

DMEK POST PENETRATING KERATOPLASTY

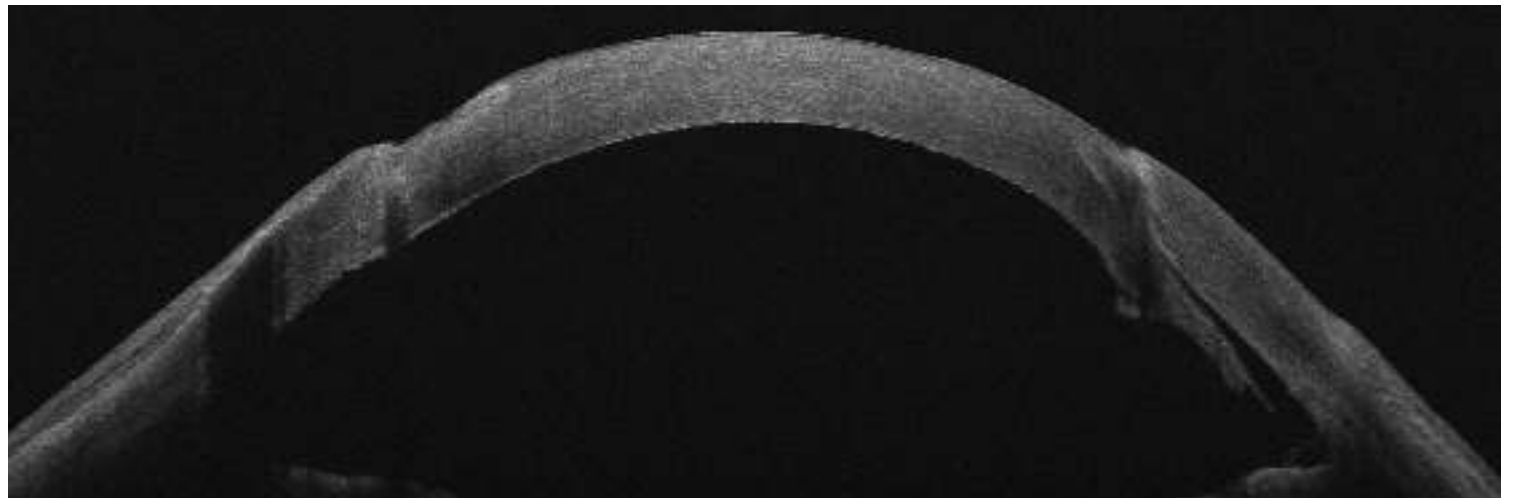
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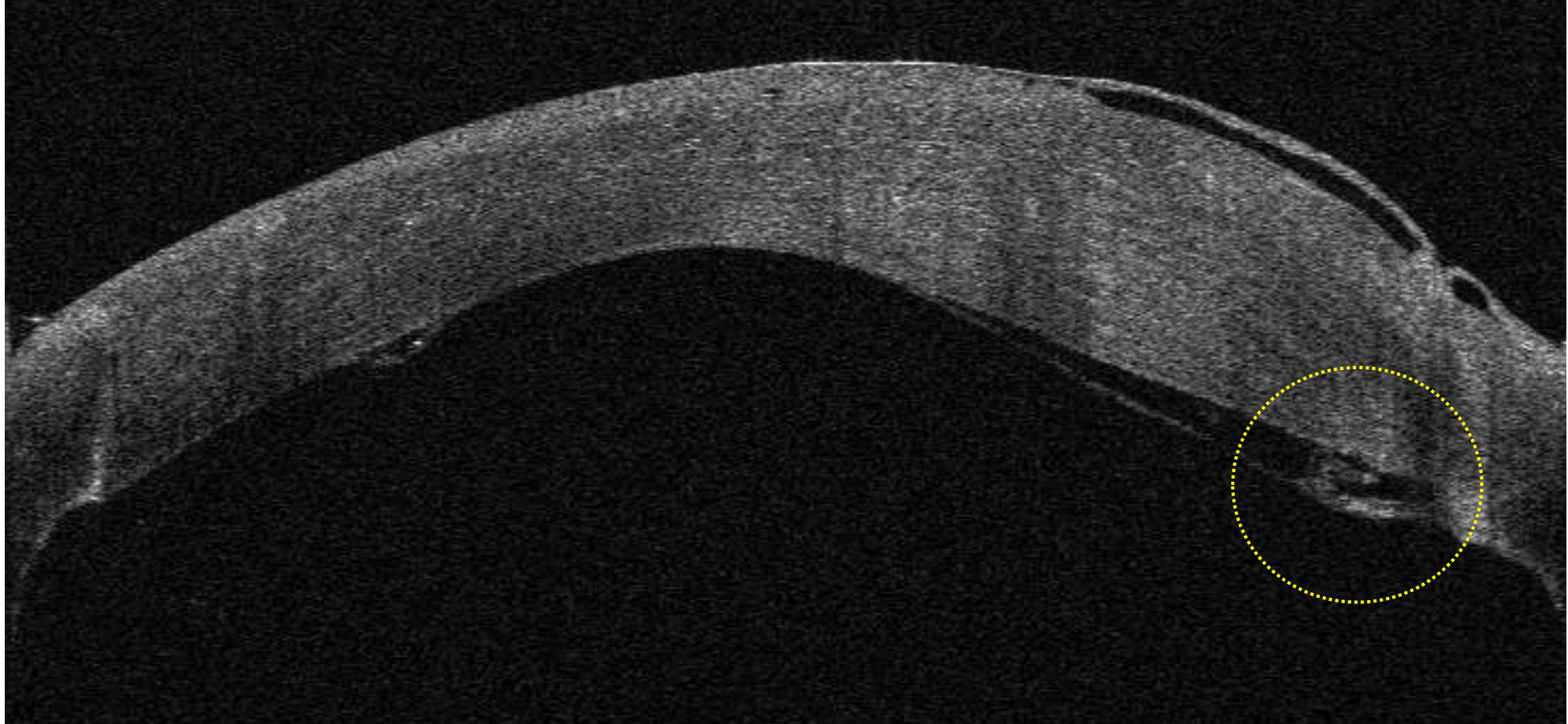
Professor of Ophthalmology, Universidad Miguel Hernández, Alicante (Spain)

