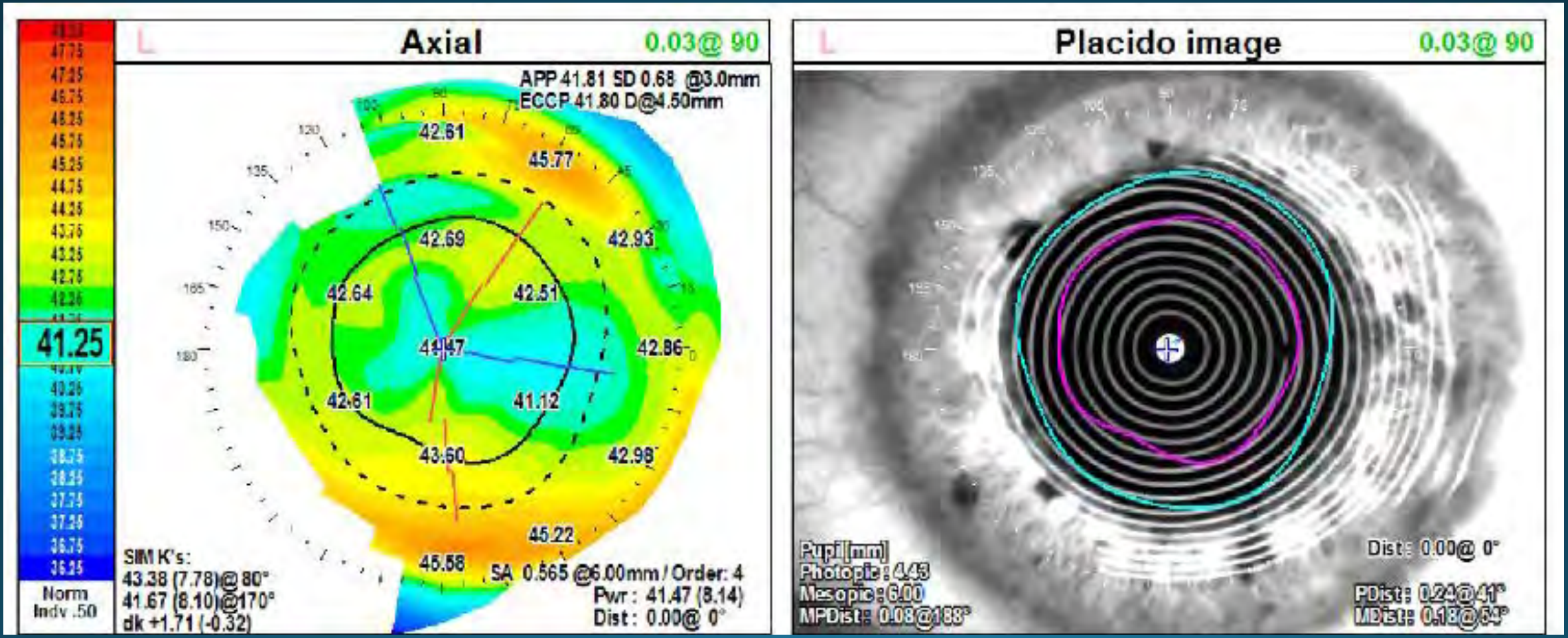
Case

Now age 33

March 2023 (10yrs. aft DALK, 6yrs aft LASIK)

Uncorrected VA 20/25 -1+0.5x135 20/20

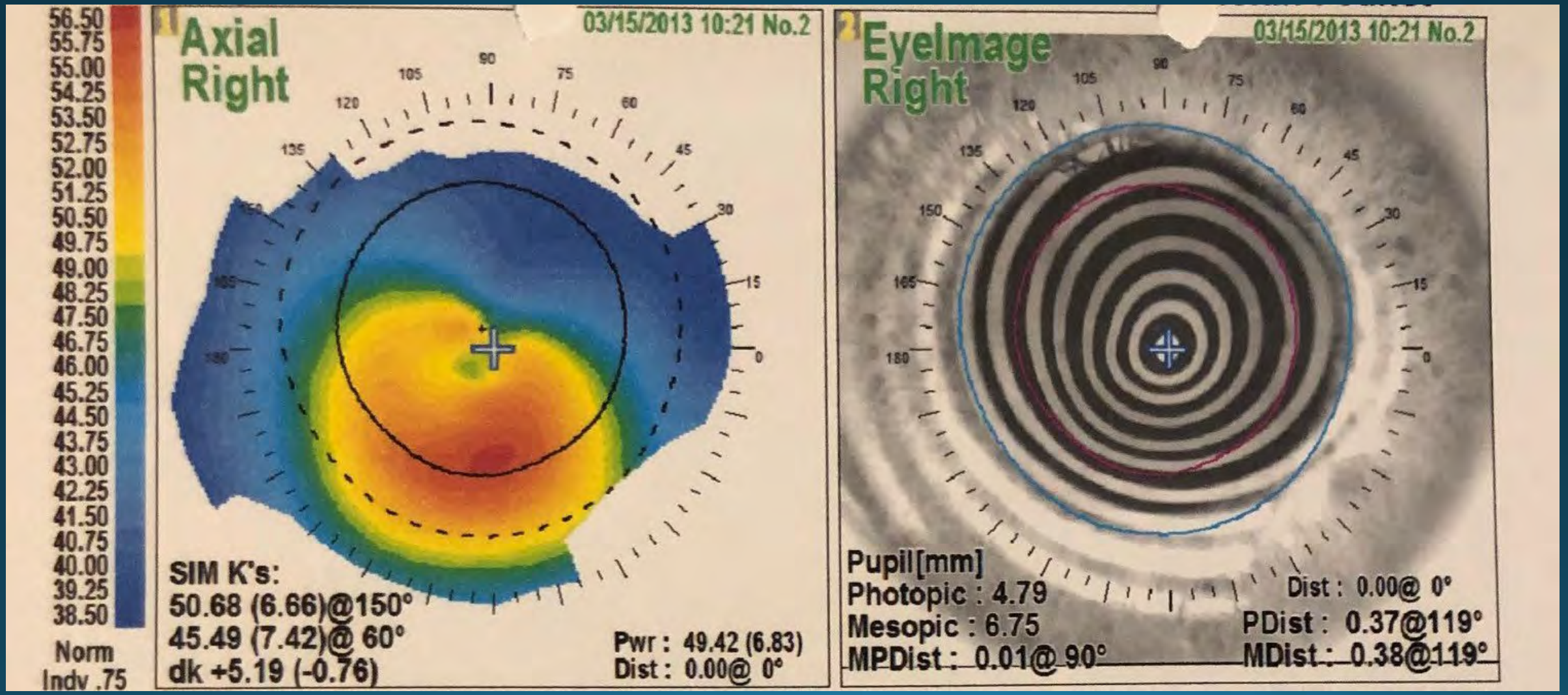
Left Eye



Right Eye

Case

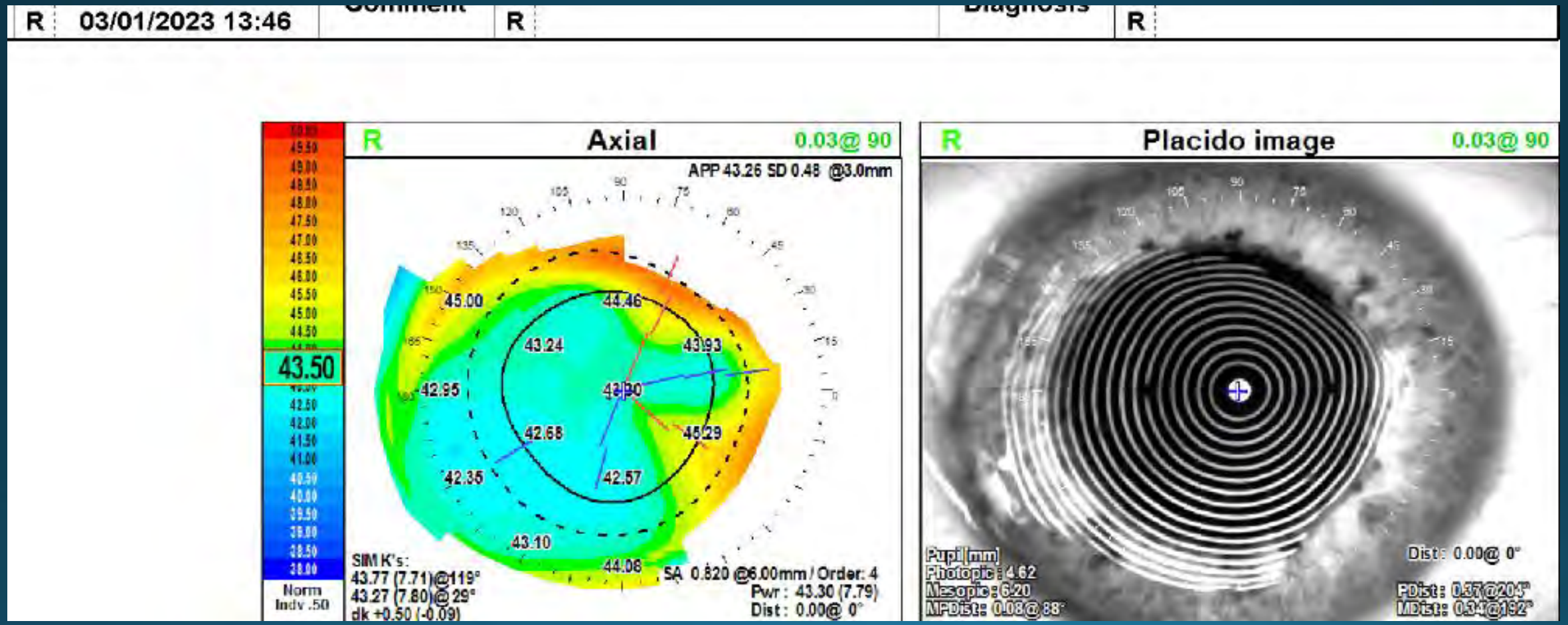
March 2013 24 yo male Keratoconus -6.0+3.75x133 20/40



Case

Right Eye

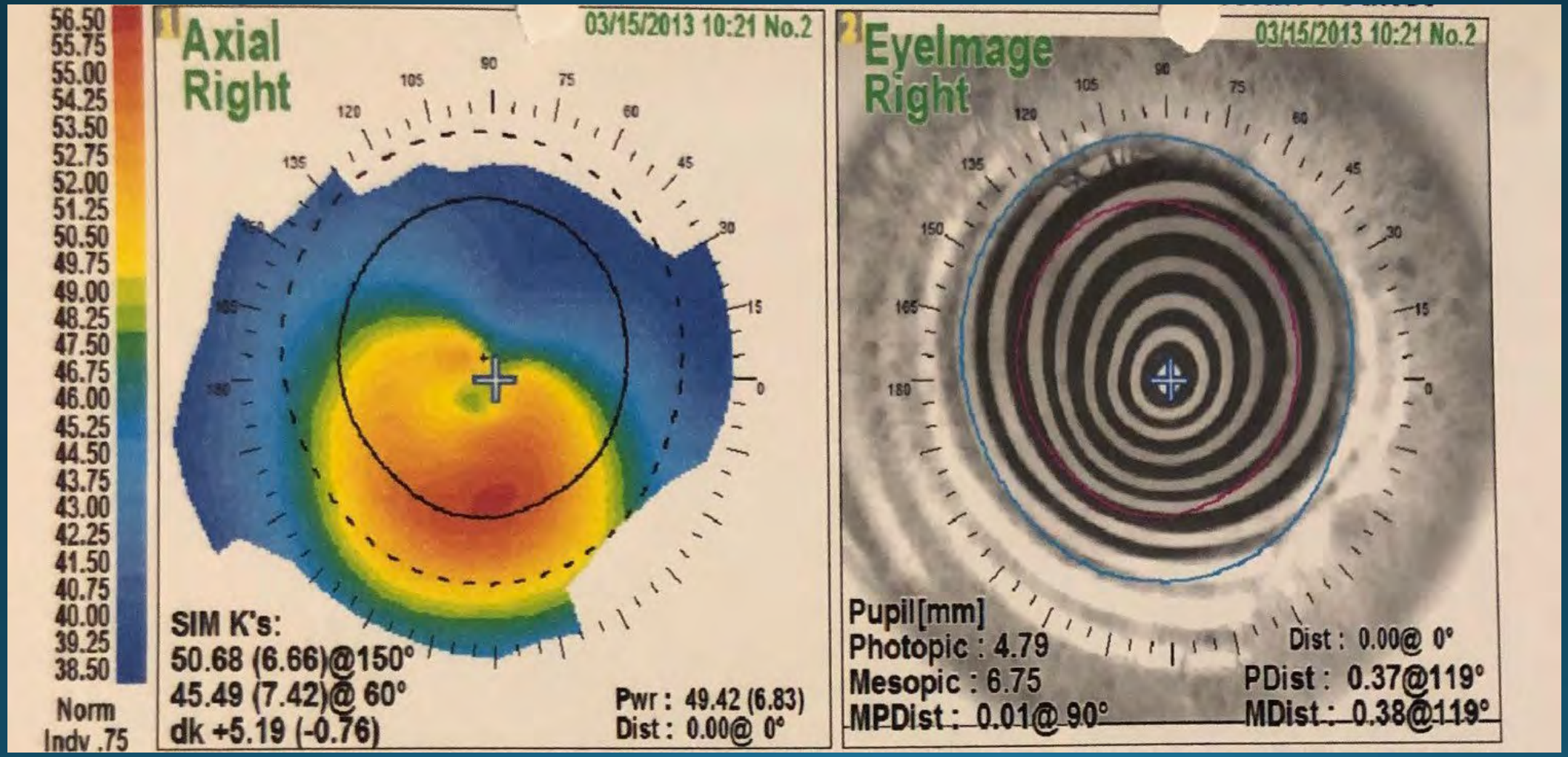
March 2023 now 33yo (9.5yrs aft DALK/5yrs aft LASIK,)
Uncorrected VA 20/20
-0.50 20/20



Case back in time… CXL instead

Right Eye

March 2013 24 yo male Keratoconus -6.0+3.75x133 20/40



Cost?

