CENTRO DI ECCELLENZA REGIONALE IN OFTALMOLOGIA

UNIVERSITÀ DEGLI STUDI "G.d'ANNUNZIO" CHIETI - PESCARA

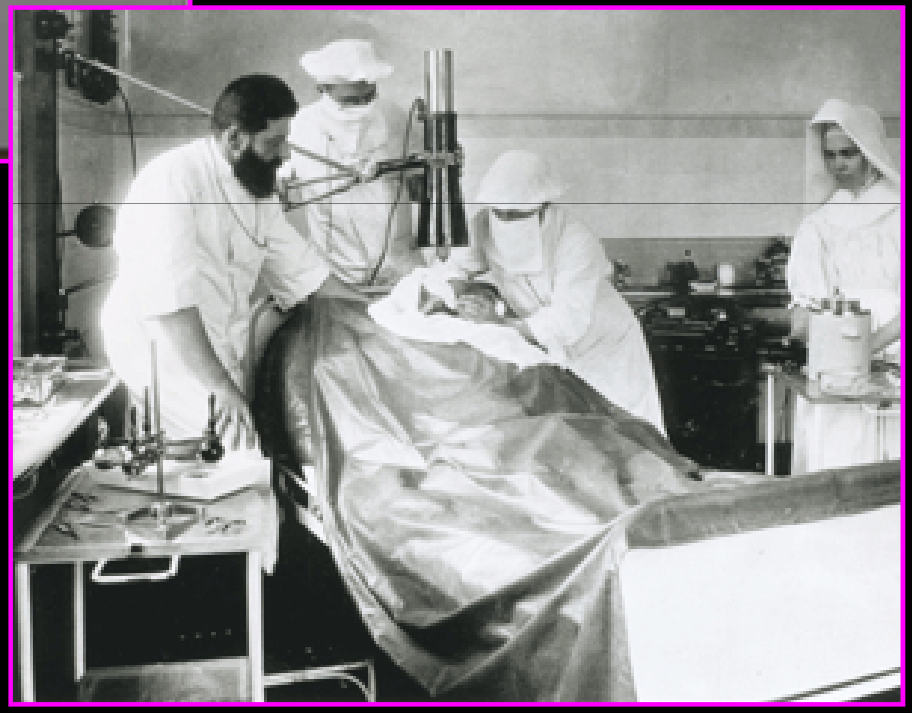
CLINICA OFTALMOLOGICA

direttore Prof. Leonardo Mastropasqua

Novità in Chirurgia della Cornea

Leonardo Mastropasqua

Palermo, SOSI 2010

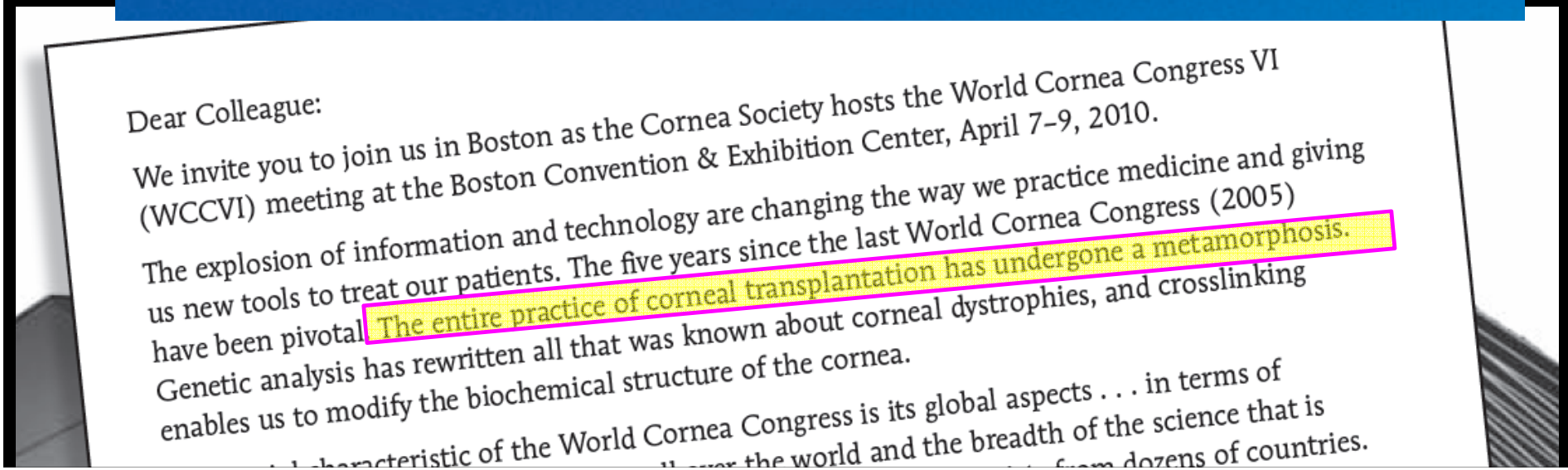


Moffatt SL, Cartwright VA, Stumpf TH. "Centennial review of corneal transplantation." *Clin Experiment Ophthalmol*. 2005 Dec;33(6):642-57.

WORLD CORNEA VI CONGRESS

Boston Convention & Exhibition Center

April 7–9, 2010



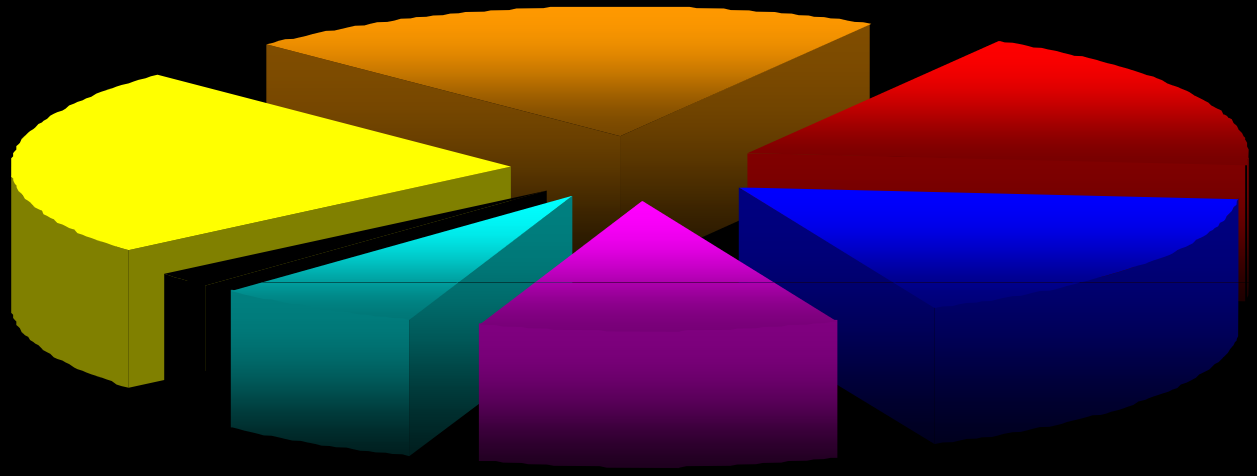
Dear Colleague:

We invite you to join us in Boston as the Cornea Society hosts the World Cornea Congress VI (WCCVI) meeting at the Boston Convention & Exhibition Center, April 7–9, 2010.

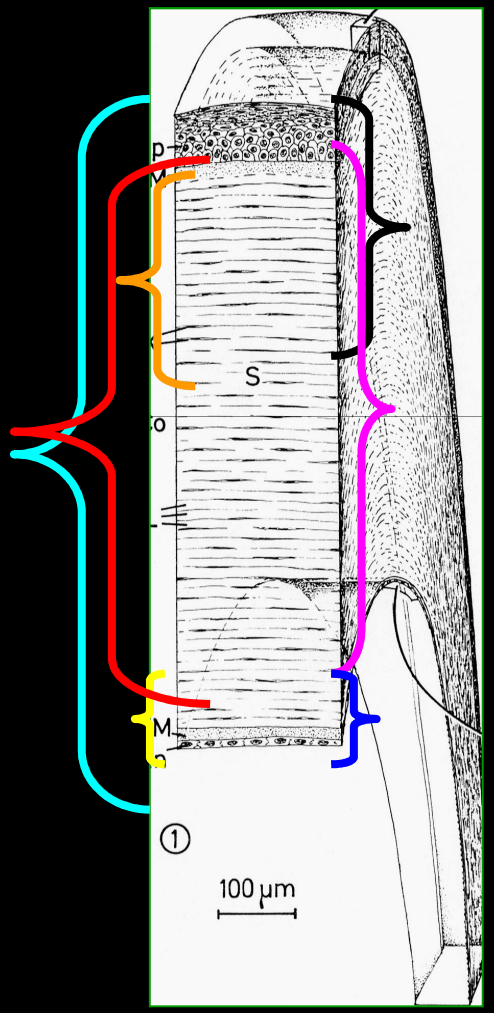
The explosion of information and technology are changing the way we practice medicine and giving us new tools to treat our patients. The five years since the last World Cornea Congress (2005) have been pivotal. The entire practice of corneal transplantation has undergone a metamorphosis. Genetic analysis has rewritten all that was known about corneal dystrophies, and crosslinking enables us to modify the biochemical structure of the cornea.

characteristic of the World Cornea Congress is its global aspects . . . in terms of the world and the breadth of the science that is dozens of countries.

Classical Indications to PK



- *Bullous Keratopathy*
- **Keratoconus**
- *Non herpetic keratitis*
- *Regraft*
- *Herpetic keratitis*
- *Distrophyes*



A Review of Randomized Controlled Trials of Penetrating Keratoplasty Techniques

N. Andrew Frost, PhD,[1] Johnny Wu, MBBS (Hons), MMedSci,[2] Tze F. Lai, MBBS (Hons), MPHC,[2] Douglas J. Coster, FRANZCO[2]

Ophthalmology 2006;113:942–949

suture intraoperatively if used. However, there was little convincing evidence for choosing interrupted suturing versus continuous suturing or for an effect of suturing on final sutures-out astigmatism. Likewise, there was no convincing evidence for the superiority of any lamellar alternative to PK for deep stromal disease. Overall, most of the effects of changing technique were small, and there was no evidence for the superiority of any specific technique in terms of improved quality of life or cost-effectiveness.

Cauterization of the Cone in Keratoconus

Trephine Design

Trephine Sizing

Viscoelastics

Vitrectomy

Intraocular Lenses

Epithelial Debridement

Suture Materials

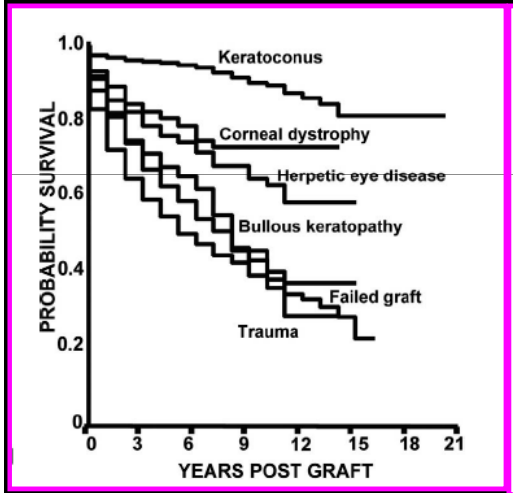
Suturing Technique

Lamellar Alternatives for Deep Stromal Disease

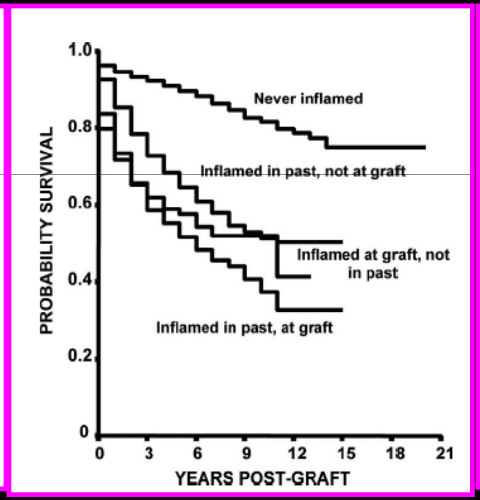
The Impact of Corneal Allograft Rejection on the Long-Term Outcome of Corneal Transplantation

DOUGLAS J. COSTER, FRACO, AND KERYN A. WILLIAMS, PHD

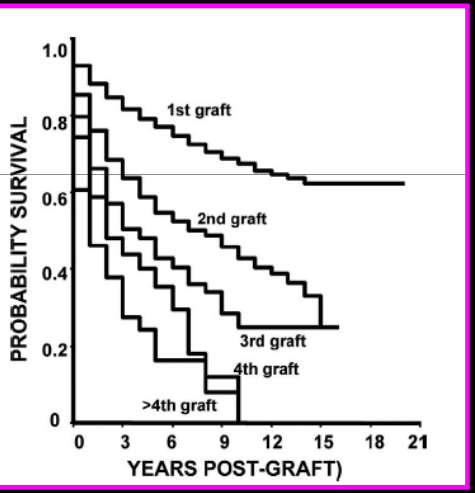
(Am J Ophthalmol 2005;140:



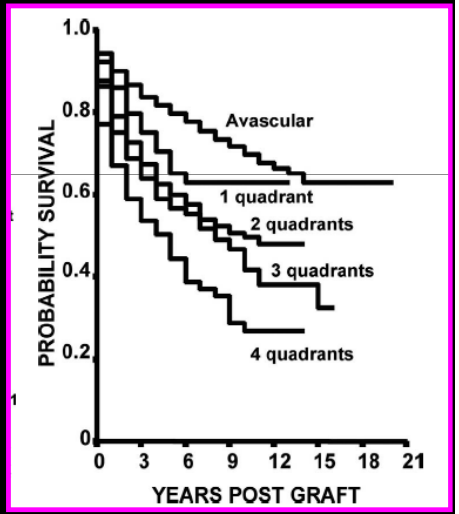
Pathology



Inflammation



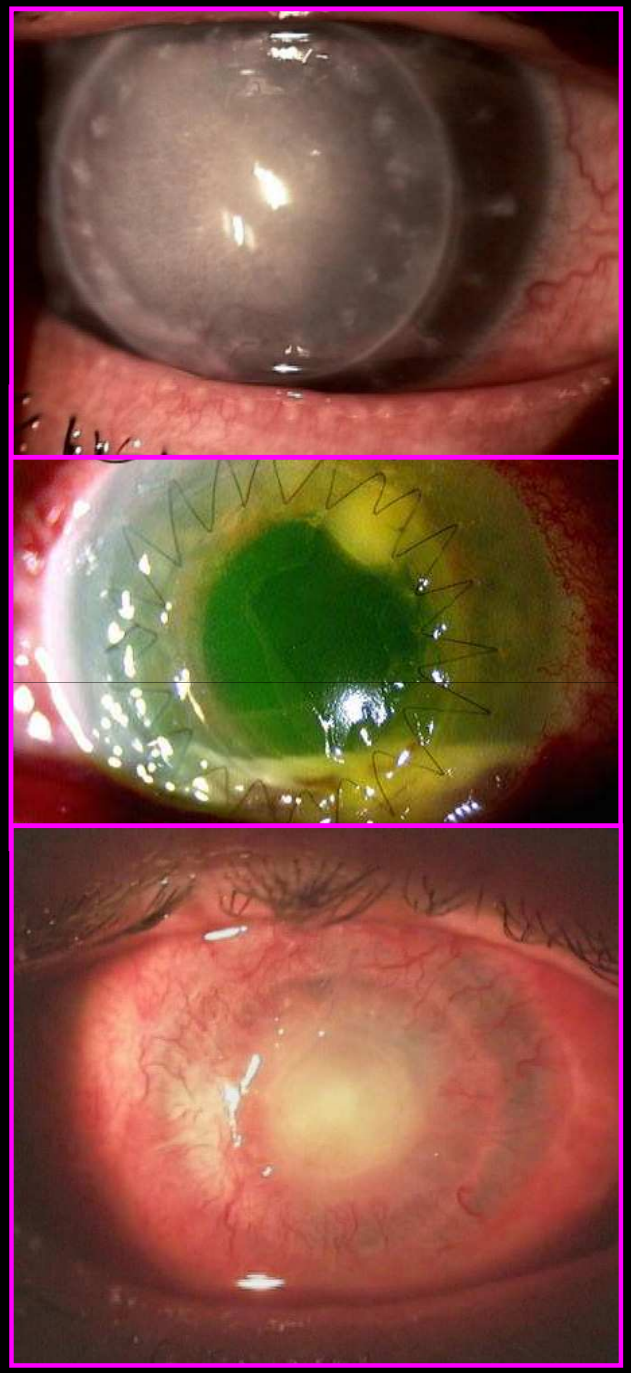
Re-grafting



Vascularization

- RESULTS: Corneal graft outcome is not improving with era. The sequelae of inflammation, whether occurring before corneal transplantation or subsequently, exert a profound influence by predisposing the graft to rejection.

- CONCLUSIONS: Corneal allograft rejection remains a major cause of graft failure. High-level evidence to vindicate the use of a particular approach or treatment to prevent or treat corneal graft rejection is lacking. In the



Nagative factors for PK

1. Graft survival and endothelial depletion
2. Rejection
3. Open-sky surgery
4. Astigmatism

Lamellar Surgical Philosophy

Component Surgery of the Cornea

Shimmura et al. Cornea, 2004,

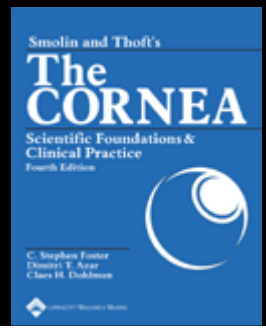
Paradigm Shifts in Corneal Transplantation

Donald TH Tan,[1-4] *FRCSED, FRCOphth, FAMS*, Arundhati Anshu,[2] *FRCSED*, Jodhbir S Mehta,[2,4] *FRCSED*

2009

"Lamellar keratoplasty represents a more conservative surgical approach than penetrating keratoplasty in that only the diseased portions of a compromised cornea are designated for transplantation while the healthy structures remain intact."

Smolin & Thoft's The Cornea, 2004, 4th Ed, Chap 62



Review Article

Paradigm Shifts in Corneal Transplantation

Donald TH Tan,[1-4]*FRCSED, FRCOphth, FAMS*, Arundhati Anshu,[2]*FRCSED*, Jodhbir S Mehta,[2,4]*FRCSED*

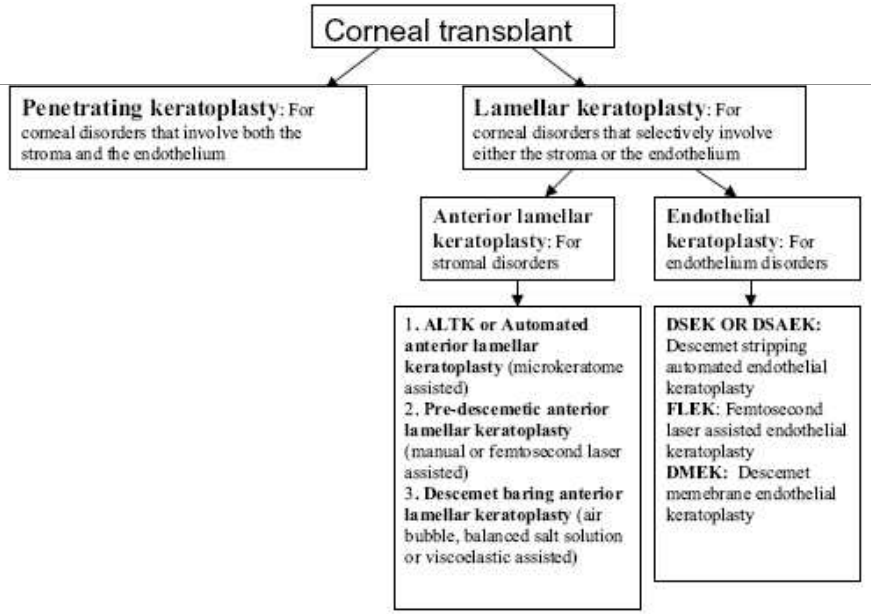


Fig. 1. Schematic diagram depicting the various forms of lamellar keratoplasty procedures and the indications.

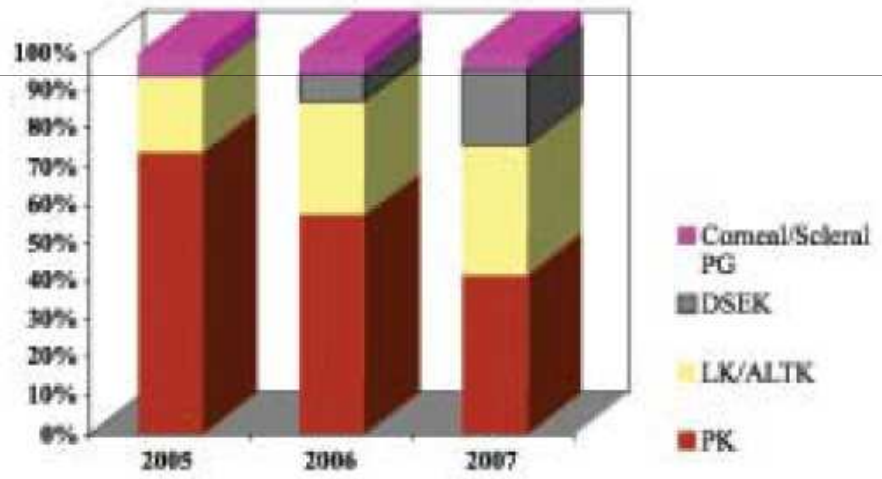


Fig. 2. Bar chart depicting shifting trends in corneal grafting procedures at SNEC over the past 3 years. In 2005, penetrating keratoplasty (PK) was the most commonly performed grafting procedure while in 2007, lamellar keratoplasty in the form of anterior lamellar keratoplasty (LK and ALTK) and descemet stripping endothelial keratoplasty (DSEK) was the most common procedure.

