

Cornea Scars? What's Better?  
Penetrating Keratoplasty (PK) or  
Large Diameter (9-10mm) Deep Anterior Lamellar Keratoplasty (DALK)

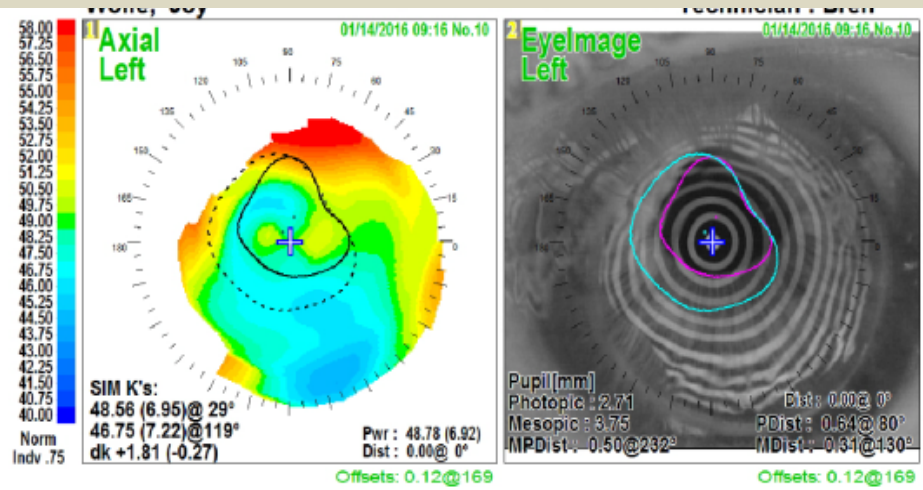


## Case Reports:

### Penetrating Keratoplasty (PK) for Cornea Scars

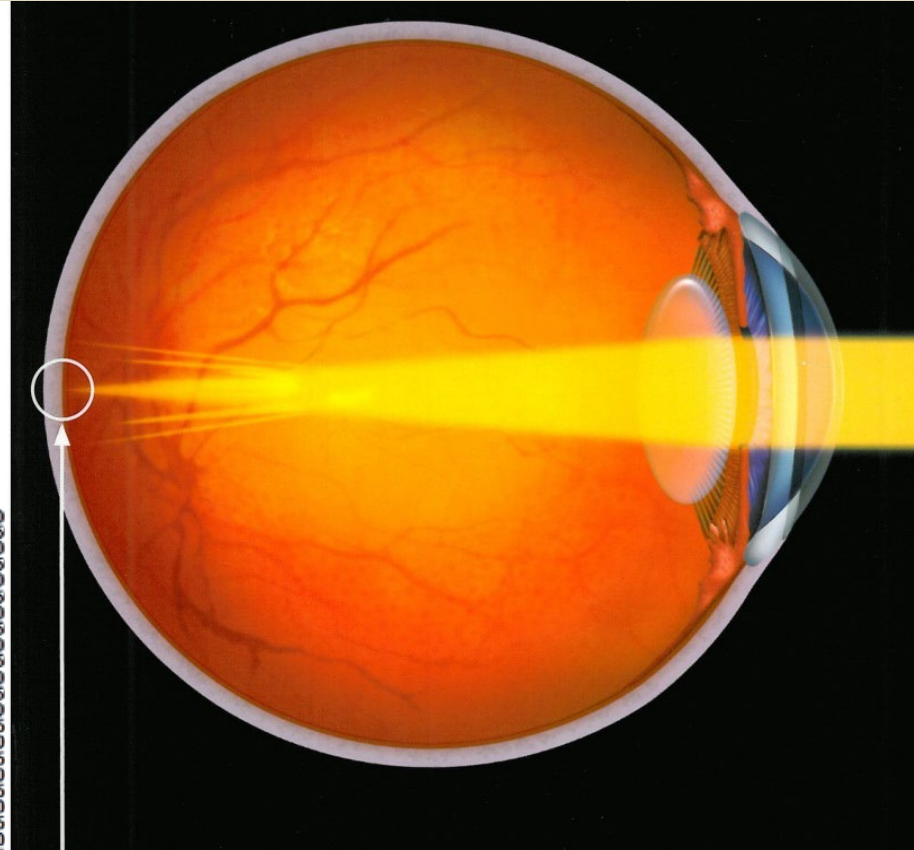
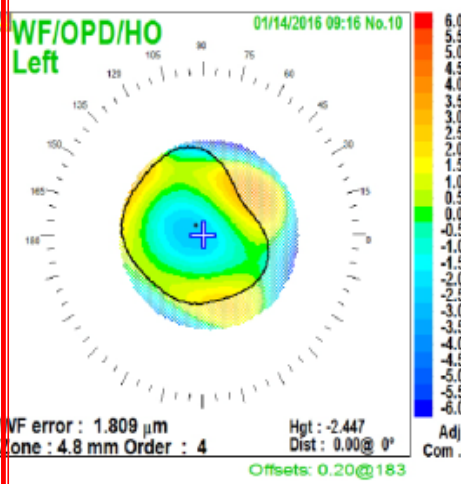
- 2 eyes

Case 1: OS: Cornea Scar 1.5 yr post-op PK  
 8.25 mm dia., suture out -3.5+2.25x39 20/25  
 cornea aberration profile: high! Long term: Graft rejection and if not,  
 cornea endothelial exhaustion may risk eventual graft replacement



3. Zernike/Corn No.10 Left Zone : 6.0 Order : 4

V.Sets	0.00	0.20	0.40	0.60	0.80
Total					11.355
Tilt(S1)					7.202
High					8.110
T.Coma					2.492
T.Trefoil					1.345
T.4Foil					3.917
T.Sph					0.911
HiAstig					6.448



Richard Erdey, MD

## Case #2 OD

77 yo cornea scar OD

PK 2004, repeated d/t graft failure PK 2011, rotated graft 2015

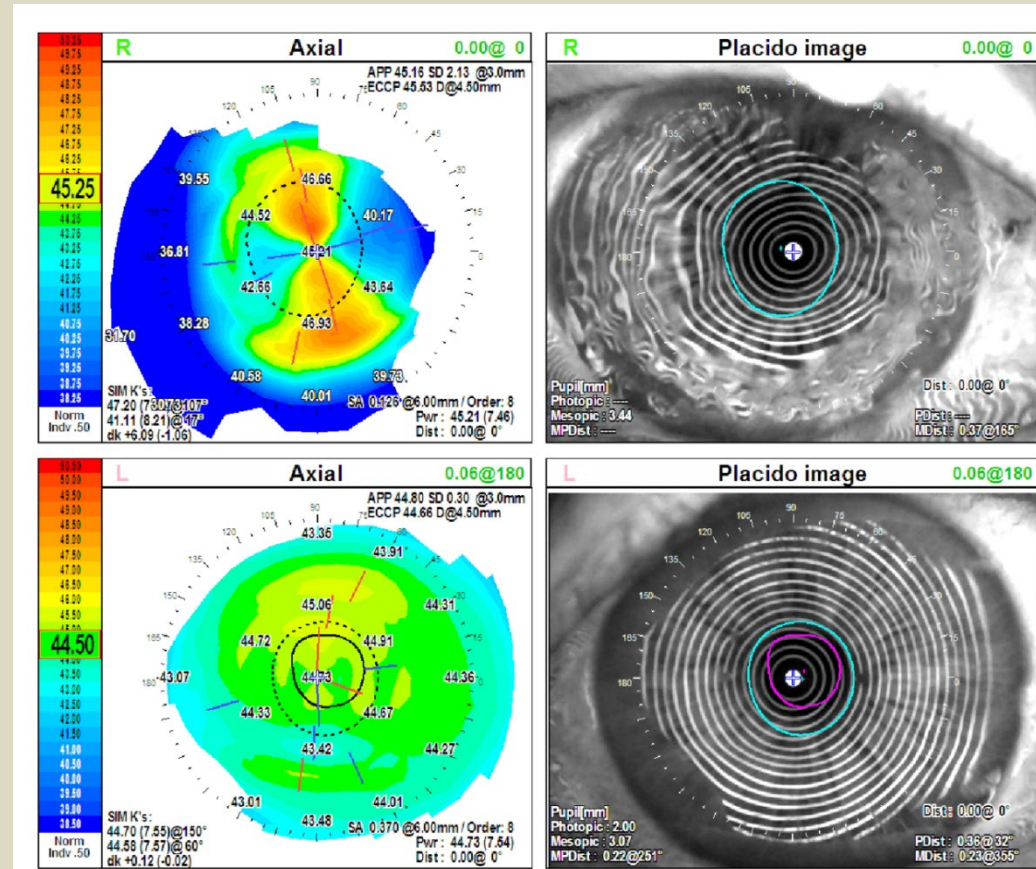
d/t high magnitude irregular astigmatism

OD cataract/IOL surg 2015

OD -1.5+4.0x100 20/25

OS +1.0

20/20



# Case Reports: PK for Cornea Scars problems (vs large diameter DALK):

- Irregular astigmatism
- Higher cylinder magnitude
- Higher corneal aberrations than large dia DALK
- Long term graft rejection – increased further if bed vascularized – graft failure
- Long term endothelial cell exhaustion – graft failure
- PK cornea grafts do NOT generally last a lifetime and if live long enough, need replaced
- Glaucoma