Introduction

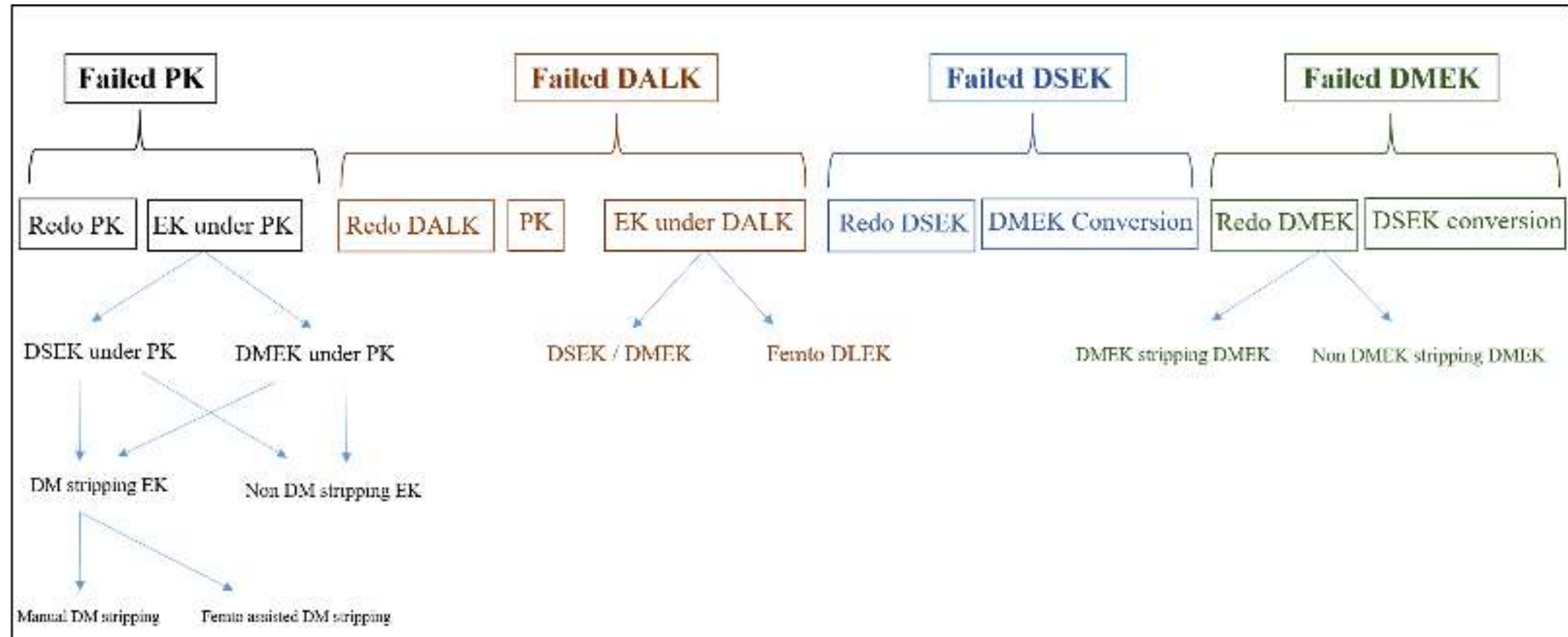
- Late endothelial failure is one of the leading causes for re-intervention after PK.
- EK is preferred over penetrating re-graft as it affords **lower risks** (rejection, ocular surface disease, OHT/glaucoma, faster visual recovery, better refractive outcome).
- EK under a failed PK can be technically challenging (risk for wound dehiscence, damage posterior stromal surface, more challenging Dmrhexis, DM remnants).



DMrhexis under PK, why to avoid it?



There is increasing evidence that it is not mandatory to perform host DM-endothelium stripping in EK surgery as long as these layers are anatomically intact (no guttae, etc).