Am J Ophthalmol 2006

EDITORIALS

Deep Lamellar Keratoplasty

SHIGETO SHIMMURA, MD, AND KAZUO TSUBOTA, MD

Am J Ophthalmol 2009

EDITORIALS

Deep Anterior Lamellar Keratoplasty: When Should it Replace Penetrating Keratoplasty?

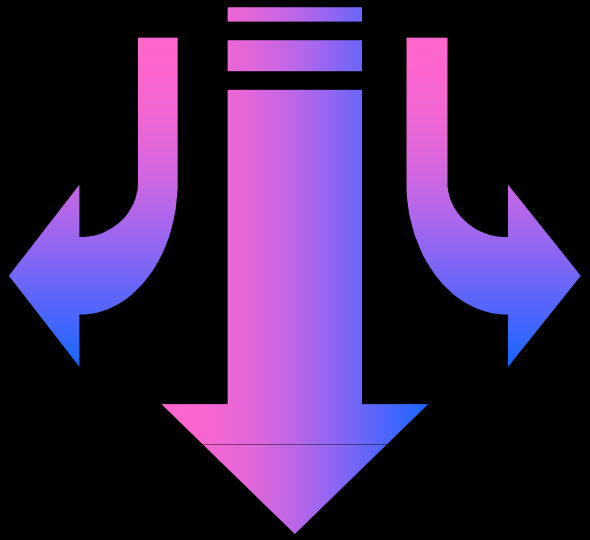
JOHN E. SUTPHIN, KENNETH M. GOINS, AND MICHAEL D. WAGONER

EYE BANK ASSOCIATION of AMERICA

2008 Eye Banking Statistics Reported by U.S. Banks: Distribution of Tissues 77 U.S. Eye Banks Reporting

Distribution	2008	2007	2006	2005	2004
Corneal Grafts Total	52,487	50,122	45,035	48,298	51,544
Penetrating Keratoplasty	32,524	34,806	38,064	45,821	51,544
Anterior (Lamellar) Keratoplasty	1,072	950	806	869	-
Endothelial Keratoplasty	17,468	14,159	6,027	1,429	-
Keratolimbal Allograft	173	207	138	179	-
Tectonic	1,250	-	-	-	-
Sclera	5,374	4,698	4,018	3,886	5,323
Long-Term Preserved Corneas	989	-	-	-	-
Research	13,730	13,824	11,845	14,332	15,780
Training	5,385	4,801	4,858	5,477	4,852

"Functional" Indication to graft surgery



Deep Lamellar Keratoplasty

Anterior, Ectatic pathologies with endothelial sparing

Penetrating Keratoplasty

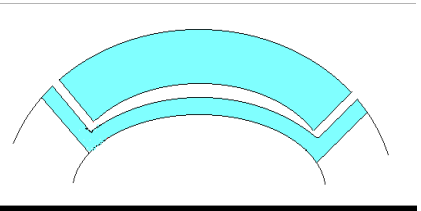
Anterior, posterior, ectatic pathologies, regraft

Posterior Lamellar Keratoplasty

Endothelial decompensation, dystrophies, depletion

Shimazaki J. The evolution of lamellar keratoplasty. Curr Opin Ophthalmol 2000.

Pros and cons of lamellar keratoplasty



Deep lamellar keratoplasty (DLKP)

Descemetic or Pre-descemetic

Preserves advantages of LKP

Visual Outcome comparable with PKP

Shimazaki J, Shimmura S, Ishioka M, et al. Randomized clinical trial of deep lamellar keratoplasty vs penetrating keratoplasty. Am J Ophthalmol 2002

Extraocular procedure

(limited risk of glaucoma, infection)

Endothelial sparing
no endothelial rejection
less immunosuppresion
low incidence of infection, glaucoma, cataract

Greater "wound strenght", Wider criteria for donor selection

Lamellar keratoplasty (LKP)

Visual outcome inferior to PK

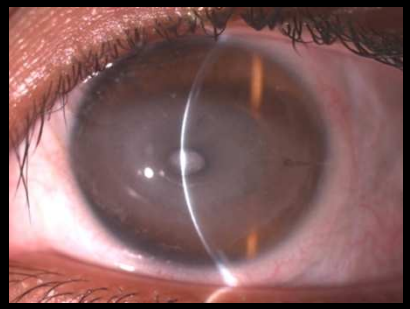
Sugita J, Kondo J. Deep lamellar keratoplasty with complete removal of pathological stroma for vision improvement. Br J Ophthalmol 1997

Richard JM, Paton D, Gasset AR. A comparison of penetrating keratoplasty and lamellar keratoplasty in the surgical management of keratoconus. Am J Ophthalmol 1978

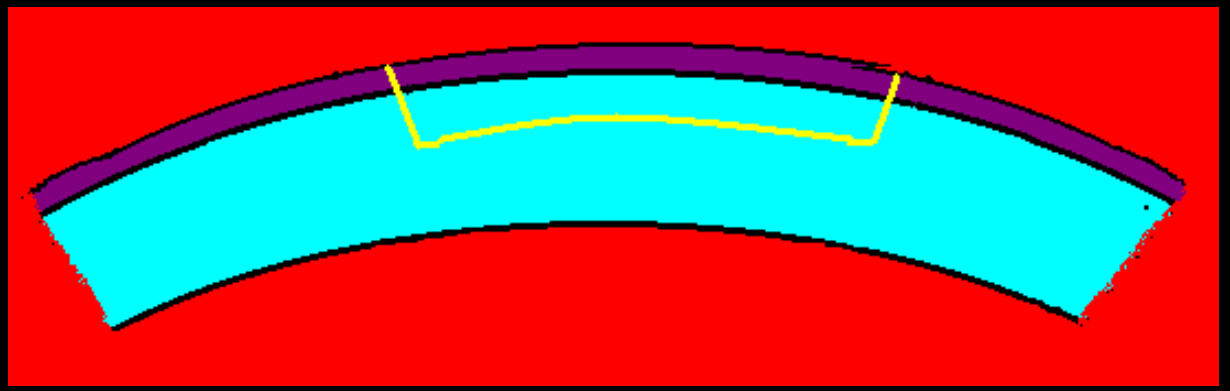
Benson WH, Goosey CB, Prager TC, et al. Visual improvement as a function of time after lamellar keratoplasty for keratoconus. Am J Ophthalmol 1993

Component Surgery of the Cornea

S. Shimmura, Cornea 2004

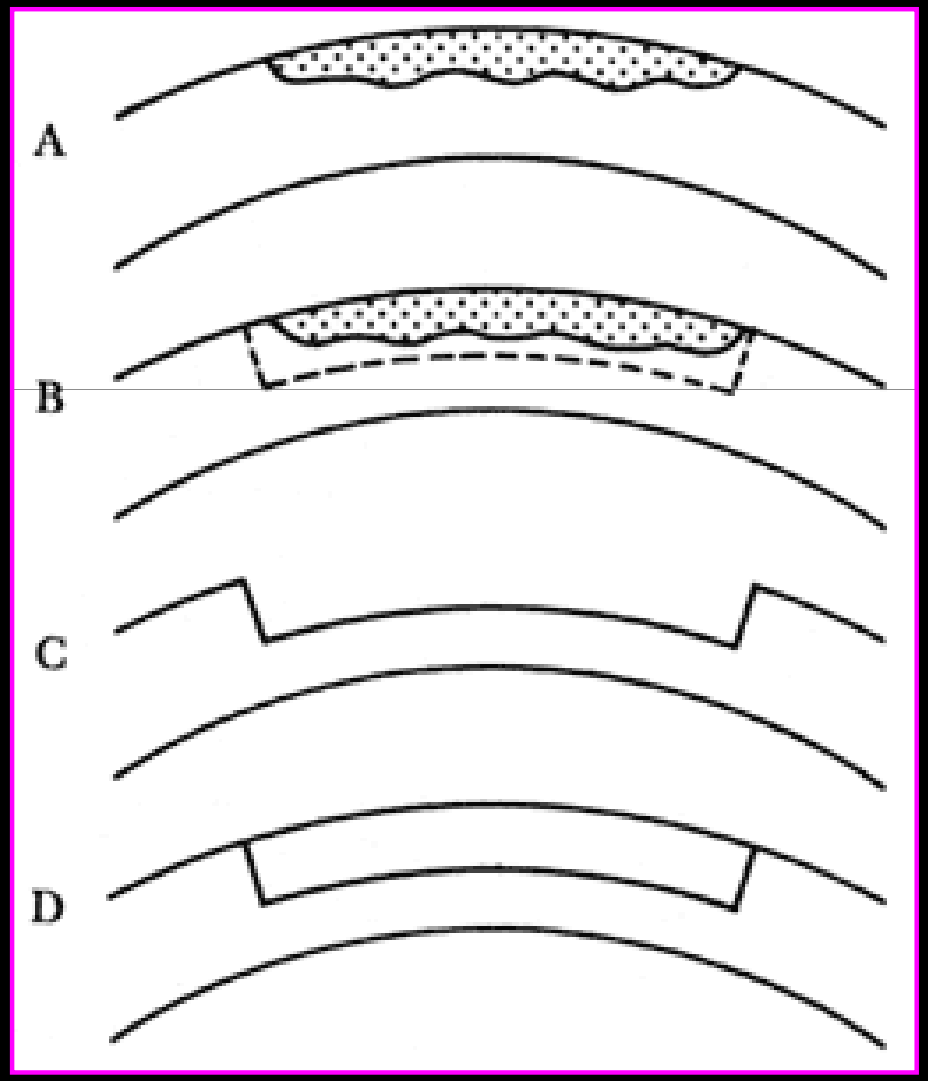


Superficial Anterior Lamellar Keratoplasty (SALK)



Anterior Lamellar Keratoplasty

Partial transplantation of stromal tissue

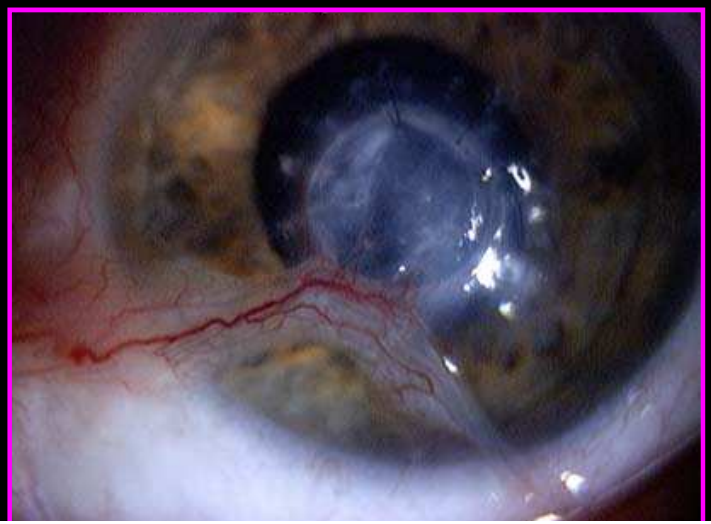


Optical goal

Refractive power and transparency

Tectonic goal

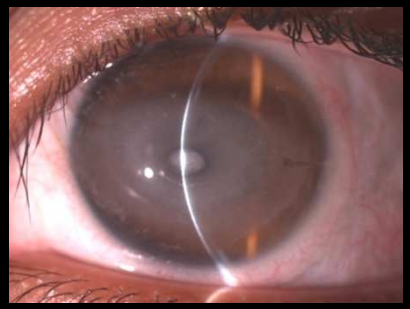
Structural integrity of the cornea (Perforations, ectasia)

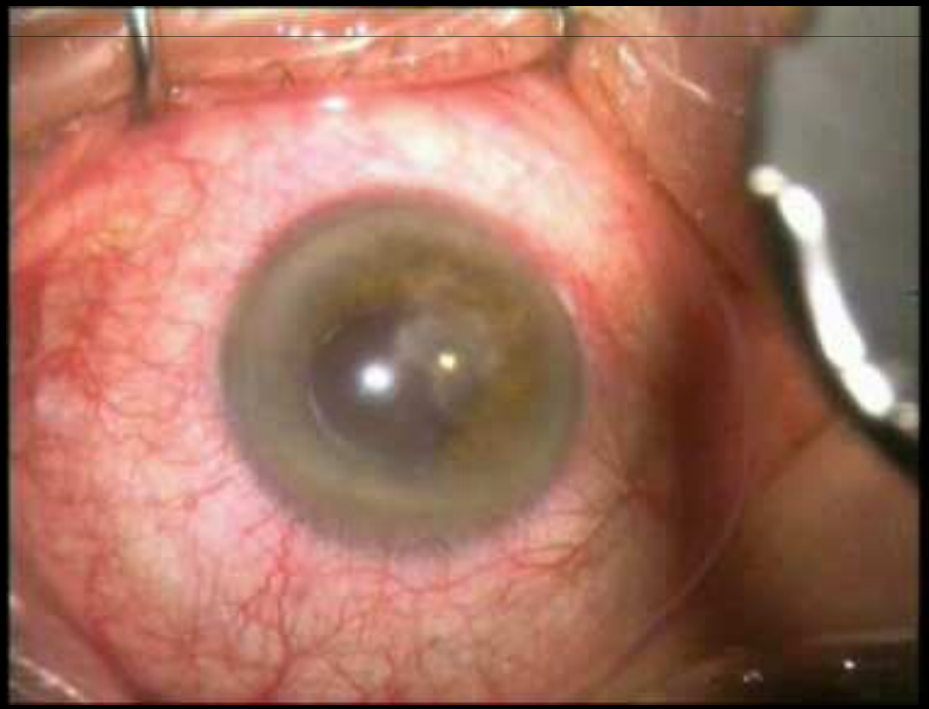


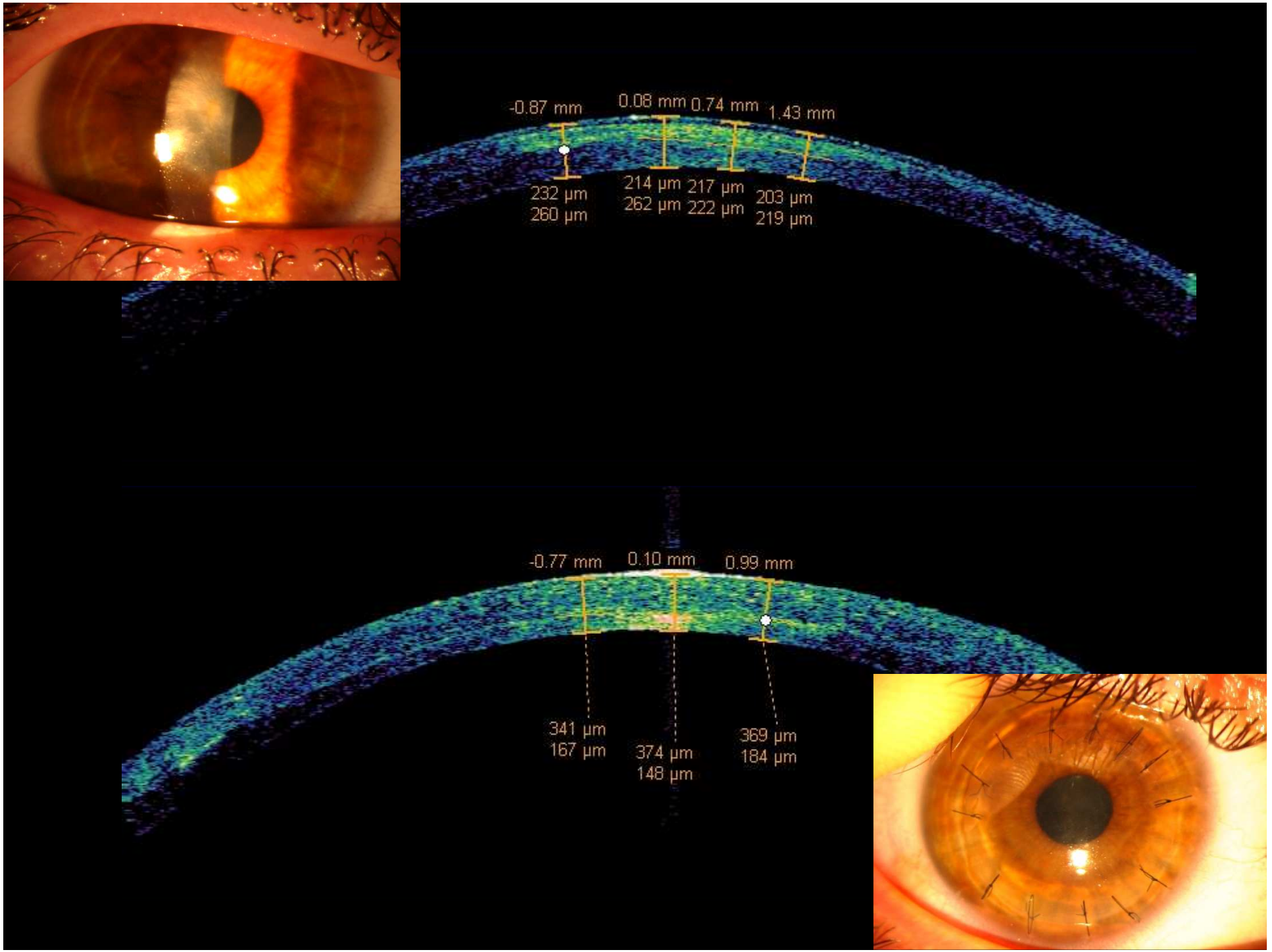
Component Surgery of the Cornea

S. Shimmura, Cornea 2004

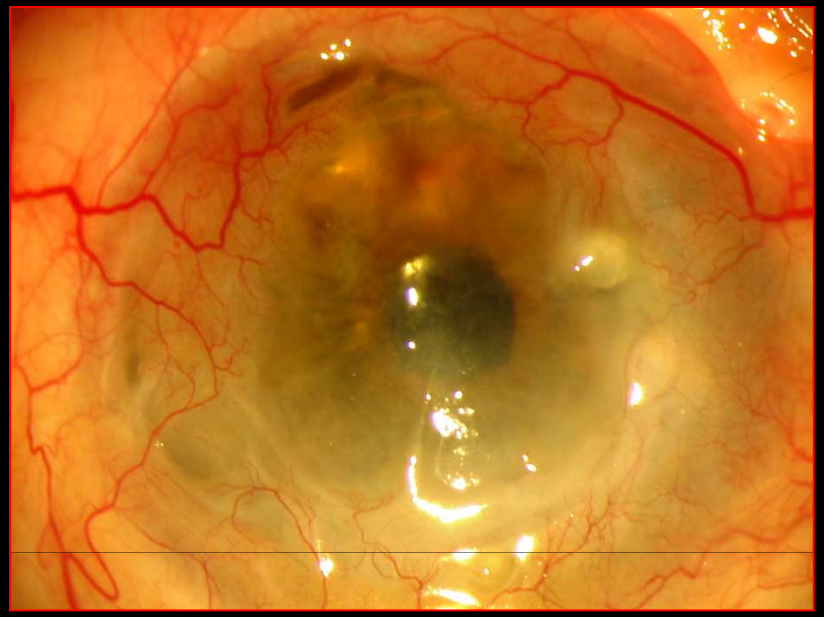
Superficial Anterior Lamellar Keratoplasty (SALK)