Case reports:  
Deep Anterior Lamellar Keratoplasty (DALK)  
for Cornea Scars

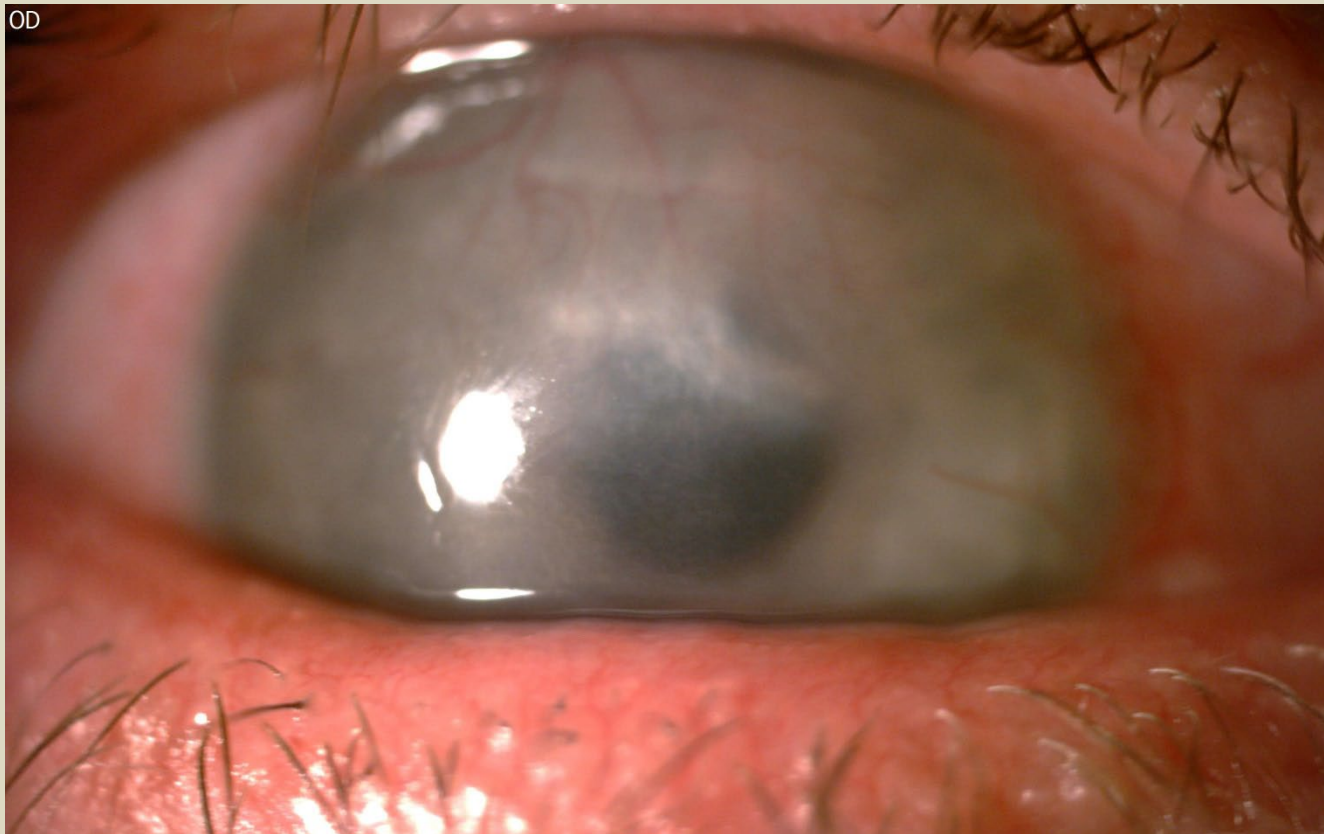
7 eyes of 6 patients

Up to 9 years post-op

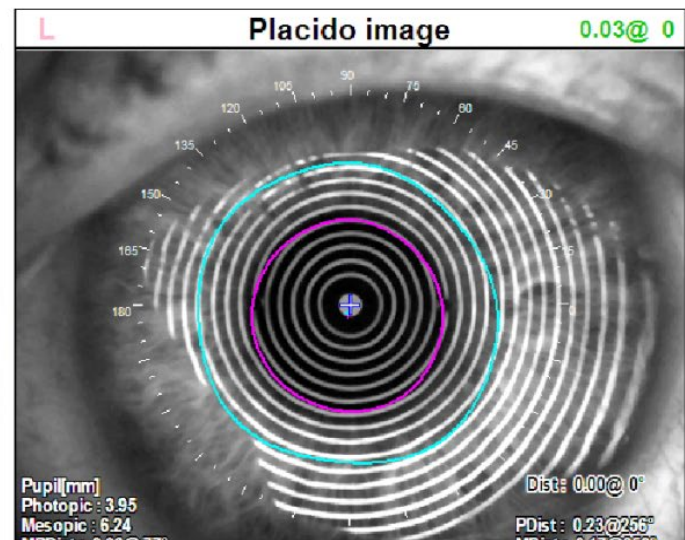
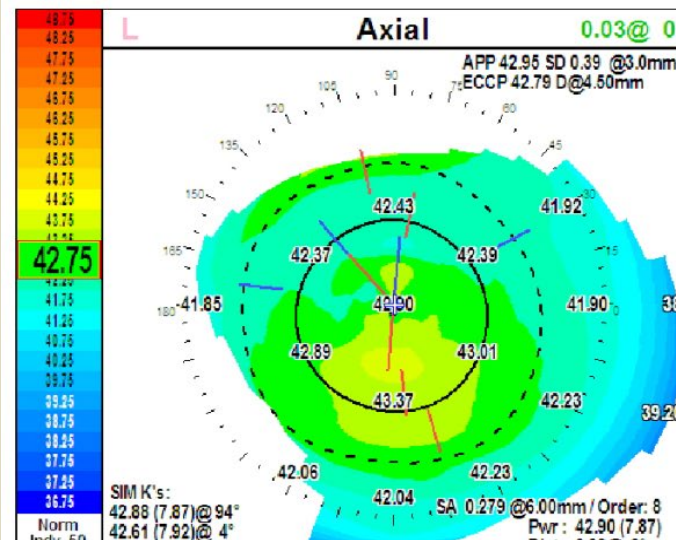
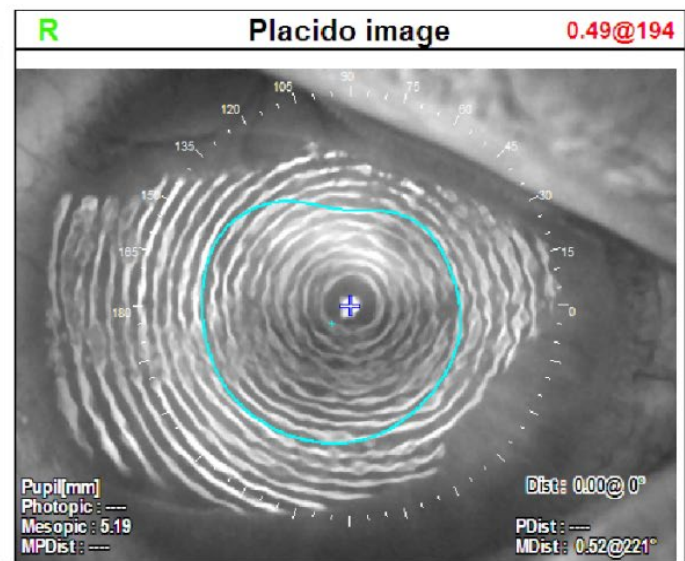
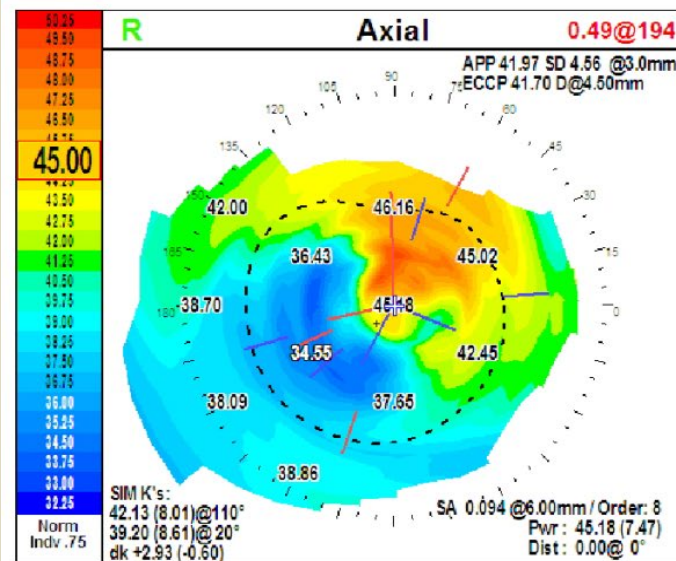
# Case #1 OD

51 yo Cornea scar / Herpes Zoster (HZV)

Best Corrected VA 20/100



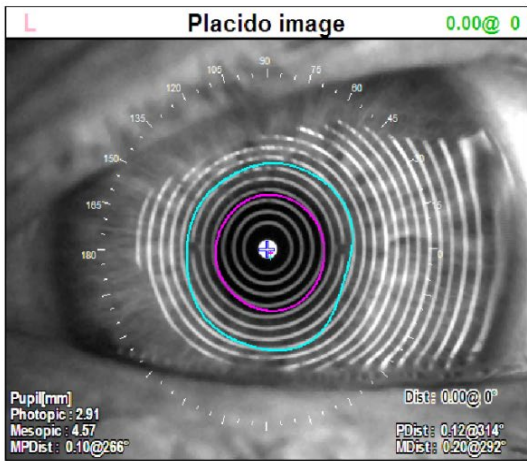
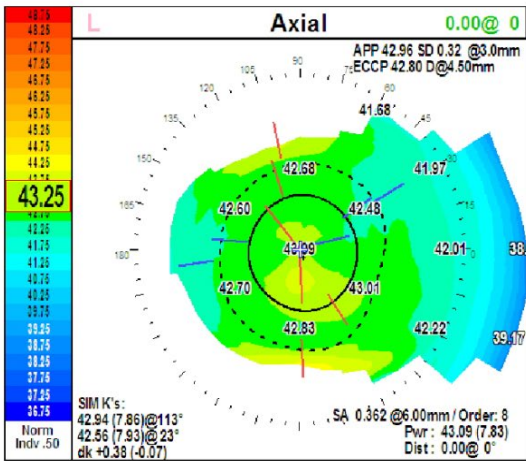
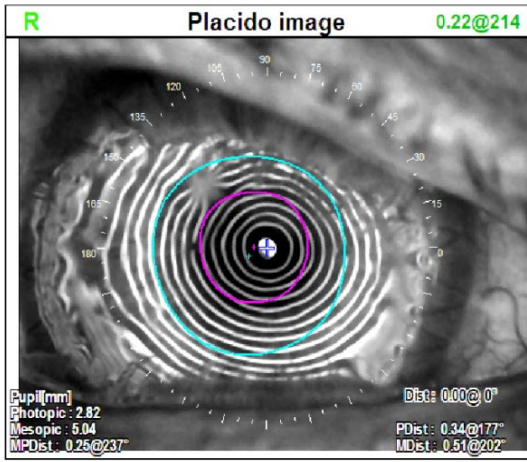
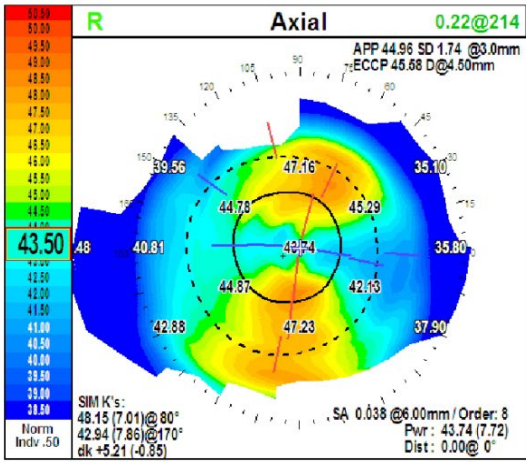
# Case #1 Cornea scar / HZV OD





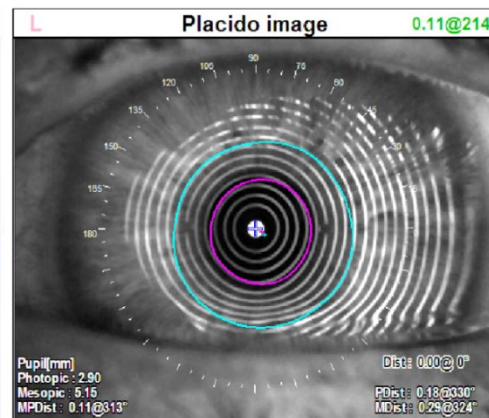
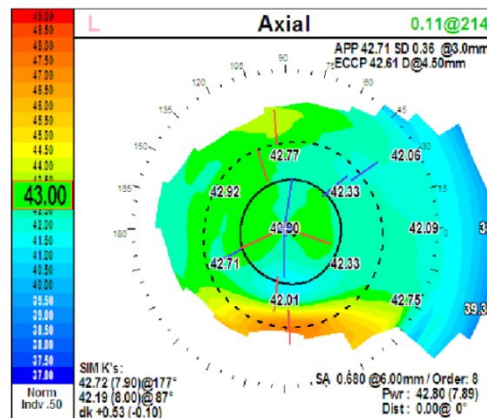
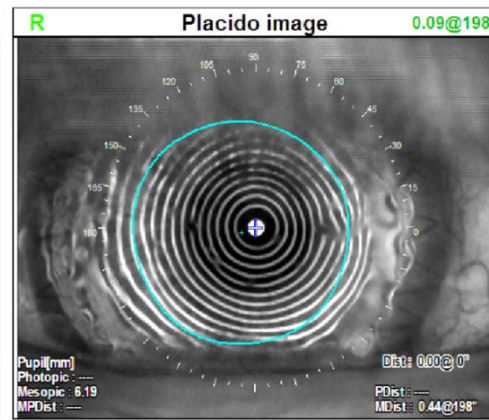
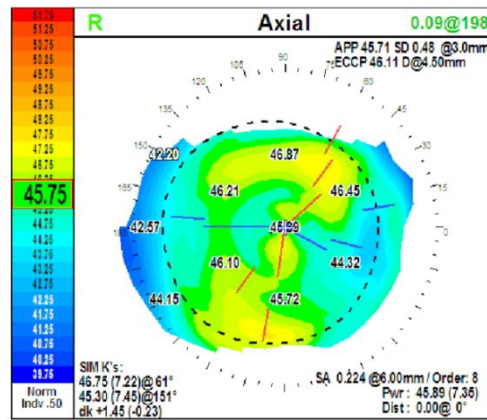
Case: #1: OD: Cornea Restoration d/t Cornea scar / HSV  
 2/11/19 Topography below: Rx: 3.25 + 4.25 x 65 20/40  
 11/27/18 DALK 9.0mm

02/11/2019 07:48		L		Diagnosis	L
02/11/2019 07:47	Comment	R			R



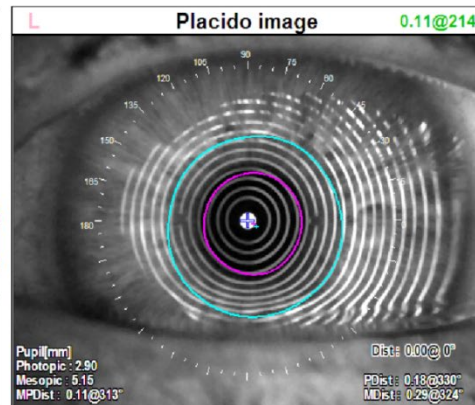
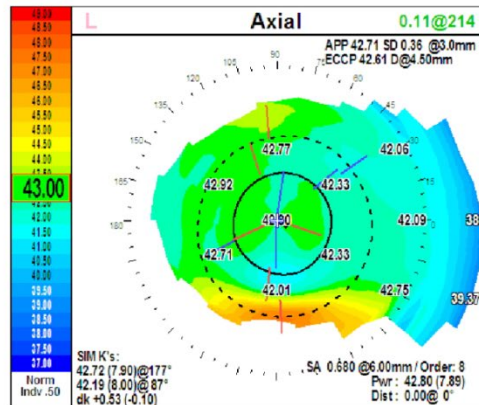
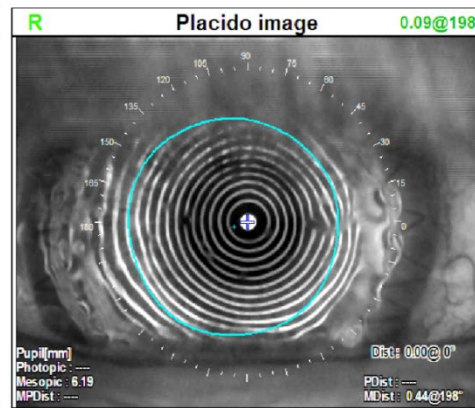
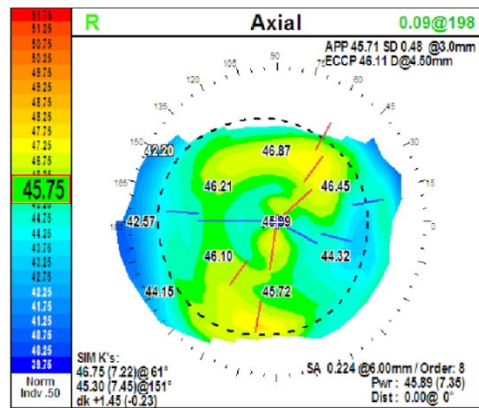
Case: #1: OD: Cornea Restoration d/t Cornea scar / HSV  
 03/11/2019 (topo below) -4.0+1.25x70 20/25  
 02/26/2019 Adjust running cornea suture under  
 intraoperative keratometer goal: reduce astigmatism  
 11/27/2018 DALK 9.0mm

L	03/11/2019 15:43	Comment	L	Diagnosis	L
R	03/11/2019 15:43		R		R



Case: #1: OD: Cornea Restoration d/t Cornea scar / HZV  
 9/1/2021 -2.0+0.5x163 20/25  
 8/11/2021 Remove Running cornea graft suture  
 03/11/2019 -4.0+1.25x70 20/25  
 11/27/2018 DALK 9.0mm