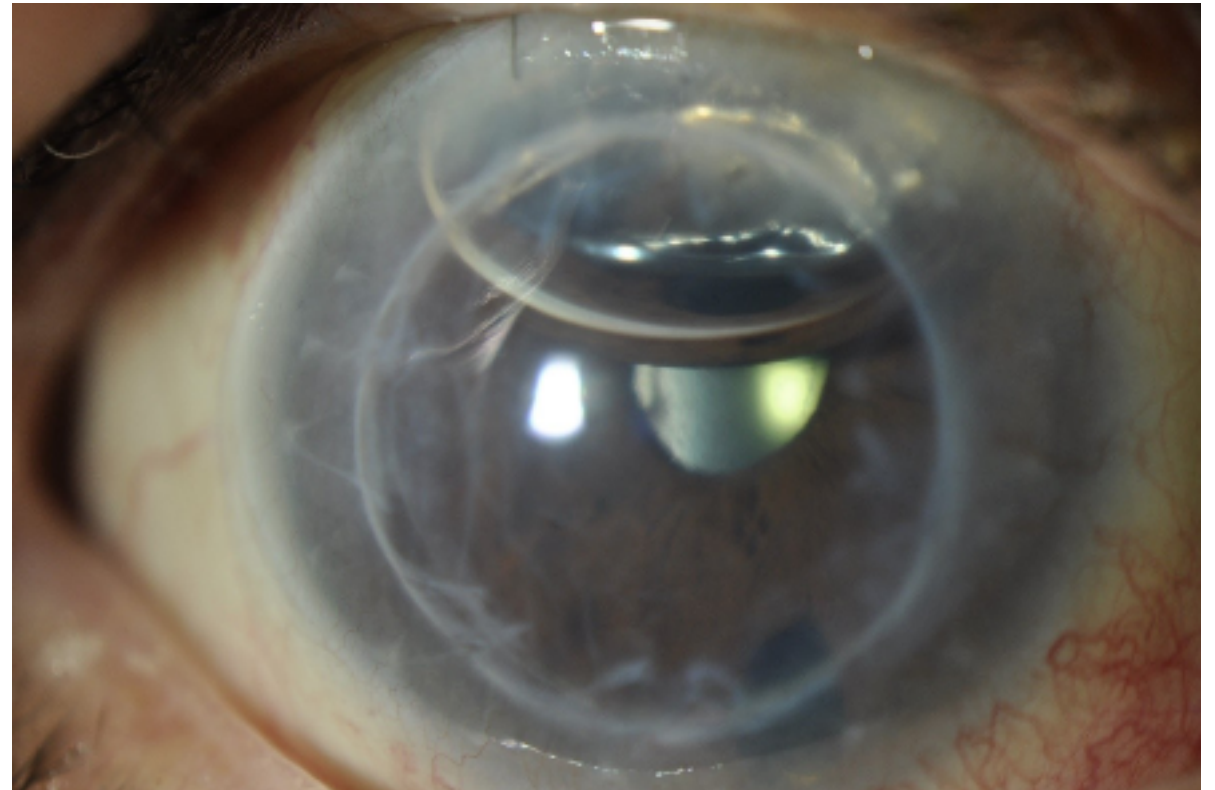


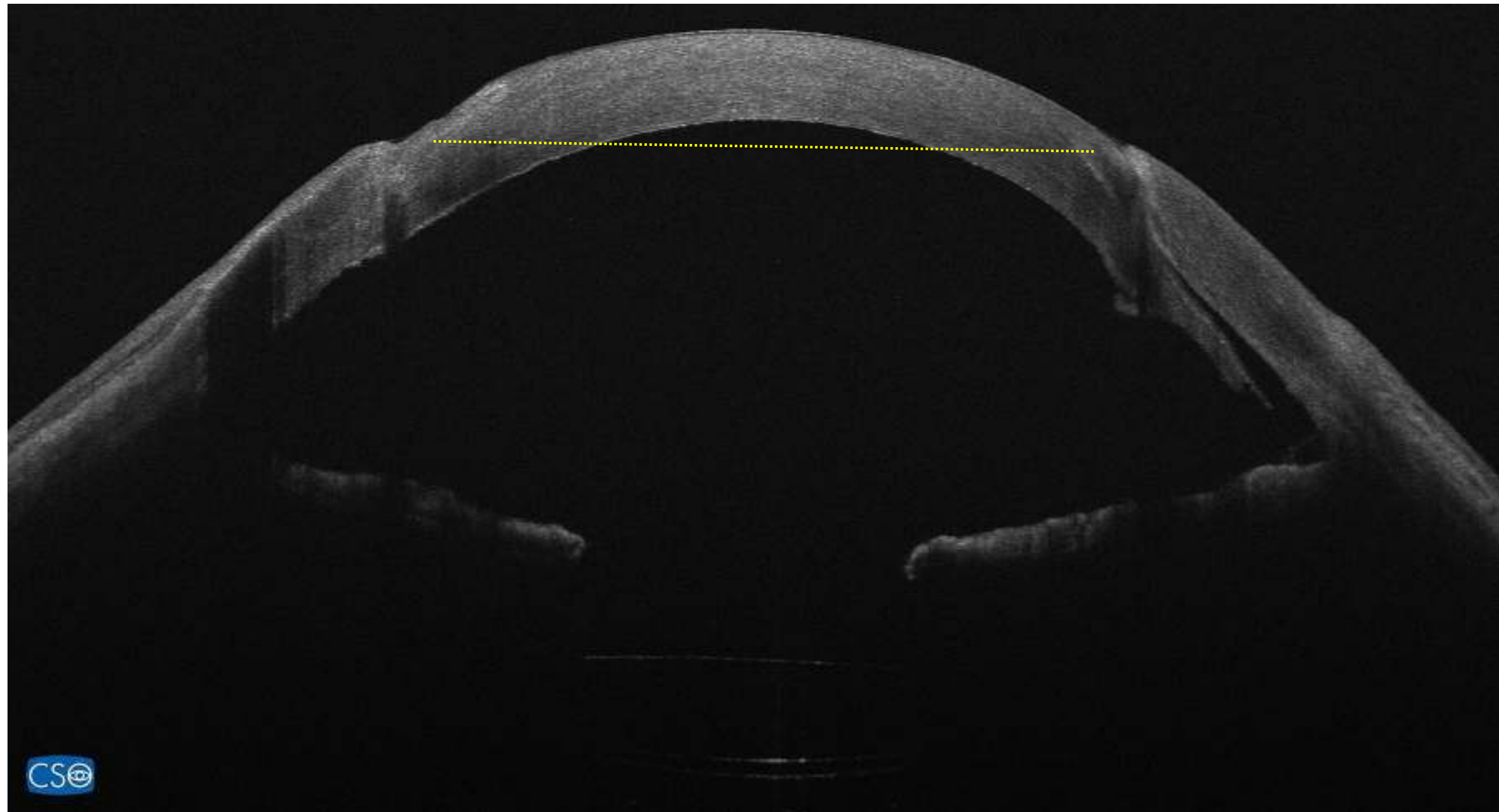
Alió Del Barrio JL, Bhogal M, Ang M, et al. **Corneal transplantation after failed grafts: Options and outcomes.** Surv Ophthalmol. 2021;66(1):20-40.

Our Approach for 2° PK failure: **NS-DMEK**

Outcomes of non-descemet's stripping DMEK (NS-DMEK) for secondary PK failure.

- Retrospective case series study (n=8)
- All eyes underwent NS-DMEK surgery under a previously failed PK
- DMEK size was either matched or undersized by 0.25-0.5mm (by imaging the posterior graft surface with OCT)
- 20% SF6 AC fill in all cases

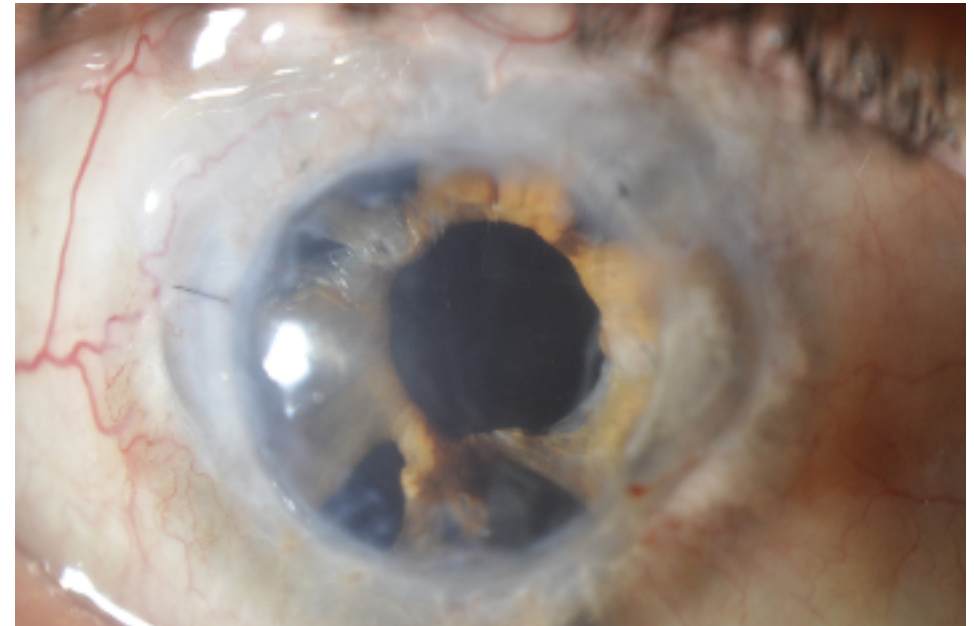
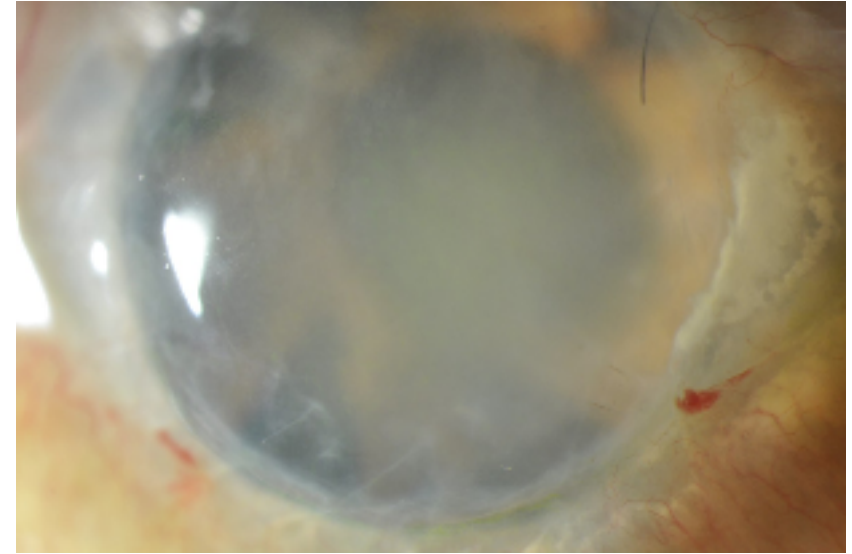