- $2500/yr or $25K in replacement CL's
- Cumulative risk?
- What if on Medicaid?

Let's assume pt above was 65 yo warped corneas entire life wears scleral CL's now with cataracts

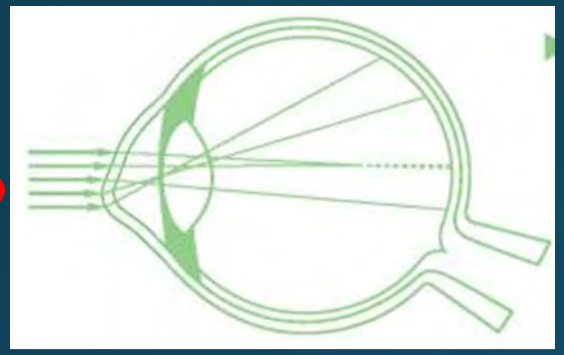
1. DALK

STAGED:

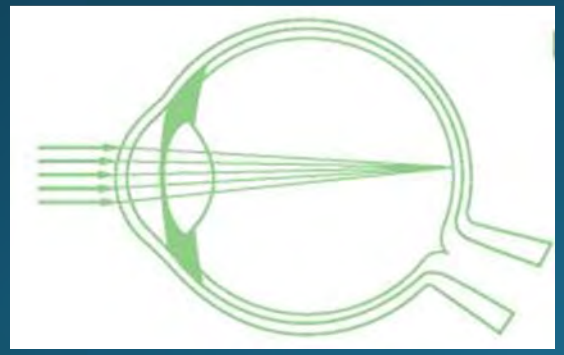
2. cataract extraction w Light Adjustable Lens (LAL)

Corneal Cross-linking Keratoconus/Ectasia

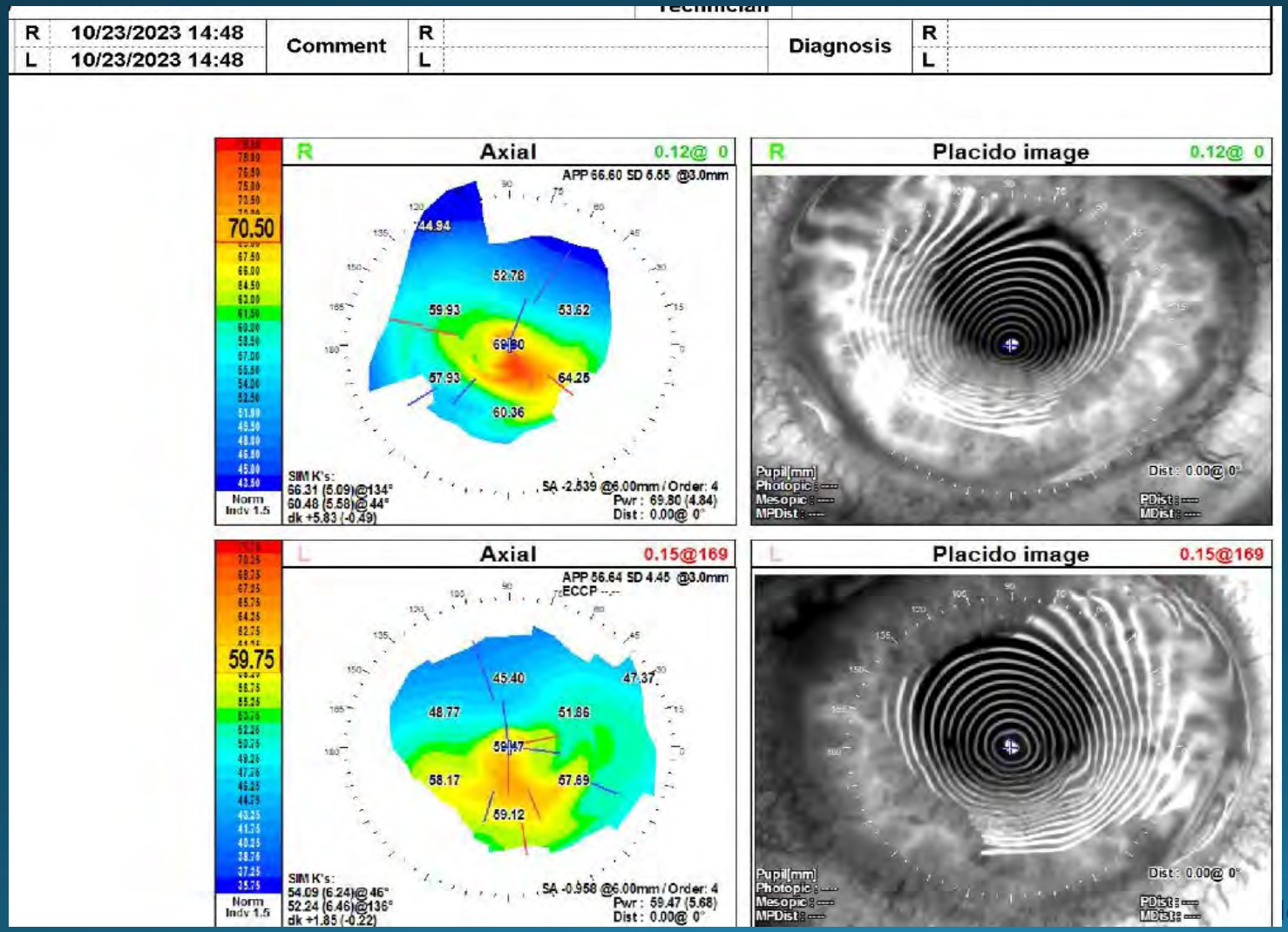
- Here??



- YES!!



Case #1: 48 yo m Severe Keratoconus OU
2024 OD: intolerant of scleral CL OS: Scleral CL
2013: CXL OU - repeated
2012: CXL OU



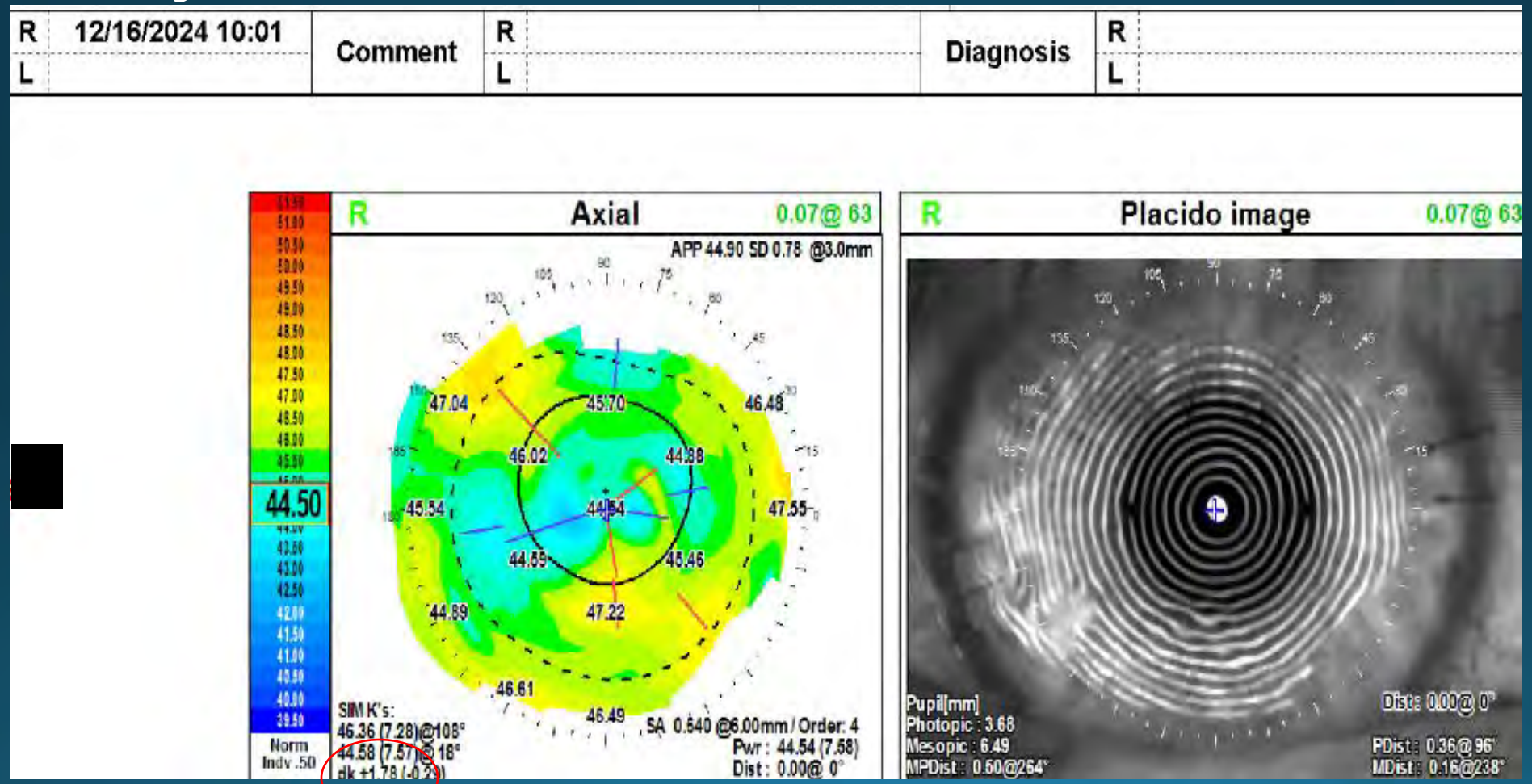
Case #1: 48 yo m Severe Keratoconus OU

12/16/2024 OD: -8.25+0.75 x 90 20/20 dramatically reduced astigmatism!

12/3/2024 Astigmatic Keratotomy Scleral Tunnel (non-penetrating) superior/inferior

3/2024 OD: DALK 10.0mm bed/10.0mm donor laterality matched, nasal marked 24 bite running suture

2012/2013: CXL OU x 2



Richard Erdey MD

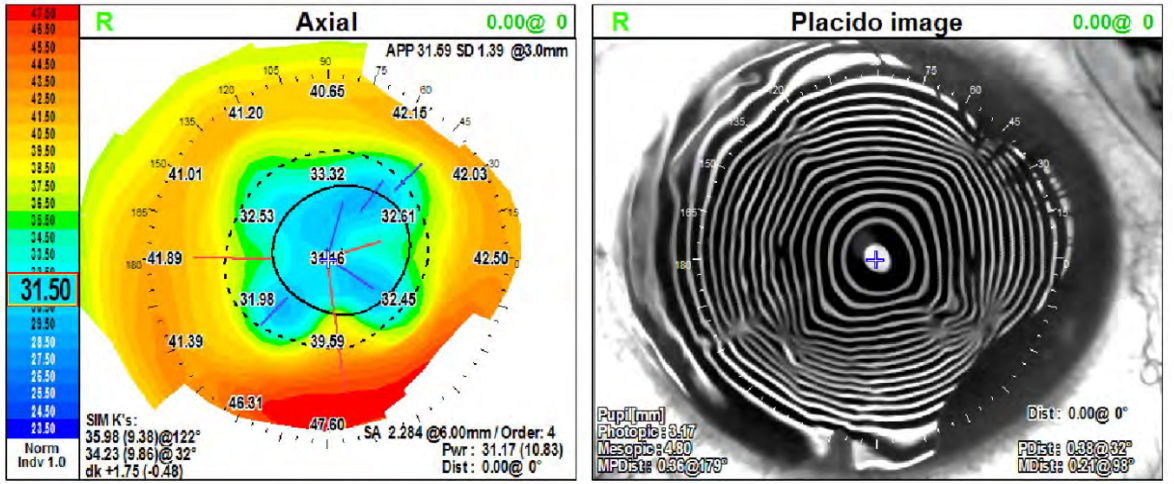
Case #1 Testimonial:
48 yo M Hx CXL after large diameter DALK (right eye) for severe keratoconus

https://youtube.com/shorts/O05QLhLHNCU

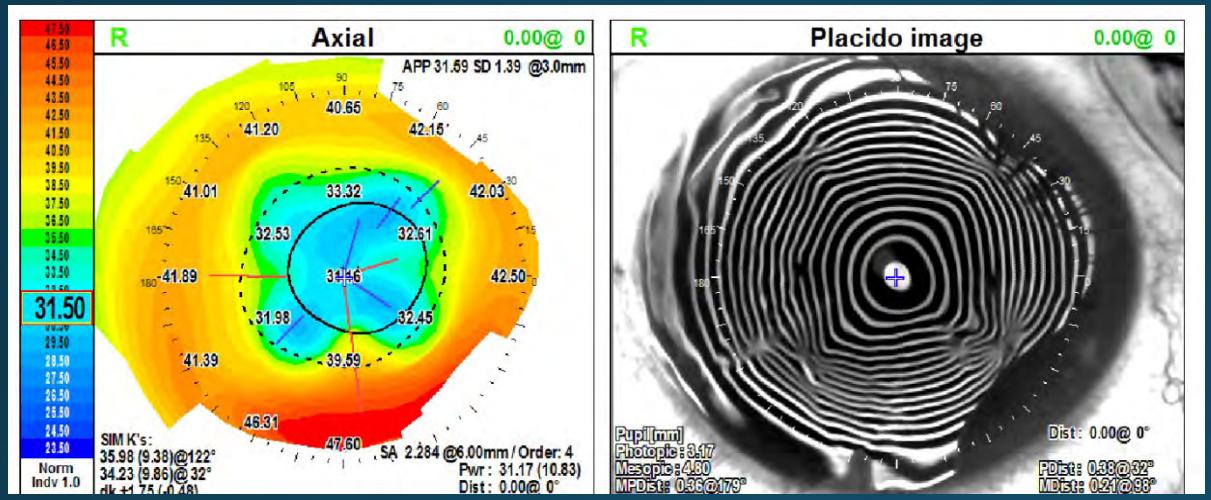
Richard Erdey MD

Case 2: 63 yo RK ectasia, irregular astigmatism, chronic diurnal fluctuation OU "no improvement" after crosslinking (OS) 2013 and cataract surgery (OU) 2018