L	03/11/2019 15:43	Comment	L		Diagnosis	L	
R	03/11/2019 15:43		R			R	



Case: #1: OD: Cornea Restoration d/t Cornea scar / HSV

9/7/2022 Topo below, Refx no change

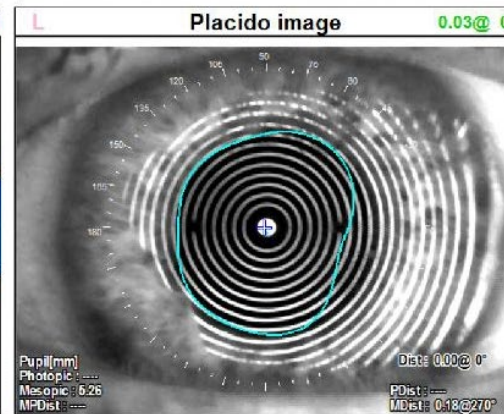
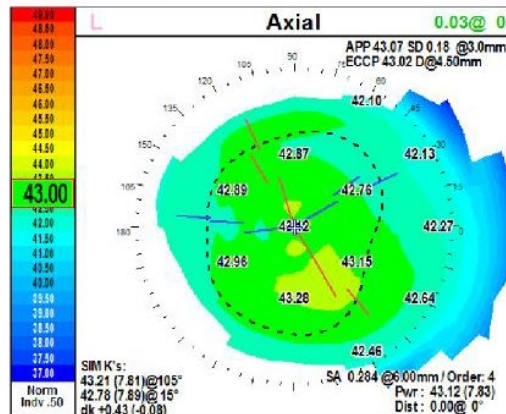
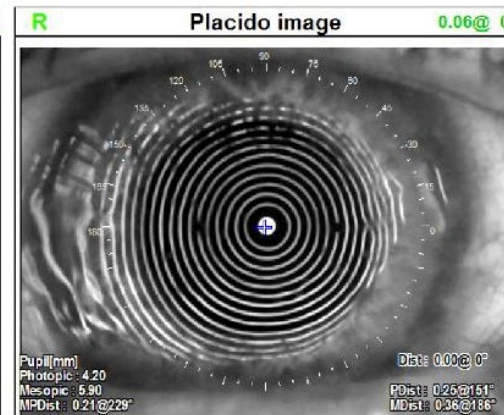
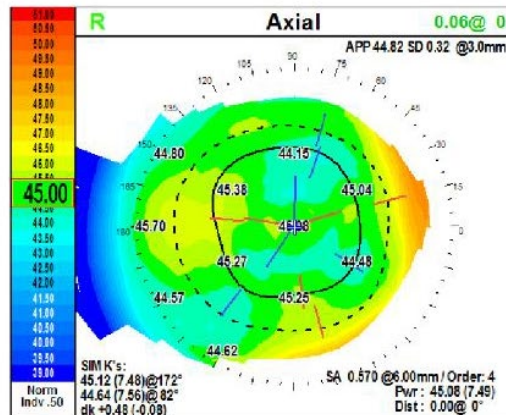
9/1/2021 -2.0+0.5x163 20/25

8/11/2021 Remove Running cornea graft suture

03/11/2019 -4.0+1.25x70 20/25

11/27/2018 DALK 9.0mm

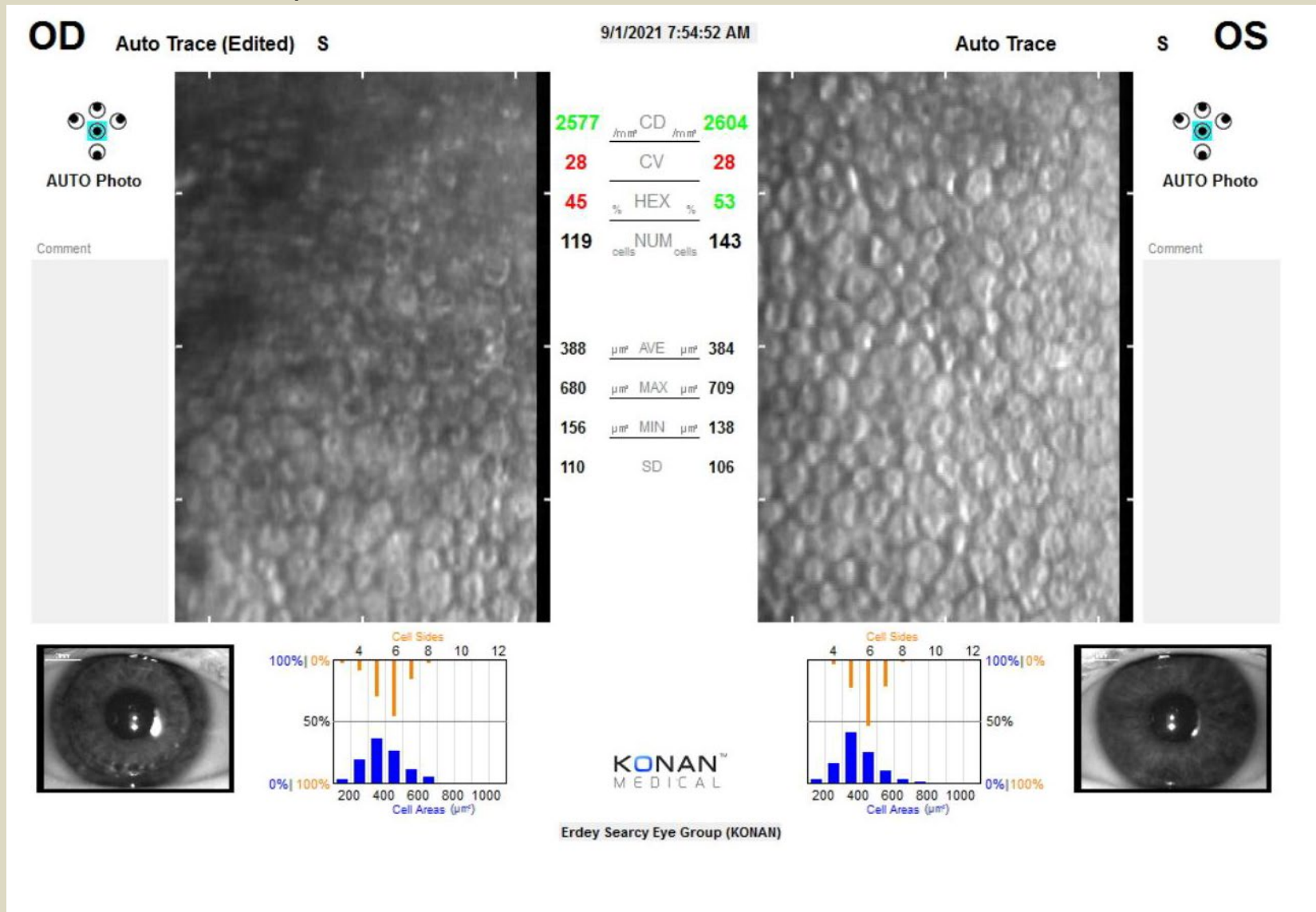
L	09/07/2022 07:43	Comment	L		Diagnosis	L	
R	09/07/2022 07:43		R			R	



Richard Erdey, MD

# Case # 1 OD: Endothelial Cell Count 9/21/2021

Note: NORMAL endothelial cell count as expected Why? Because Endothelial cells/Descemet's membrane RETAINED with DALK



## CASE #2 OU

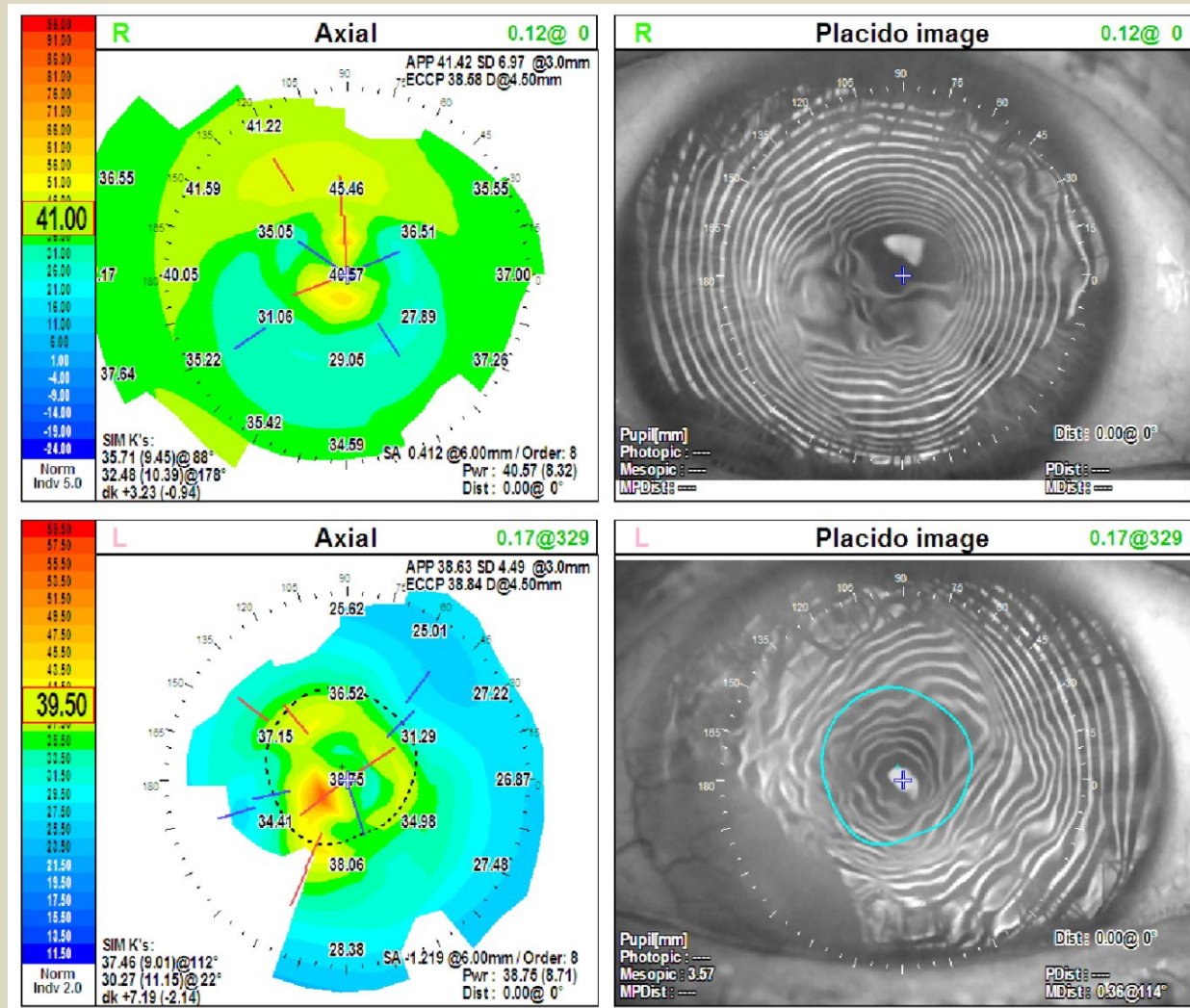
57 yo FM Bilateral Central Thinning and severe cornea  
scar /Herpes Simplex Virus (HSV) 1982

BSCVA 20/400 EACH EYE! Disabled since age 21!