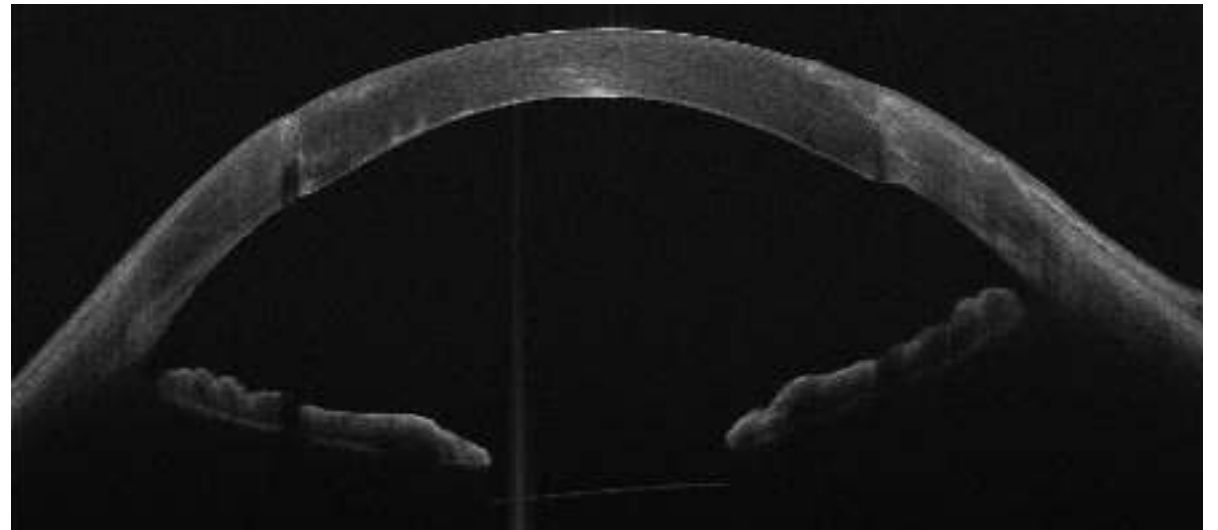
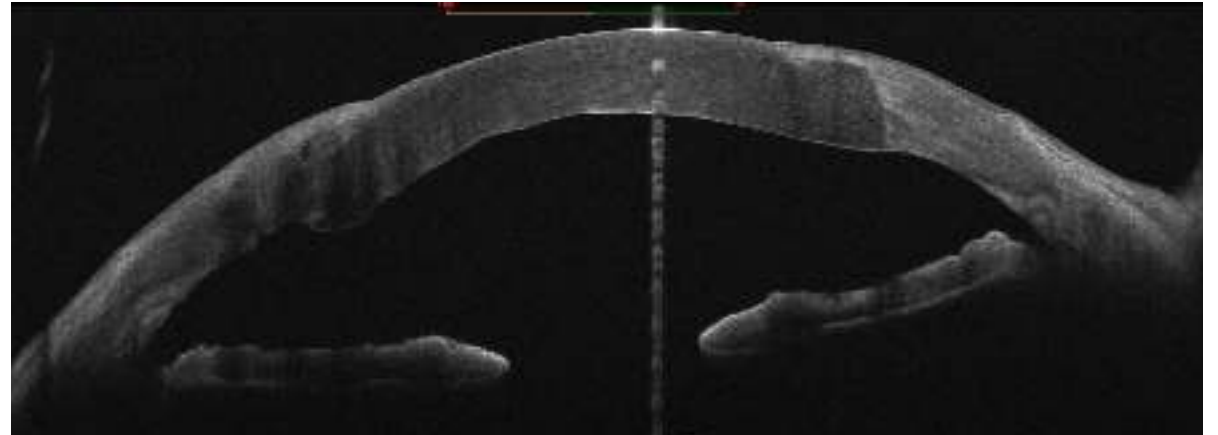


Results

6 months follow-up

- Extensive preoperative ocular co-morbidity.
- No primary graft failure
- **CDVA** improved from a median of **CF** (CF-0.2) to **0.57** (0.05-0.7)
- **Median CCT** from **650.5** (497-897) to **464** (372-597) μm .
- **Median ECD** was **1080** (581-2043) cells/mm².





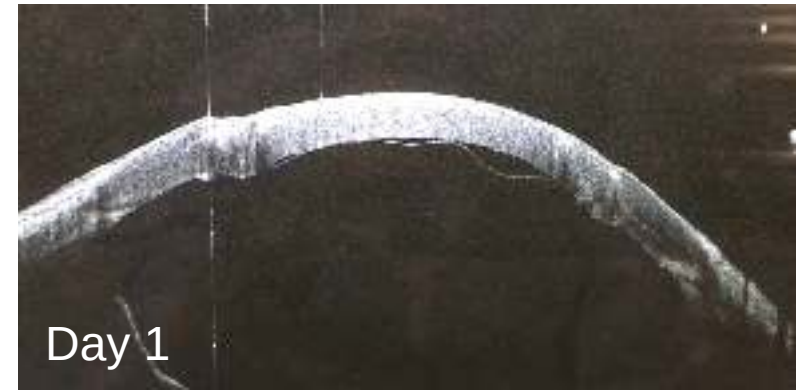
Alió Del Barrio JL, Montesel A, Ho V, Bhogal M. **Descemet Membrane Endothelial Keratoplasty Under Failed Penetrating Keratoplasty Without Host Descemetorhexis for the Management of Secondary Graft Failure.** *Cornea*. 2020;39(1):13-17.

Complications

Rebubbling rate: 25% (2 cases)

- 1x postop PK junction dehiscence (previous early suture removal): required PK re-suturing and DMEK rebubbling.
- 1x glaucoma drainage device

No cases of graft rejection or secondary graft failure were observed



DMEK under PK Outcomes

Table 1 – Reported outcomes of DMEK for failed PK management

Author	Year	N	Time	PK descemetorhexis	Tamponade	Preop BCVA	Postop BCVA	ECC loss (time point)	Rebubbling rate	Rejection rate	Graft failure
Anshu et al. ²⁶	2013	6	6 m	Yes	Air	20/70 Snellen	20/30 Snellen	33% (6m)	50%	0%	17% PGF 0% SGF
Heinzelmann et al. ²⁷	2017	19	21.5 m (1–47 m)	Yes	Air	20/400 Snellen	20/200 Snellen	n/y	26%	10.5%	5% PGF 11% SGF
Lavy et al. ¹¹⁶	2017	11	16 m	Yes	Air	Range HM-20/30	5 eyes >20/25 Snellen	59% (16m)	36%	0%	9% PGF 18% SGF
Pasari et al. ²³⁸	2019	93	21 m (1 m–7 y)	Yes	Air	20/100 (6 m) Snellen	20/30 (6 m) Snellen	31% (6 m) 44% (12 m) 47% (24 m)	53% (DMEK > PK) 27% (DMEK = PK) 33% (DMEK < PK)	2%	5% PGF 11% SGF
Pierré et al. ¹⁴⁸	2019	28	6 m	Yes	Air	1.34 LogMAR	0.54 LogMAR	24% (6 m)	50%	0%	0% PGF 0% SGF
Schrittenlocher et al. ¹⁷⁷	2020	52	12 m	Yes	Air/SF6 20%	1.07 LogMAR	0.56 (6 m) 0.38 (12 m) LogMAR	36% (6 m) 37% (12 m) 40% (24 m)	59.6%	13.5%	34.6%
Sorkin et al. ¹⁷⁸	2020	29	6 m	Yes	Air	0.97 LogMAR	0.51 LogMAR	38% (6 m)	58.6%	6.9%	27.5% PGF 6.9% SGF
Sorkin et al. ¹⁷⁸	2020	10	6 m	Yes (Femto)	Air	1.32 LogMAR	0.35 LogMAR	43.8% (6m)	10%	10%	0% PGF 0% SGF
Alió del Barrio et al. ⁹	2019	8	6 m	No	SF6 20%	20/800 Snellen	20/40 Snellen	50% (6m)	25%	0%	0% PGF 0% SGF
Gdell et al. ⁸⁰	2019	26	23.08 m (6–48 m)	No	SF6 20%	20/80 (6 m) Snellen	20/32 (6 m) Snellen	27.7% (6 m) 34.4% (12 m)	11.53%	0%	0% PGF 7.7% SGF

N, study sample; BCVA, best corrected visual acuity; HM, hand movements; ECC, endothelial cell count; m, months; y, years; Femto, femtosecond laser-assisted descemetorhexis; SF₆, 20% sulfur hexafluoride; DMEK > PK, DMEK graft diameter larger than PK graft diameter; DMEK = PK, DMEK graft diameter equal than PK graft diameter; DMEK < PK, DMEK graft diameter smaller than PK graft diameter; PGF, primary graft failure; SGF, secondary graft failure; LogMAR, logarithm of the minimum angle of resolution; Snellen, Snellen visual acuity.