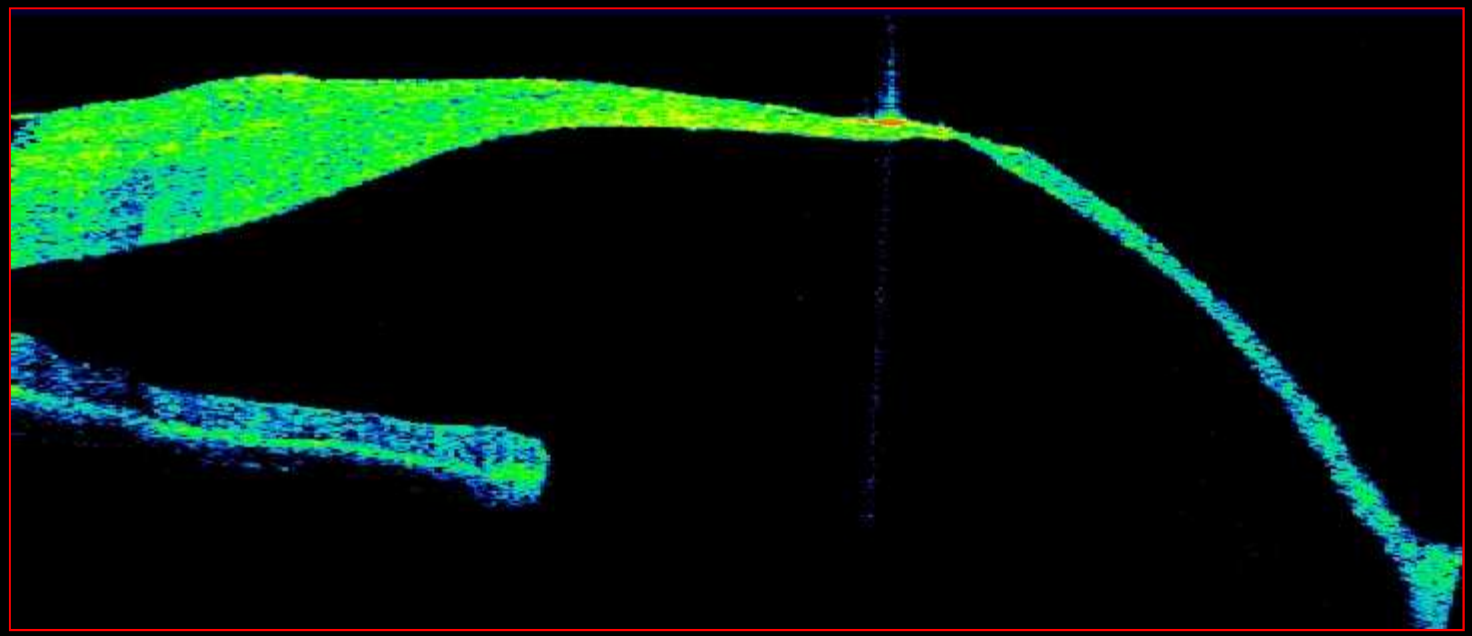




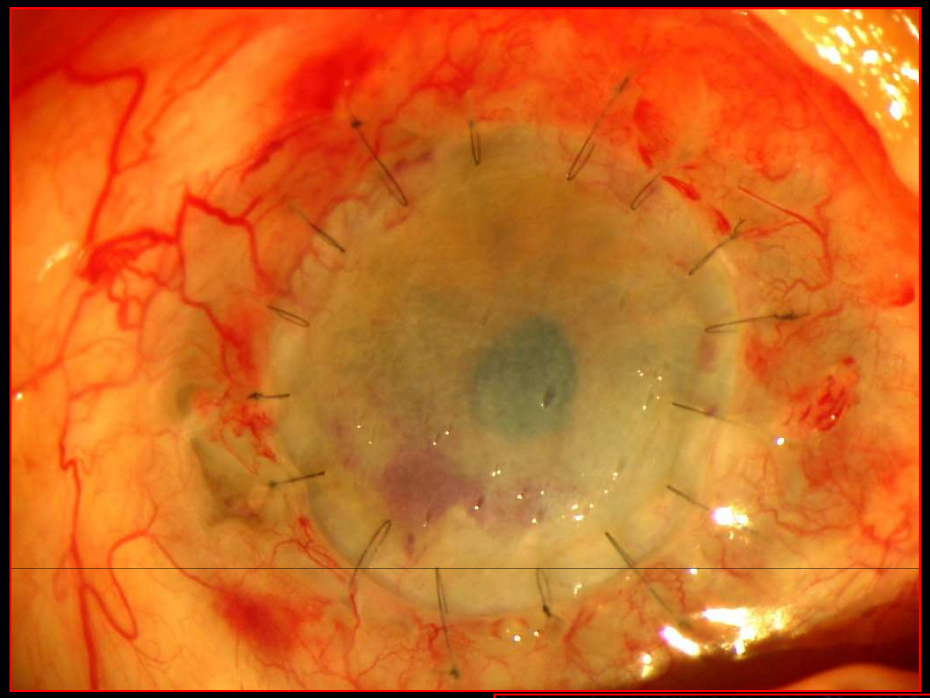

-0.87 mm
0.08 mm
0.74 mm
1.43 mm
232 µm
260 µm
214 µm
262 µm
217 µm
222 µm
203 µm
219 µm
-0.77 mm
0.10 mm
0.99 mm
341 µm
167 µm
374 µm
148 µm
369 µm
184 µm

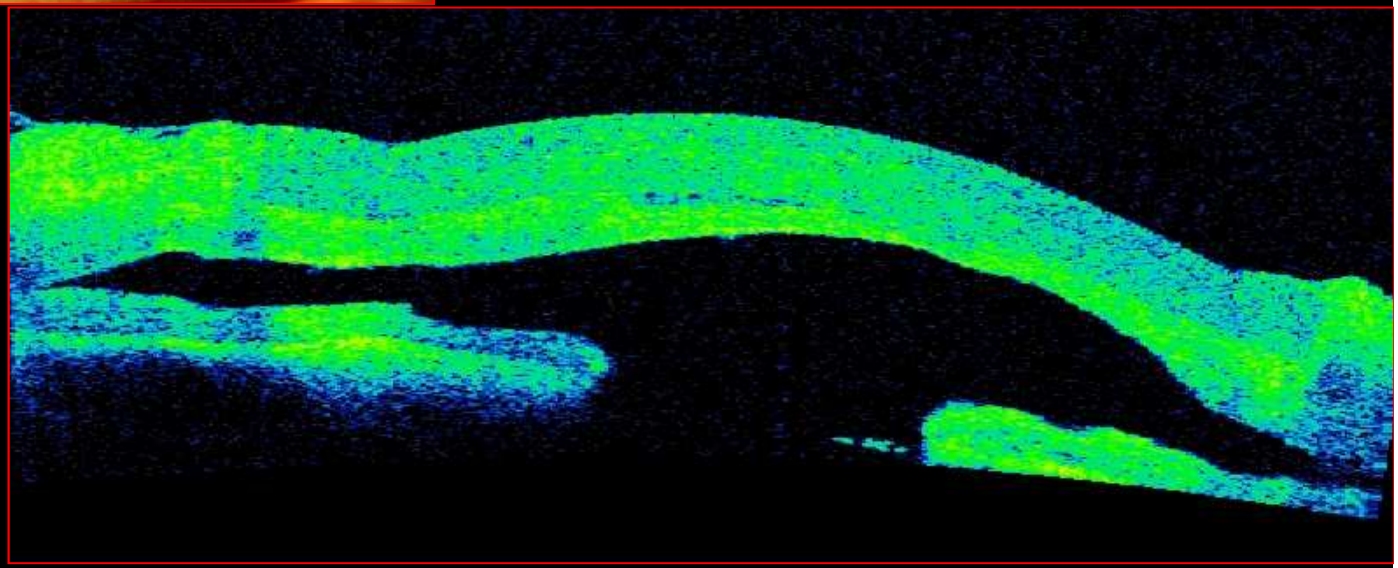
Corneal thinning and descemetocele in PK





Tectonic LK in corneal reconstruction



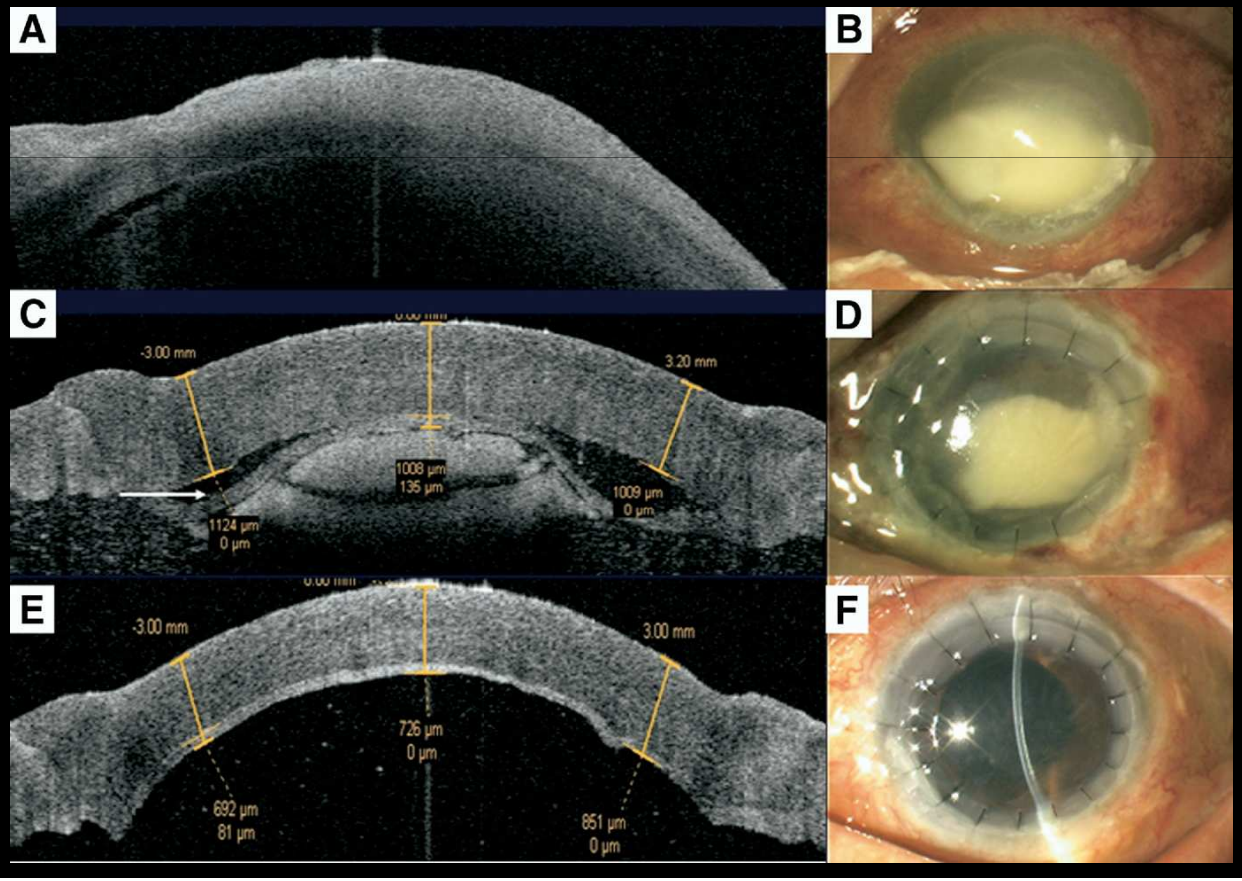


Outcomes of Therapeutic Deep Lamellar Keratoplasty and Penetrating Keratoplasty for Advanced Infectious Keratitis

A Comparative Study

Ophthalmology 2009;116:615–623

Arundhati Anshu, FRCSED,[1,2] Anand Parthasarathy, MD,[1] Jodhbir S. Mehta, FRCSED,[1,2] Hla Myint Htoon, PhD,[2] Donald T. H. Tan, FRCSED, FRCOphth[1,2,3]



Lamellar Keratoplasty for corneal acute infections

Indications:

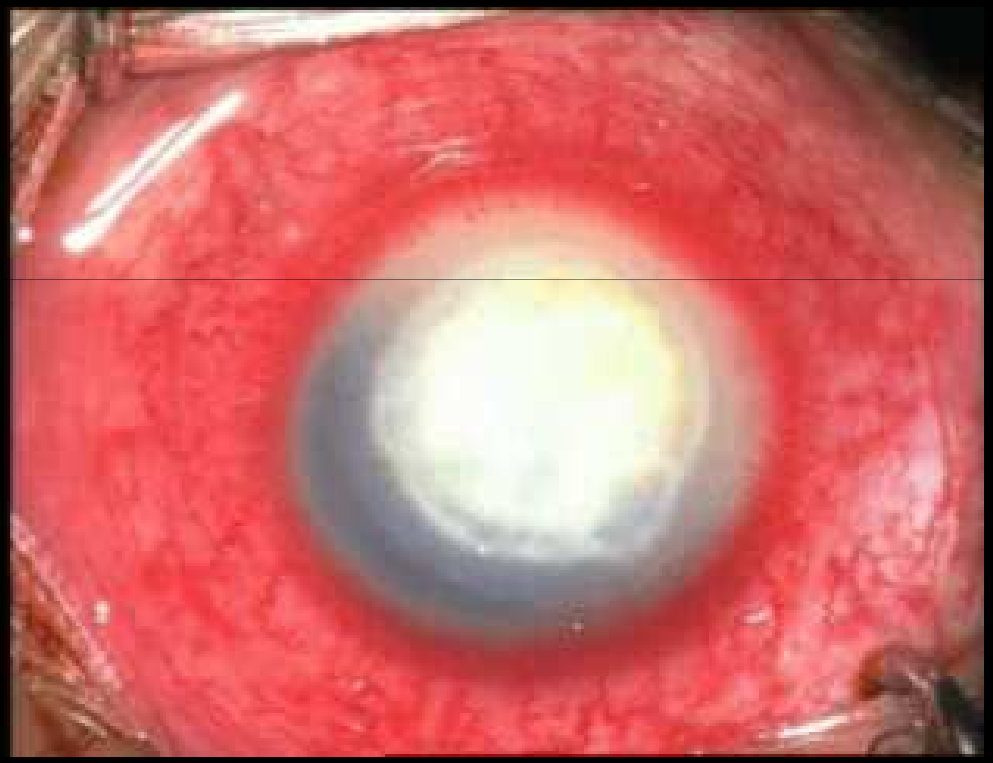
- Perforation risk
- Medical treatment faliure
- Extension of the infiltration

Advantages:

- Low rejection risk
- Low risk of endophthalmitis

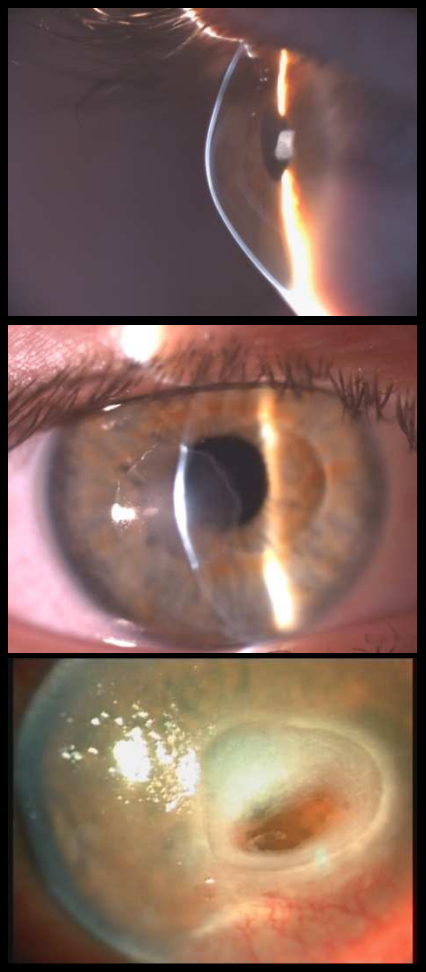
Disadvantages:

- Incomplete excision
- recurrency

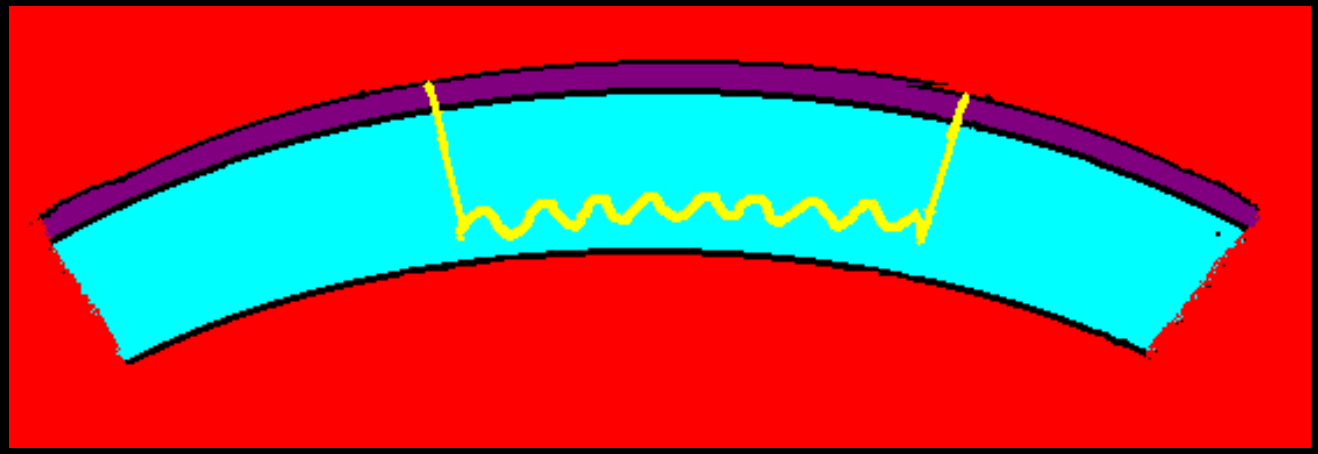


Component Surgery of the Cornea

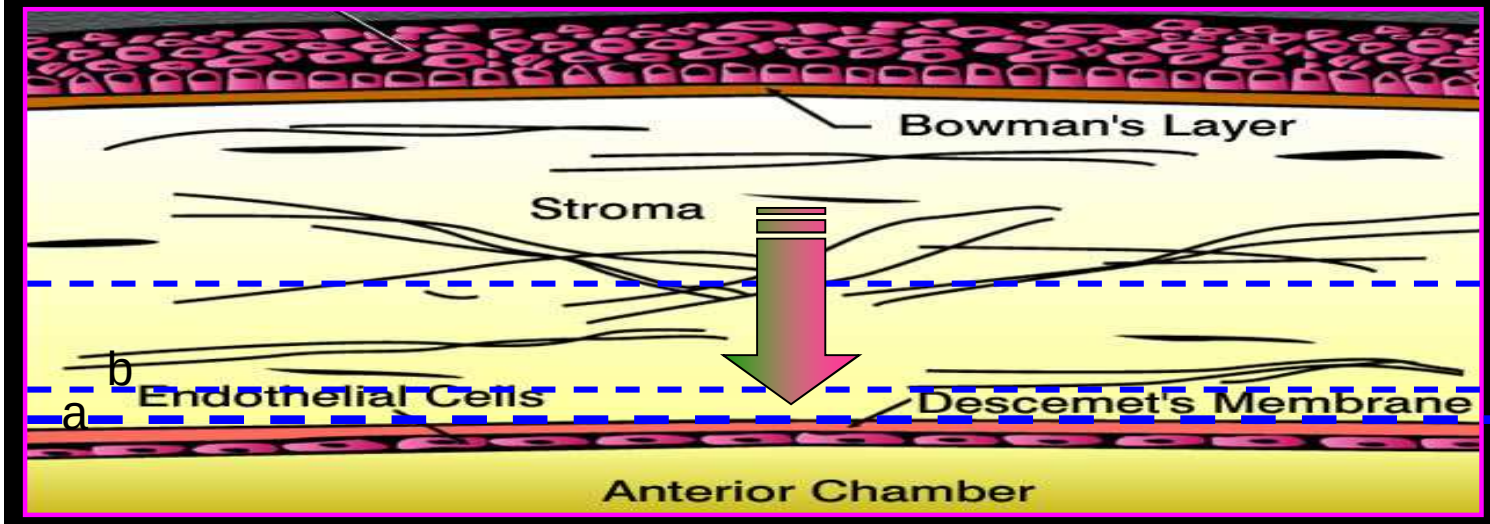
S. Shimmura, Cornea 2004



Deep Anterior Lamellar Keratoplasty (DALK)



Deep Lamellar Keratoplasty (DLKP - DALK)



LKP

DLKP

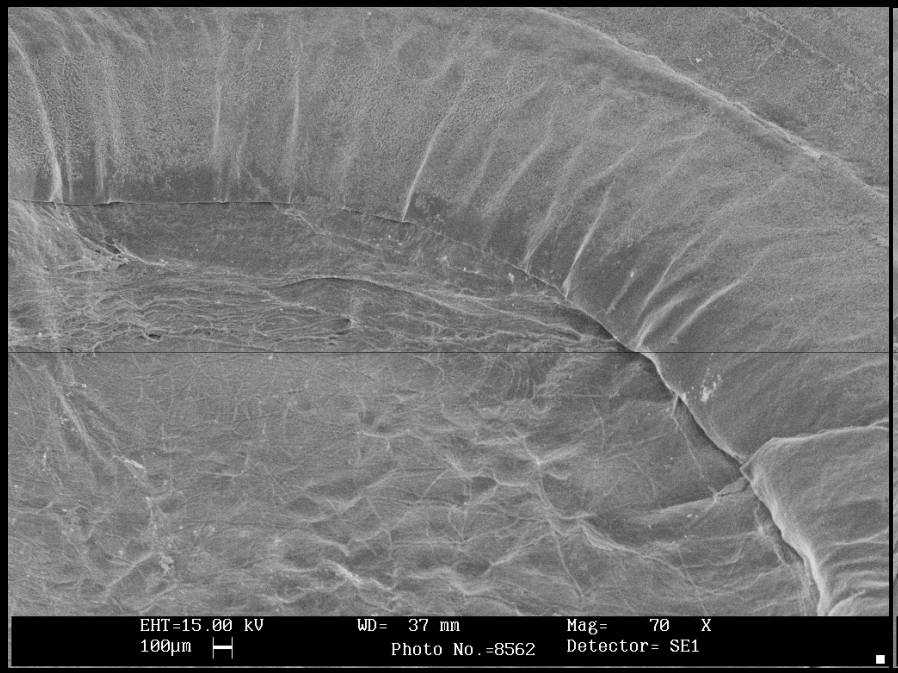
a) Descemetic

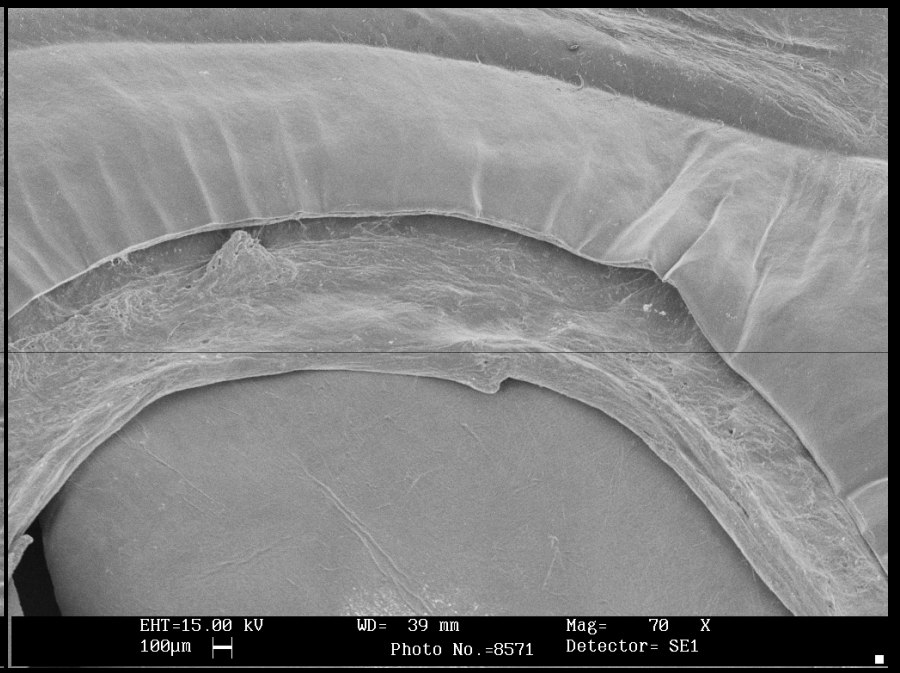
b) Pre-Descemetic

Deep Interface:

1. Not significant irregularity and opacity of interface
2. Stroma-Descemet interface or minimal irregularity of deep stromal interface
3. Visual outcome comparabe with PK

Differences between Descemetic And non Descemetic DALK surfaces





SEM:
stromal interface of Manual dissection

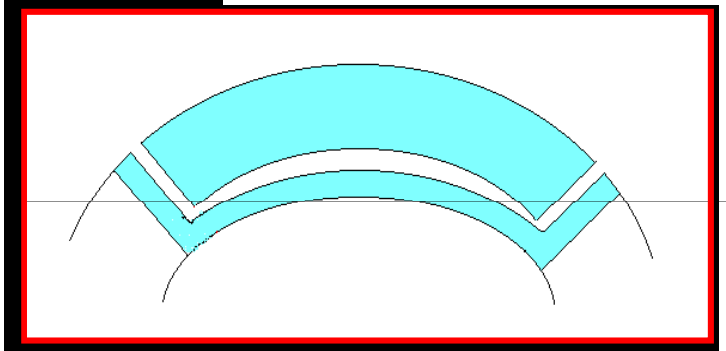
SEM:
Descemetic interface of big bubble

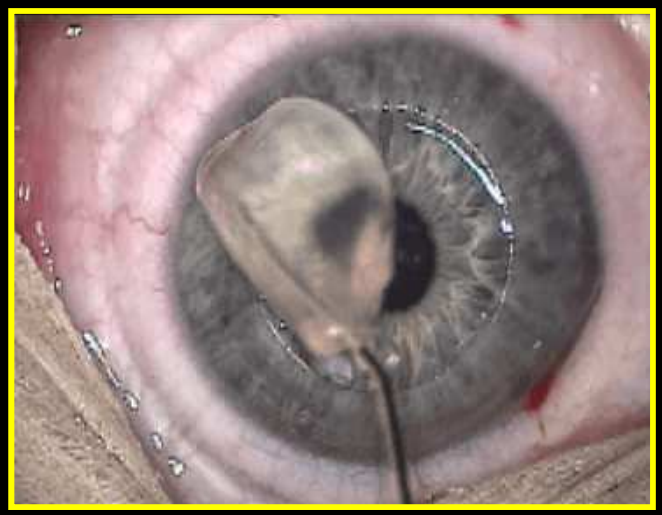
Unpublished data: Nubile M, Fontana L, Mastropasqua L

Deep Lamellar Keratoplasty by Intracorneal Dissection

A Prospective Clinical and Confocal Microscopic Study

Giorgio Marchini, MD,[1] Leonardo Mastropasqua, MD,[2] Emilio Pedrotti, MD,[1] Mario Nubile, MD,[2] Marco Ciancaglini, MD,[2] Arianna Sbabo, MD[1]





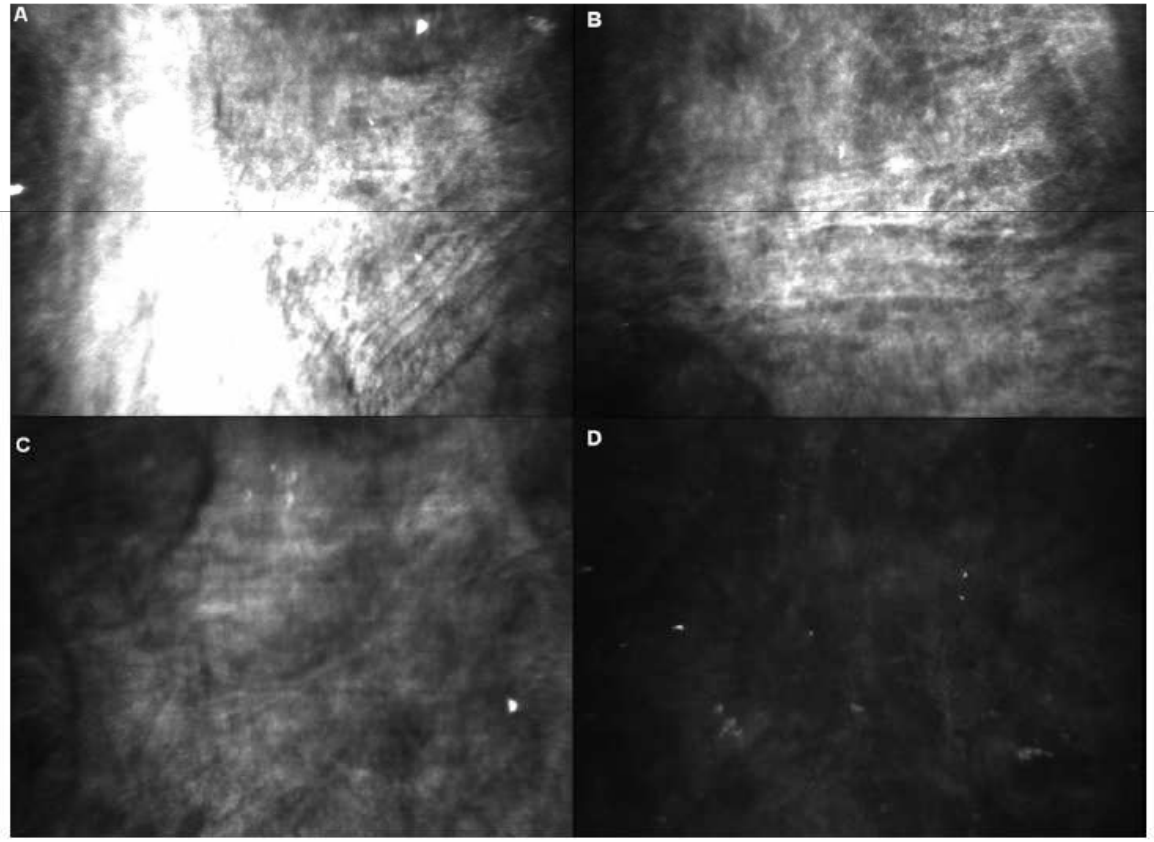


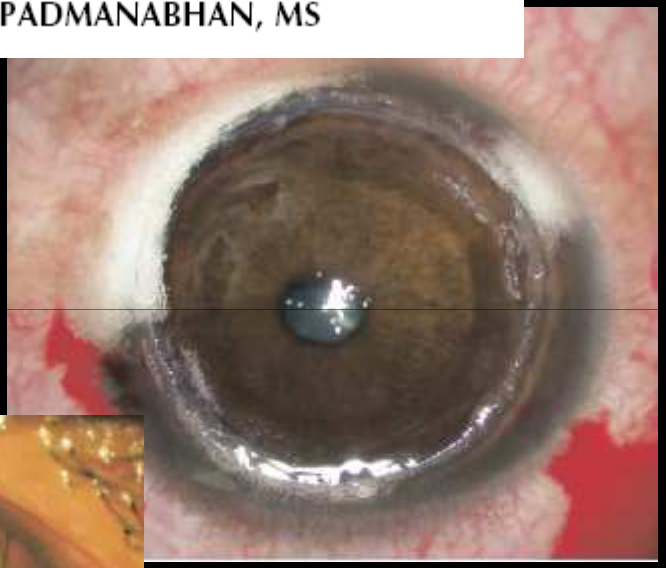
Figure 2. Confocal images of the interface of the same patient at (A) 15 days, (B) 3 months, (C) 6 months, and (D) 12 months after deep lamellar keratoplasty. Note the progressive reduction of haziness and brightness, associated with the recovery of transparency: keratocytes became visible from adjacent layers, as well as some bright microinclusions similar to those visible in LASIK interfaces.

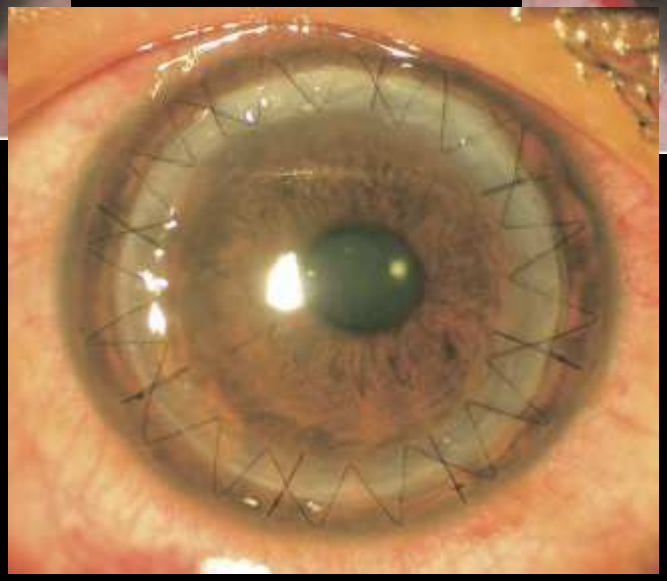
Results of Deep Lamellar Keratoplasty Using the Big-bubble Technique in Patients With Keratoconus

Am J Ophthalmol 2006

Anwar Technique

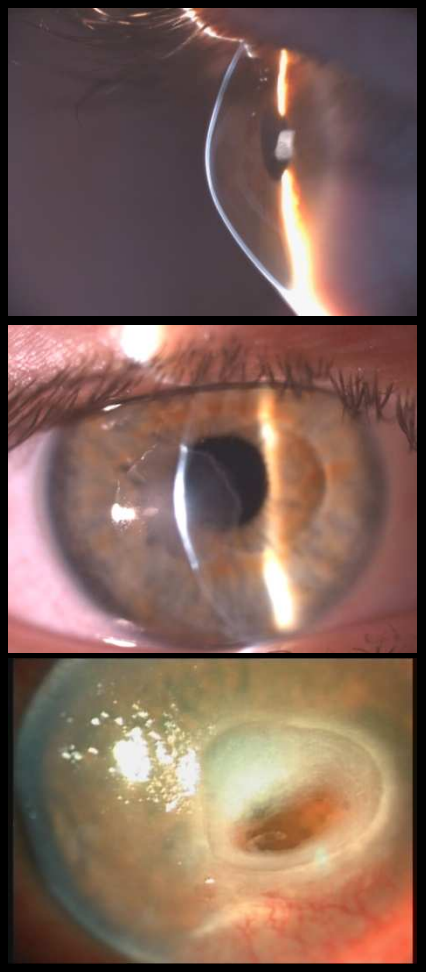
RAJESH FOGLA, DNB, FRCS, AND PREMA PADMANABHAN, MS





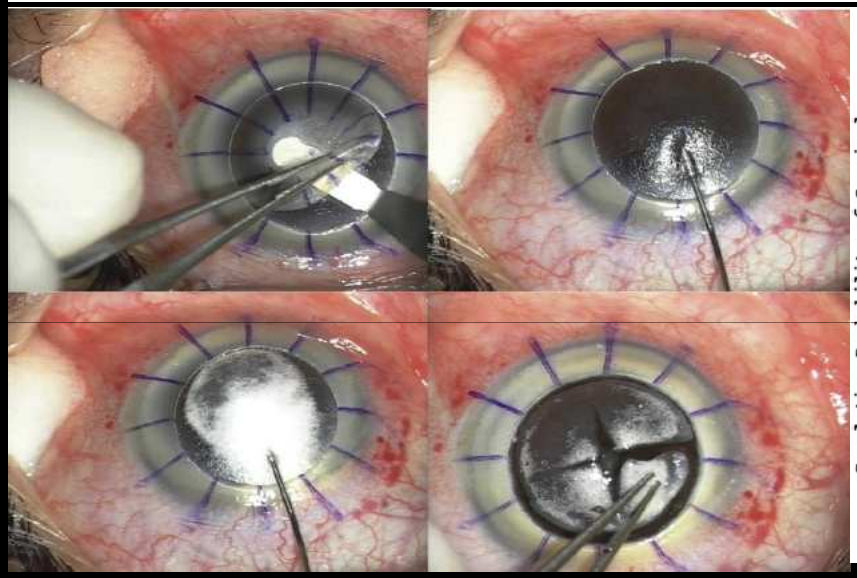
Dissections baring the DM
Big bubble Air Dissection

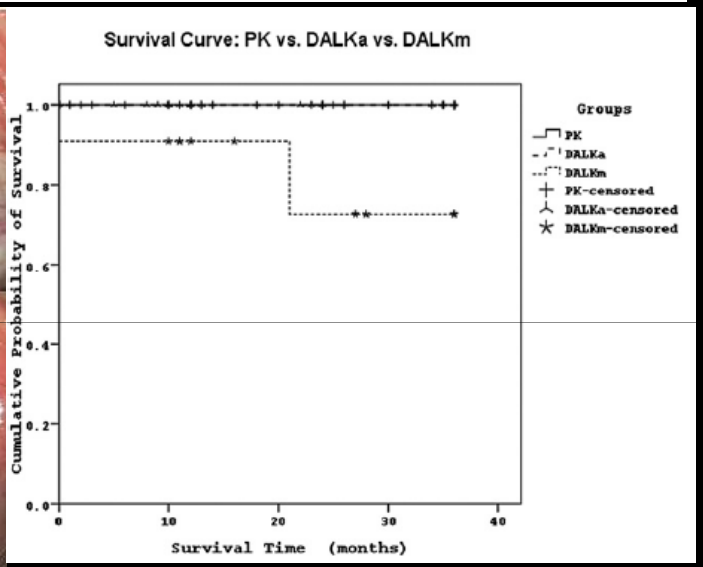
Deep Anterior Lamellar Keratoplasty (DALK)



Comparison of Outcomes of Lamellar Keratoplasty and Penetrating Keratoplasty in Keratoconus

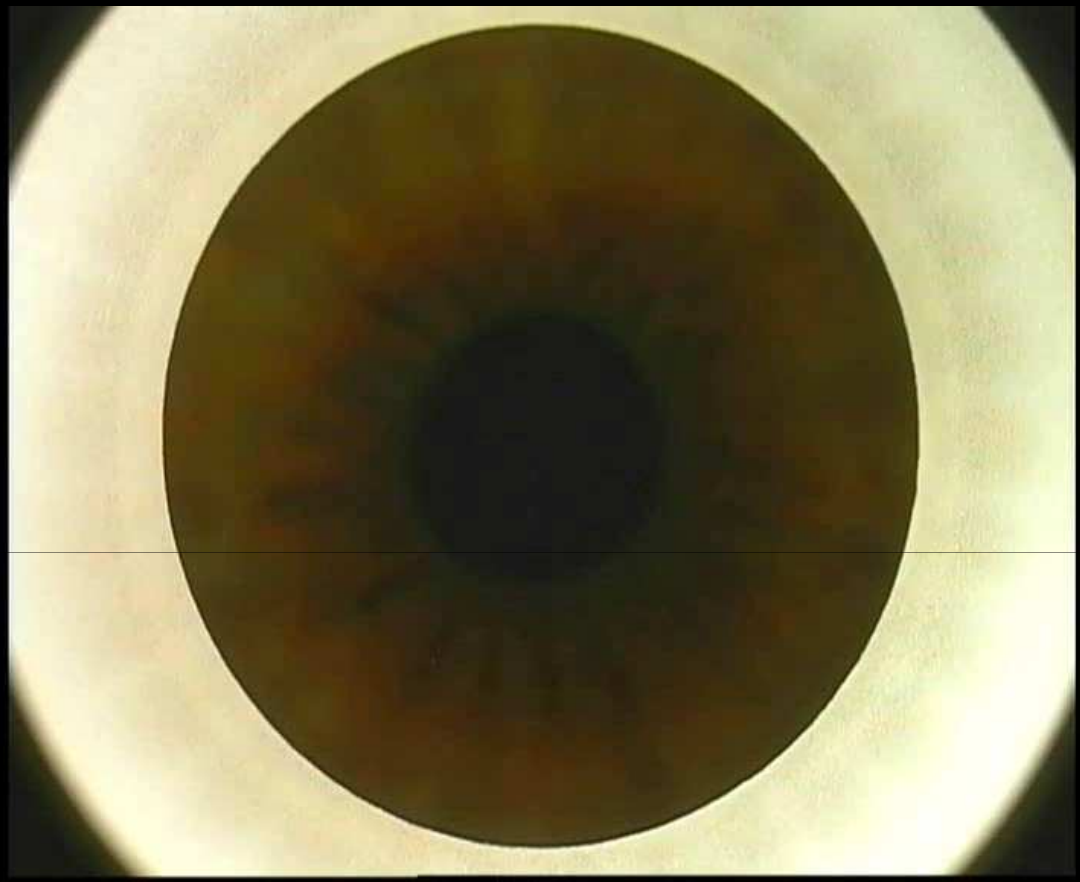
DAPHNE C. Y. HAN, JODHBIR S. MEHTA, YONG MING POR, HLA MYINT HTOON, AND DONALD T. H. TAN





• CONCLUSIONS: Visual acuity outcomes of the DALKa technique are comparable with those of PK for keratoconus, whereas DALK surgery results in fewer postoperative complications than PK. DALKa is emerging as a preferred choice among the lamellar techniques for better optical outcome. Further studies are required to provide long-term analysis of these results. (Am J Ophthalmol 2009;148:744–751.

Femtosecond superficial lamellar dissections



FSL 100 microns flap creation

Comparison of the femtosecond laser and mechanical keratome for laser in situ keratomileusis. Chan A, et al. ***Arch Ophthalmol. 2008***

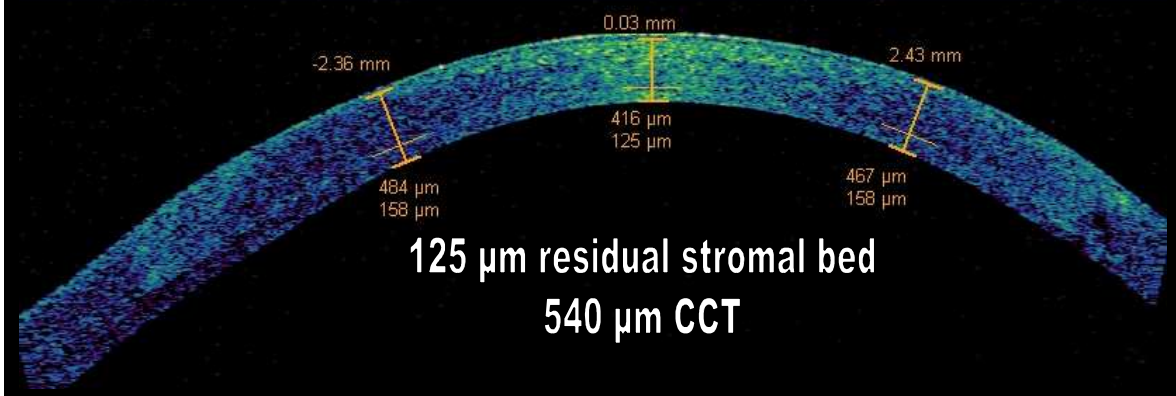
Corneal Aberrations and Visual Acuity After Laser In Situ Keratomileusis: Femtosecond Laser Versus Mechanical Microkeratome. Calvo R, **et al.** ***Am J Ophthalmol. 2010***

Literature review on FSL – (D)ALK

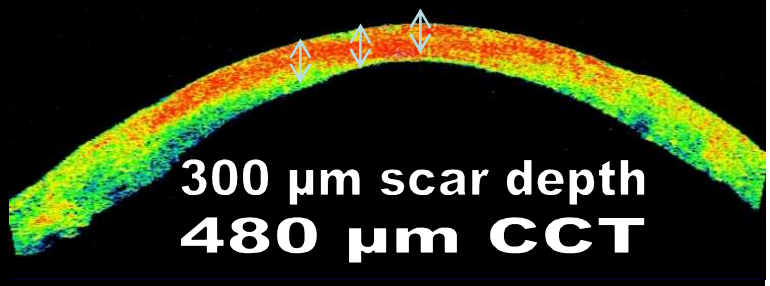
- Clinical papers = 3 PKP= >15
- Case reports: = 3
- Rct = 0
- Indications: post-infectious or traumatic scar, keratoconus, post LASIK ectasia
- Outcomes:

30 KhZ	Yoo SH et al. *Ophthalmology 2008*	12 eyes : BSCVA	20/50	20/80–20/25
60 KhZ	Mosca L et al: *Cornea 2008*	21 eyes : BSCVA	0.63 ± 0.16 SD.	
60 KhZ	Chan CC et al: *Cornea 2010*	7 eyes: BSCVA	20/40 (range, 20/25–20/60),	
200 - 500 KhZ	Our case series: *Unpublished data*	10 eyes: BSCVA	20/40 range 20/30 20/60	