# CASE #2 Bilateral Central Corneal Scars

## Disabled since age 21!

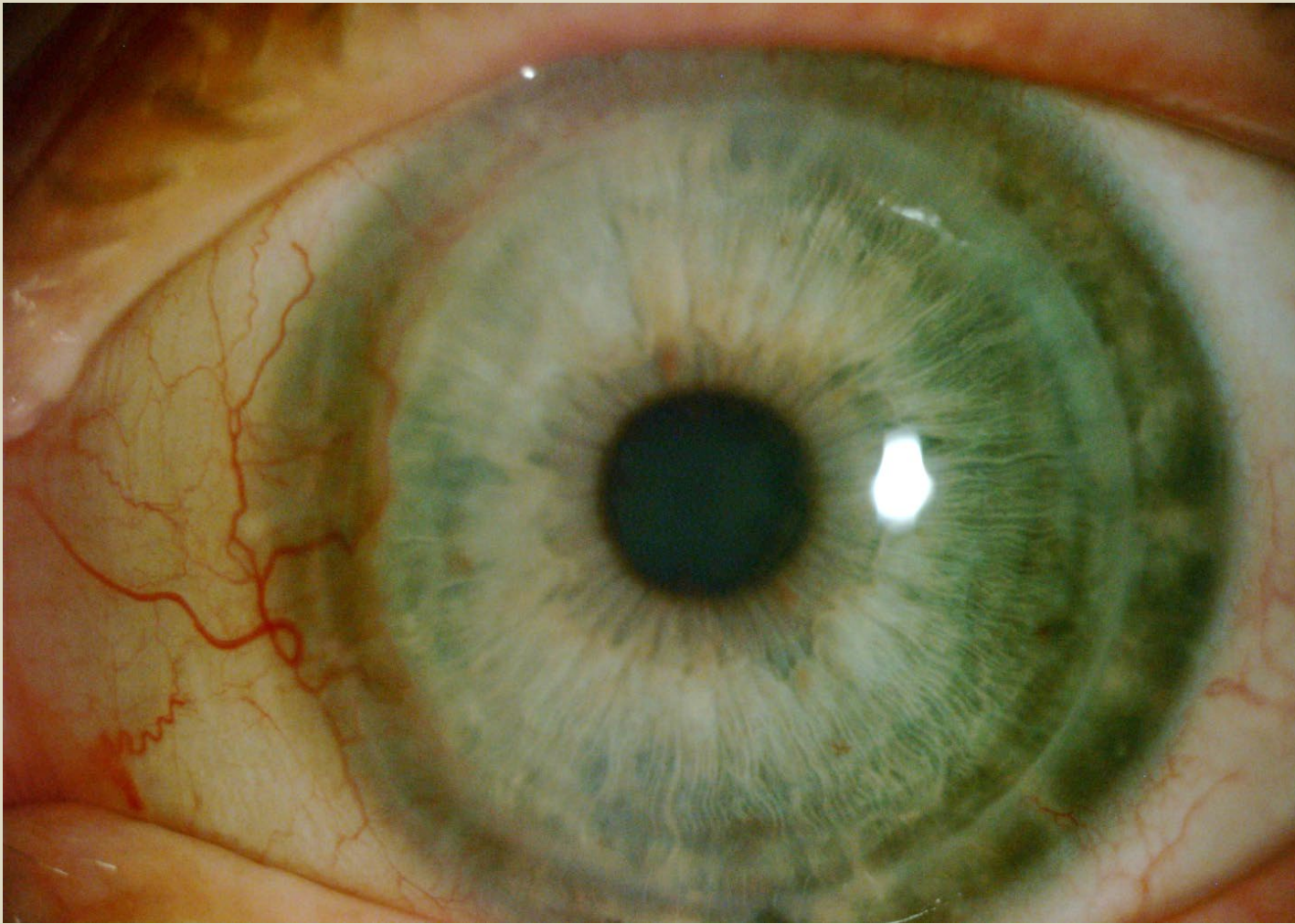


## Case #2

Bilateral Central Thinning Cornea Scar/HSV since age 21

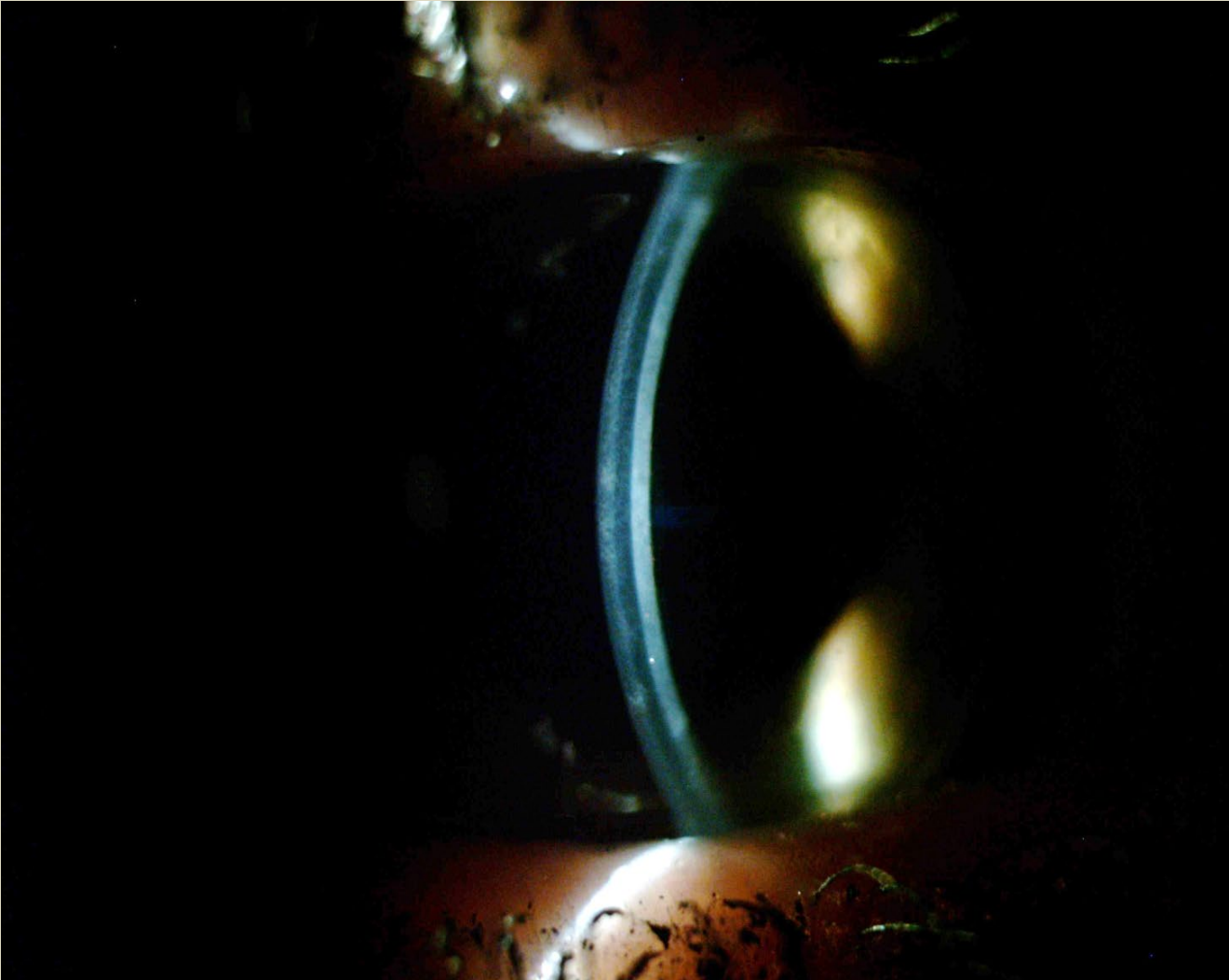
3/2019 OS Uncorrected VA 20/50 note nasal deep neovascularization in host bed. If this graft was a PK, this finding would dramatically increase chance of endothelial graft rejection and decompensation = failed graft...cannot happen with DALK!

8/2018 OS DALK 9.0mm



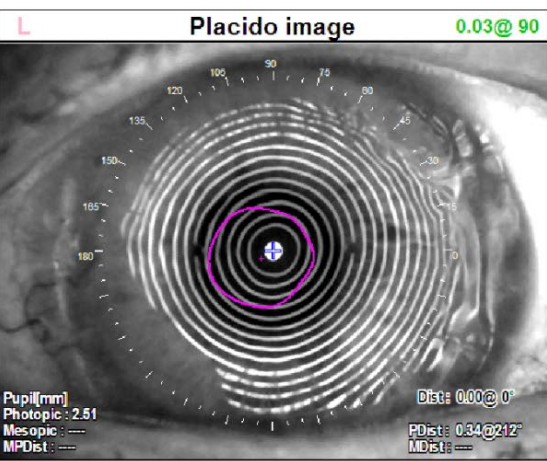
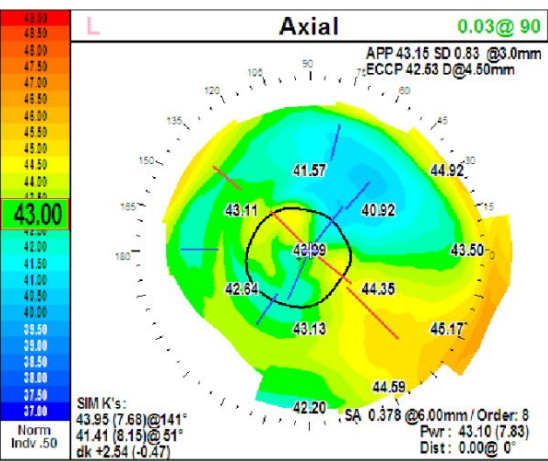
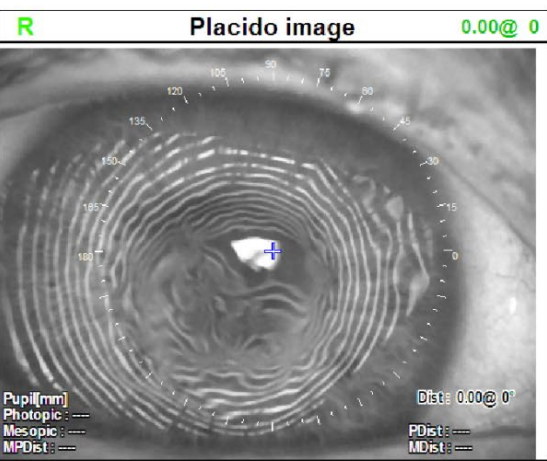
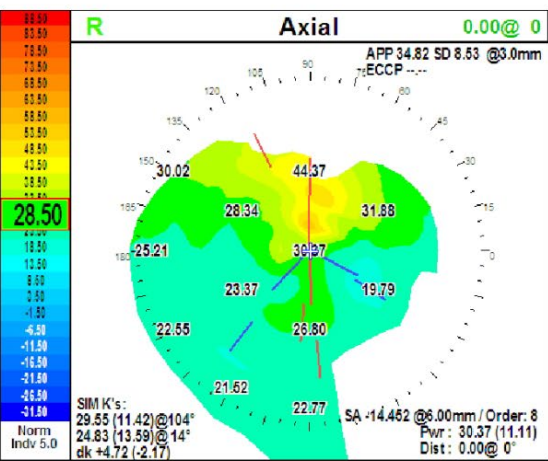


Case #2 Bilateral Central Thinning Cornea Scar/HSV  
3/2019 OS UCVA 20/50 mild residual haze Descemet's  
Membrane/Endothelial layer preferable to sacrificing it as would w PK!  
8/2018 DALK OS



Case #2 Bilateral Central Thinning Cornea Scar/HSV  
 3/2019 OS suture out UCVA 20/50 - Right eye: DALK not done yet...  
 8/2018 OS DALK 9.0mm

03/06/2019 13:52	Comment	L	Diagnosis	L
03/06/2019 13:52		R		R



# Case #2: Bilateral Central Scars (since age 21)

8/2019 Topo Below:

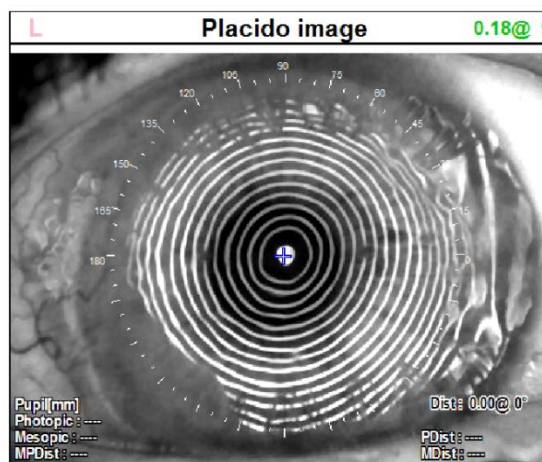
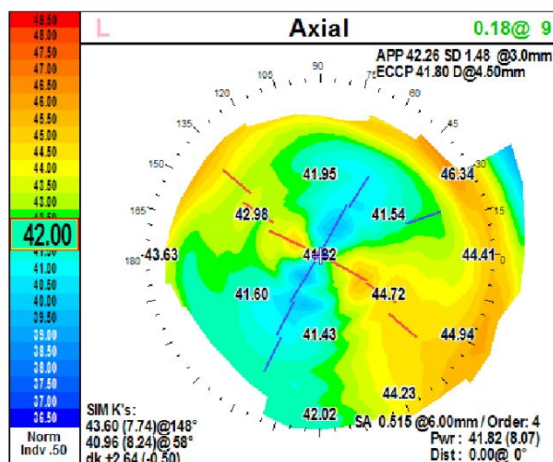
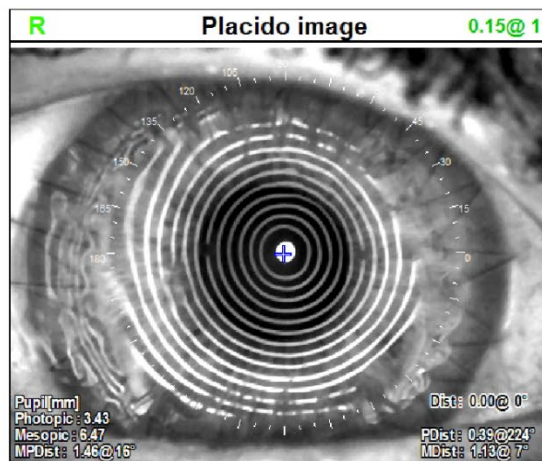
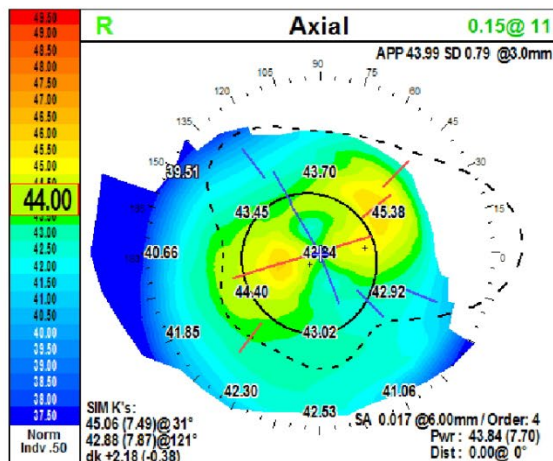
Refraction: OD -1.0+1.75x30 20/30 OS plano+1.75x150 20/40

Very rapid Corneal Restoration/visual rehabilitation OU with DALK (vs PK) !!

OD 4/2019 DALK 9.5mm

OS 8/2018 DALK 9.0mm

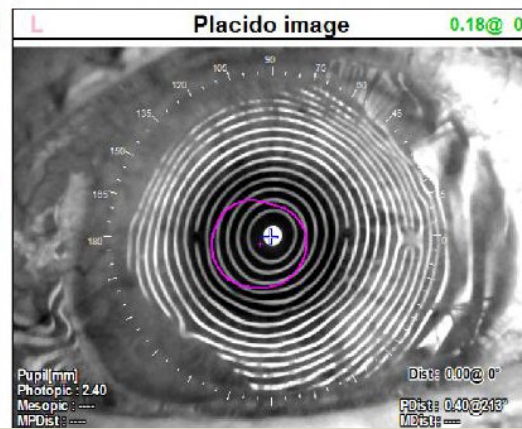
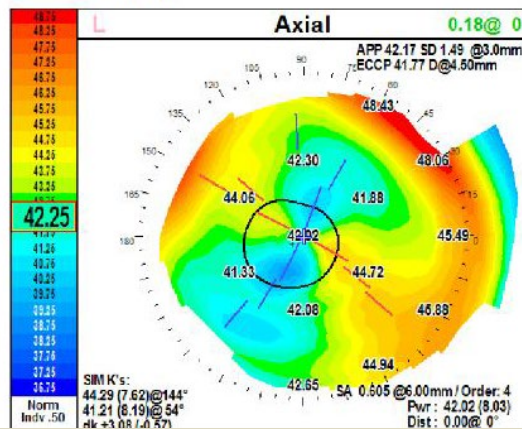
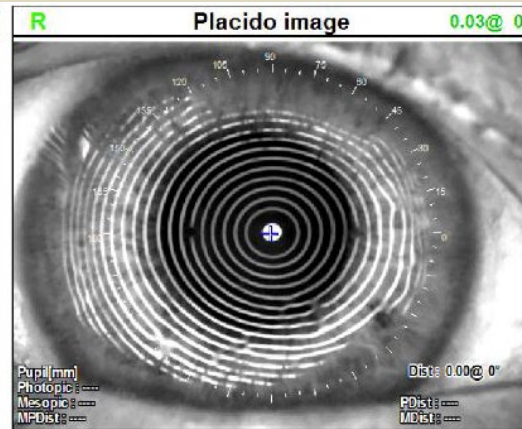
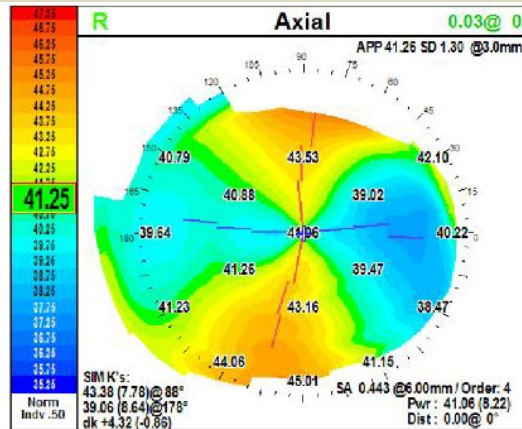
L	08/22/2019 10:22	Comment	L	Diagnosis	L
R	08/22/2019 10:22		R		R



# Case #2: Bilateral Central Scars (since age 21)

7/28/2021 – Massive visual improvement! -**VERY Happy** –  
“Life Changing after 39yrs of visual disability” – (now age 60)

!