Alió Del Barrio JL, Bhogal M, Ang M, et al. **Corneal transplantation after failed grafts: Options and outcomes.** *Surv Ophthalmol.* 2021;66(1):20-40.

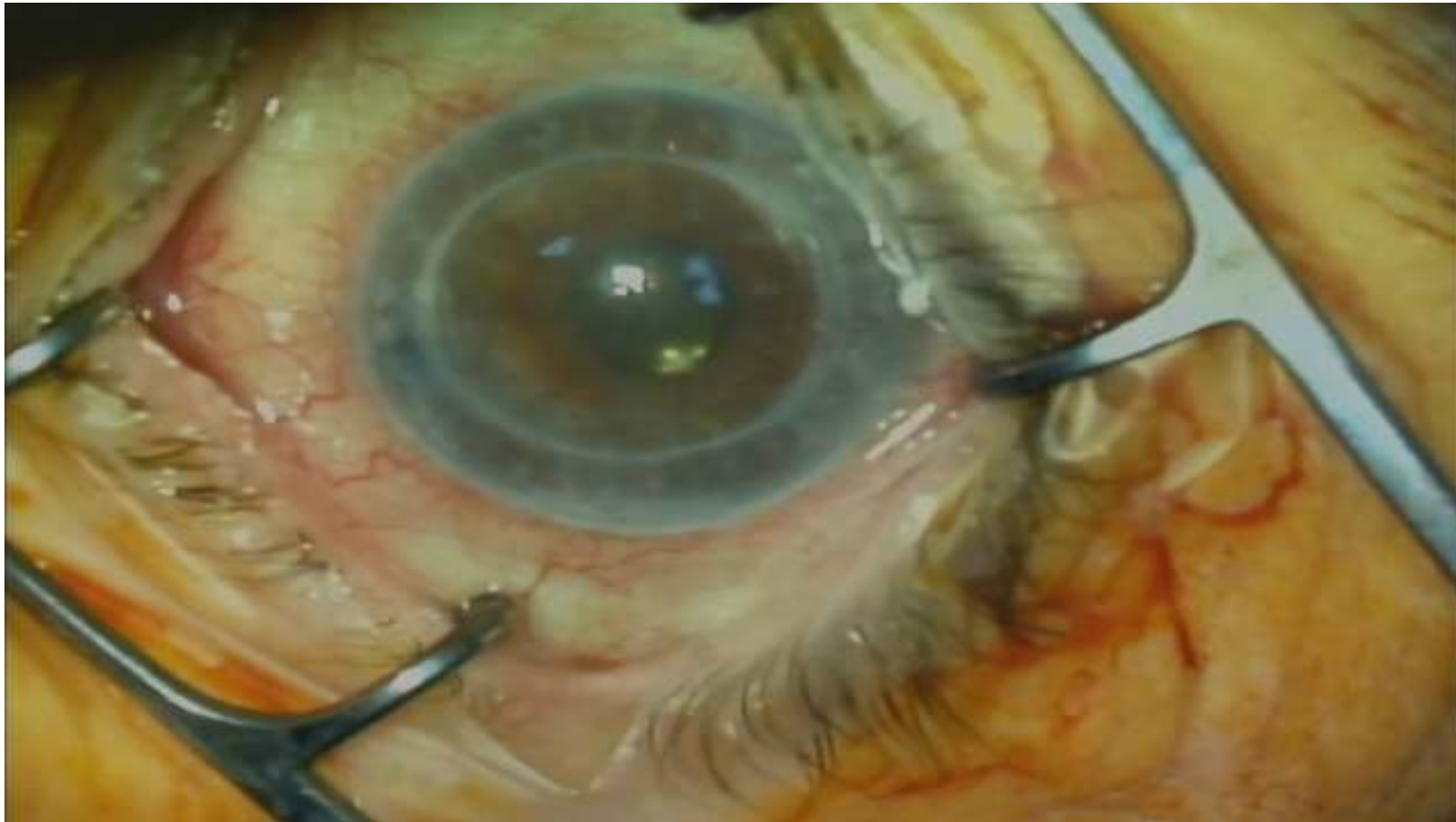
NS-DMEK under PK

Alió Del Barrio JL, Montesel A, Ho V, Bhogal M. **Descemet Membrane Endothelial Keratoplasty Under Failed Penetrating Keratoplasty Without Host Descemetorhexis for the Management of Secondary Graft Failure.** *Cornea*. 2020;39(1):13-17.

DMEK under PK without host DMrexis is a feasible surgical alternative for the treatment of PK graft secondary failure

- Host DM should present intact (no guttae, scarring or retrokeratic precipitates).
- We demonstrated equivalent levels of efficacy and safety compared with DM stripping DMEK techniques.
- Surgical procedure is simplified and intraoperative risks associated with Descemet's stripping avoided.

NS-DMEK under PK: ¡Easy & Fast!



What if DMEK fails? NS-DMEK under DMEK

Only if 1st DMEK is intact, without deposits/scars, and perfectly attached, if not removal....