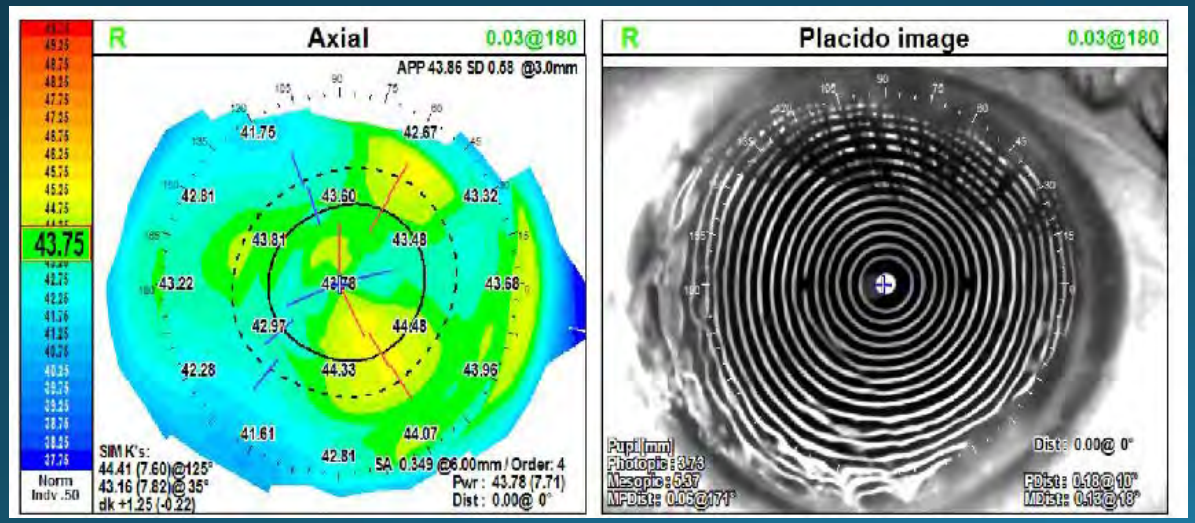
L	12/09/2019 08:30	Comment	L		Diagnosis	L	
R	12/09/2019 08:30		R			R	



Case 2: RIGHT EYE: SUMMARY
Top: Pre-op vs. Bottom: 14 mos after DALK (large 9.5mm dia.)



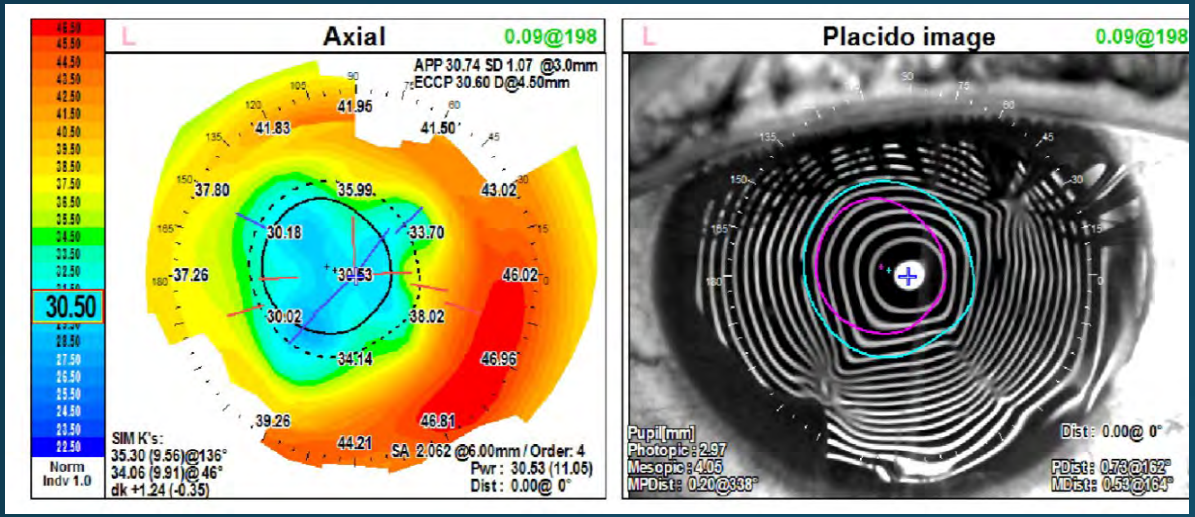
OD: 25yrs after RK cataract extraction w high (24.5D) power IOL



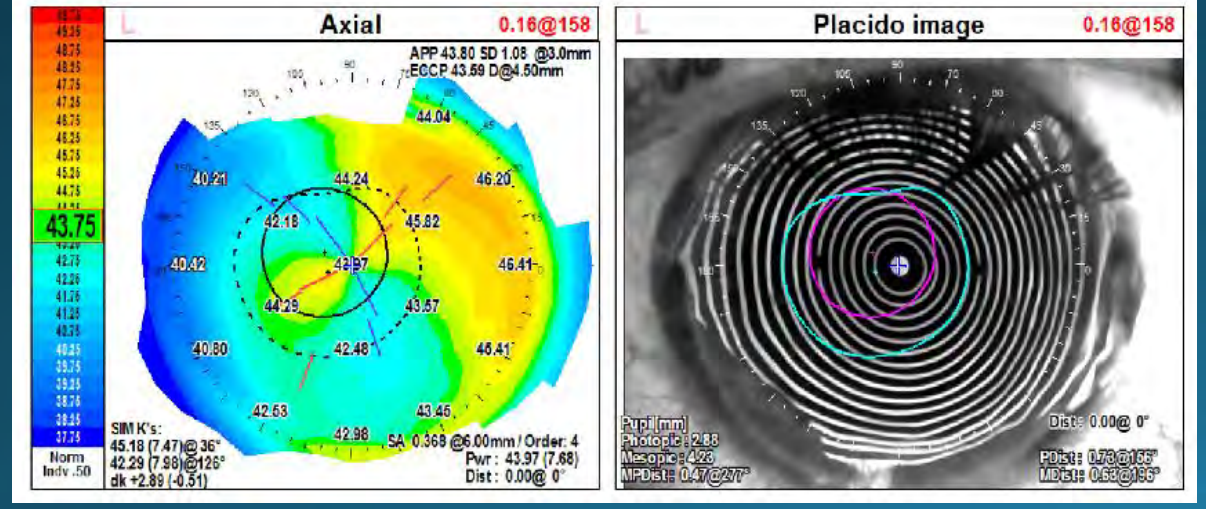
OD: 14mos after DALK, 9 mos after running suture removal, 6 mos aft IOL exchange w B&L MX60T1.25 9.0 x 125

Uncorrected VA 20/25

Case 2: LEFT EYE: SUMMARY
Top: Pre-op vs. Bottom: 2 years after DALK (large dia.)



OS: Pre-op DALK 25yrs after RK/CXL/ cataract / high power IOL

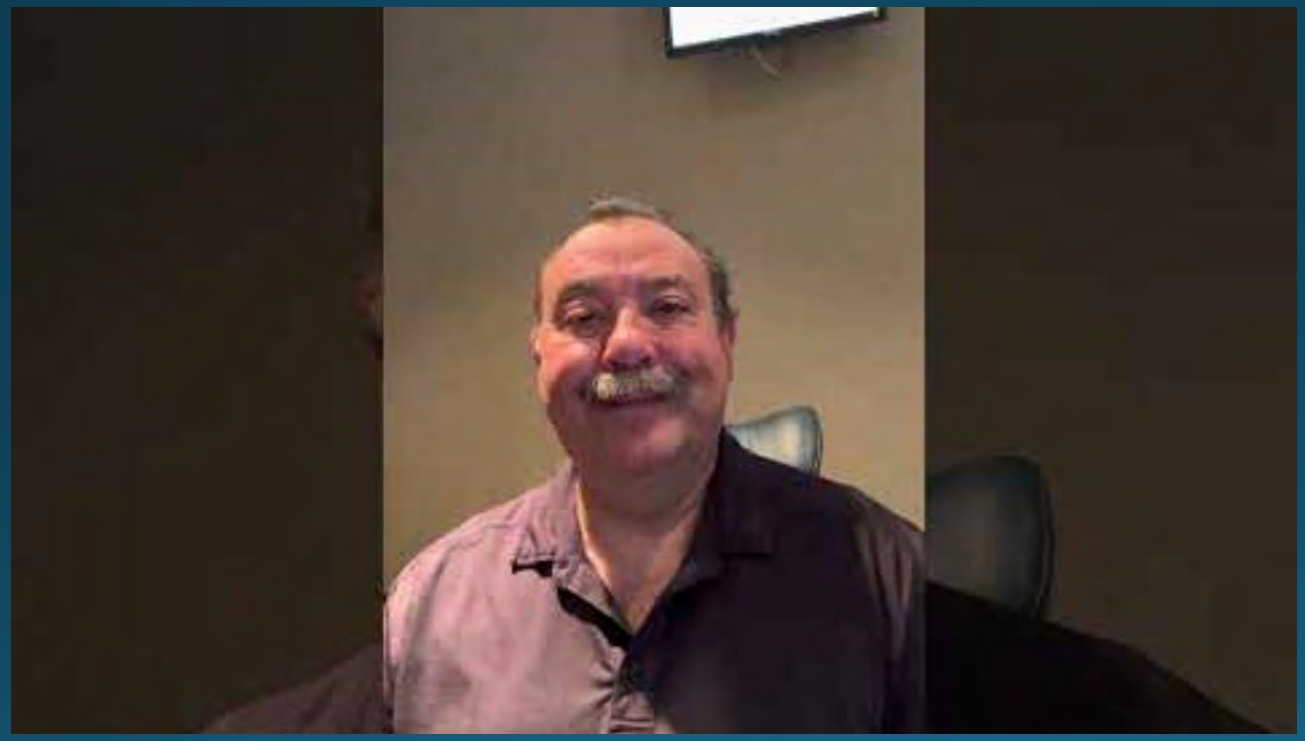


OS: 2 yrs after DALK, 14mos after running suture removal, 1yr aft IOL exchange)

.

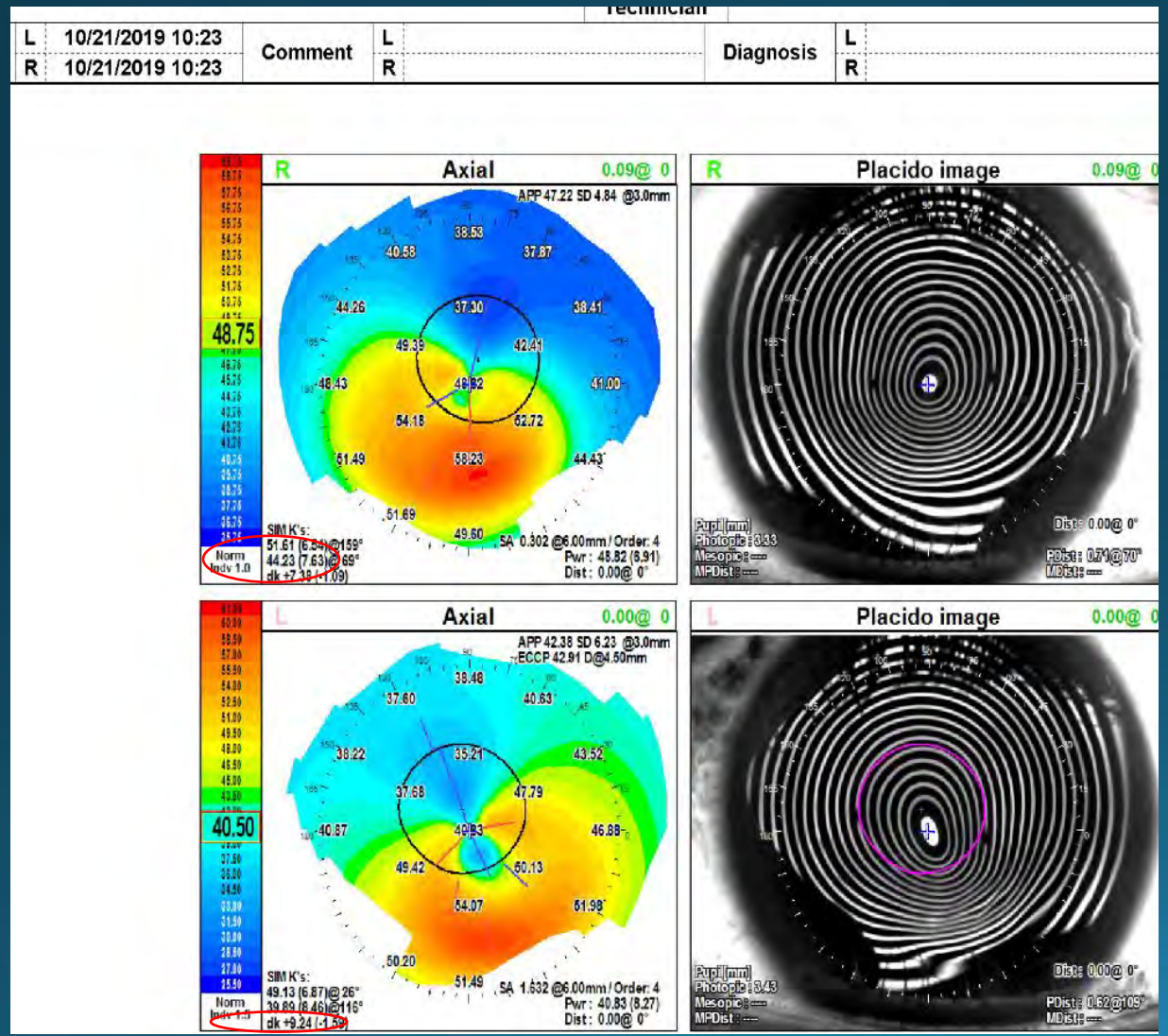
OS UCVA 20/30 -0.5+0.5x008 20/20 add 2.50 J1