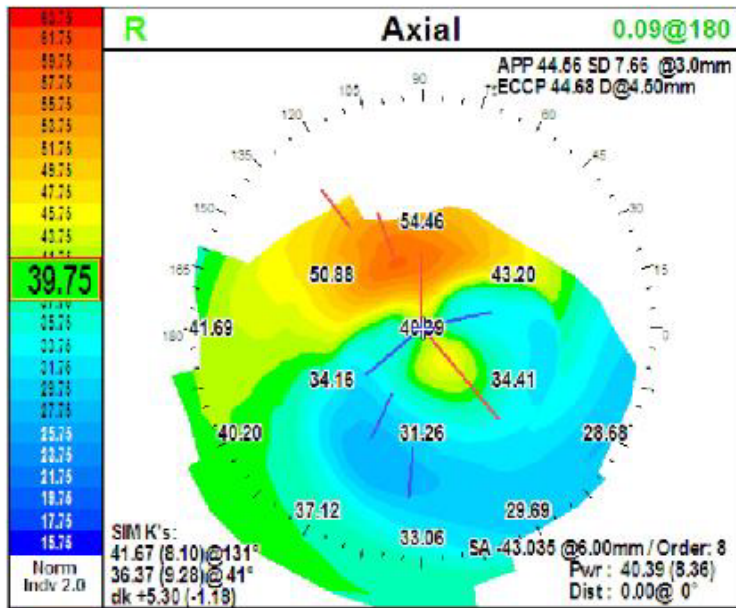
- OD: -0.25+3.5x90 20/30
- (vs. pre-op 20/400!)
- Running suture out x 1.75 yrs
- Topography is STABLE and is expected to remain so for life! (unlike PK)
- Future: reduce/eliminate cylinder w cataract extraction w Toric IOL
  
- OS: -0.5+2.5x140 20/40
- (vs. pre-op 20/400!)
- Running suture out 2.5yrs
- Topography is STABLE and is expected to remain so for life! (unlike PK)
- Future: reduce/eliminate cylinder w cataract extraction w Toric IOL

# Case 3: OD

70 yo woman Corneal Scar since 1943  
(infectious ulcer)

Best Corrected VA 20/100

R 02/06/2019 13:01 R R



# Case 3: OD

Cornea Scar since 1943: Cornea Restoration w large dia DALK

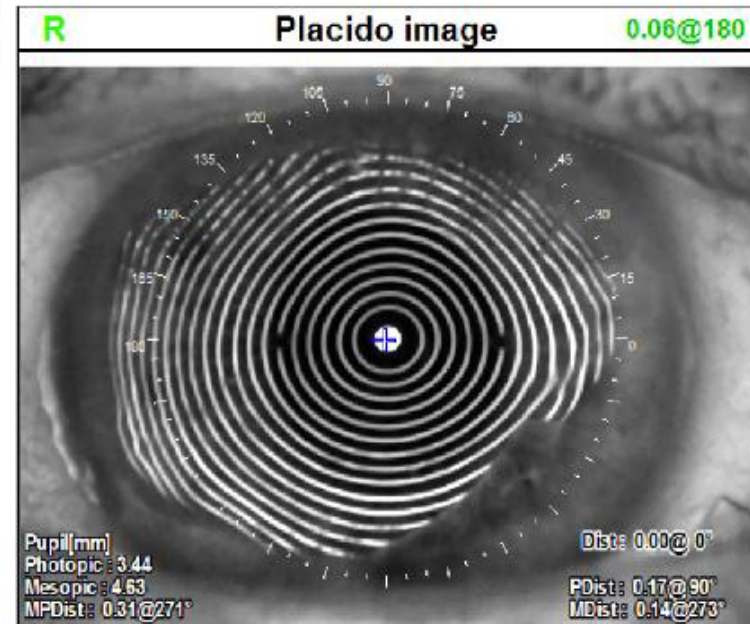
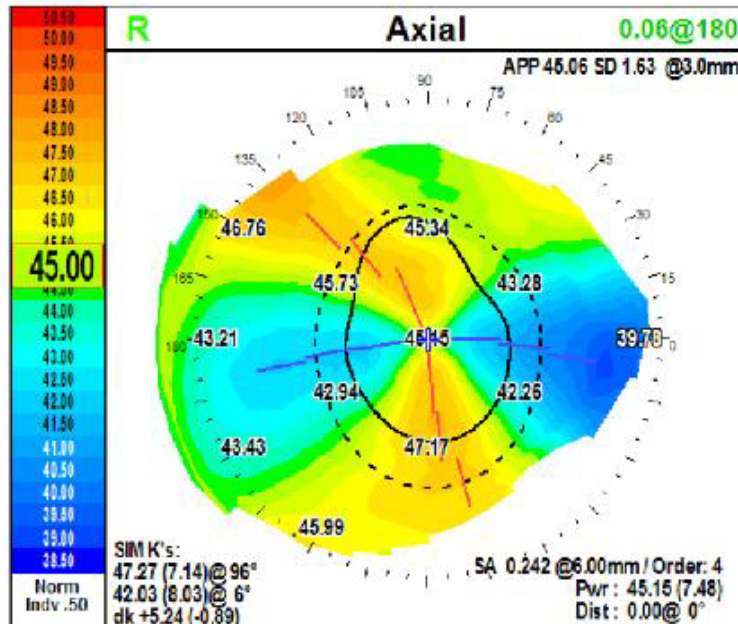
4/2022 TOPOGRAPHY (below) Refx: -1.25+0.25x150 20/30+ **“thrilled”!**

2/2020 optical “rescue” with Cat Ext w TORIC IOL AMO 600 15.5x90

12/2019 suture out

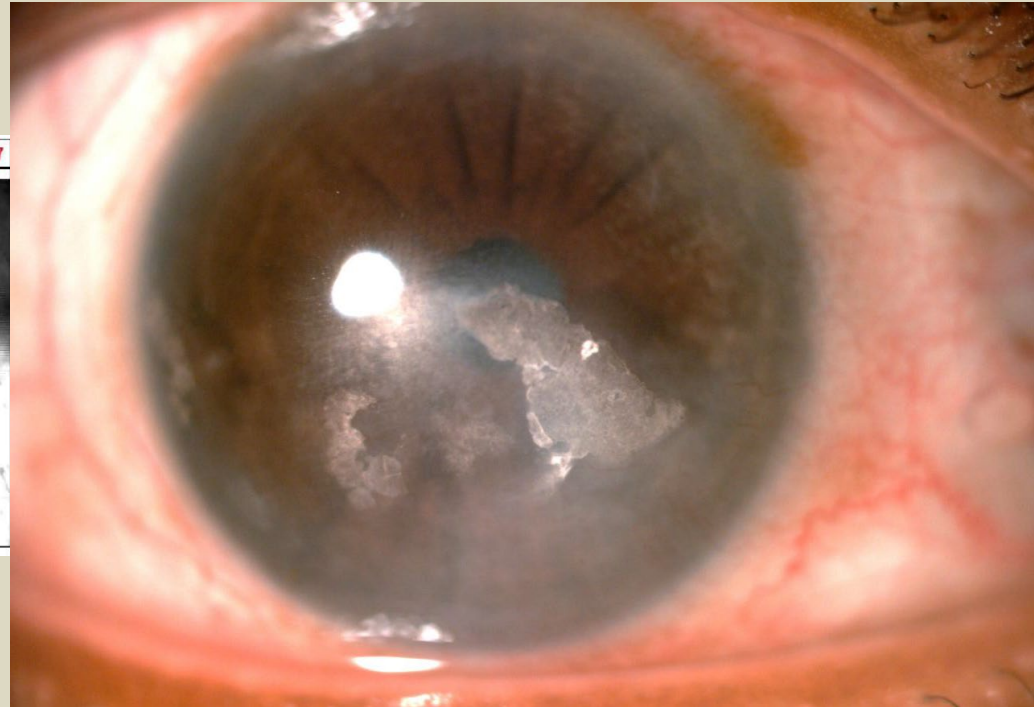
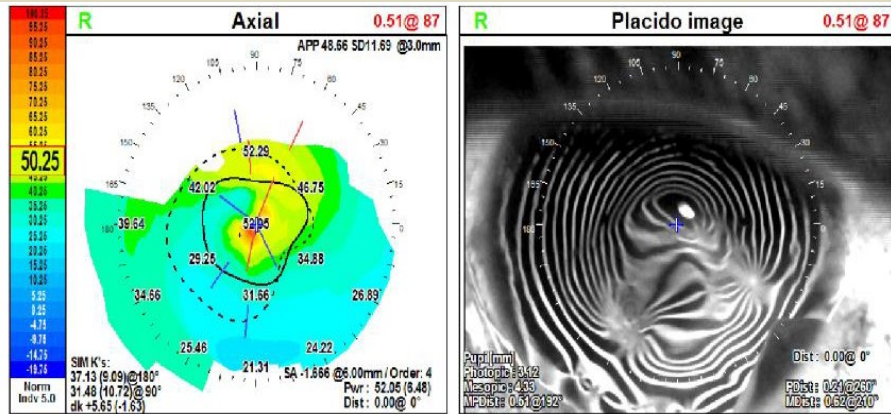
2/2019 DALK 9.5mm diameter

Date	Comment	Diagnosis
R 04/06/2022 12:38	R	R



# Case # 4 OD

71 yo FM Corneal Scar – Band keratopathy – Failed keratectomy/chelation -12.0+7.25x135 20/100

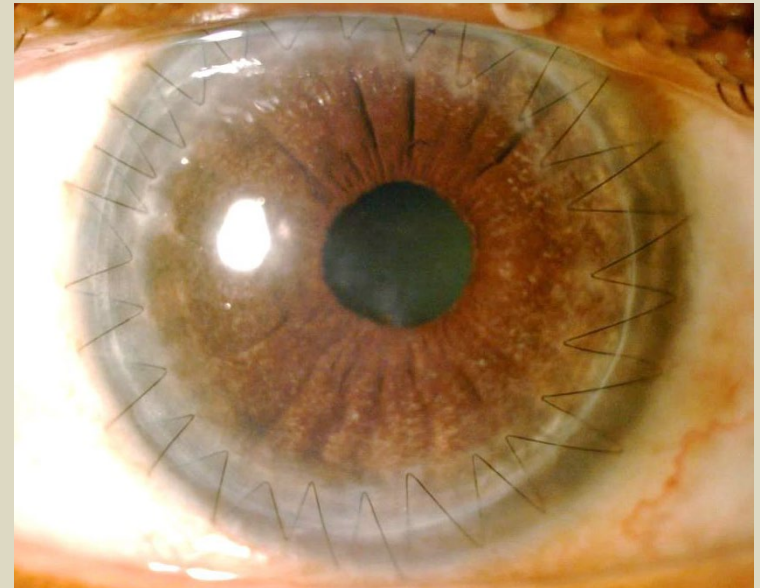
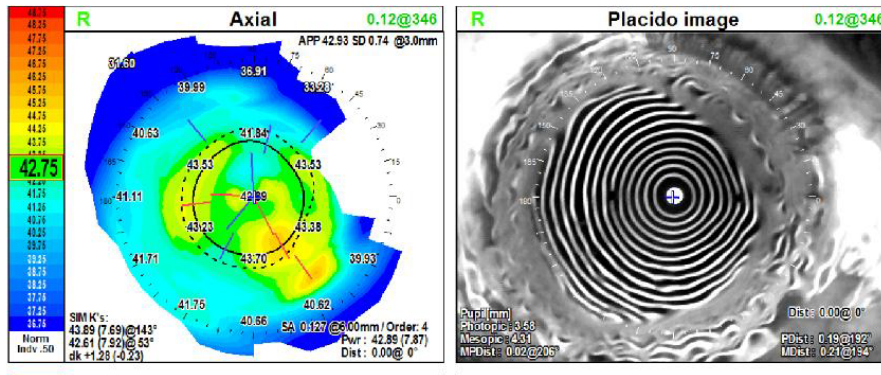


# Case #4 OD

10/13/2021 Refx: -8.5 20/60 (limited by cataract)

9/14/2021 DALK 9.0mm

R	10/13/2021 08:46	Comment	R		Diagnosis	R	
L	10/13/2021 08:46		L			L	



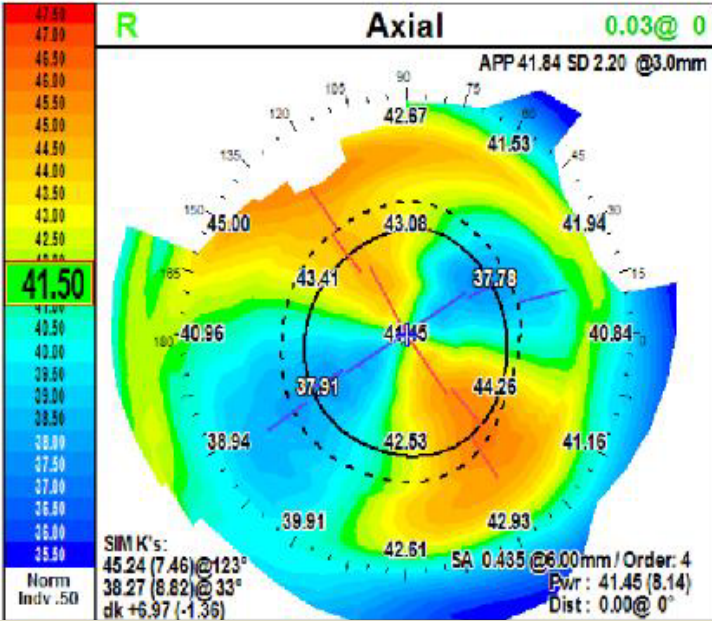


# Case #4 OD

8/26/2022 High magnitude astigmatism 7.0 Diopters (regular)