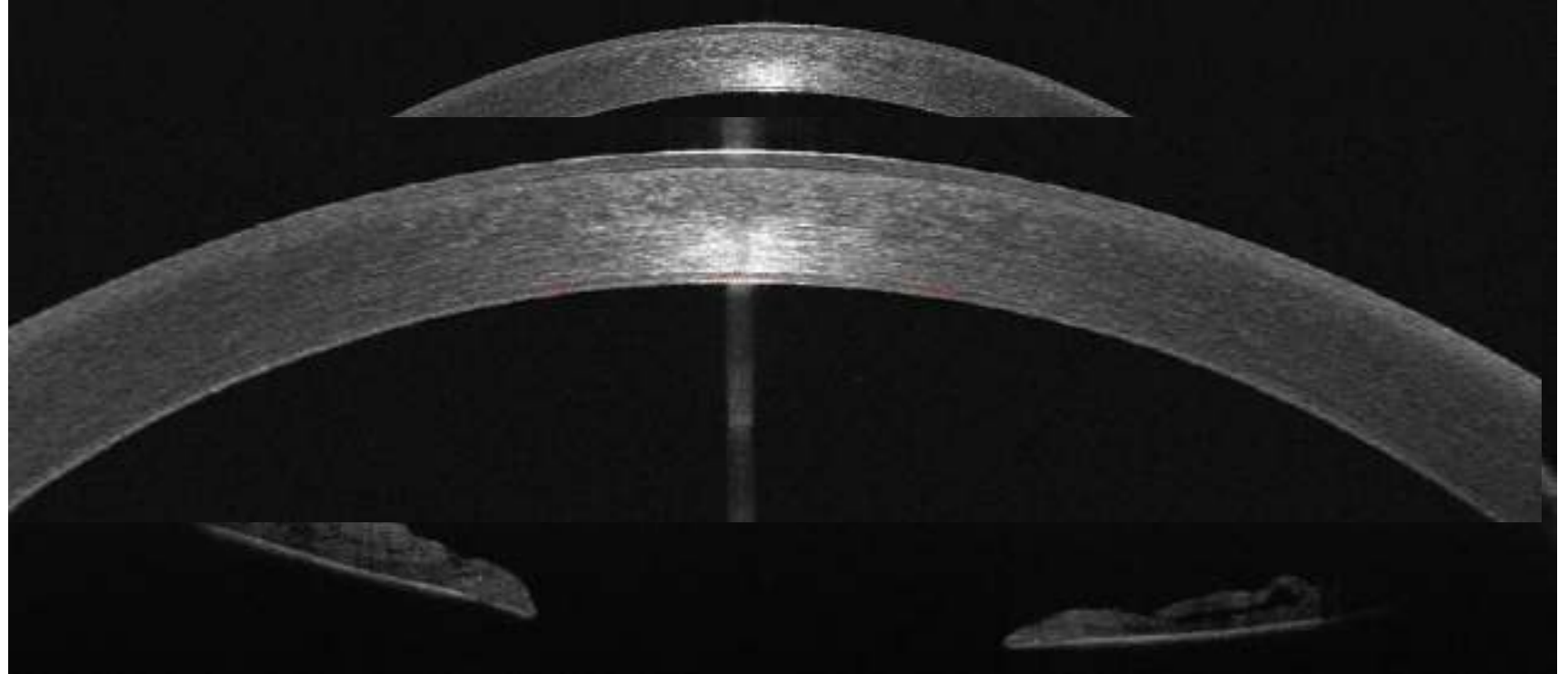
PreDMEK-1: 0.067

(CDVA)

PostDMEK-1: 0.7

PostRejection: 0.2

PostDMEK-2: 0.9



Alió del Barrio JL, Vega-Estrada A, Alió JL. Descemet Membrane Endothelial Keratoplasty (DMEK) Under Previous DMEK for Secondary Endothelial Graft Failure. Cornea 2018; 37(6): 793-795.

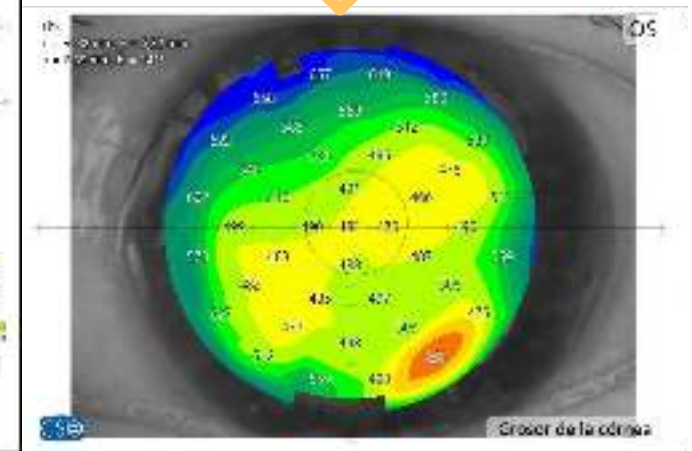
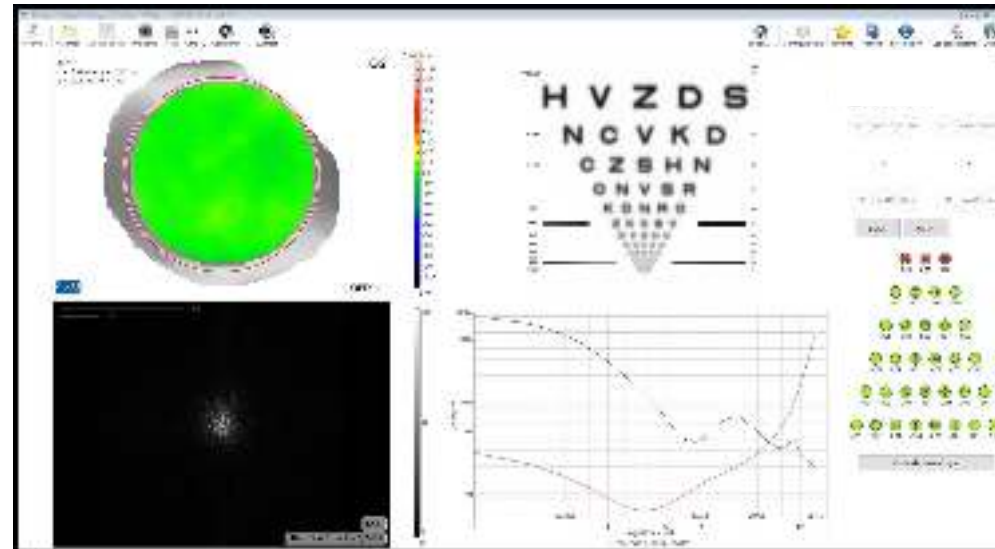
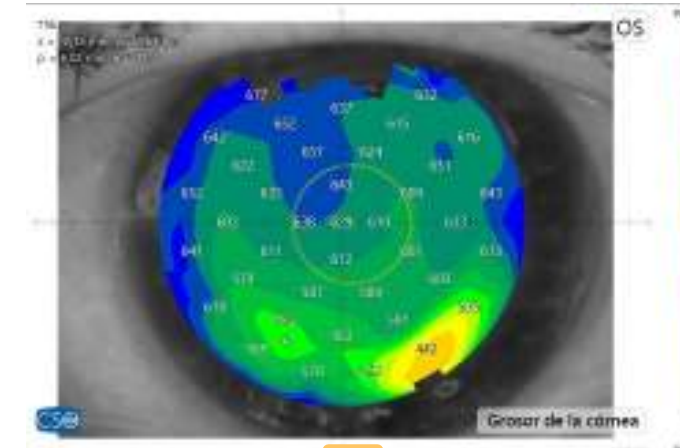
What if DMEK fails? NS-DMEK under DMEK under PK?