Case #2 Testimonial
Large diameter DALK OU:
Cornea Restoration for RK ectasia



- https://youtu.be/fahTnxXAUxQ

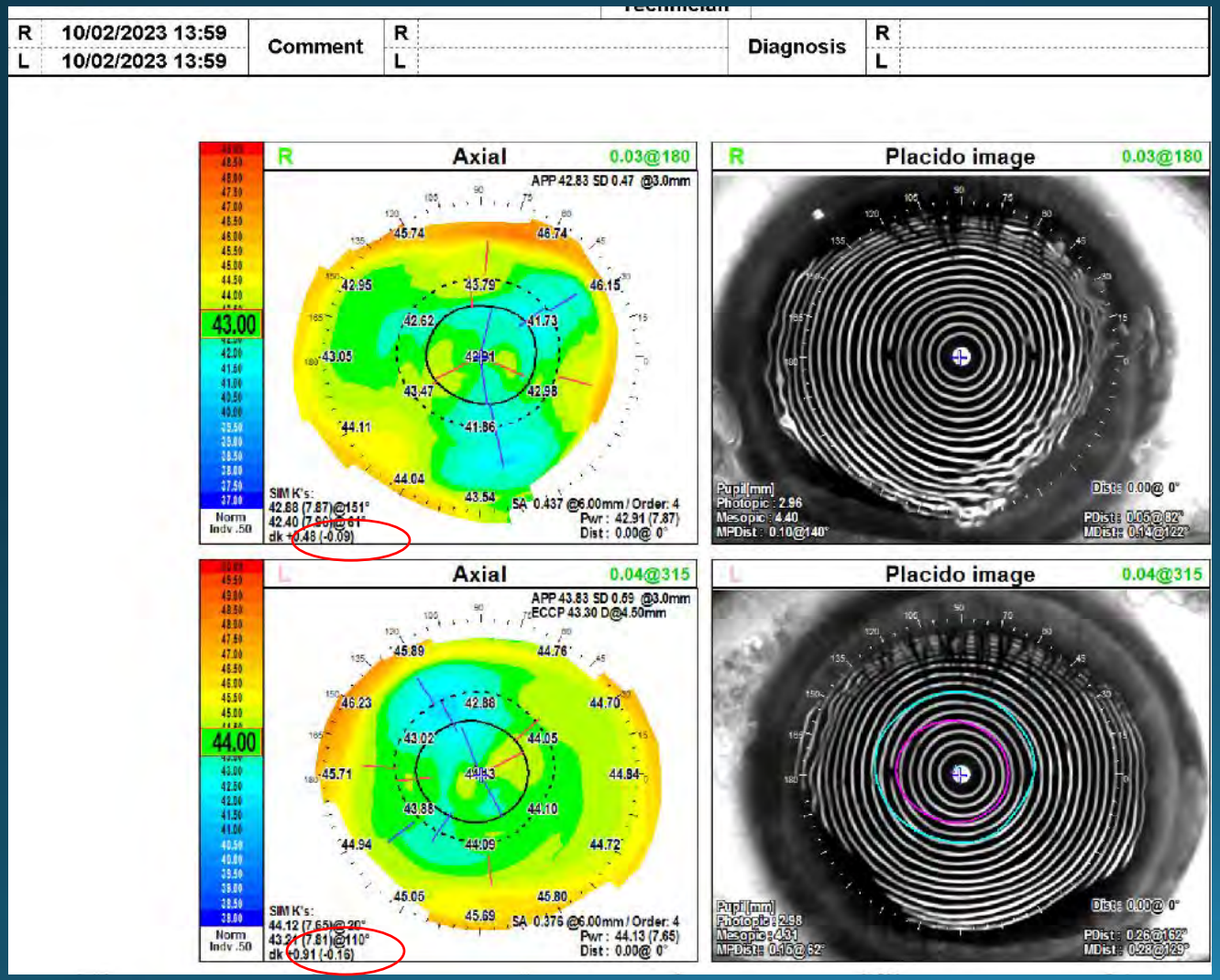
Case #3 48 yo m Pellucid Marginal Degeneration (PMD) CXL both eyes



OD: -6.50+7.25x172 20/50

OS: -4.0 + 5.50 x 26 20/30

Case #3 Pellucid Marginal Degeneration (PMD) /CXL both eyes
2021 running corneal graft sutures out OU
OD: 11/2020 DALK 10.25mm bed/10.5mm donor
OS: 12/2019 DALK 10.25mm bed/10.5mm donor



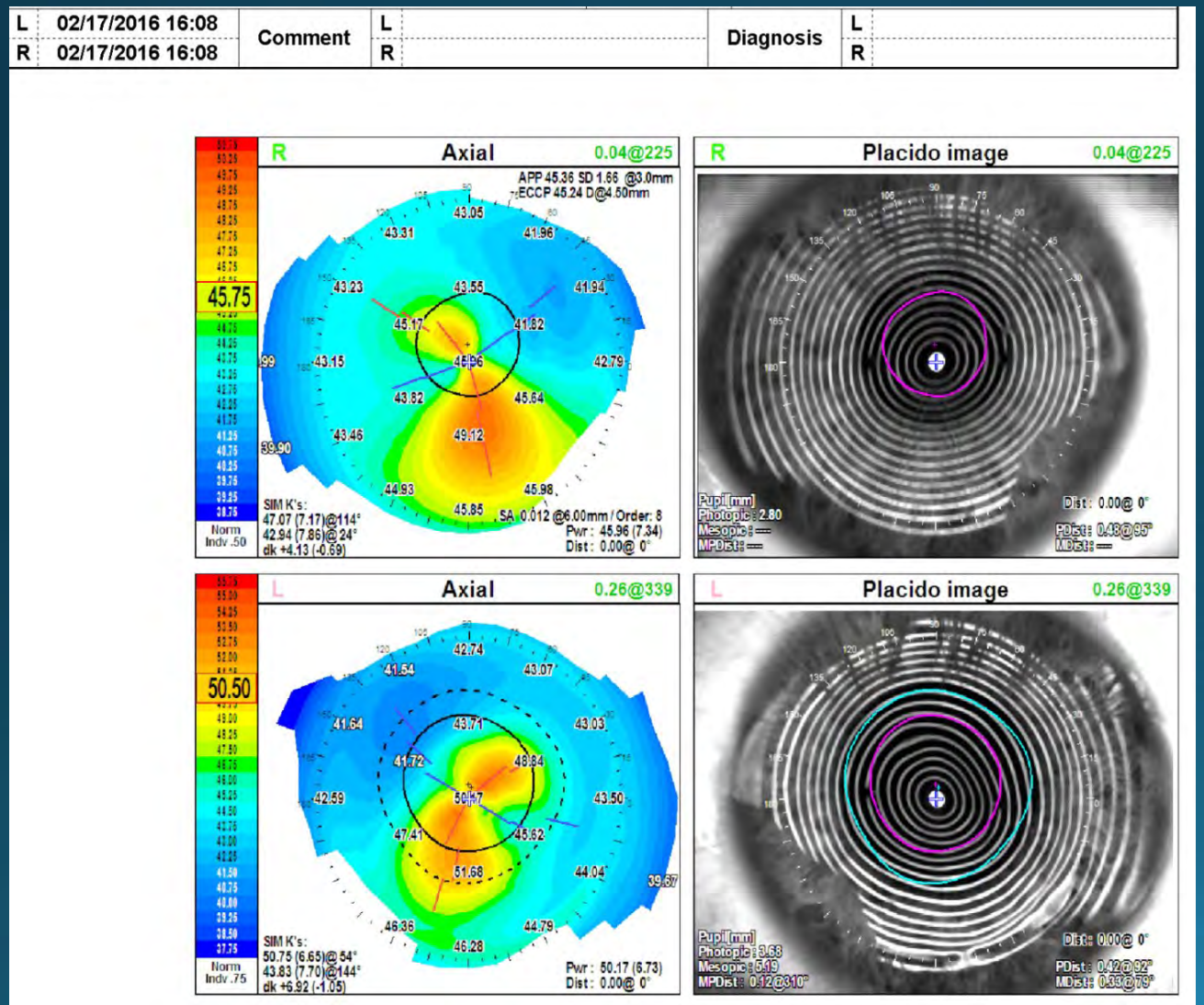
10/2/2023

OD: --1.75+1.25x20 20/20

OS: -3.50+1.25x14 20/20

CASE #4: LASIK ECTASIA

2/2016: 33 yo male referred 3 mos after cross linking OS (right eye not x-linked)
"I still cannot see out of my left eye and vision very poor right eye – especially at night"
12/2015 OS: Corneal Cross-linking (performed by original LASIK surgeon)
2008 LASIK OU for low myopia (-3.0D OU) " vision OK for for initial 4 yrs" then developed ectasia OU



- OD: -2.50+2.0x165 20/40
- OS: 20/150

Richard Erdey, MD

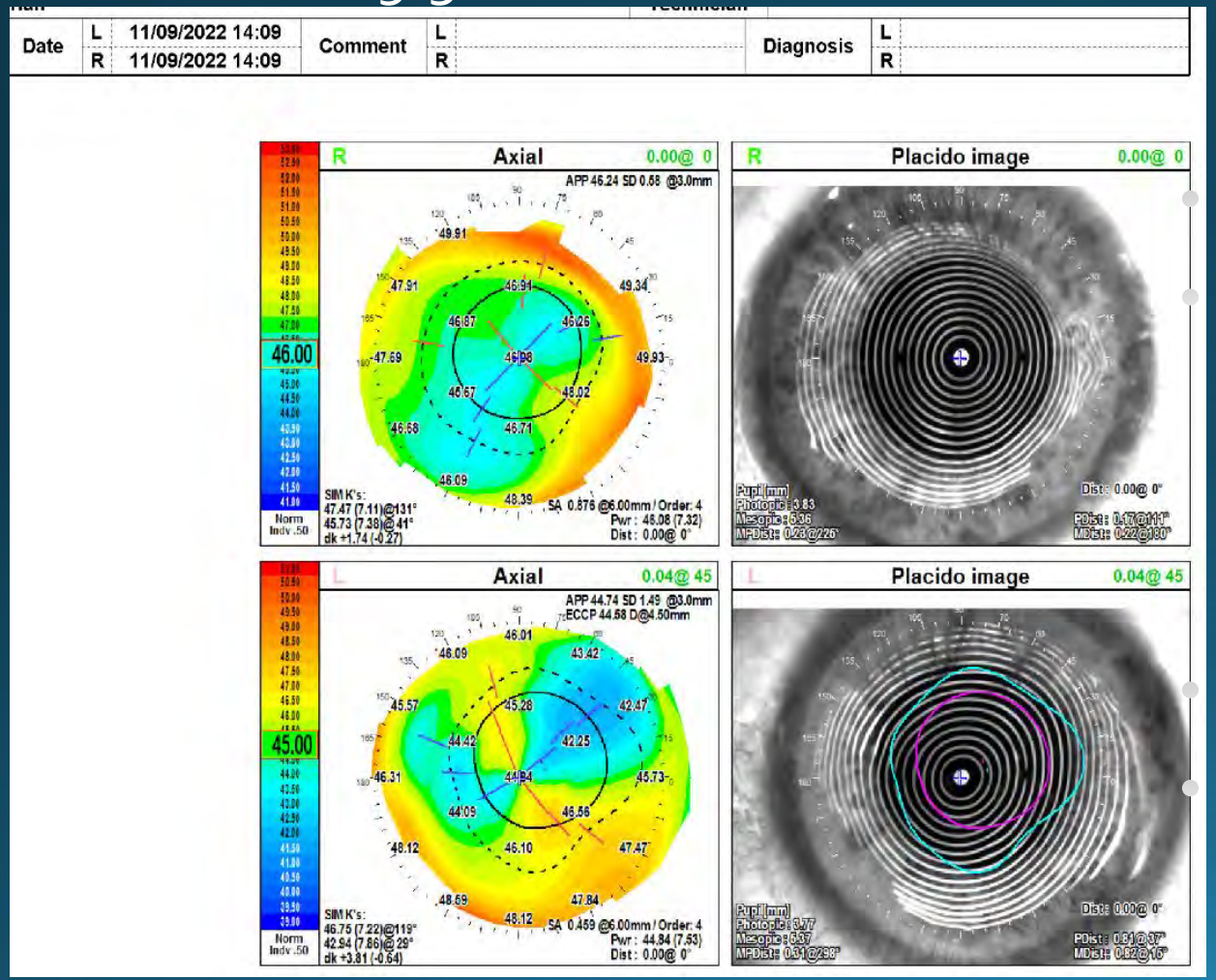
Case #4: LASIK ECTASIA

11/2022 Topo below EXTREMELY HAPPY!

2/2022 Staar Toric ICL OD: 13.2 -8.0/2.5 OS: 13.2 -7.5/4.0

6/2019 OS: DALK 9.5mm

6/2016 OD DALK 9.5mm



OD: Uncorrected VA 20/20

-0.25+0.5x136

OS: Uncorrected VA 20/25

-1.0+1.0x100 20/20-

CXL warped corneas?

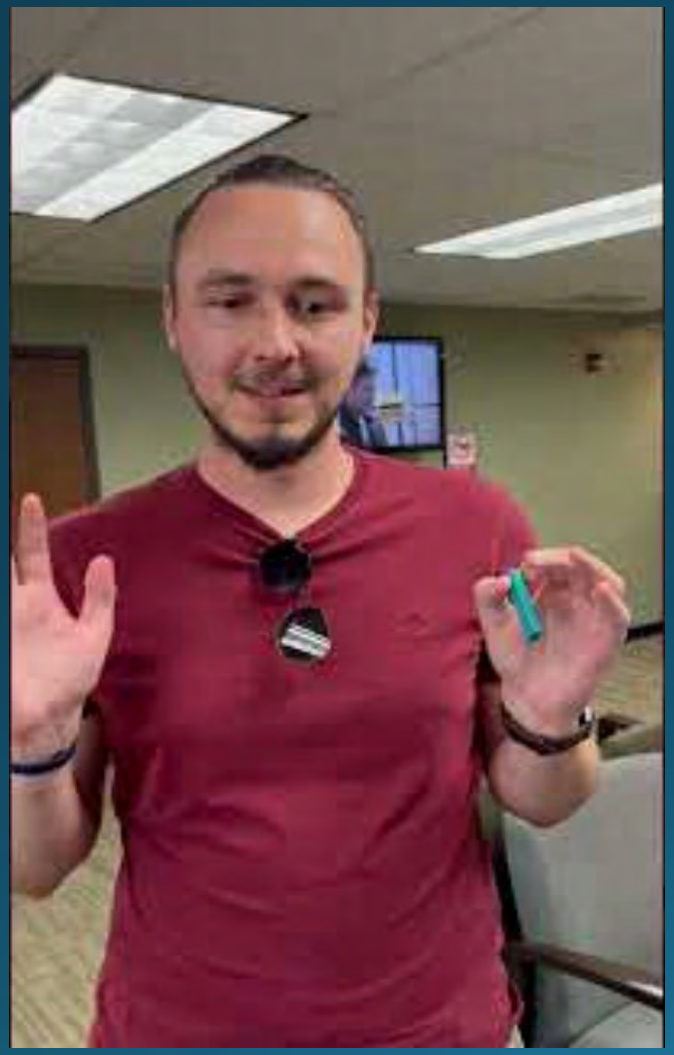
NO!!...