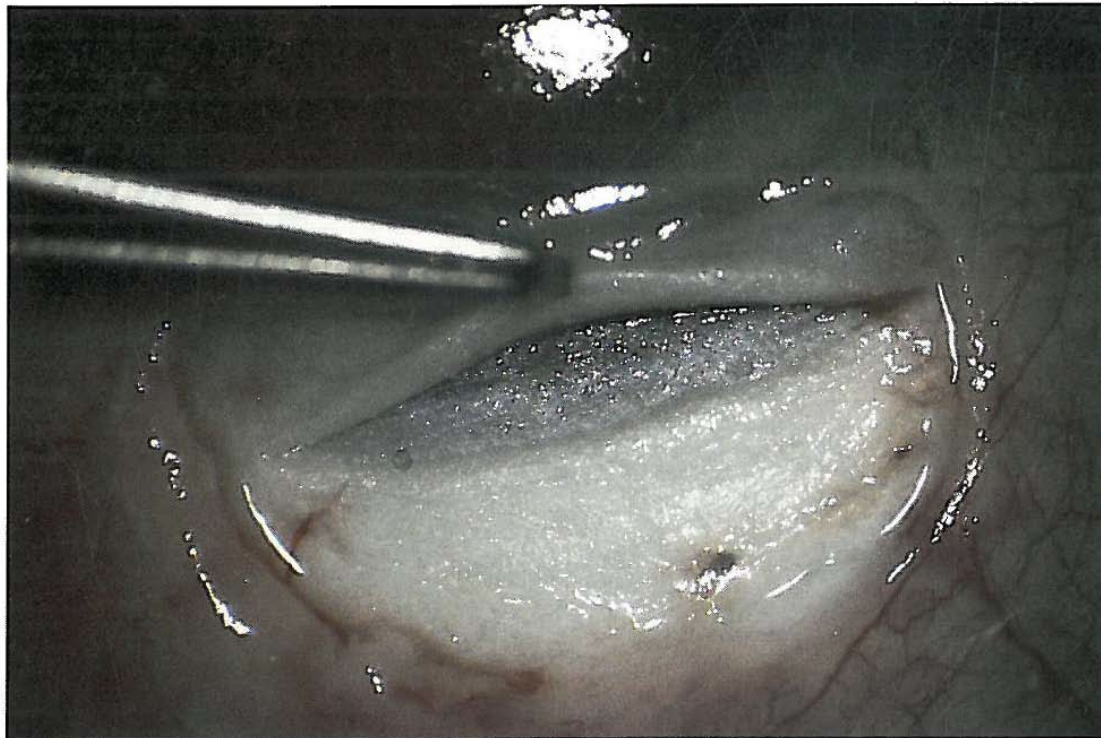
9/14/2021 DALK 9.0mm

L	08/26/2022 07:42	Comment	L	Diagnosis	L
R	08/26/2022 07:42		R		R



Scleral Recession: Astigmatic Keratotomy technique to reduce corneal astigmatism using a long scleral tunnel on steep axis to relax the cornea in that meridian

*The Incision*



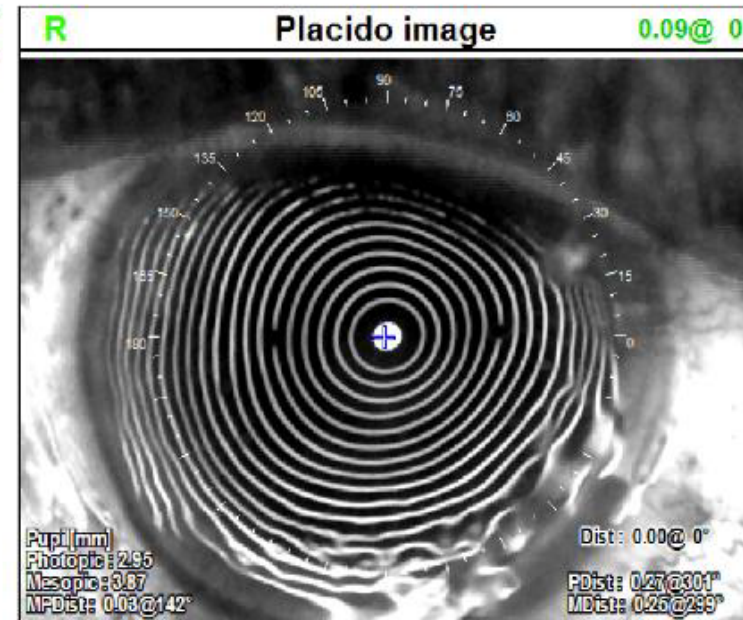
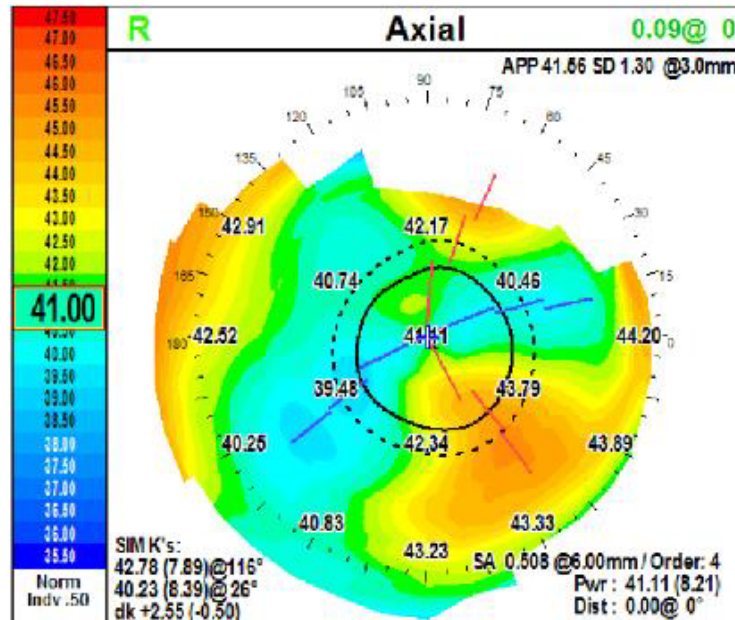
*3-7. Shelf of the incision. The shelf portion of the incision holds the iris back and helps prevent iris prolapse.*

# Case #4

9/14/2022 topographic cylinder reduced to 2.5 D

8/30/2022 AK - Scleral pocket lamellar incision x 120 deg

Date	L	09/14/2022 09:12	Comment	L		Diagnosis	L	
	R	09/14/2022 09:12		R			R	



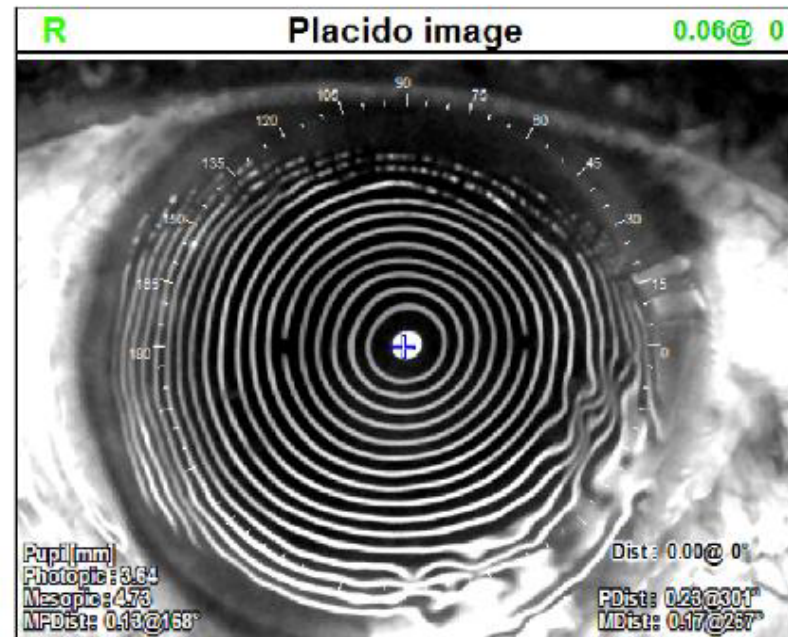
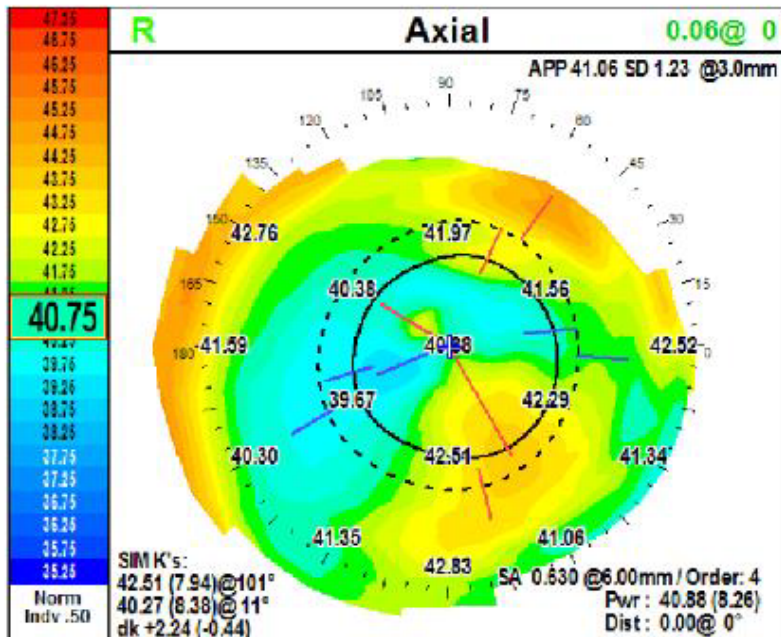
# Case #4

1/28/2023 topographic cylinder further normalized – future  
cat ext OD

12/2022 AK scleral pocket incision x 305

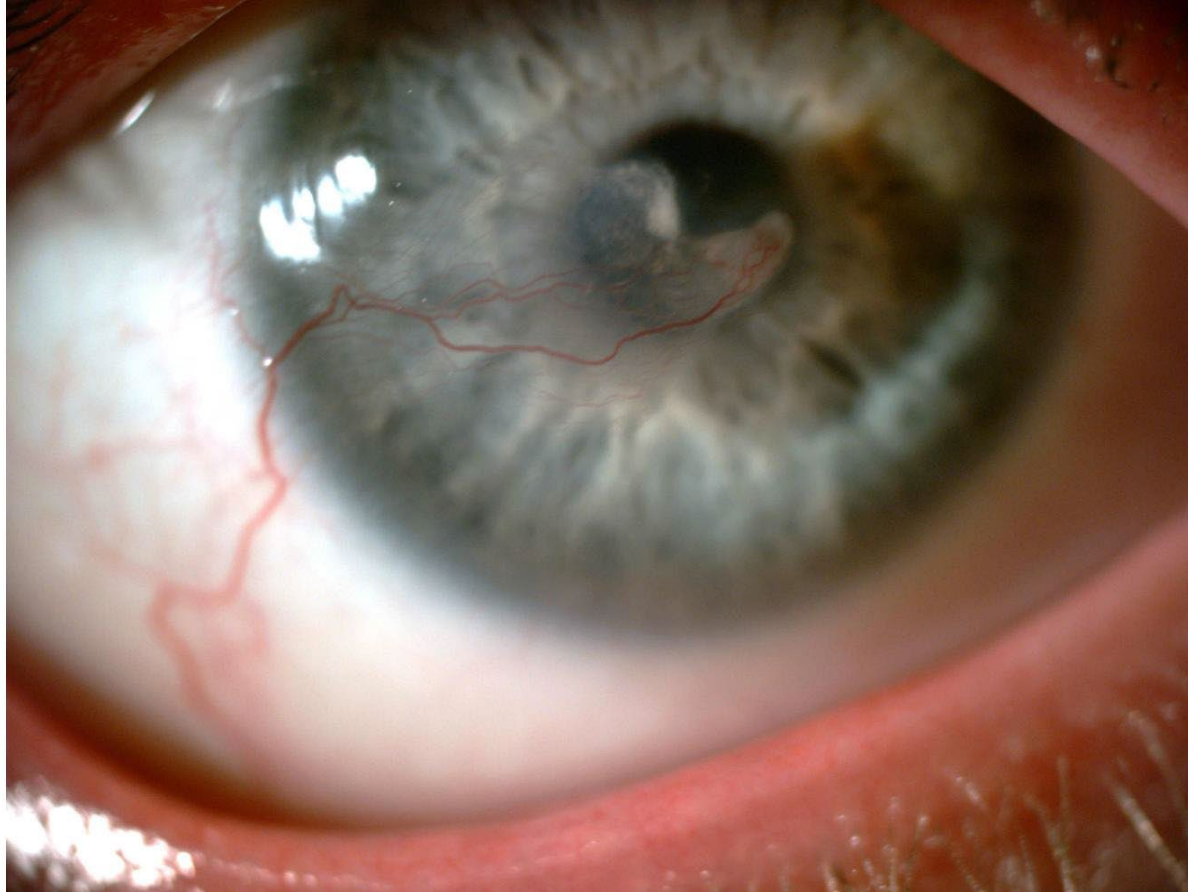
8/30/2022 Scleral pocket incision x 120 deg

L	01/26/2023 10:16	Comment	L		Diagnosis	L	
R	01/26/2023 10:16		R			R	



Case #5 OD

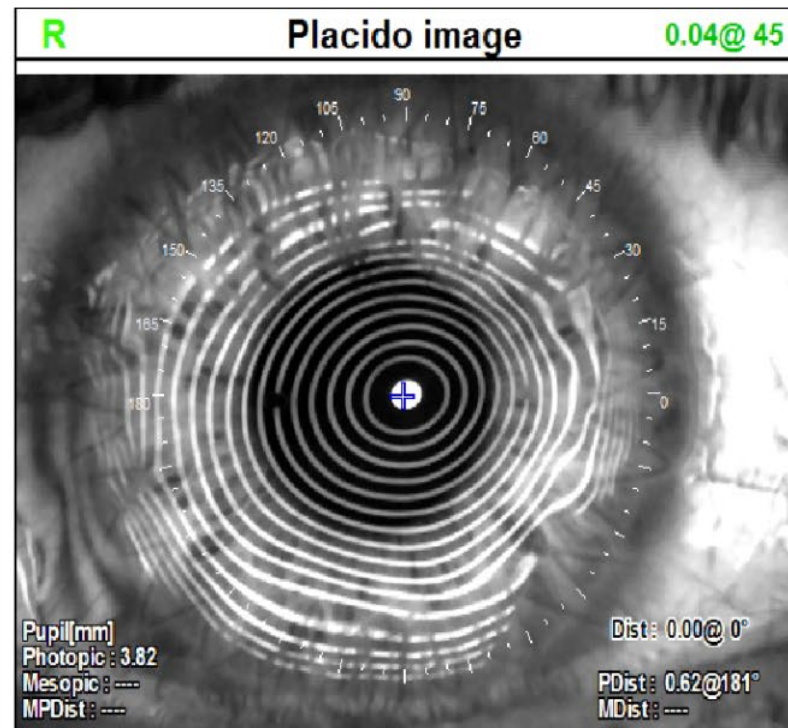
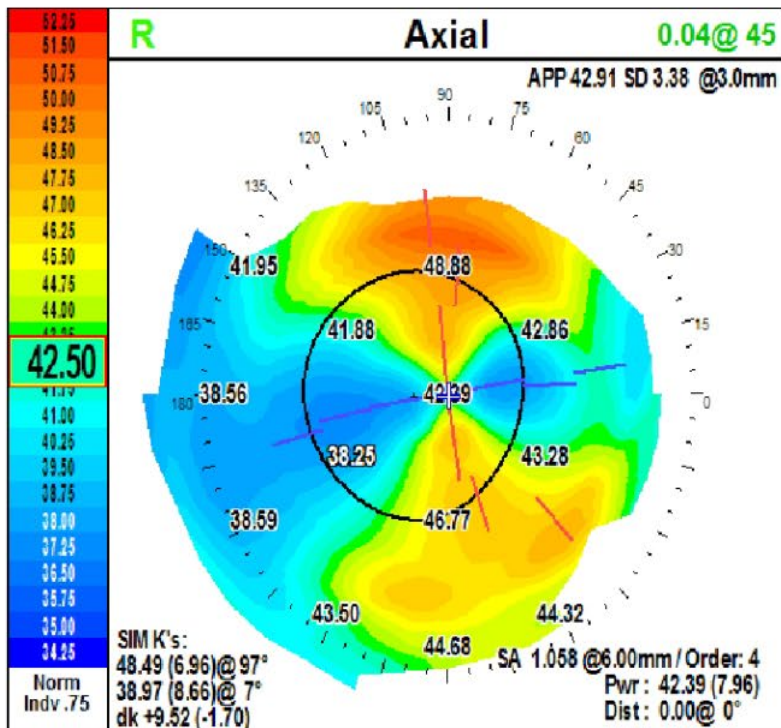
18yo Male w Cornea Scar (HSV)