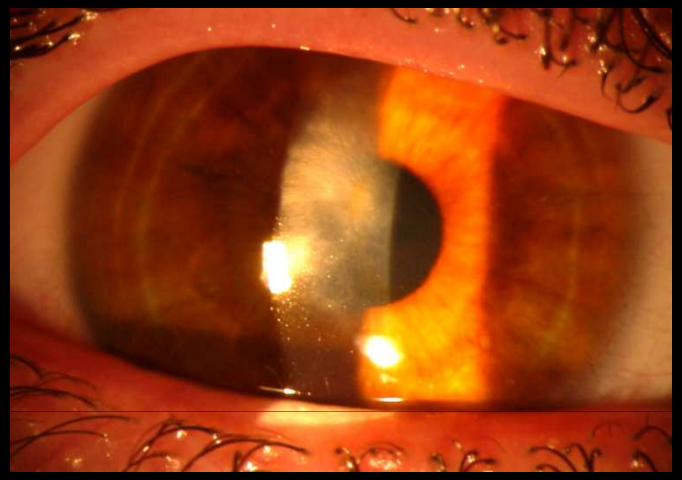
500 KhZ FSL DALK 400/350 microns
8.1 mm – 90° rim



125 µm residual stromal bed
540 µm CCT



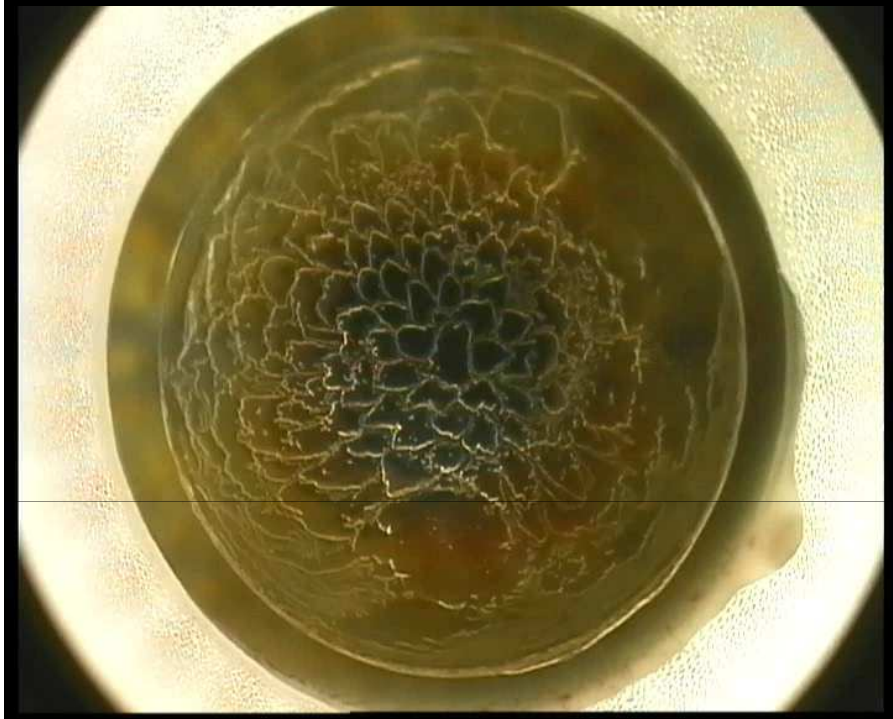
300 µm scar depth
480 µm CCT

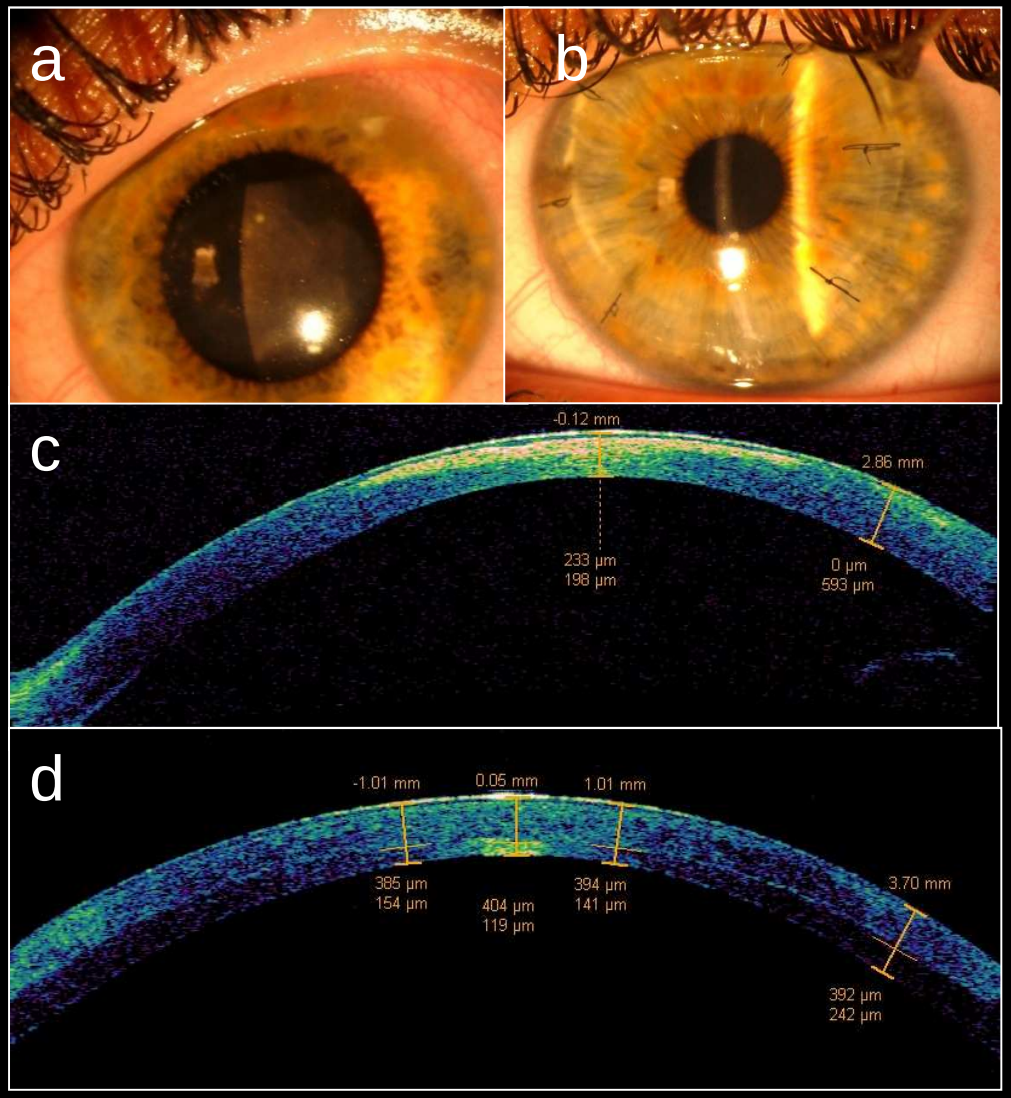


Preop. Central stromal scar
20/200 BCVA

2 months postop.
20/40 BSCVA

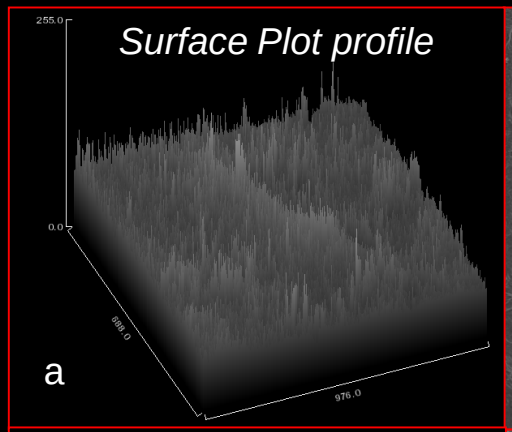
500 KhZ FSL DALK 390 µm donor -320 µm recipient
8.3 mm – 90° rim

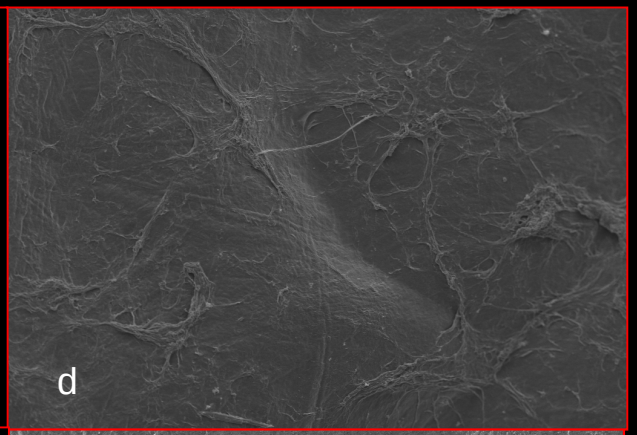


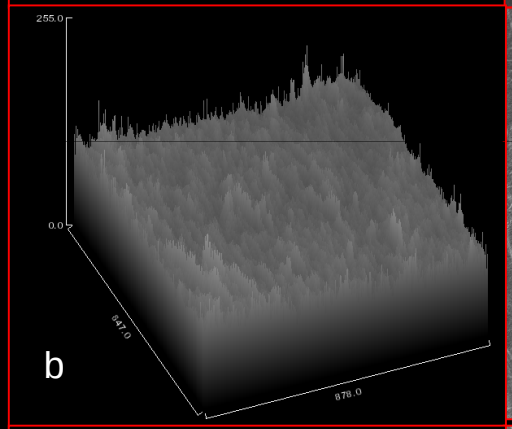


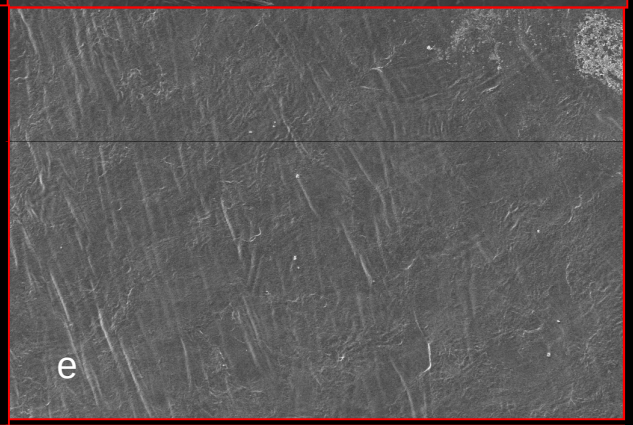
Post-infectious stromal scar
3 months after LK
Preop OCT – 430 µm CCT
3 months post op- 520 µm CCT

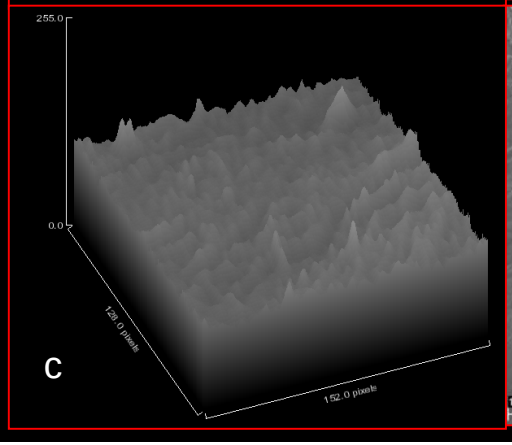
Surface regularity analysis of SEM images

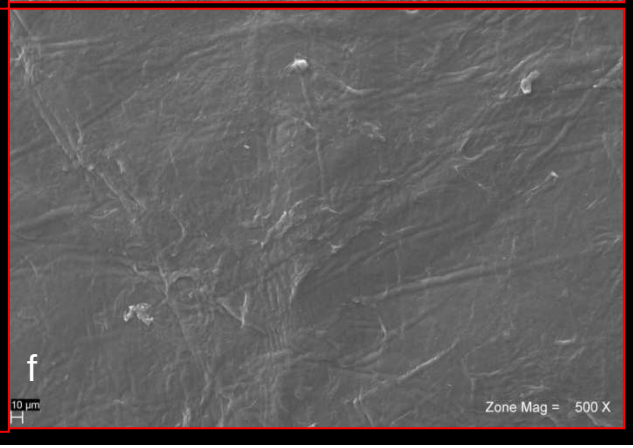












40 KhZ FSL deep lamellar dissection
400 µm depth
2006

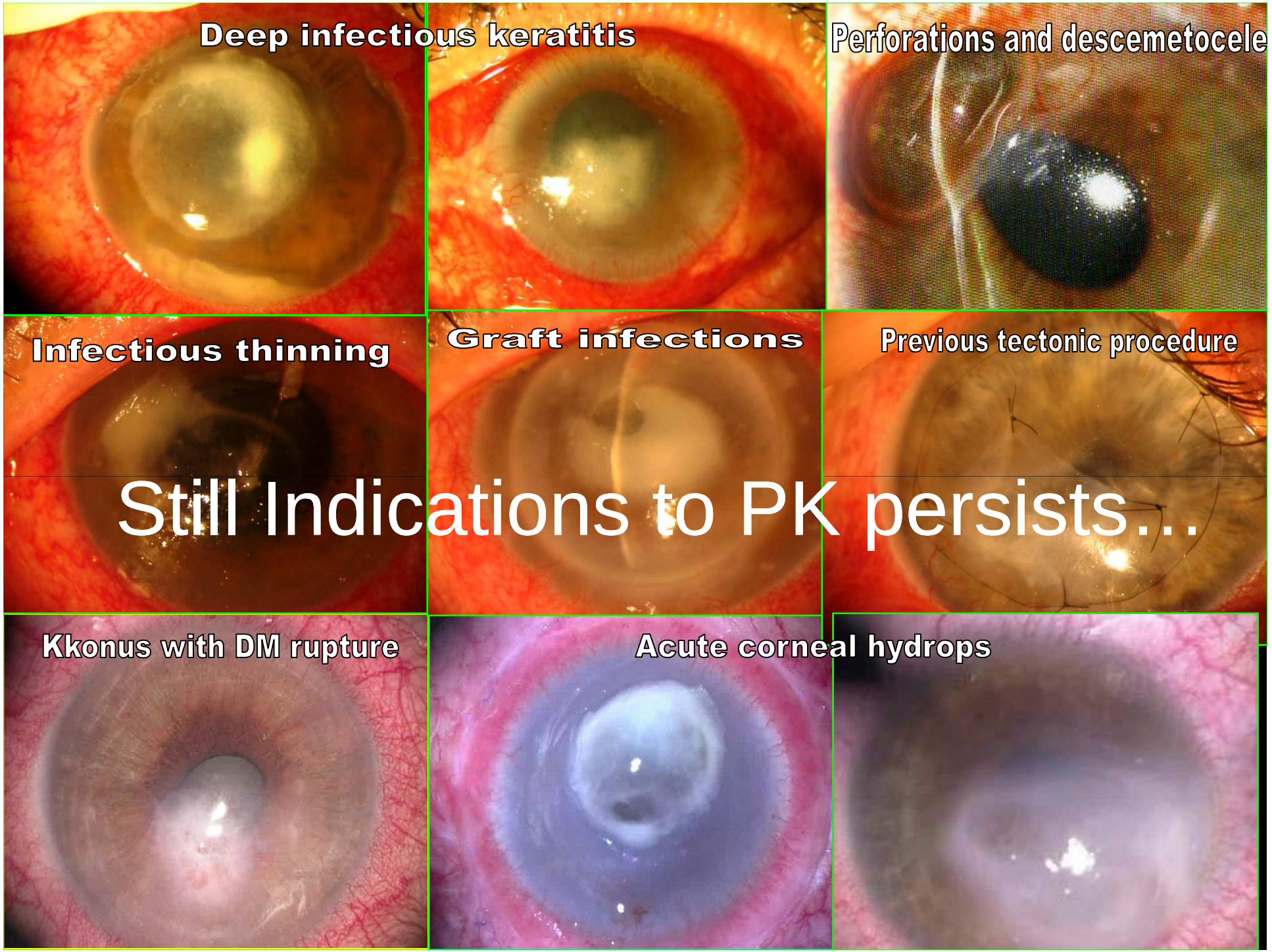
↓

200 KhZ deep lamellar dissection
400 µm depth
2008

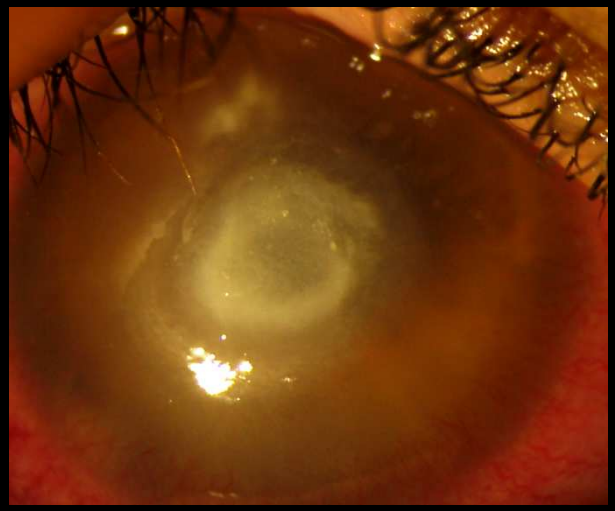
↓

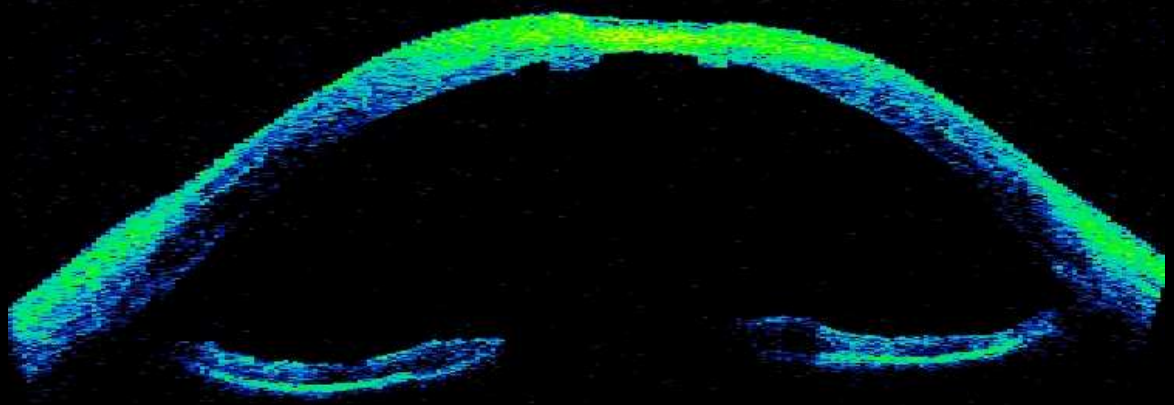
2009
500 KhZ deep lamellar dissection
400 µm depth

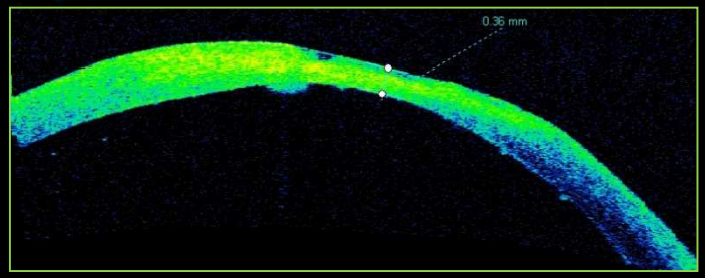
Unpublished data: Mastropasqua L, Nubile M, Pocobelli A, Tan DT

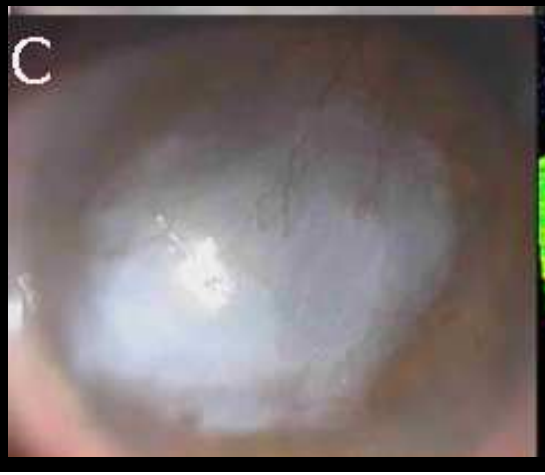

Deep infectious keratitis
Perforations and descemetocele
Infectious thinning
Graft infections
Previous tectonic procedure
Still Indications to PK persists...
Kkonus with DM rupture
Acute corneal hydrops