When DALK surgeon is available with low conversion rates to PKP!

Case #5: Testimonial LASIK Ectasia rehabilitation after DALK/IOL Both Eyes

- https://youtube.com/shorts/uj4bneNT3Gk

Case #6 TESTIMONIAL: 32 yo Dentist from Spit, Croatia with severe (dysphotopsia) LASIK Ectasia
6/5/2024 OD DALK 10.0mm bed/10.0mm donor laterality matched
2017 Hyperopic LASIK OD for high hyperopia (+5.0) and amblyopia



6/24/2024

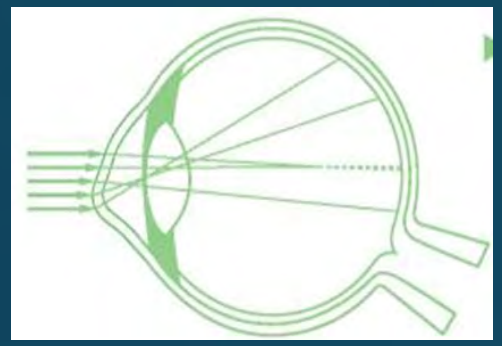
1 week after suture adjustment :

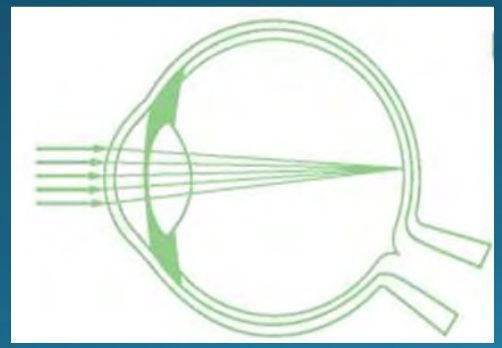
0.3D cylinder

Glare Gone! Last visit before leaving for home (Croatia)

https://youtube.com/shorts/MAI_HkrSmKQ

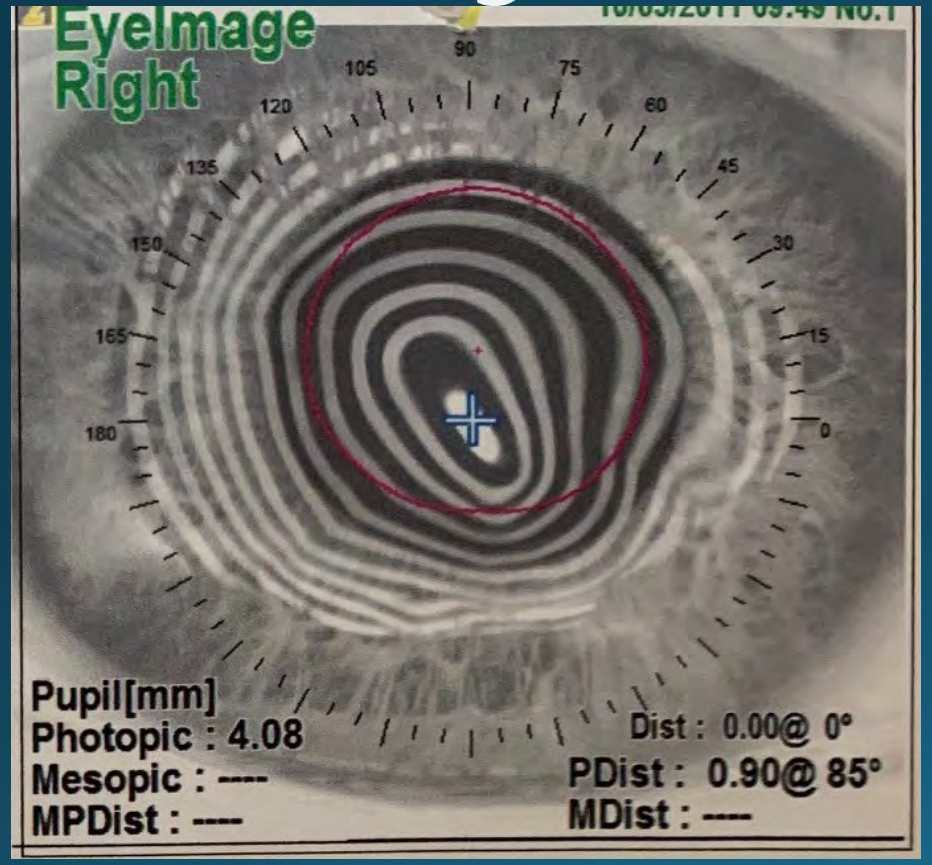
Corneal Cross-linking?
Keratoconus (advanced) PMD/RK / LASIK ectasia



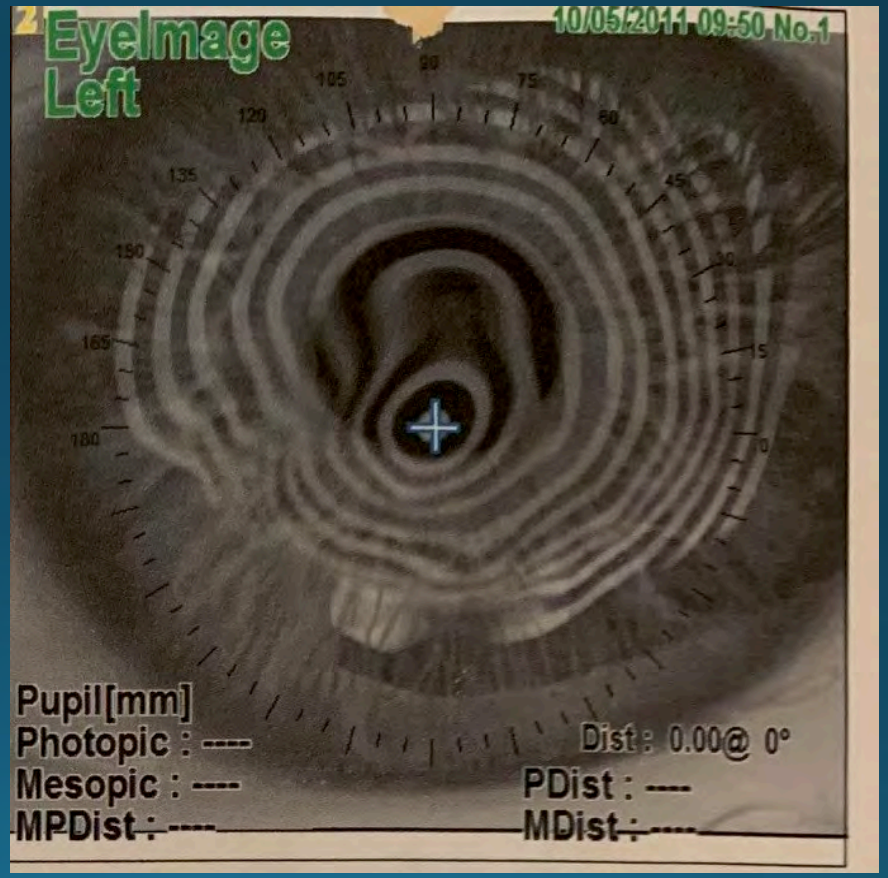


64yo Bilateral severe RK ectasia

OD 20/150



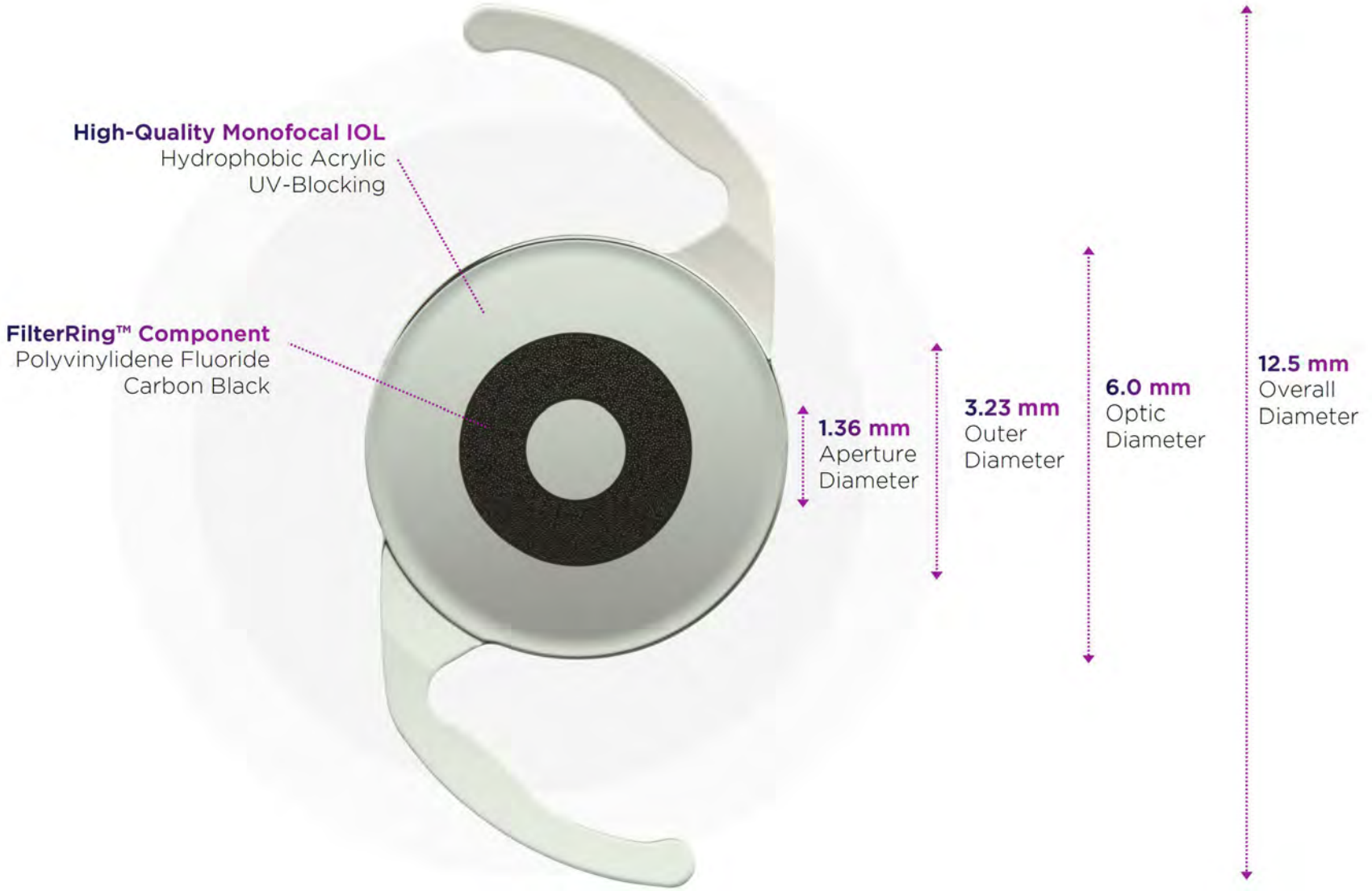
OS 20/200



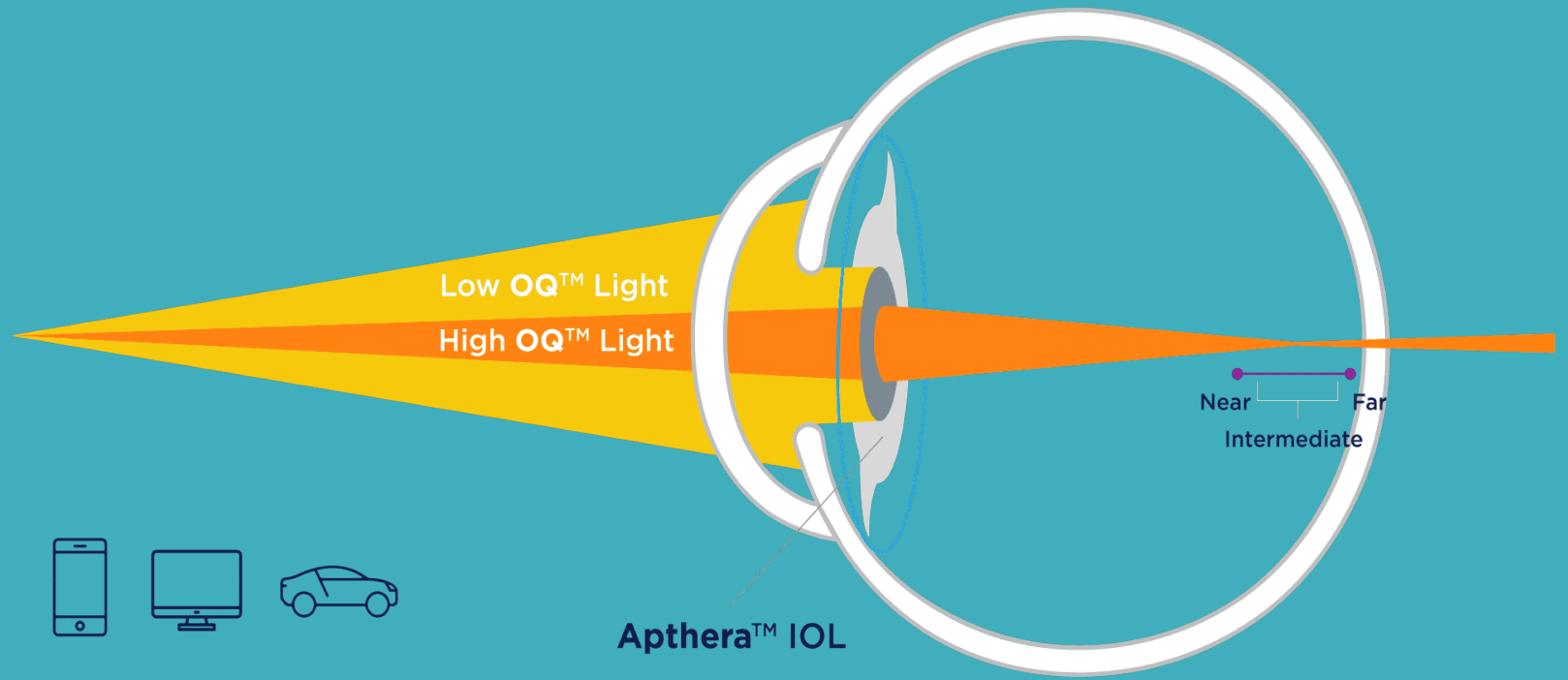
Surgical Treatment RK Ectasia:

- Apthera IC-8 IOL (off-label)
- Large Dia DALK

IC-8® Apthera™ IOL Features



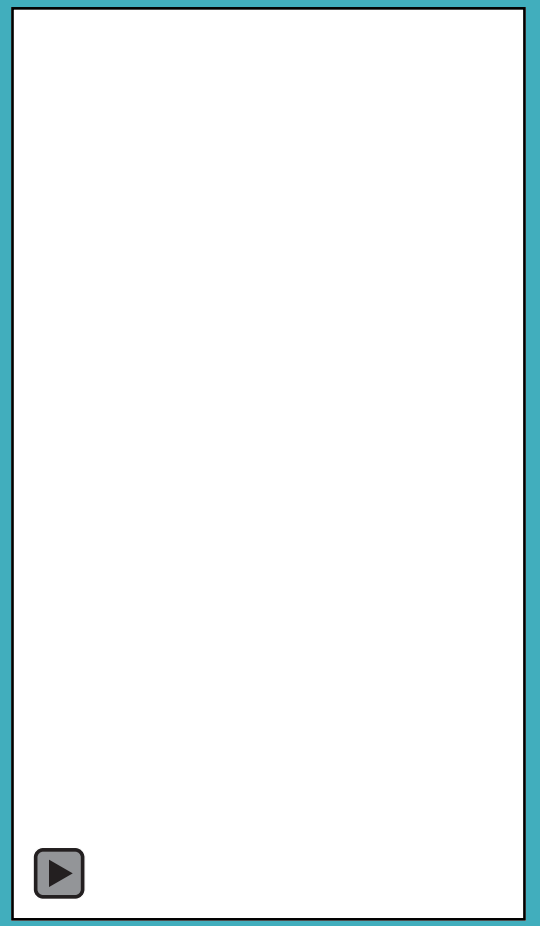
Apthera IC-8



E E E E

Near Intermediate Far

*Simulated Image



Eye Connect list serve - March 2024

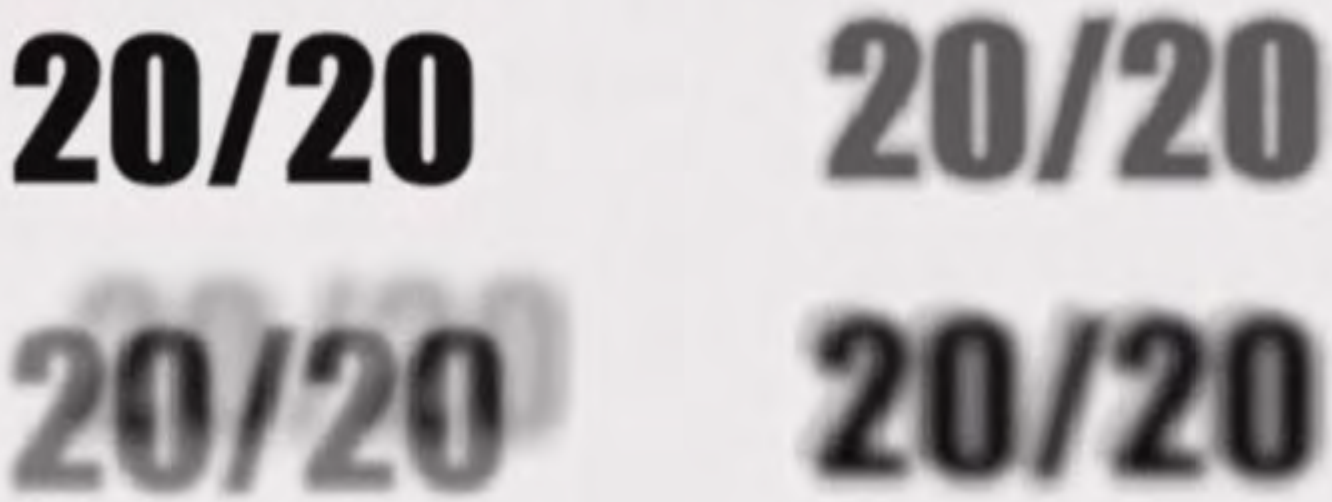
- One USA ophthalmologist reported 12 Apthera explantations
- “unhappy with vision”
- “glare”

Case: RK Ectasia
Cataract ext w Apthera IC-8
Will's Eye – Chief Rounds Oct. 2023

- 20/"happy" for a month until noticed persistent night glare
- Now on Chronic pilocarpine?

What is 20/20 Vision?

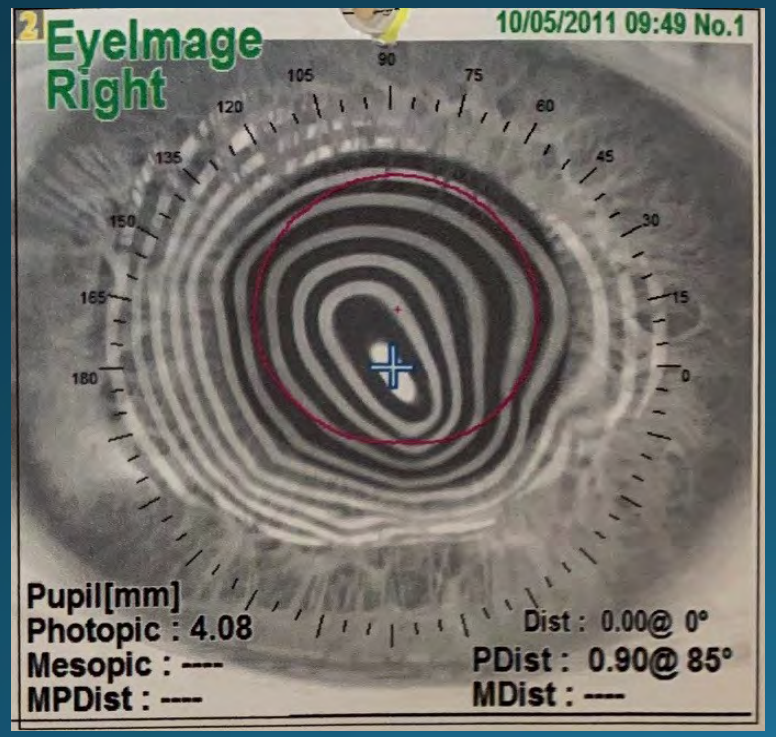
- All of the following represent 20/20 vision

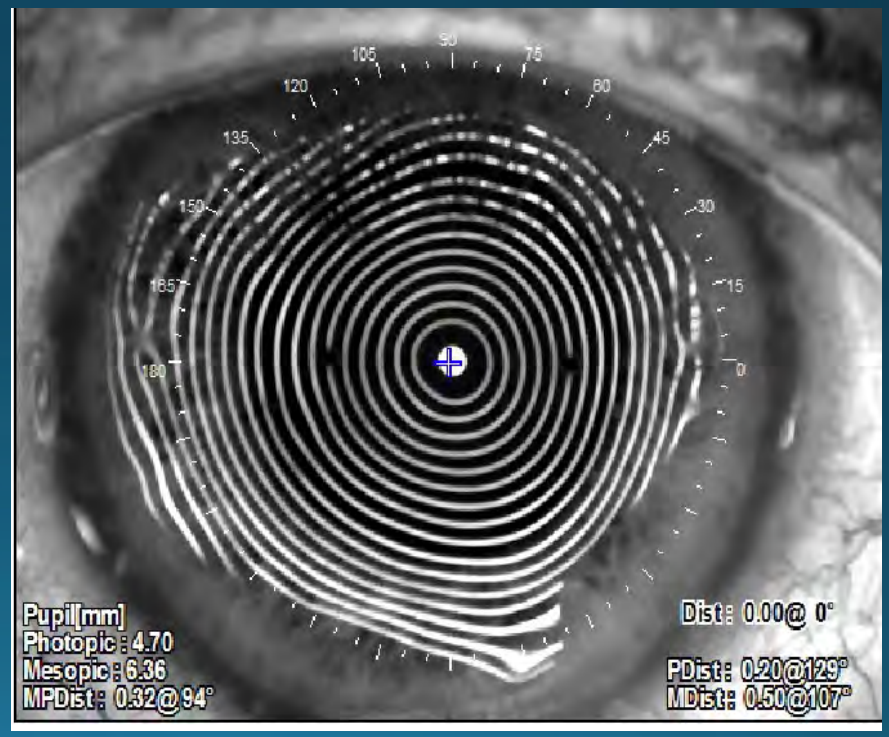


RK Ectasia: RIGHT eye 9 years after DALK Great result!!

10/2019 Cataract Ext with low power toric IOL OS

- UCVA 20/30
- -0.50+ 0.75 x 20 20/30
- pre-op 9 yrs after DALK!

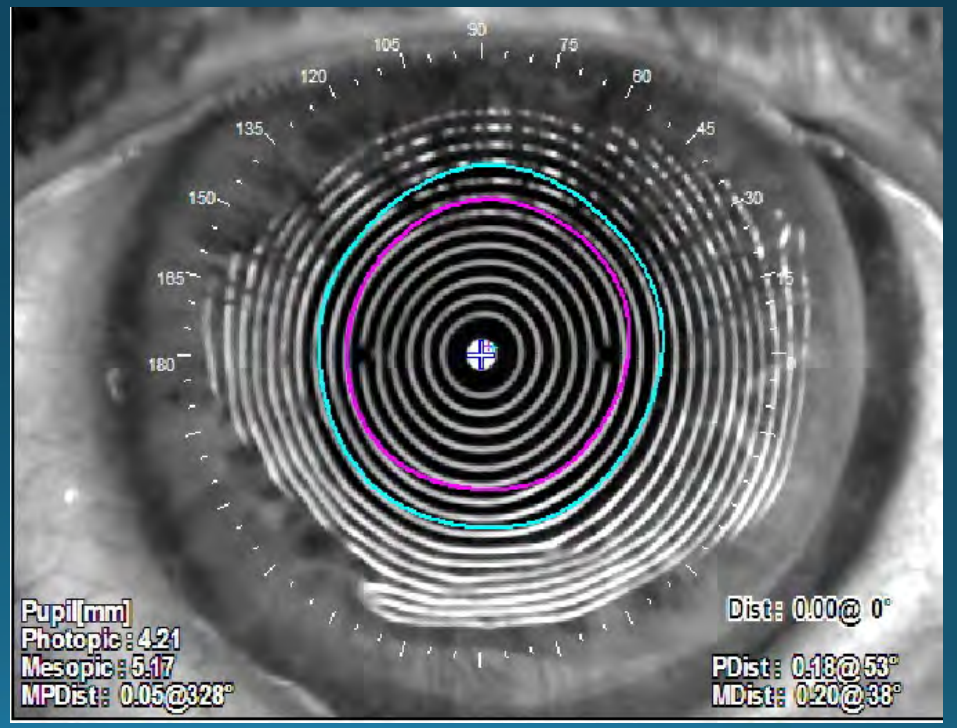




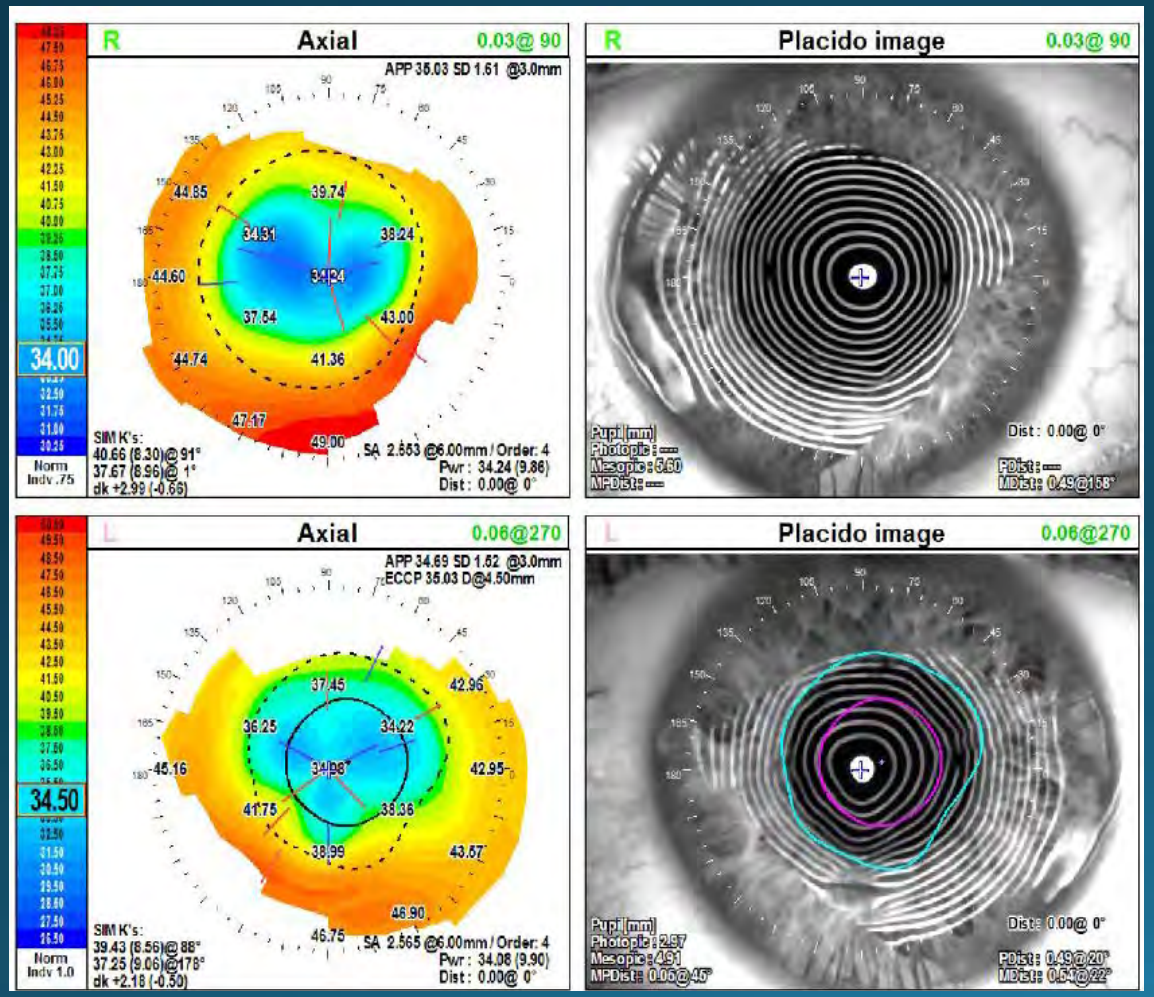
RK Ectasia: Left eye: 9 yrs after DALK, Great result!!
8/2019 Cataract Ext with low power toric IOL