# Case #5: OD

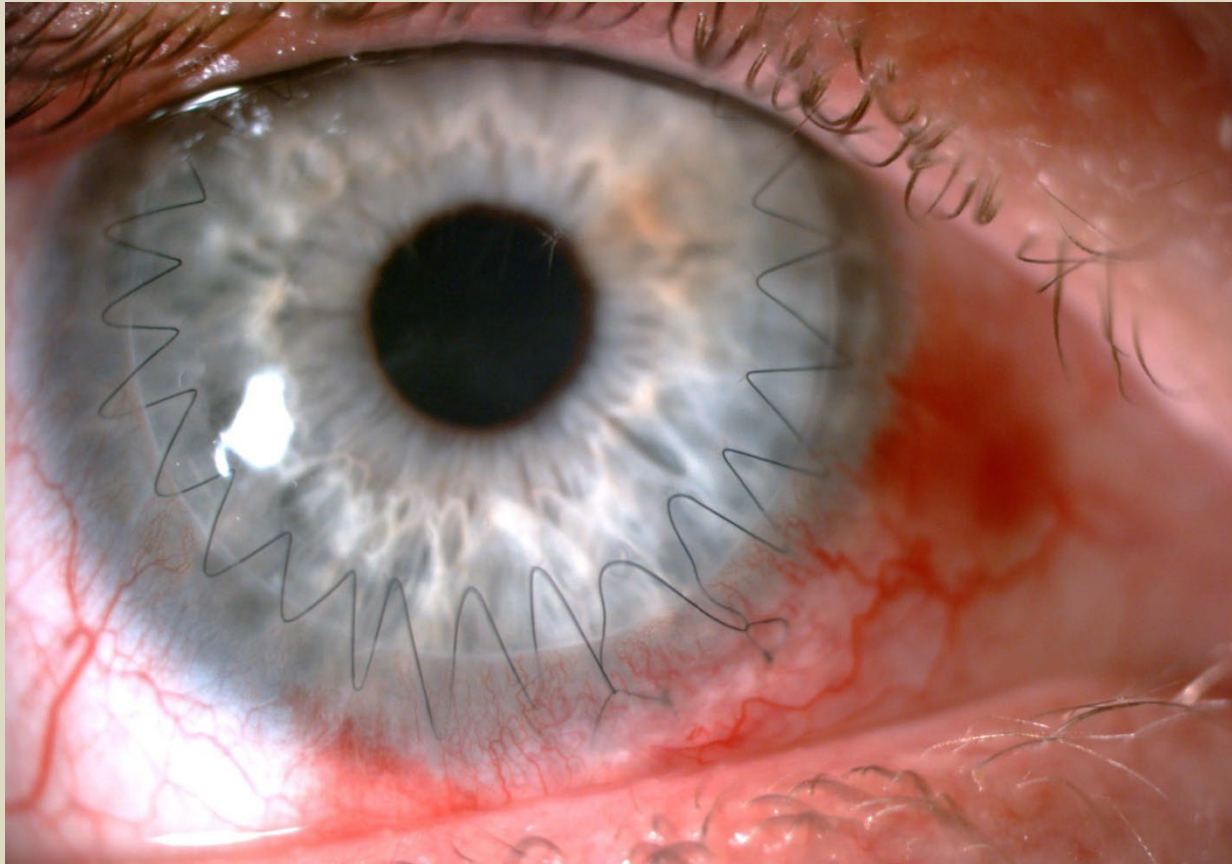
Cornea Scar (HSV) 5 wks aft DALK: 7/16/2019 high cylinder – loose running suture loops

R	08/23/2019 11:13	Comment	R	Diagnosis	R
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## Case#5 OD

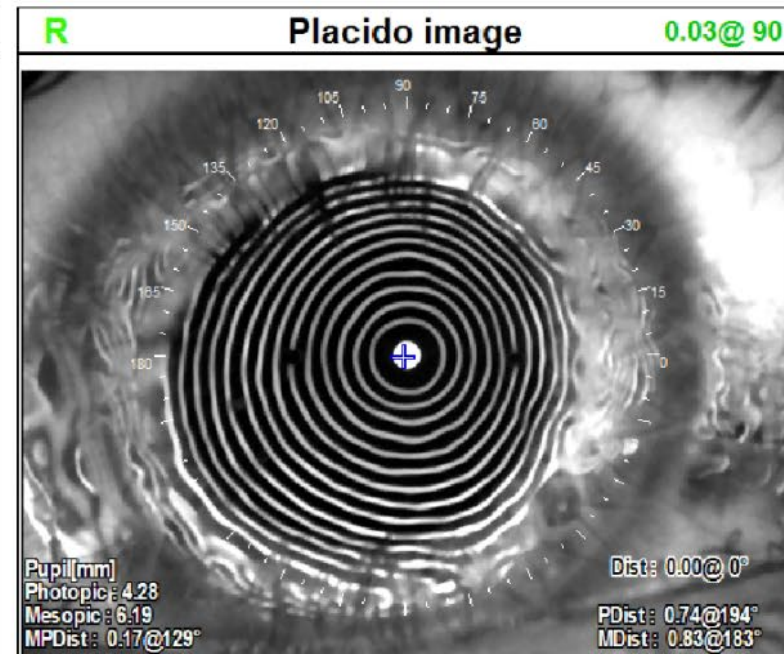
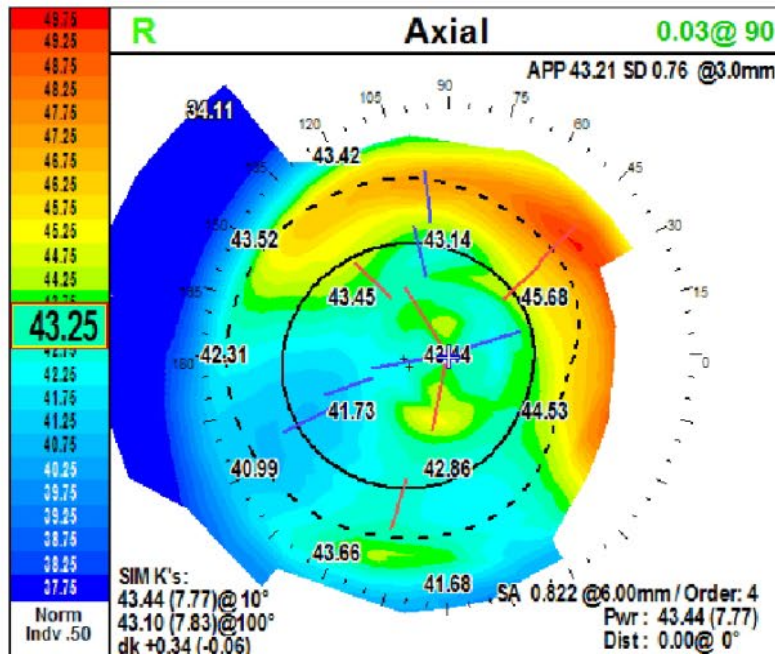
Loose running suture loops: fixed with interrupted plication sutures at 4 & 5 o'clock. Adjusted suture tension under guidance of intraoperative keratometer.



# Case #5: OD

2 wks after running suture adjustment:  
UCVA 20/40 +0.5+0.75x78 20/30

R	09/09/2019 10:56	Comment	R	Diagnosis	R
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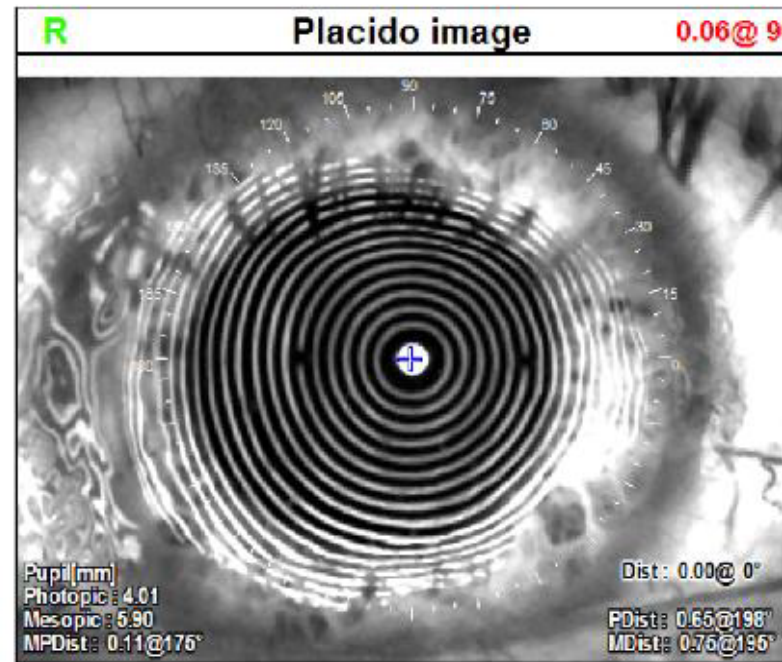
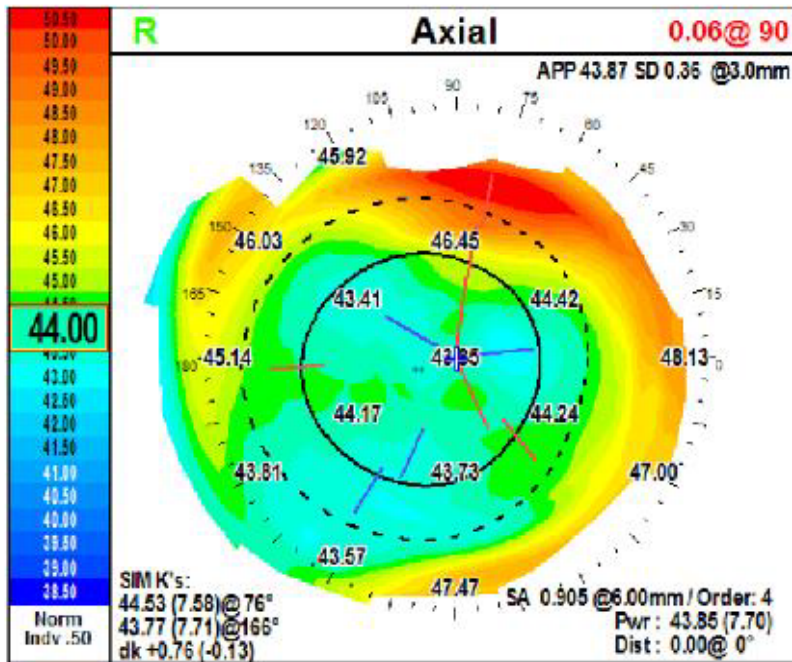
# Case #5 OD

6/25/22 (Topo below) Plano +1 x 65 20/25

11/12/2020 Removed running corneal suture Uncorrected VA 20/40

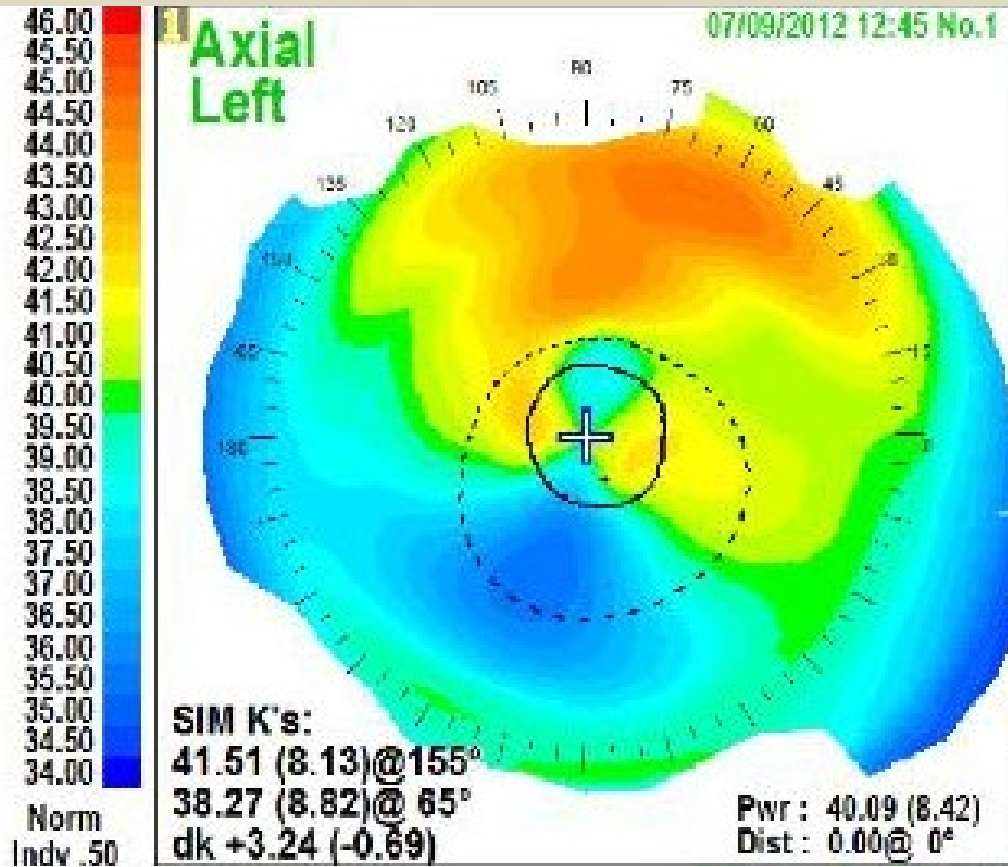
7/16/2019 DALK

R	05/25/2022 14:20	Comment	R	Diagnosis	R
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# Case #6 OS (Left Eye)