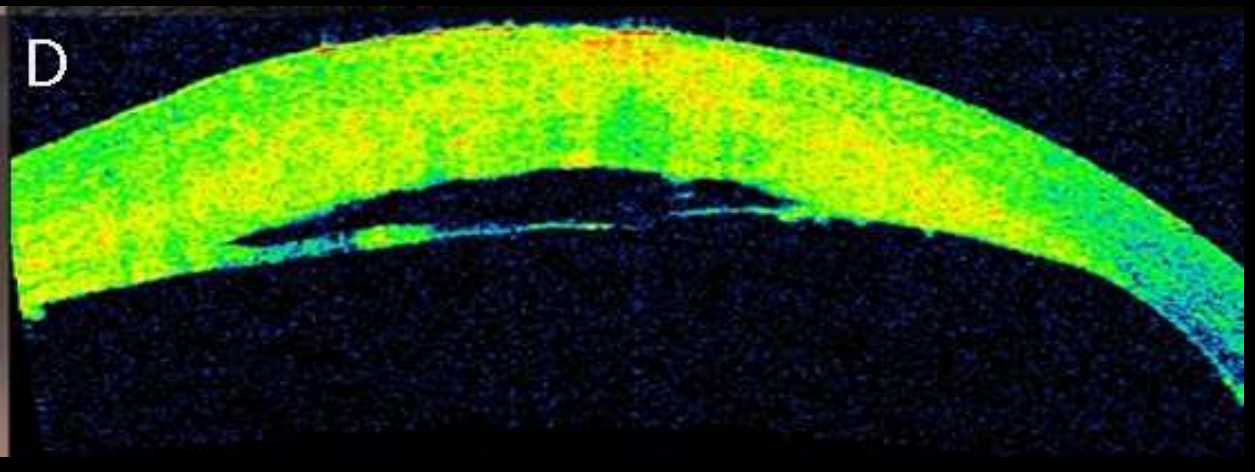
Posterior imaging in non-transparent corneas may help in PK selection



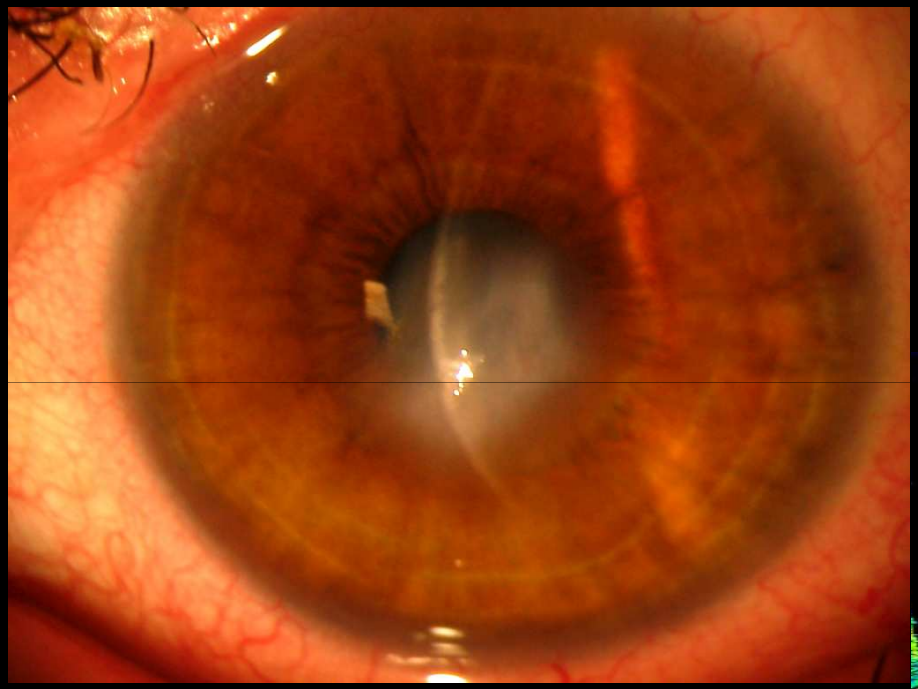


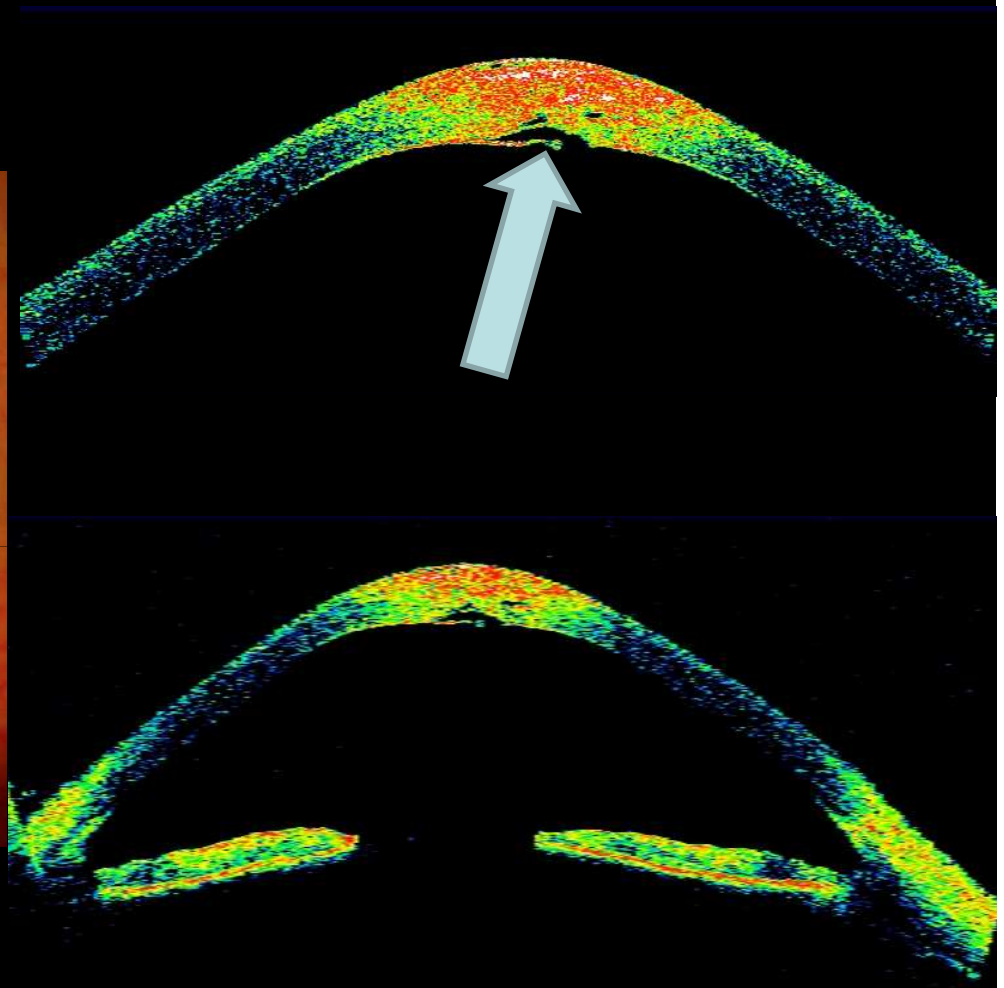




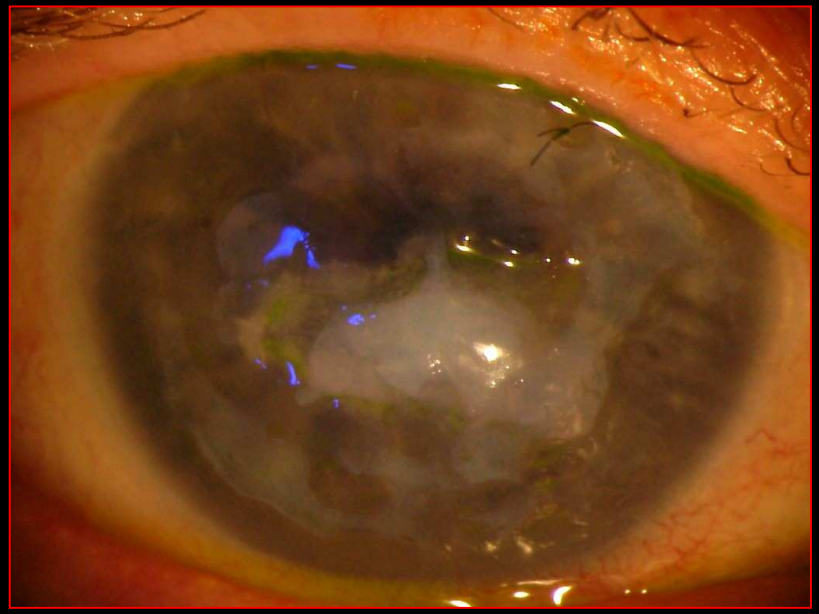


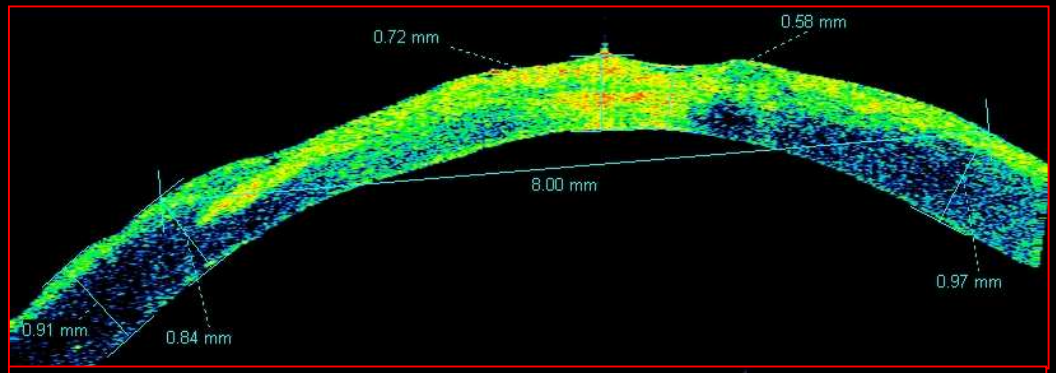
Acute corneal hydrops in Kkonus due to DM rupture

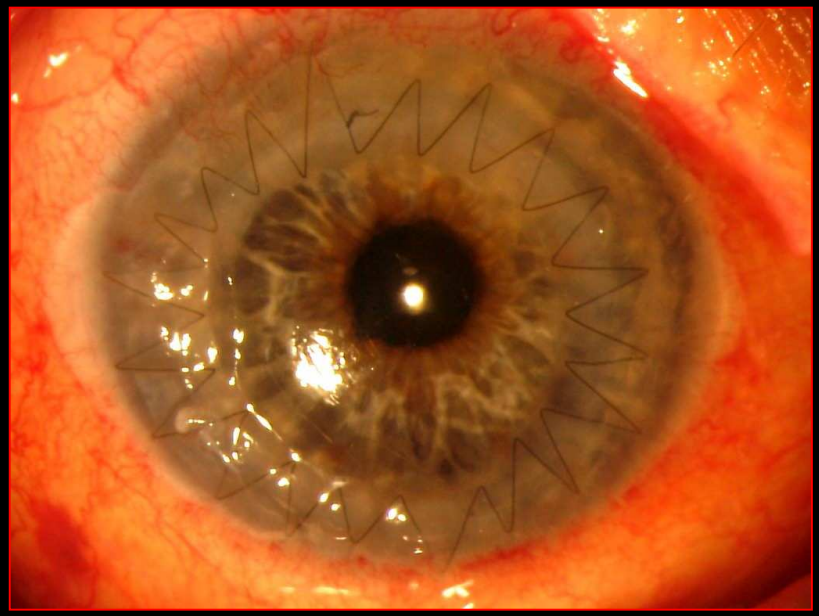


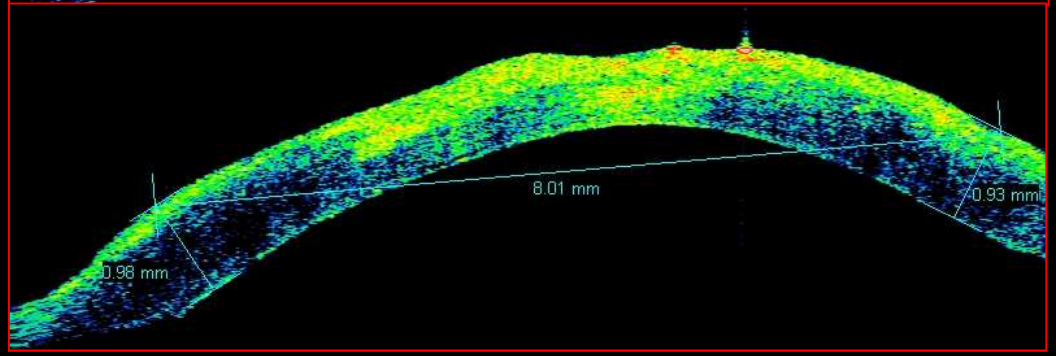


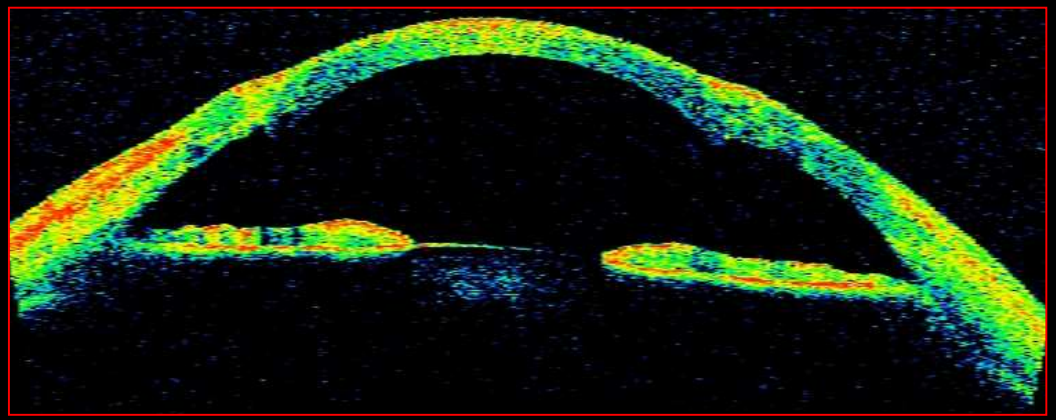
90° 500 KhZ Visumax PK in full-thickness scar after AMT in BK











FSL PKs benefit from wound configuration
Not achievable in standard mechanical trephination PK

Femtosecond Laser Shaped Penetrating Keratoplasty: One-year Results Utilizing a Top-hat Configuration

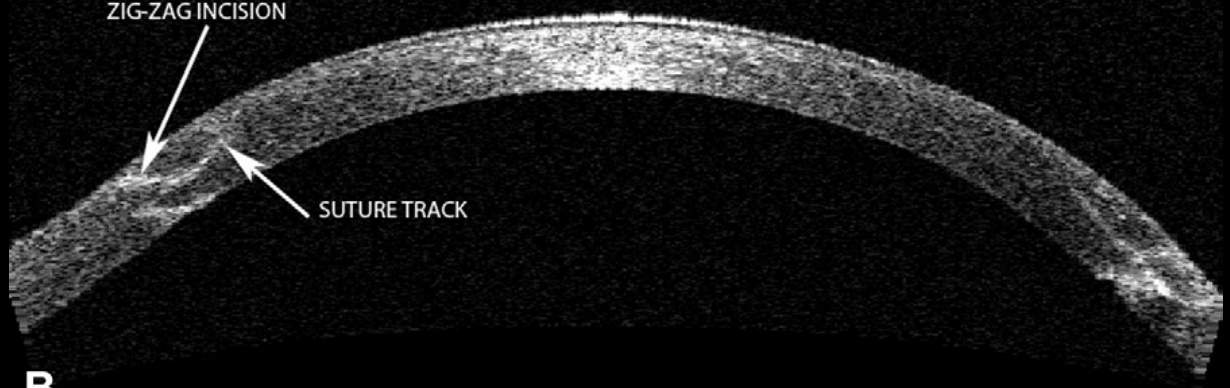
Am J Ophthalmol 2008;

FRANCIS W. PRICE, JR AND MARIANNE O. PRICE

FIGURE 1. Illustration of the femtosecond laser-shaped penetrating keratoplasty (PK) "top-hat" graft configuration.

Results of Penetrating Keratoplasty Performed with a Femtosecond Laser Zigzag Incision Initial Report

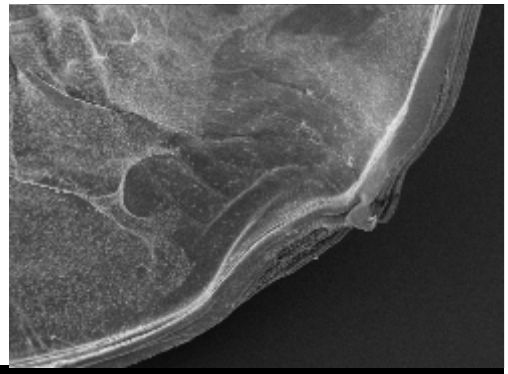
Marjan Farid, MD, Matthew Kim, MD, Roger F. Steinert, MD



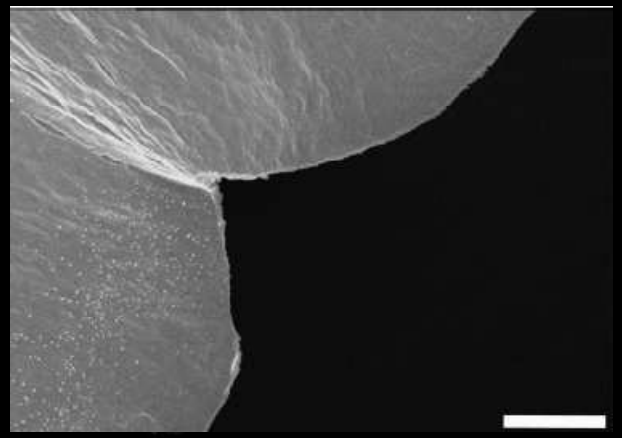
Orientation Teeth in Nonmechanical Femtosecond Laser Corneal Trephination for Penetrating Keratoplasty

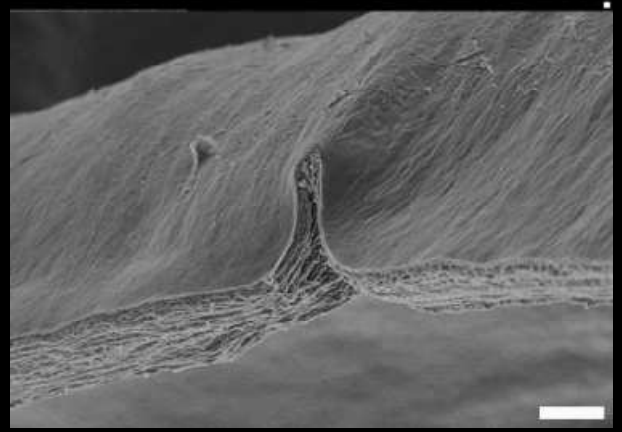
Am J Ophthalmol 2008;

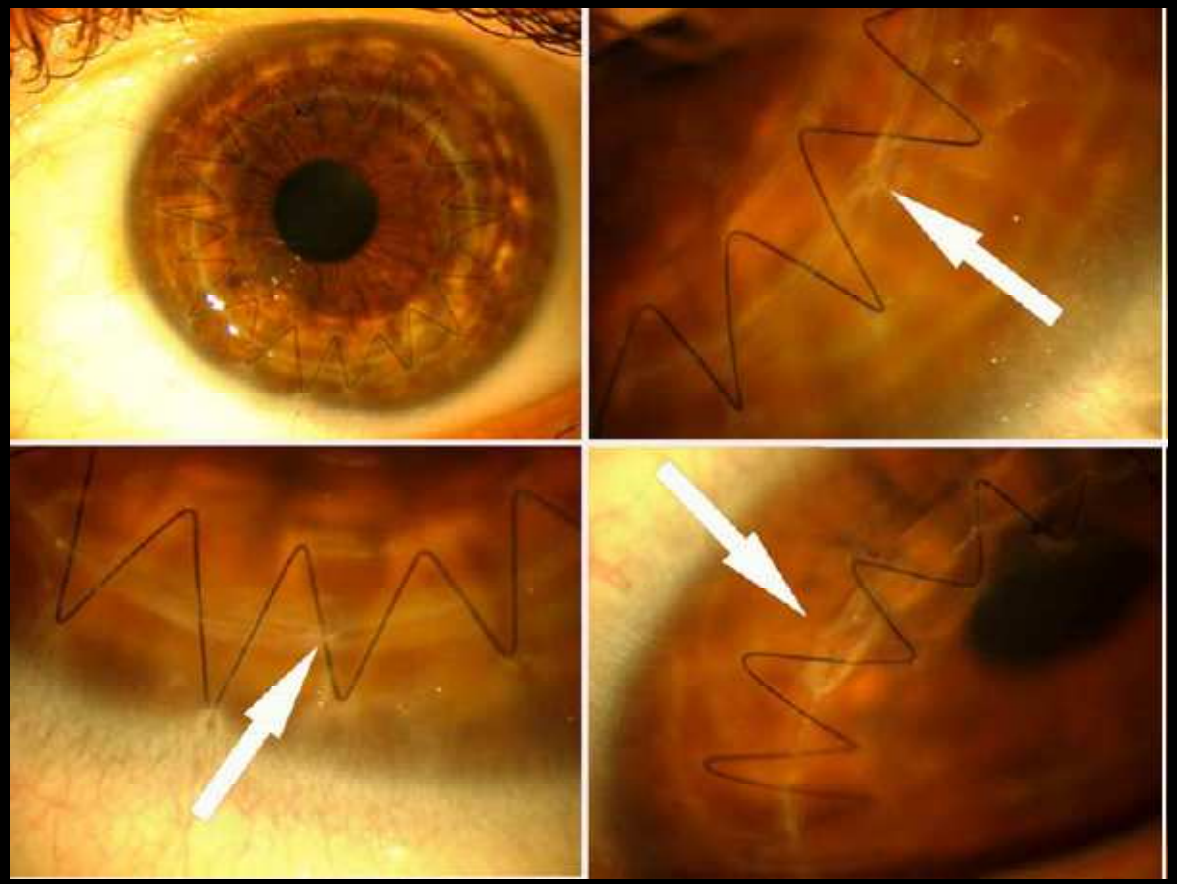
LEONARDO MASTROPASQUA, MARIO NUBILE, MANUELA LANZINI, ROBERTA CALIENNO, AND ORIANA TRUBIANI