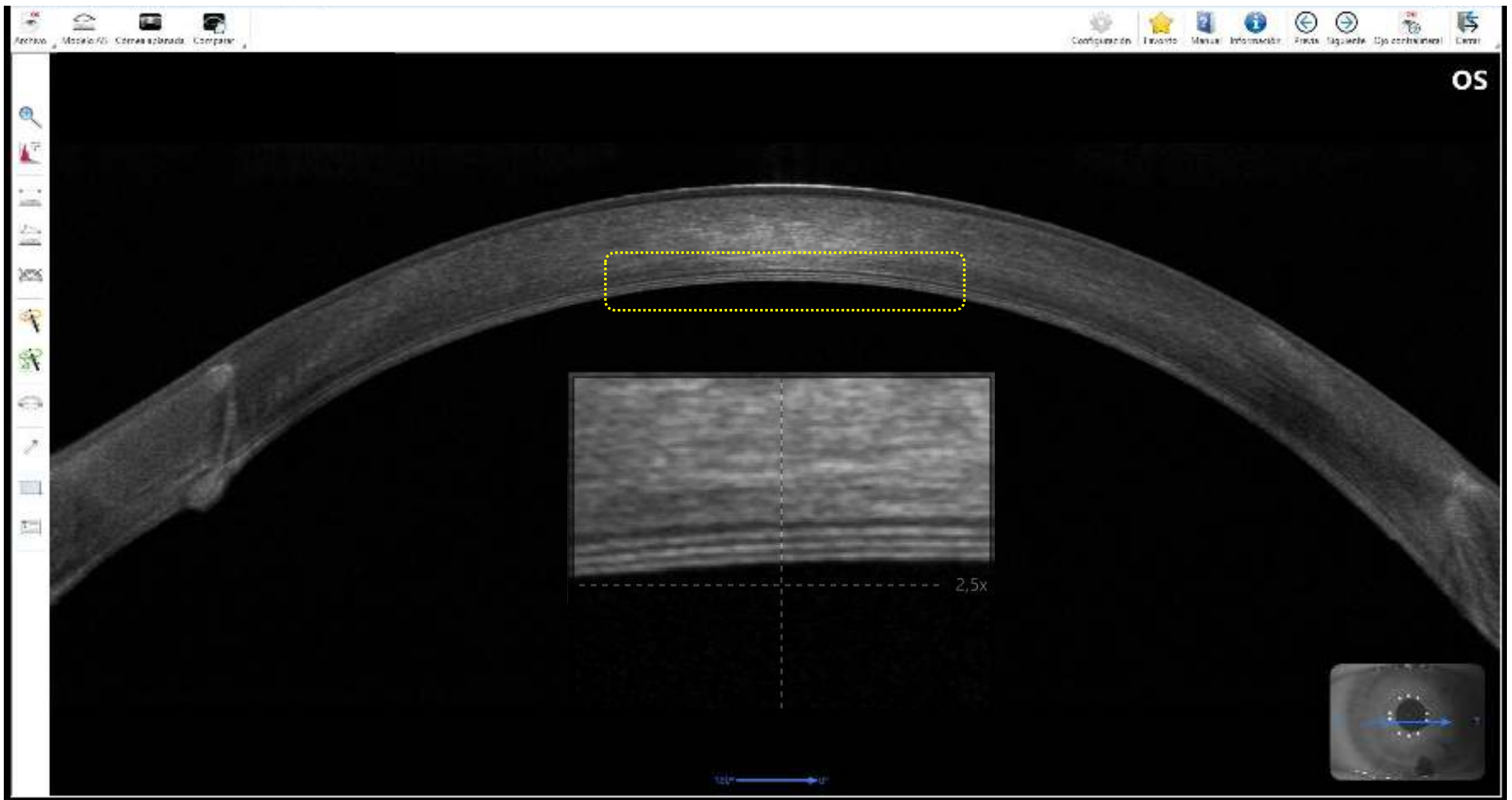
CDVA_pre-DMEK_1 (PK failure): 0.2

CDVA_post-DMEK_1: 0.9

CDVA_pre-DMEK_2 (DMEK-1 failure): 0.3

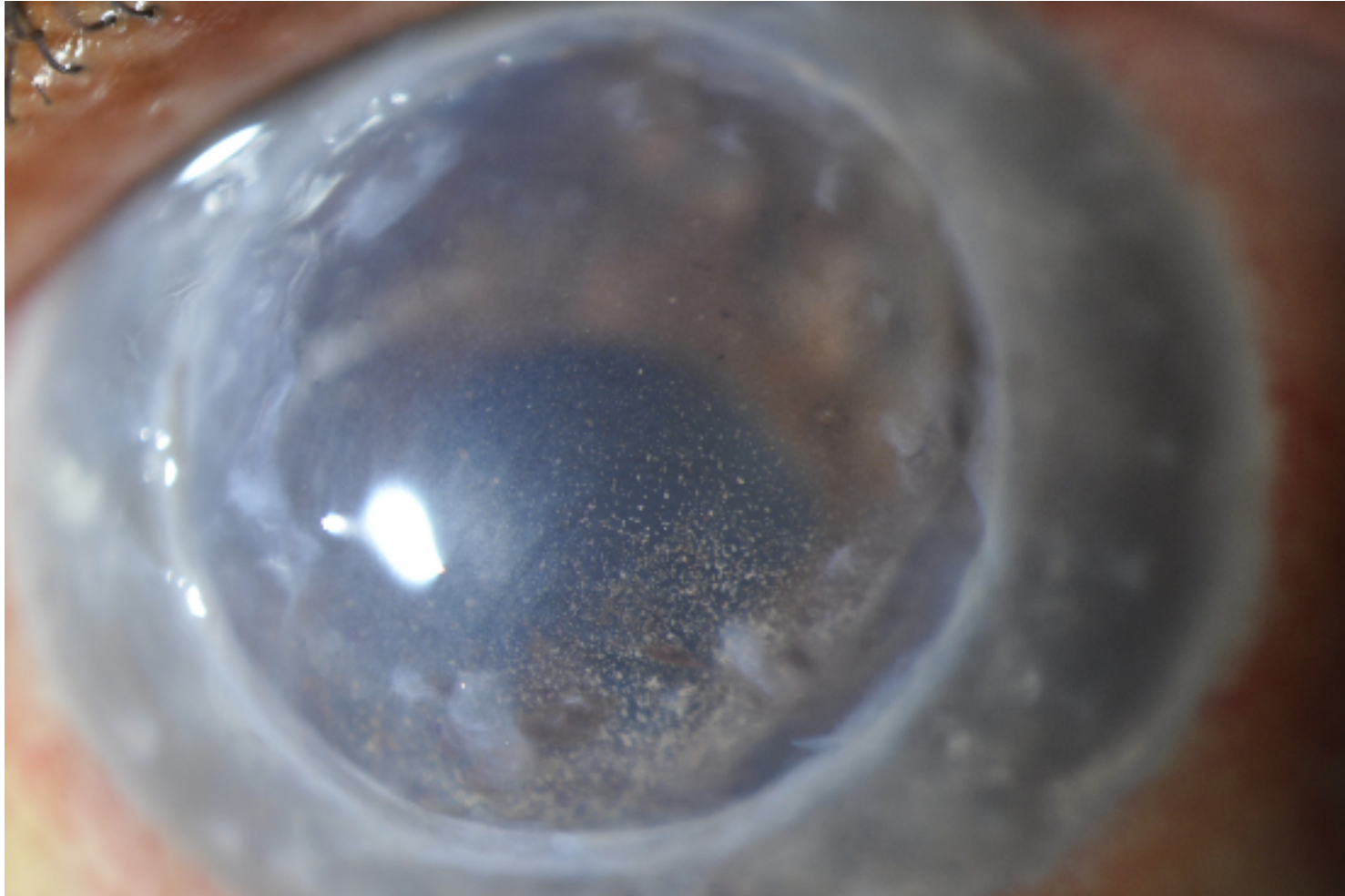
CDVA_post-DMEK_2 (3m): 0.9



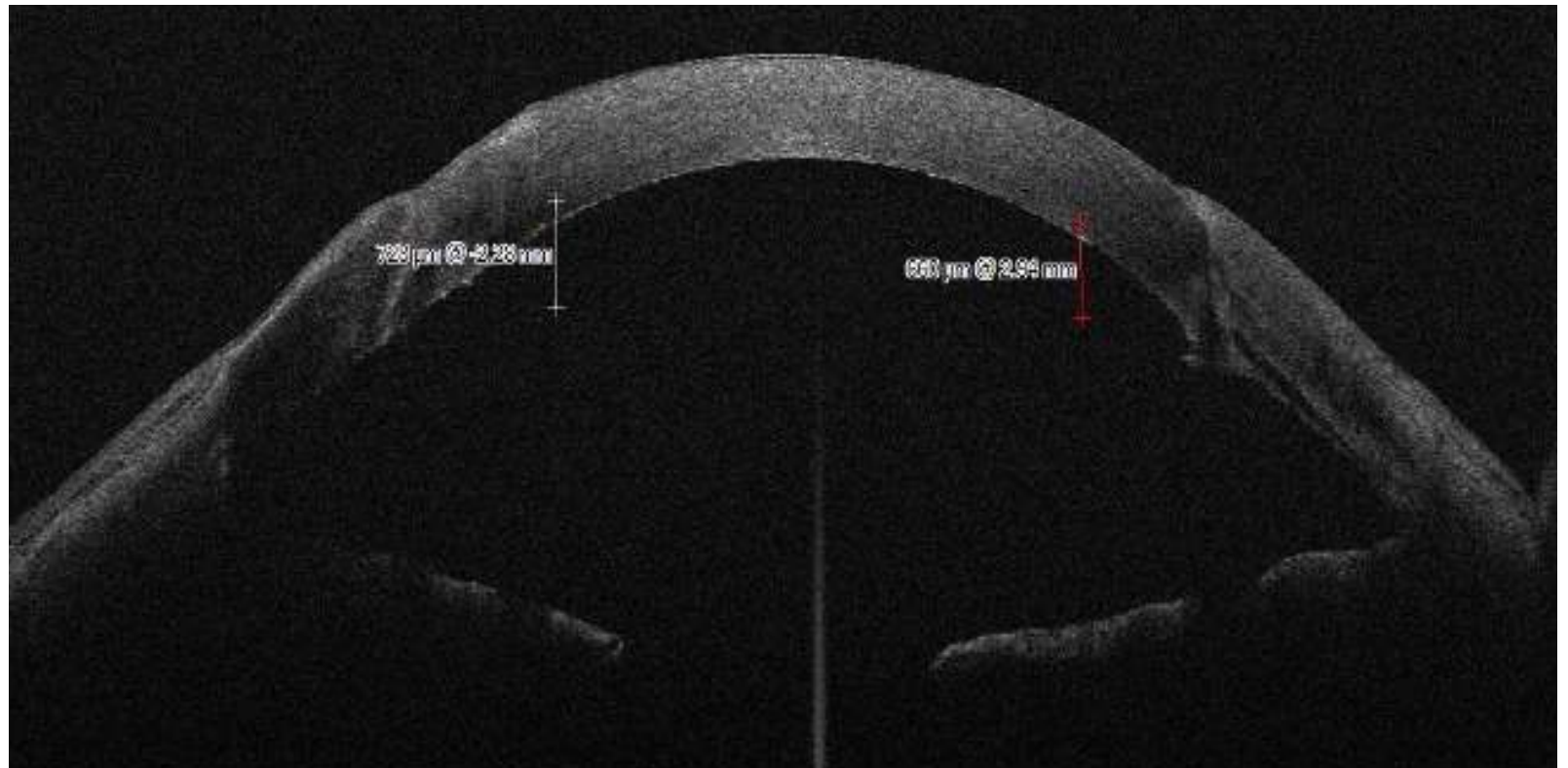


Medalle II RS, Pederzoli M, Alio del Barrio JL. **Management of endothelial failure after non-stripping descemet membrane endothelial keratoplasty (NS-DMEK) under previous penetrating keratoplasty (PKP), a case report.** Indian Journal of Ophthalmology - Case Reports 5(3):p 441-443, Jul-Sep 2025

But...if DM not intact? **DM stripping**
DMEK



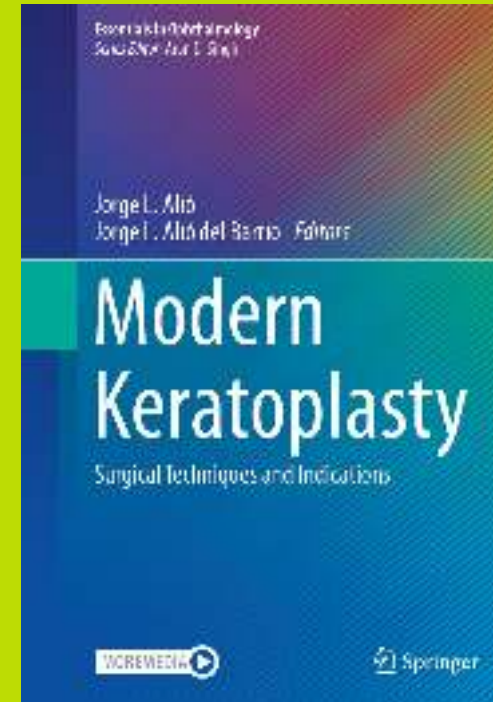
Femto DM-Stripping DMEK under PK





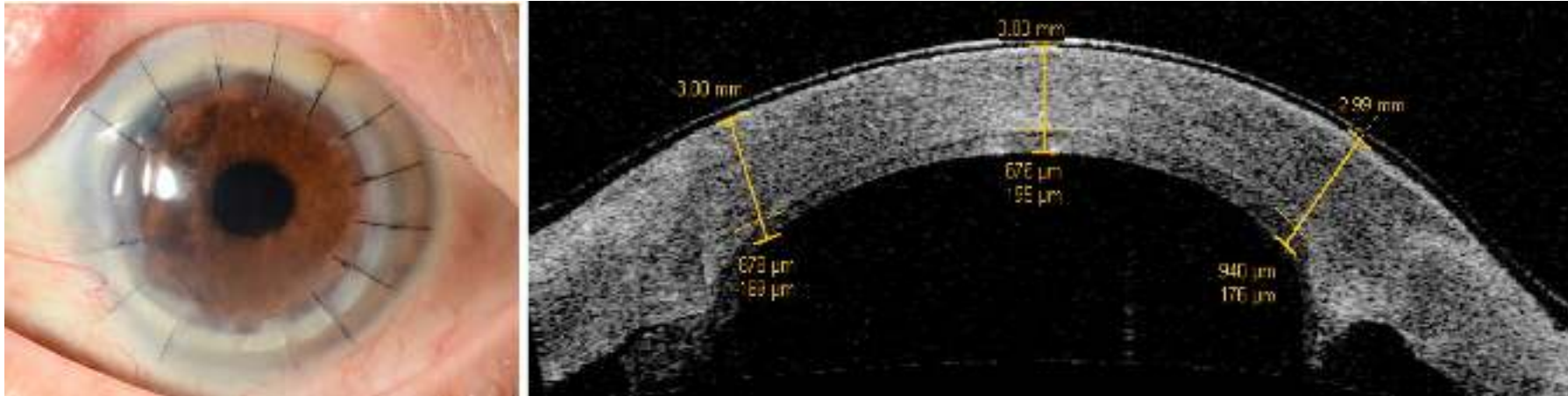
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GRUPO MIRANZA



DSEK under PK

- Technically, similar to a standard DSEK case.
- Pay **attention to the posterior graft-host junction morphology (AS-OCT)**, avoid steps between the donor and the host posterior surfaces
 - ✓ Center the DSEK graft within the PK graft-host junction



- **Graft survival**: is prolonged significantly in eyes with DSEK under a failed PK, compared to redo-PK
 - *Cumulative 5 year survival probability*: 86.4% versus 51.3% respectively
- **DSEK dislocation rate**: 5.9 to 6.3%
 - *Main risk factors*: glaucoma drainage device, mismatch of the posterior graft-host junction.

DM stripping has not been reported to reduce the graft dislocation rate in such cases, so surgeons may therefore choose not to perform DM stripping in DSEK under PK