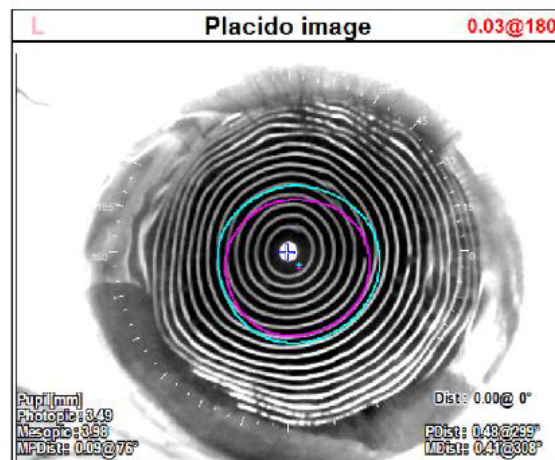
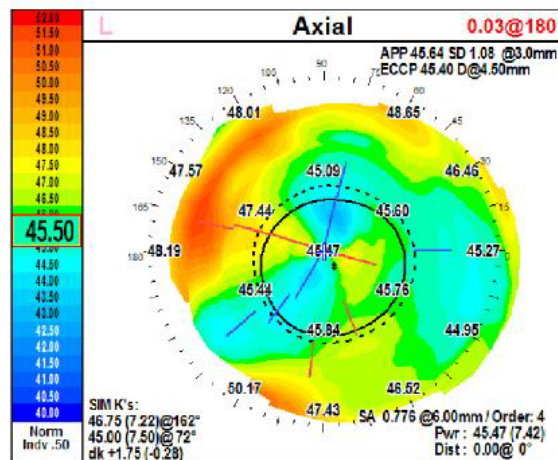
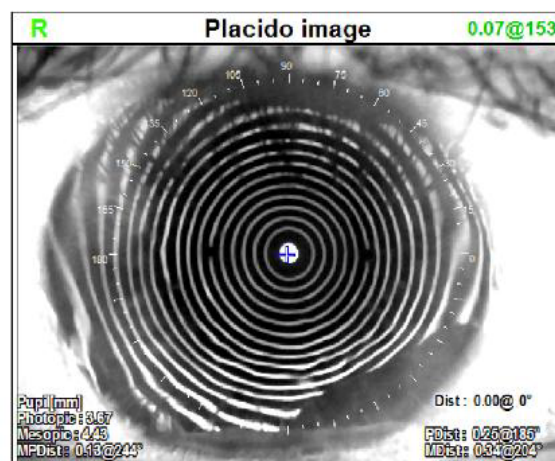
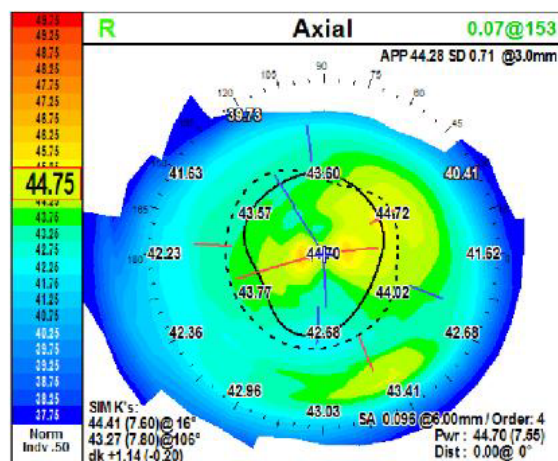
## 58 yo Cornea Scar since age 20



# Case #6 OS

12/2021 Topo (below) still stable 9 years after  
7/21/2012 DALK 9.0mm

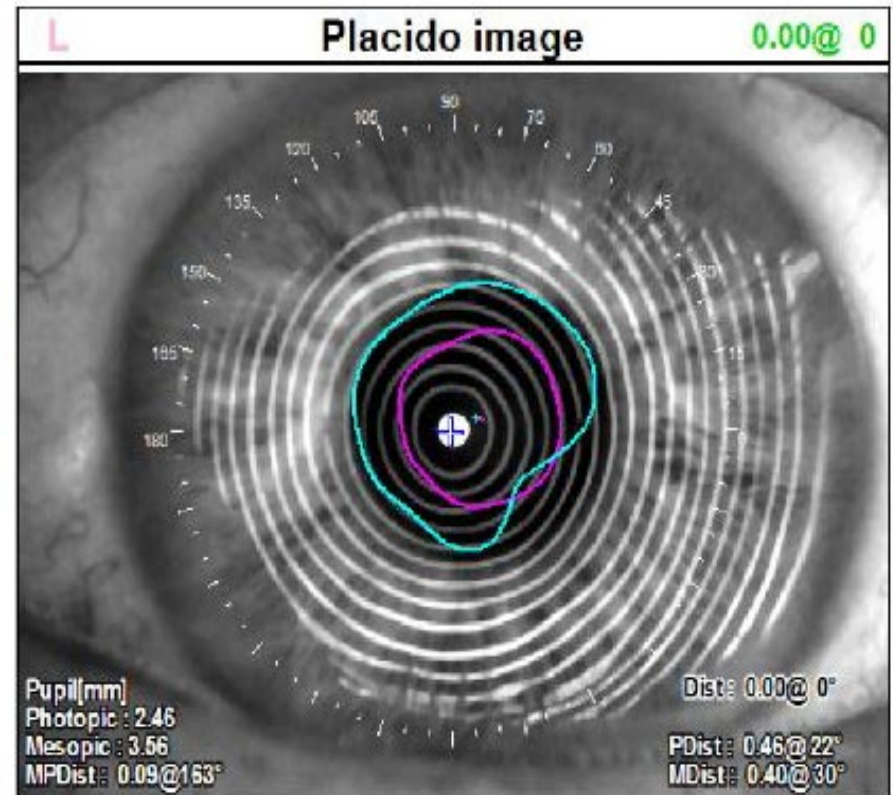
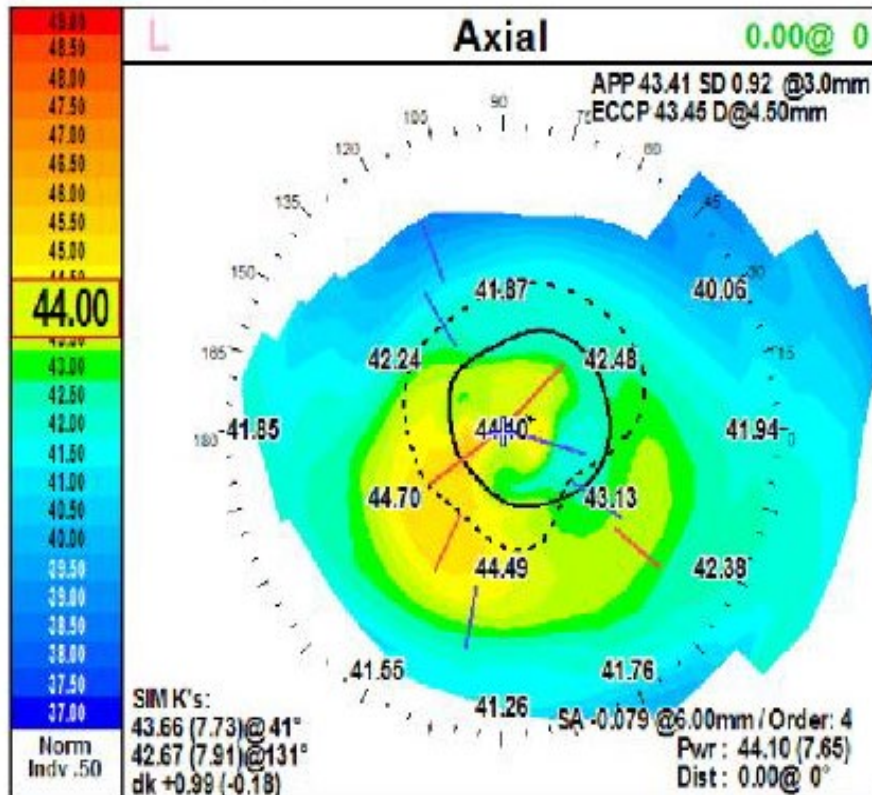
L	12/13/2021 15:17	Comment	L	Diagnosis	L
R	12/13/2021 15:17		R		R



# Case #7 OS

67yo male central cornea scar and monocular diplopia

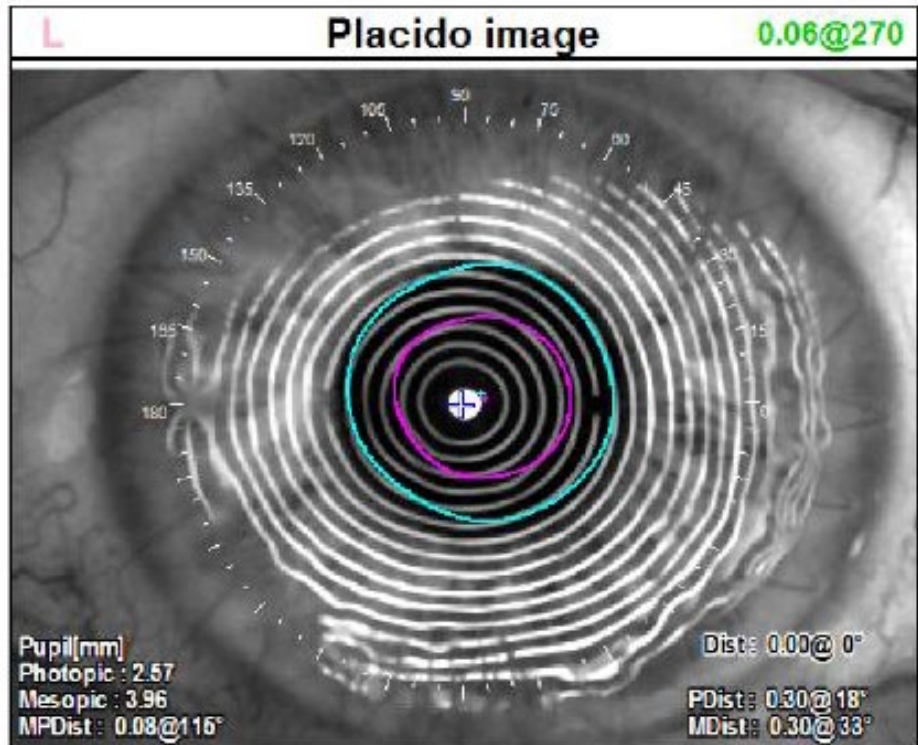
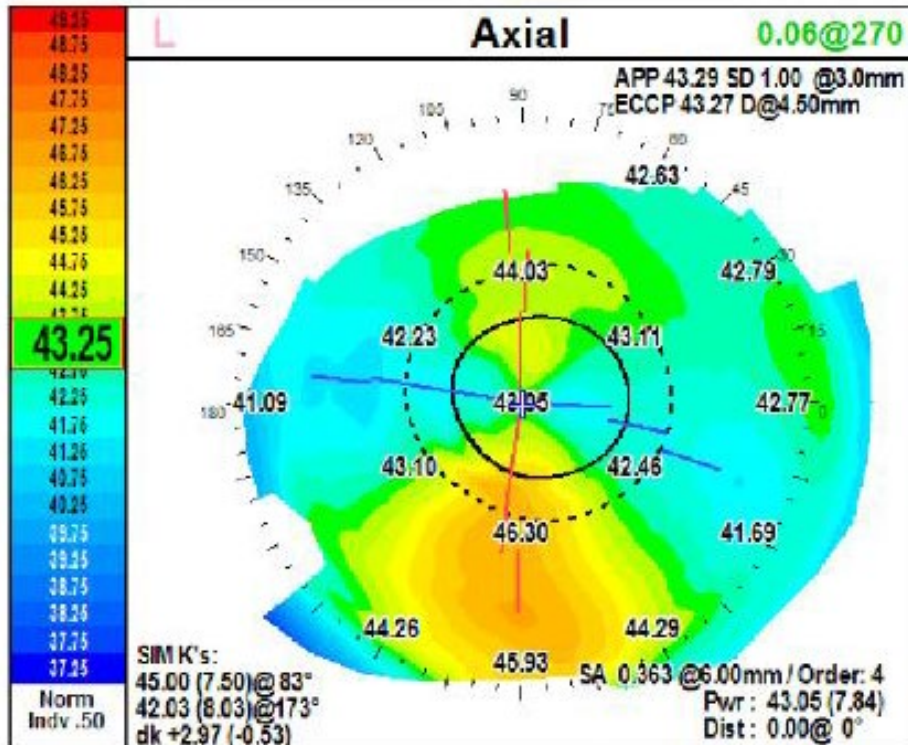
hit in cornea w pine needle during college



# Case #7 OS

67yo male central cornea scar and monocular  
diplopia

hit in cornea w pine needle during college



# Case #7 OS

67yo male central cornea scar

DALK 9.5mm dia uncut surgical video

- 

- Part 1: <https://youtu.be/rUe2bEdC8h0>
- Part 2: [https://youtu.be/3D\\_A07NU6vg](https://youtu.be/3D_A07NU6vg)
- Part 3: <https://youtu.be/qqKPgMSJQrl>

# Case Reports: Large Diameter DALK for

## Cornea Scars

### Conclusion:

- Faster visual rehabilitation.
- Running cornea suture technique is ADJUSTABLE if necessary to reduce early astigmatism and rx glasses or soft contact lens early optical rehabilitation
- less corneal aberrations than PK
- Long term graft endothelial rejection/exhaustion – graft failure eliminated
- If donor/bed centered, residual astigmatism is almost always regular
- Cornea Topography VERY stable over time – NO long term ectasia more often seen with PK and rarely reported with smaller dia DALK
- Closed procedure – does not disturb trabecular meshwork - No increase in Glaucoma