Complex geometry in FSL keratoplasty







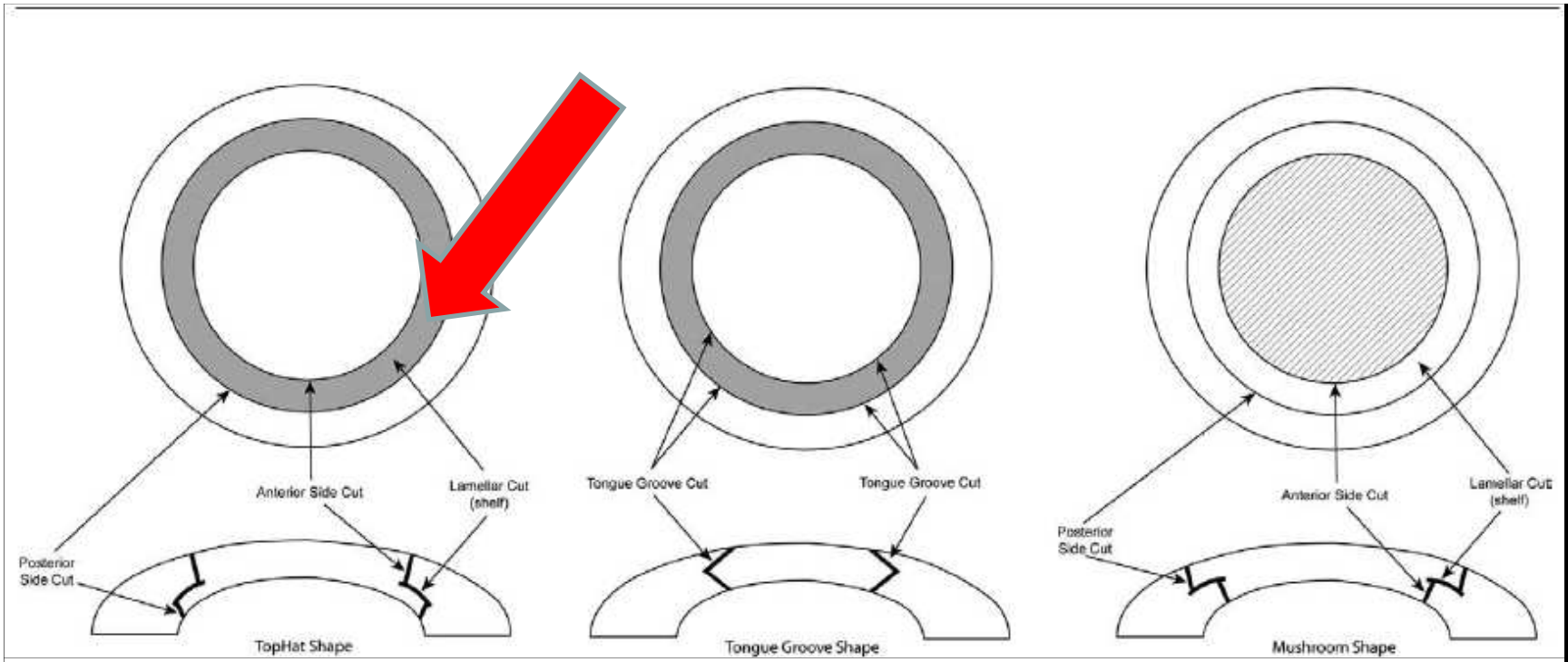


FIGURE 6. Some examples of shaped trephination configurations for femtosecond laser–assisted penetrating keratoplasty.

LABORATORY SCIENCES

Femtosecond Laser Top Hat Penetrating Keratoplasty

Wound Burst Pressures of Incomplete Cuts

Penny McAllum, MBChB, FRANZCO; Igor Kaiserman, MD, MSc, MHA; Irit Bahar, MD; David Rootman, MD, FRCSC

PERSPECTIVE

Femtosecond Lasers in Ophthalmology

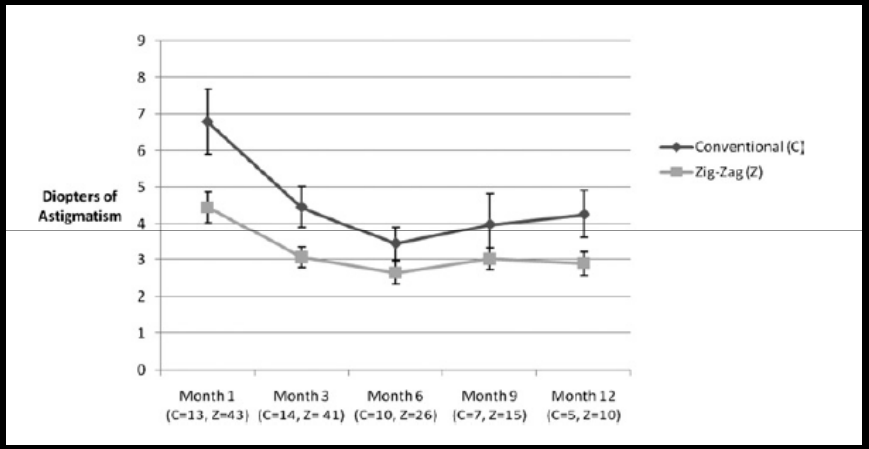
H. KAZ SOONG AND JOÃO BAPTISTA MALTA

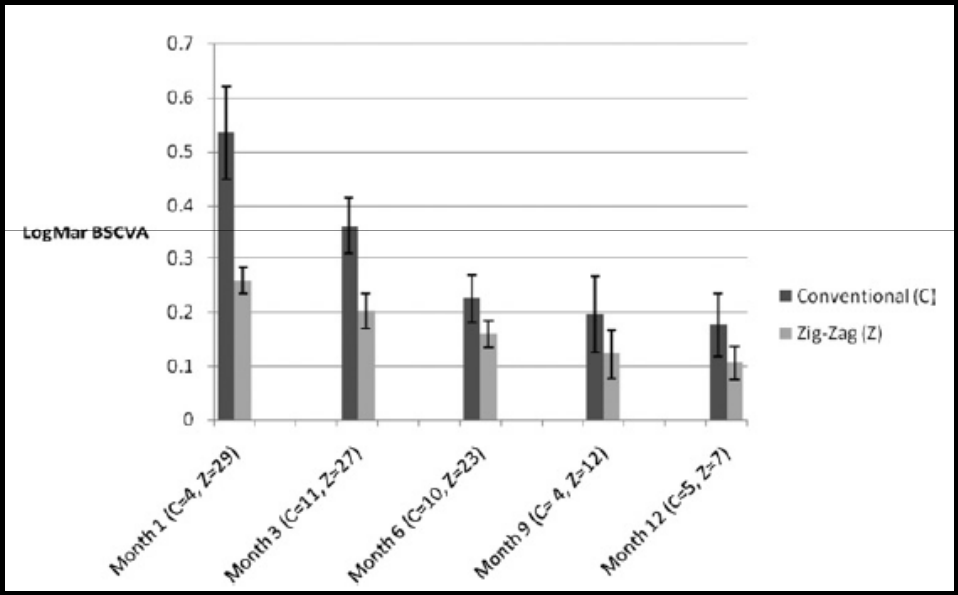
Bahar I, et al . Cornea 2008

Comparison of Penetrating Keratoplasty Performed with a Femtosecond Laser Zig-Zag Incision versus Conventional Blade Trephination

Ophthalmology 2009;116:1638–1643

Marjan Farid, MD, Roger F. Steinert, MD, Ronald N. Gaster, MD, Winston Chamberlain, MD, PhD, Amy Lin, MD





Conclusions: The femtosecond laser generated zig-zag–shaped incision results in a more rapid recovery of BSCVA and induces less astigmatism compared with conventional blade trephination PK.

Outcomes of Femtosecond Laser–Assisted Penetrating Keratoplasty

Am J Ophthalmol 2008;

YONG M. POR, JACOB Y. CHUAN CHENG, ANAND PARTHASARATHY, JODHBIR S. MEHTA, AND DONALD T. H. TAN

FIGURE. Representative anterior segment optical coherence tomography (ASOCT) image of Patient 7 following femtosecond laser–assisted penetrating keratoplasty, showing perpendicularly cut recipient/donor edges, which are perfectly apposed.

Mean cylinder: 2.56 D
(range 0.50 – 4.00 D)

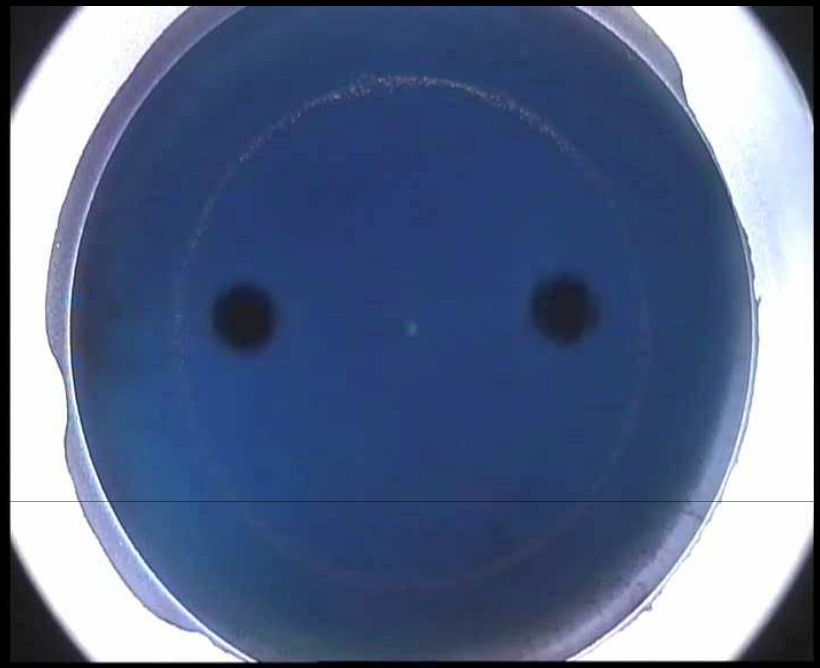
TABLE. Patient Diagnoses, Operative Details, and Outcomes Following Femtosecond Laser–Assisted Penetrating Keratoplasty

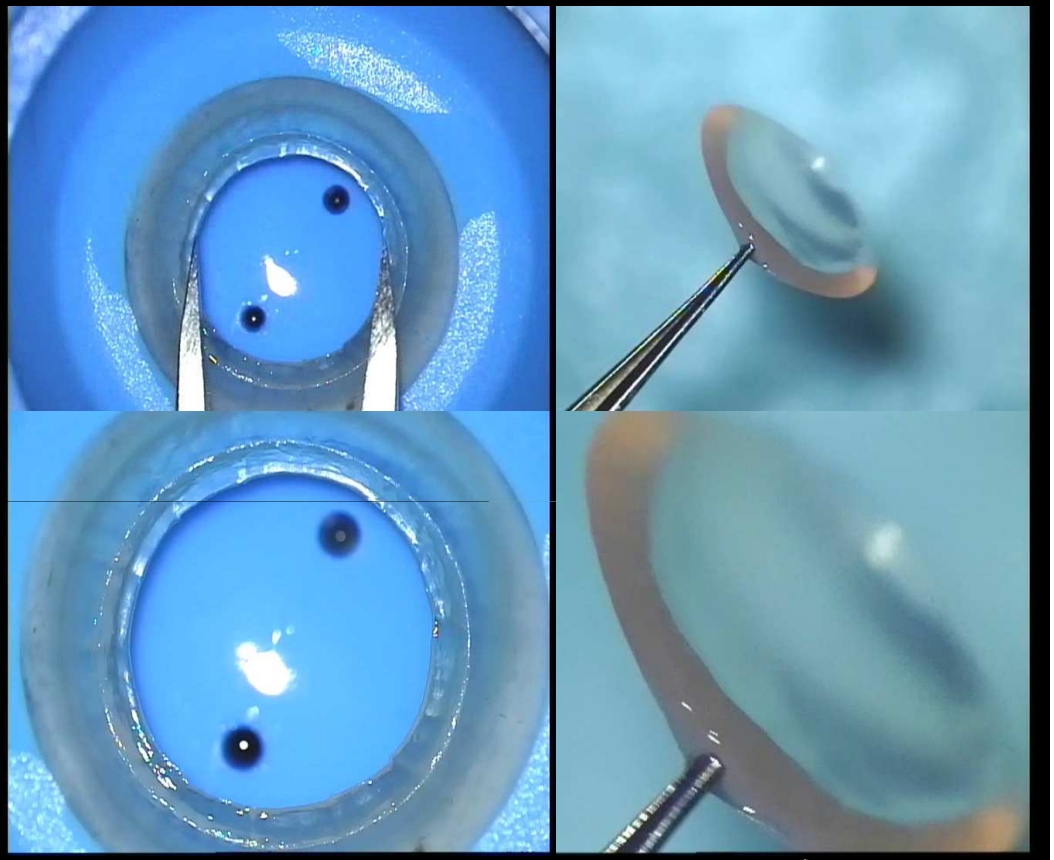
Patient No.	Diagnosis	Preoperative BCVA	Suture Type	Donor Diameter (Projected/Chord Length)	Recipient Diameter (Projected/Chord Length)	Three-month BCVA	Refraction Three Months	Best Vision	Refraction Latest Follow-up
1	BK (trauma)	CF 1 m	16 interrupted	7.75	7.75	20/80	+3.00/−4.00×50	20/80	+1.00/−4.50×60
2	BK (laser PI)	CF 2 m	Double continuous 8 bite	7.75	7.5	20/30	+4.00/−1.50×55	20/30	+5.00/−0.50×55
3	Failed graft (PK for keratoconus)	CF 2 m	Double continuous 8 bite	8.25	8.00	20/70	+3.75/−1.50×160	20/70	+3.75/−1.50×160
4*	BK (Fuchs dystrophy)	HM	16 interrupted	8.25	7.75	CF 2 m	+3.00/−3.50×30	CF 2 m	+2.00/−2.50×20
5	Failed graft	20/400	Double continuous 8 bite	8.50	8.00	20/30	−2.75/−1.00×45	20/30	−3.00/−2.75×35
6†	Pseudophakic BK	CF 3 m	16 interrupted	8.80	8.45	CF 2 m	+3.00/−5.50×60	20/400	PI/−4.00×120
7	Herpetic corneal scarring	CF 1 m	16 interrupted	7.75	7.50	20/40	+2.00/−0.50×180	20/20	+3.25/−1.25×145
8	Pseudophakic BK	CF 2 m	Double continuous 8 bite	8.50	8.25	20/80	−0.75/−2.75×160	20/80	−3.00/−3.50×170

BK = bullous keratopathy; BCVA = best-corrected visual acuity; CF = counting fingers; HM = hand motions; PI = peripheral iridotomy; PK = penetrating keratoplasty.
*Poor BCVA because of diabetic macular edema.
†Poor BCVA because of epiretinal membrane with macular striae.

PENETRATING KERATOPLASTY

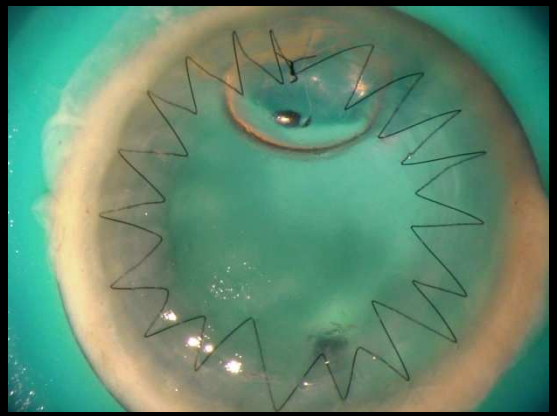
90° to 120°Visumax FSL full thickness trephination for PK





Donor button preparation in AAC

120° angled cut results in 7.0 mm 8.5 mm endo-surface

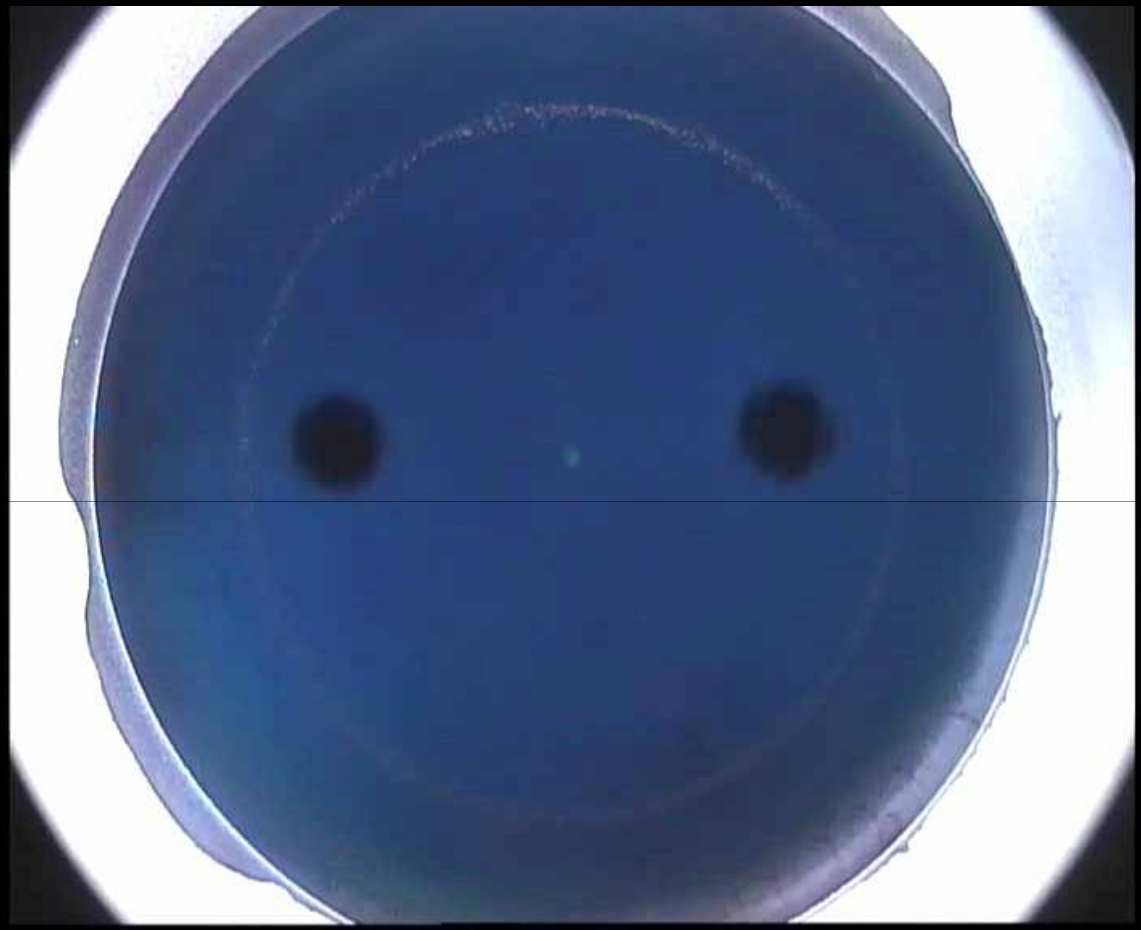


Donor button preparation in AAC

With 90° angled cut a 7.1 mm diameter is achieved on the endothelial side, wile 8.1 mm on the surface

PENETRATING KERATOPLASTY

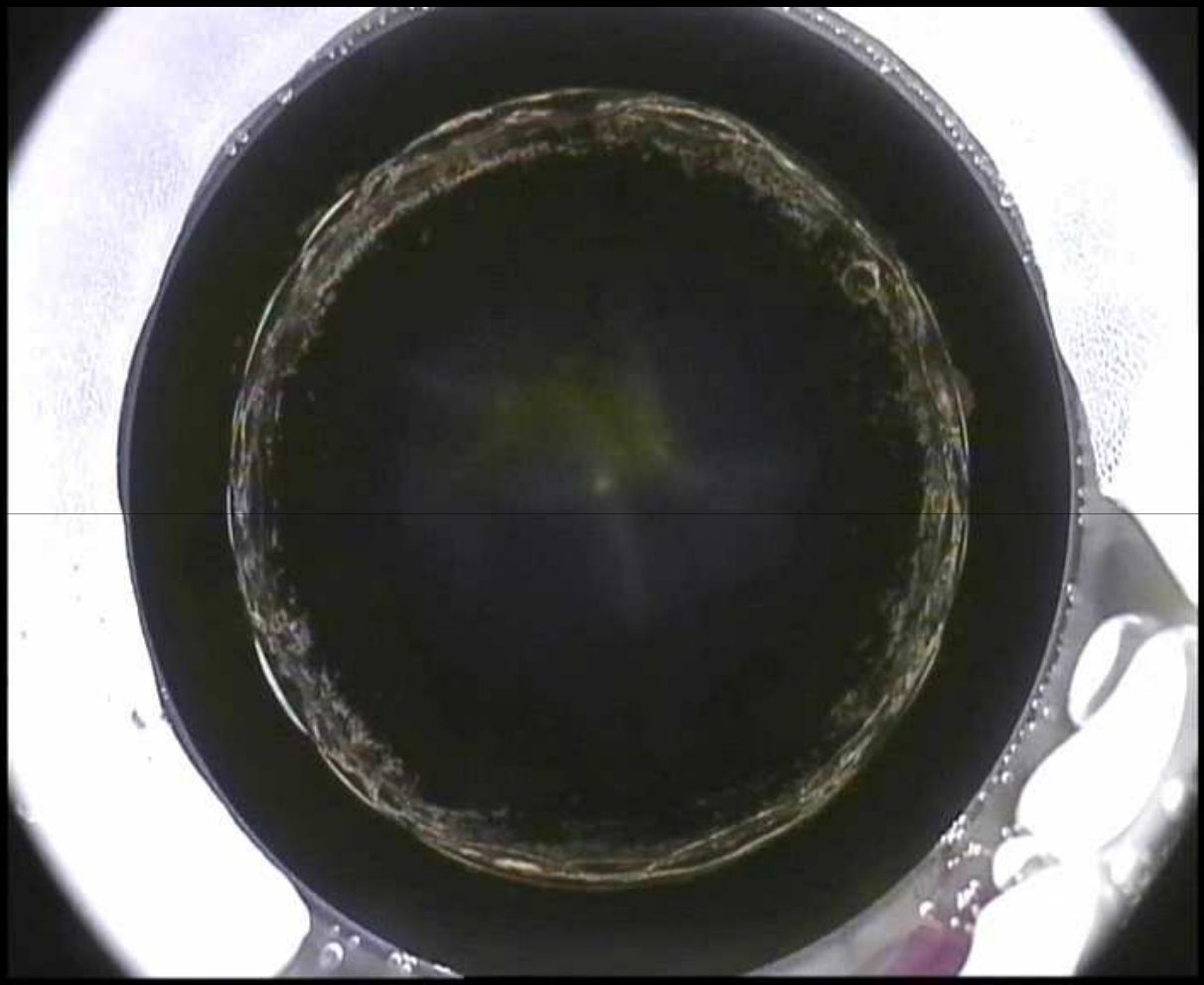
90° Visumax FSL full thickness trephination for PK