- UCVA 20/30
- -0.75+ 0.75 x 50 20/20
- Pre-op

9 yrs after DALK!



Case 2 55yo male
Radial Keratotomy (RK) both eyes 1993 Illinois
c/o very poor night vision, glare
topography OU: irregular astigmatism, very flat central K's



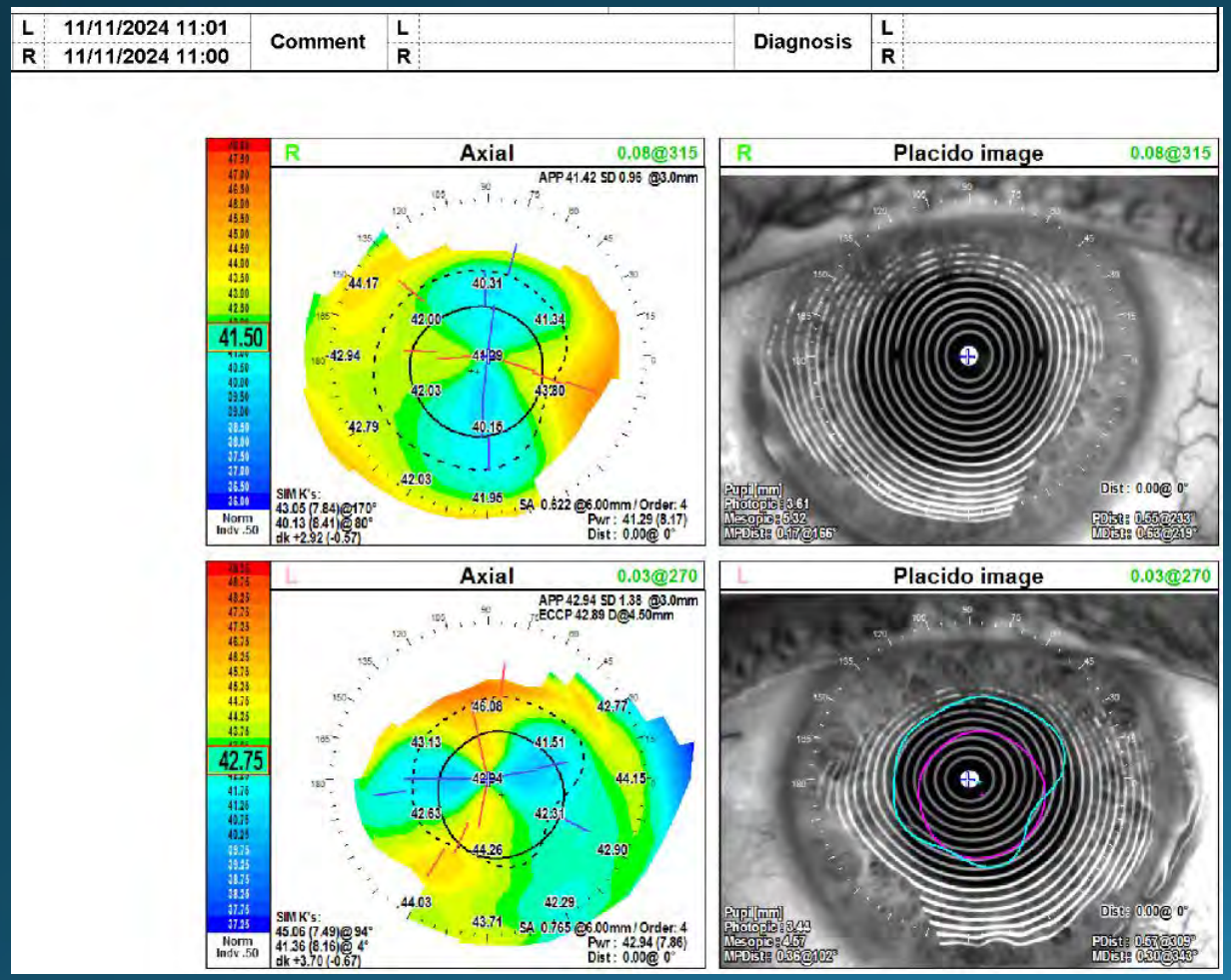
OD

-3.50+3.25x90 20/40

OS

-0.5+2.25x45 20/30

Case 2 currently 59yo male visual quality/night vision "dramatically improved – superb visual clarity!"
topography OU: restored normal K's, eliminated irregular astigmatism
11/2024 OD topography (below): restored normal K's, regular astigmatism suture "out"
4/2024 OD Cataract Ext w LAL
11/2022 OD DALK 9.5mm bed/9.75mm donor laterality matched nasal marked big bubble no perforations
7/2022 OS: Cataract ext w Toric B&L MX60T4.25 13.5 x 95
5/2021 OS: DALK 9.5mm bed/9.75mm donor predescemets deep dissection, no perforations
1993 Radial Keratotomy (RK) OU



NOT WEARING CORRECTIVE LENSES DISTANCE OR NEAR!

OD

- Uncorrected VA:20/20-
- -0.5+0.75x 180 20/20 Near J5
- Cataract Extraction w Light Adjustable Lens (LAL)
- (LDD treatments completed)

OS

- Uncorrected VA:20/40 Near J3
- Cataract Ext w Monofocal Toric IOL
- -1.5+1.25x75 20/30

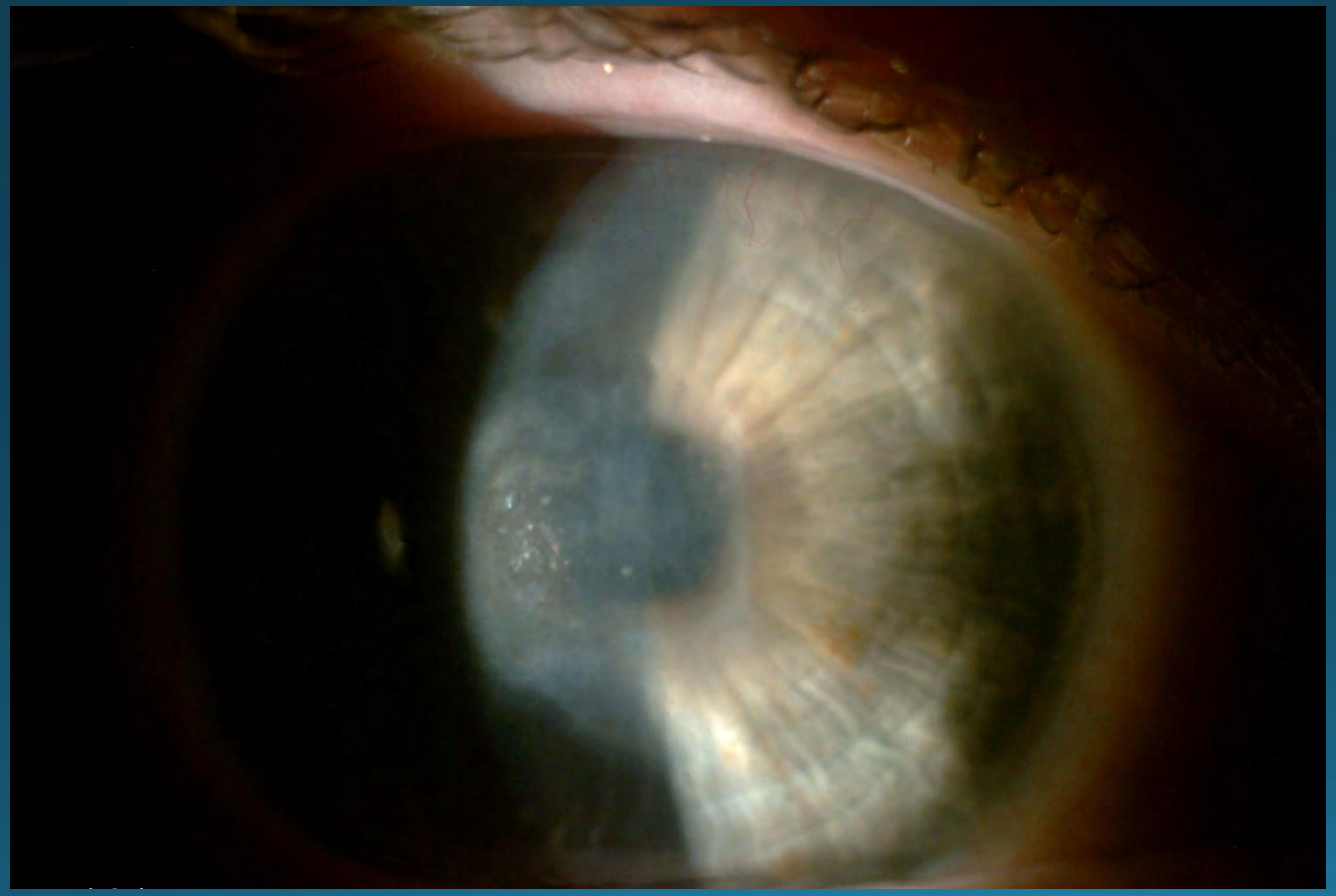
Case 2 Testimonial: DALK OU w RK Ectasia w LAL

2025:NOT WEARING CORRECTIVE LENSES DISTANCE OR NEAR!

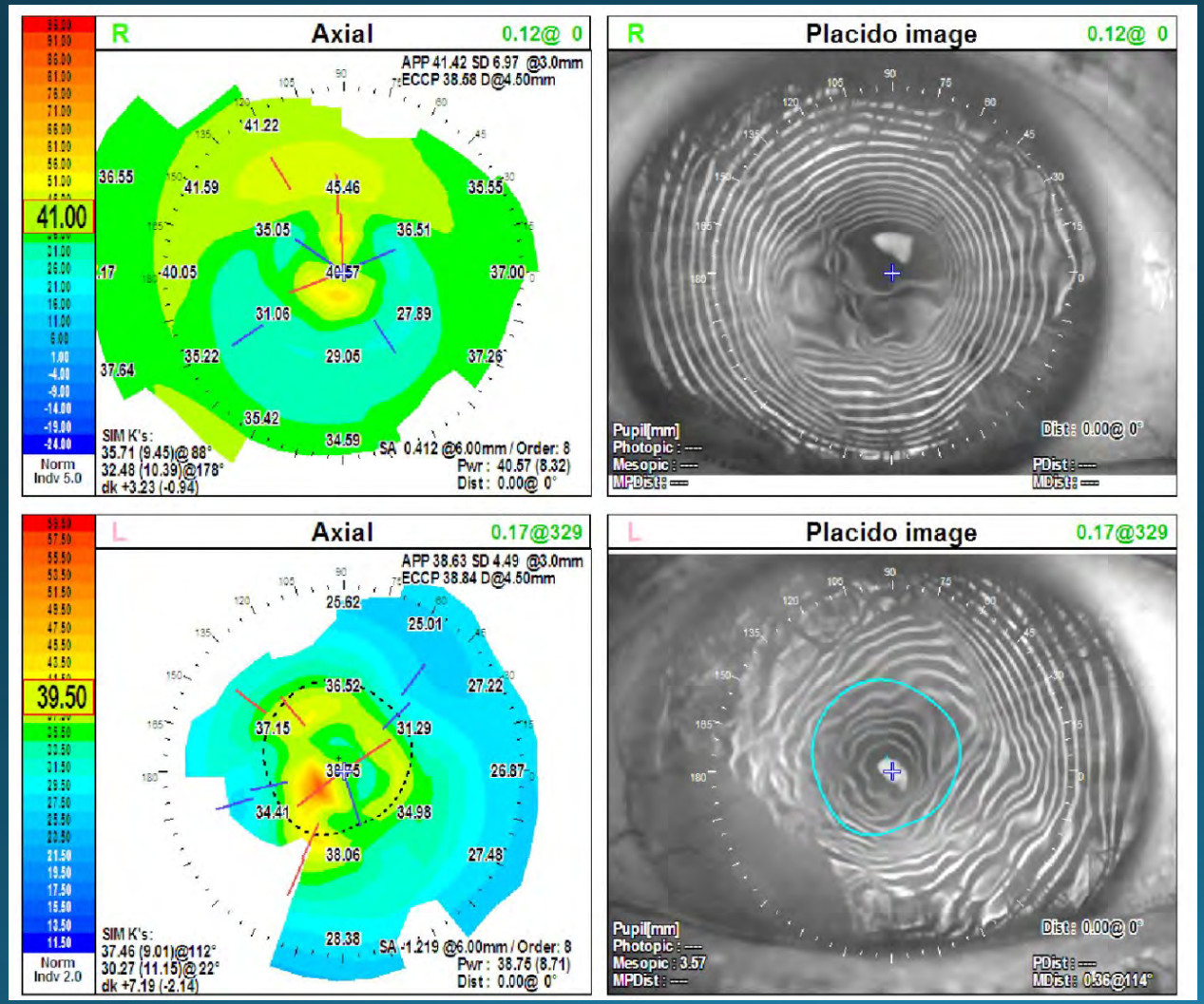
https://youtu.be/PQcvbZWDcIE

Cornea Scars

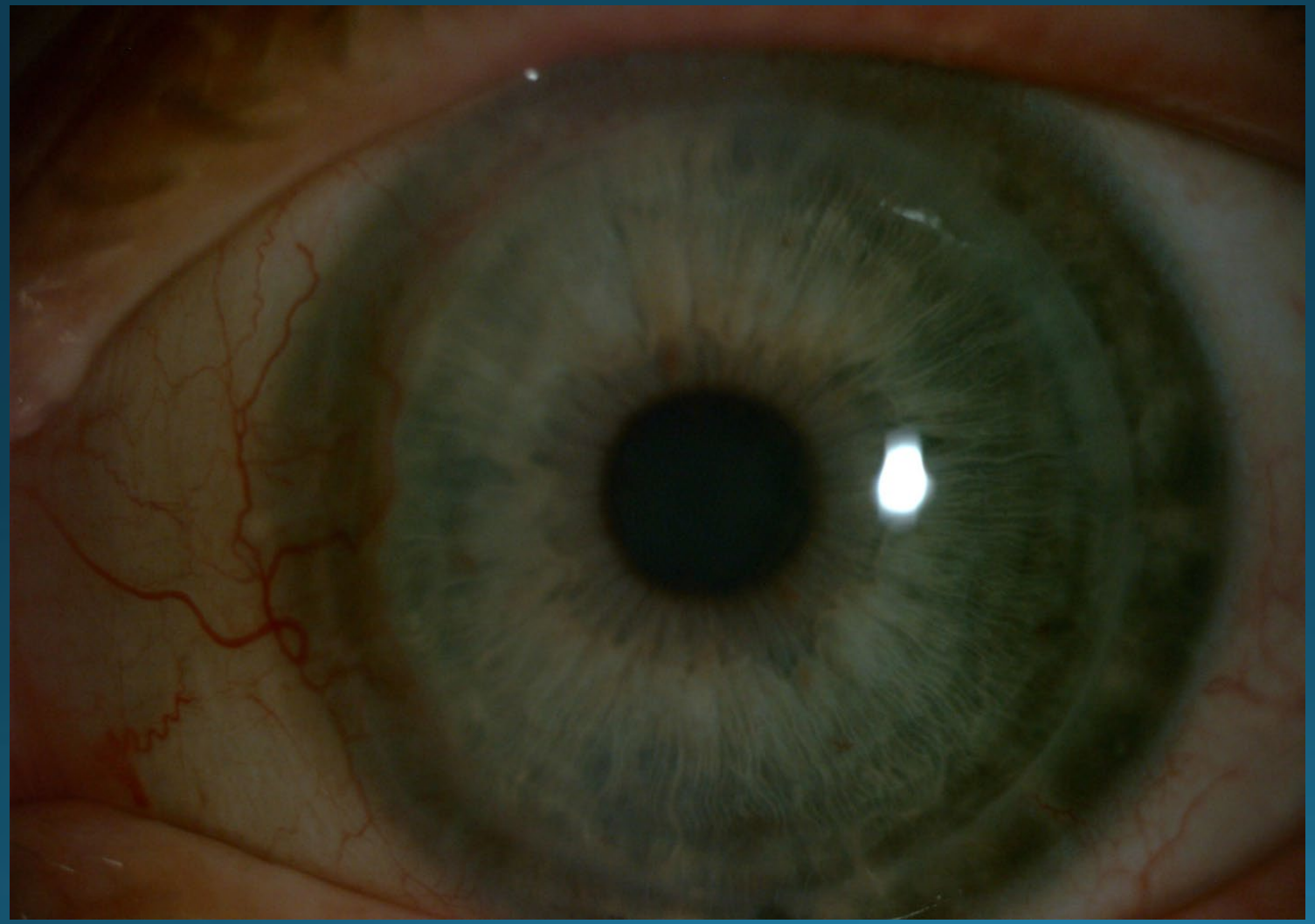
57 yo woman Bilateral Central Thinning and Cornea scars /HSV 1982 BSCVA 20/400 EACH EYE!



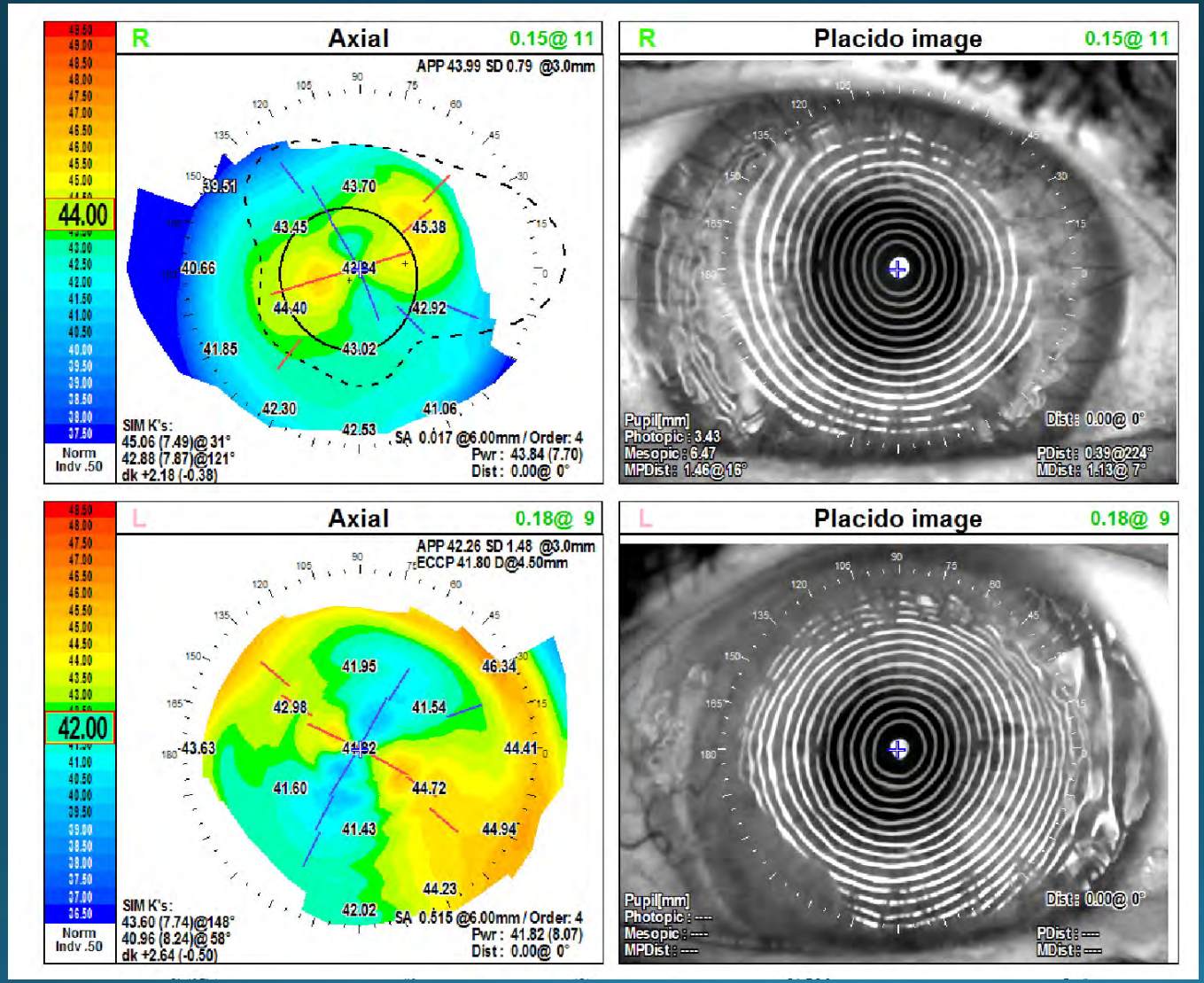
57 yo FM Bilateral Central Disabled since age 21!



57 yo FM Bilateral Central Thinning Cornea scars /HSV
3/2019 OS UCVA 20/50
8/2018 OS   DALK 9.0mm



57 yo FM Bilateral Central scars (since age 21)
8/2019 OD -1.0+1.75x30 20/30 OS plano+1.75x150 20/50
8/2018 OS DALK 9.0mm 4/2019 DALK OD 9.5mm



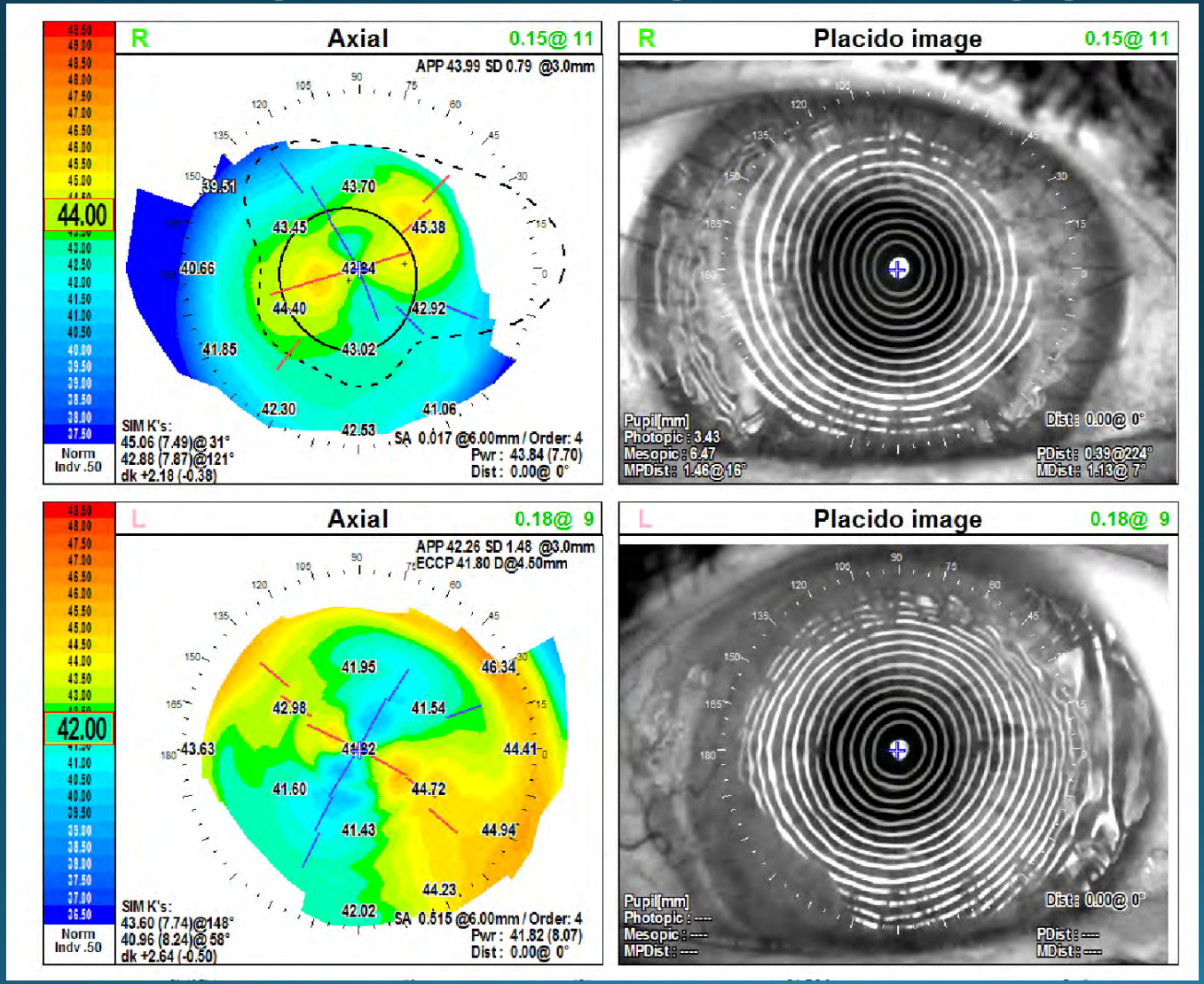
57 yo FM Bilateral Central Thinning and Cornea scars /HSV
3/2019 OS UCVA 20/50 mild residual haze DM preferable to sacrificing it as would with PK!
8/2018 DALK OS

57 yo FM Bilateral Central scars (since age 21)

11/2023 OS improved to 20/25 predescemets haze CLEARED!

8/2019 OD -1.0+1.75x30 20/30 OS plano+1.75x150 20/50

8/2018 OS DALK 9.0mm 4/2019 DALK OD 9.5mm



Conclusion: Warped Cornea?

- DALK (large diameter) is potentially fully restorative "LASIK-LIKE" for corneal ectasia/scars optimizes S/N optical system!
- DALK surgeon must be committed to near zero conversion to PK!
- Light Adjustable Lens (LAL) an important new refinement after DALK

Conclusion: Warped Cornea ?

- CXL : not restorative - stabilization (not guaranteed) -lifetime scleral / RGP CLs'
- Apthera IC8 – optical compromises

Large Diameter DALK – performance!

Large Diameter DALK – BEST!

- No DALK capable surgeon in your area with near zero conversion rates to PK?

https://www.icanseeclearly.com/cornea-transplant-surgery