Donor button preparation in AAC

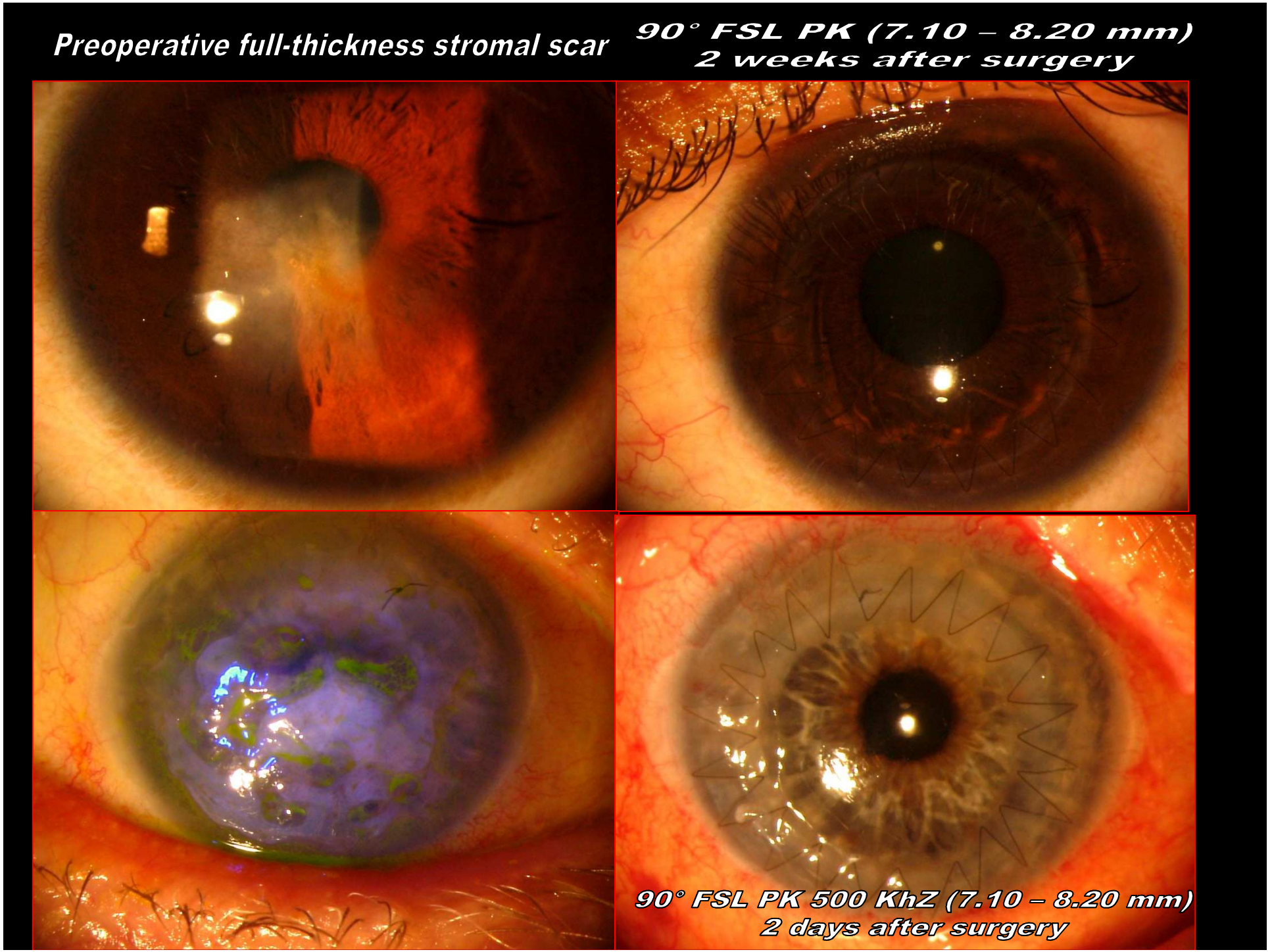
With 90° angled cut a 7.1 mm diameter is achieved on the endothelial side, wile 8.1 mm on the surface

90° Visumax FSL full thickness trephination for PK

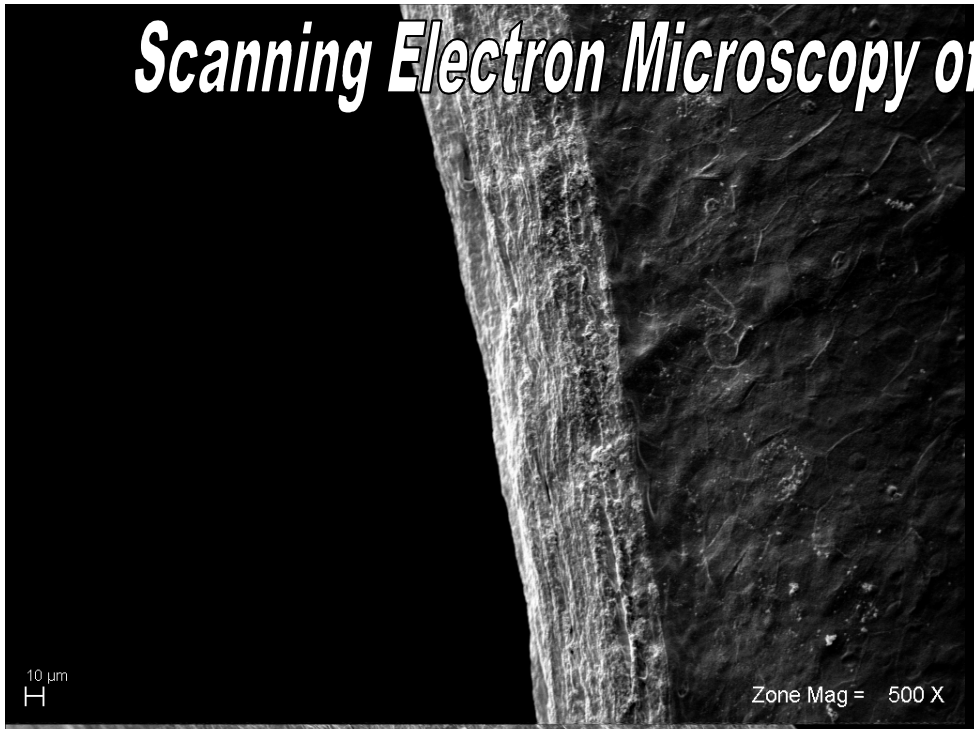


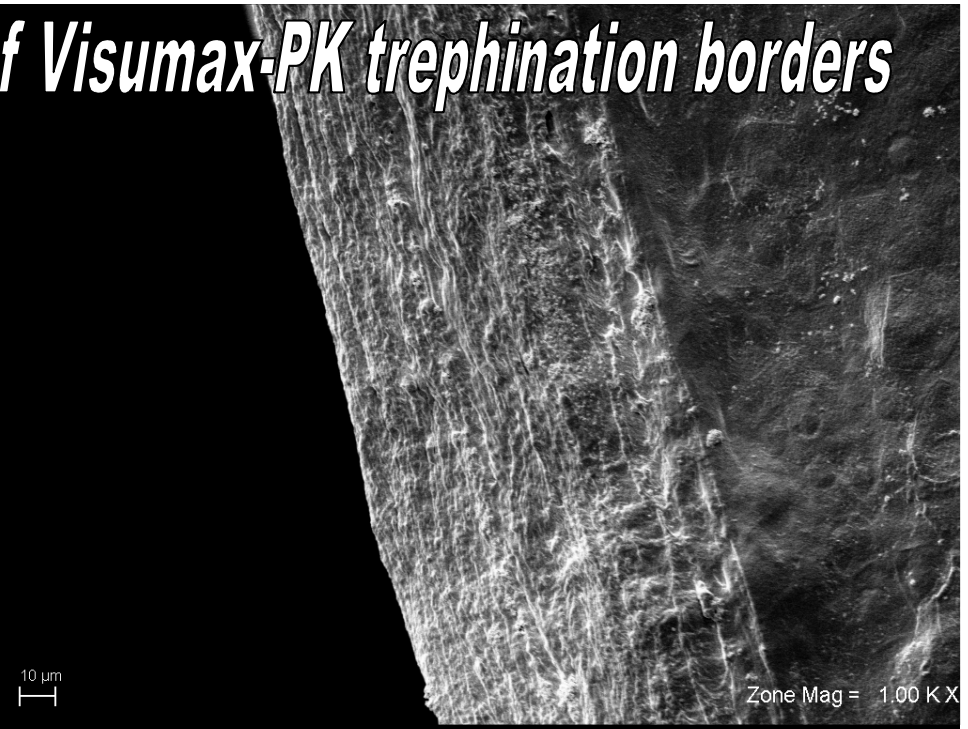
Recipient preparation (full thickness corneal scar)

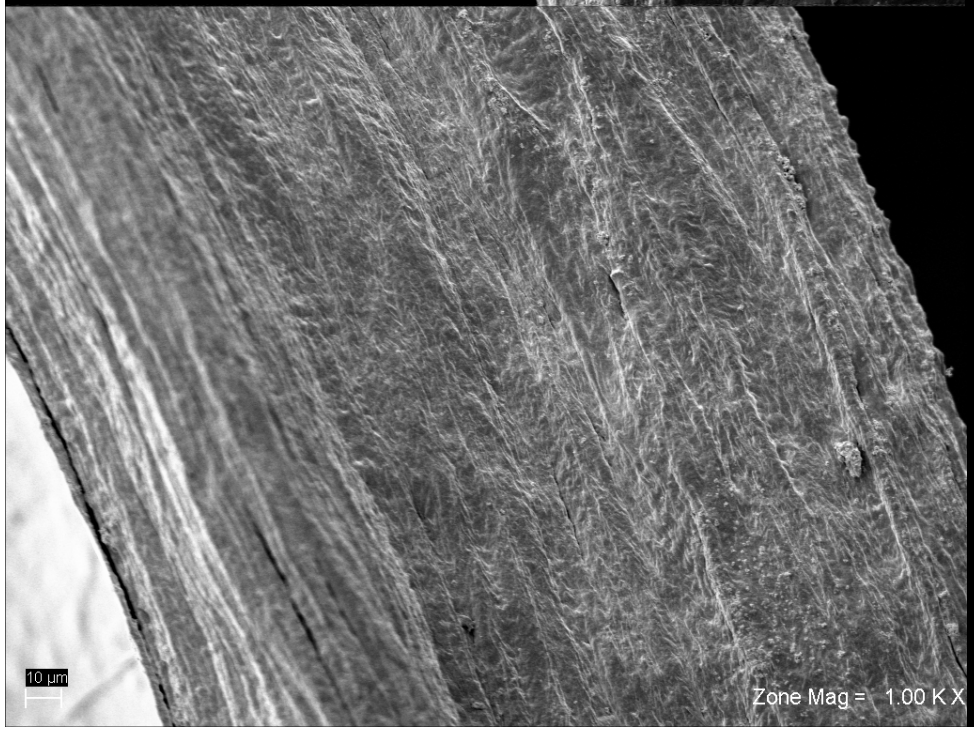
0.1 mm undersized - 7.0 mm diameter is achieved on the endothelial side, wile 8.0 mm on the surface


Preoperative full-thickness stromal scar
90° FSL PK (7.10 – 8.20 mm)
2 weeks after surgery
90° FSL PK 500 KhZ (7.10 – 8.20 mm)
2 days after surgery

Scanning Electron Microscopy of Visumax-PK trephination borders



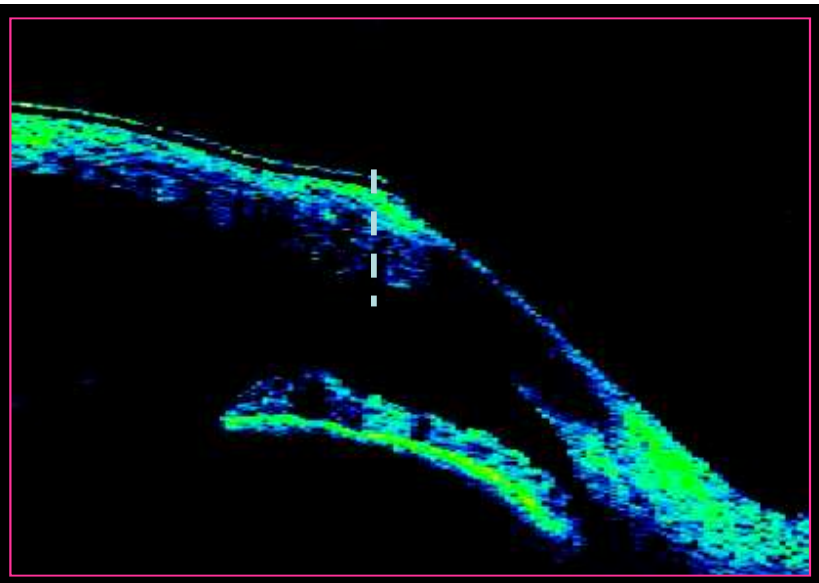


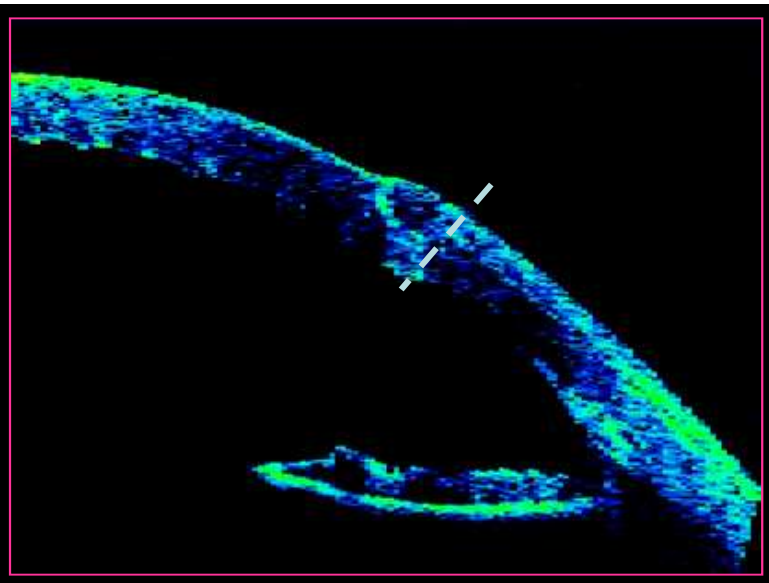


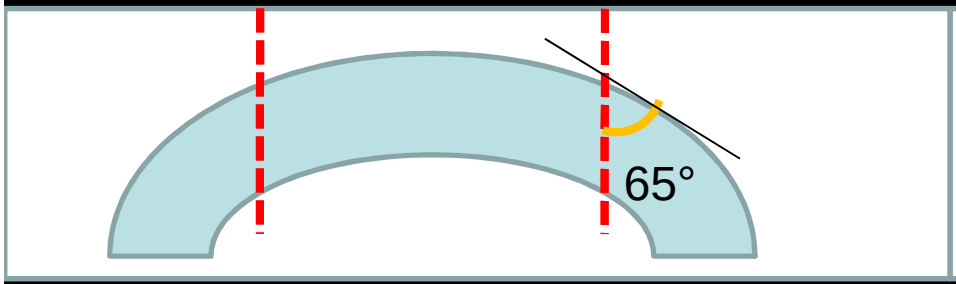
200 KhZ, 0.8 µm spot size, 2.5 µm separation, energy 0.35 µJ

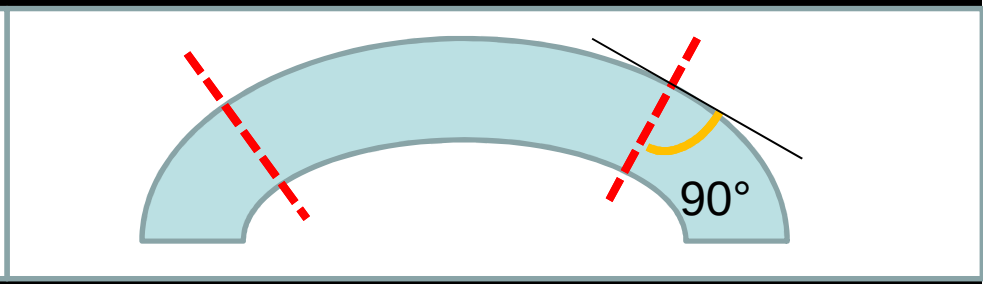
Smooth cut surface
Throughout the whole thickness

Epithelial and endothelial cells are preserved at the borders indicating no damage to surrounding tissue









Mechanical trephination
65° to the surface
Outer and inner diameter:
8.00 – 8.00 mm

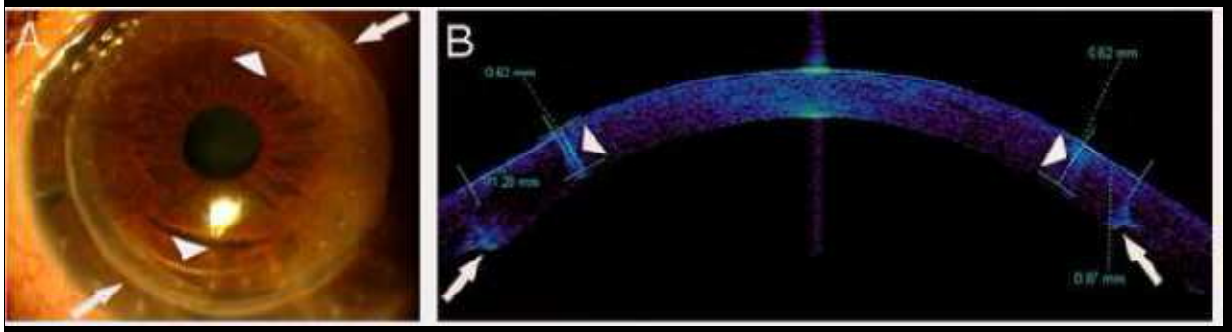
FSL trephination
90° to the surface
Outer and inner diameter:
7.10 – 8.20 mm

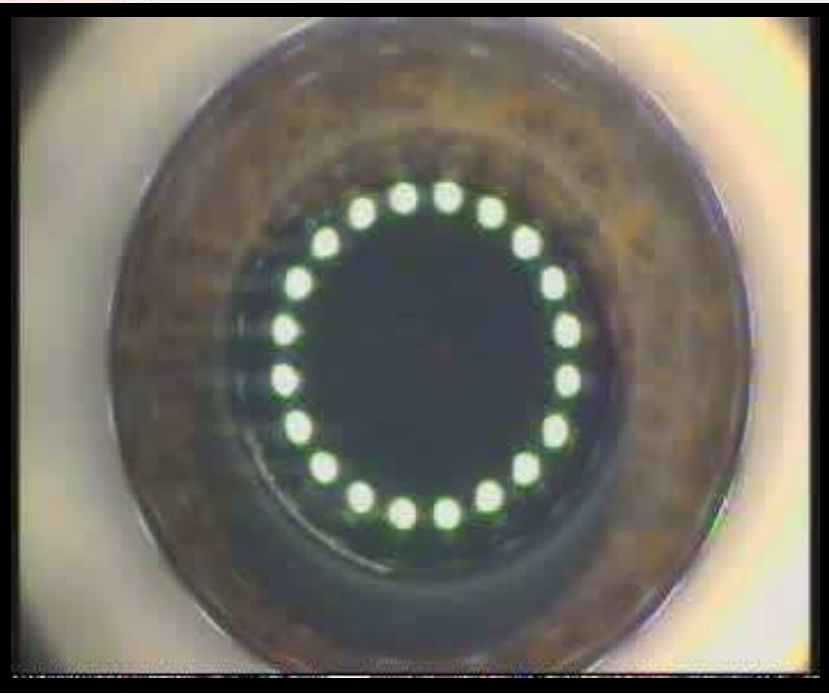
The geometry of the donor-recipient matching is more physiological and requires less tight sutures, improving the post-pk anterior segment geometry

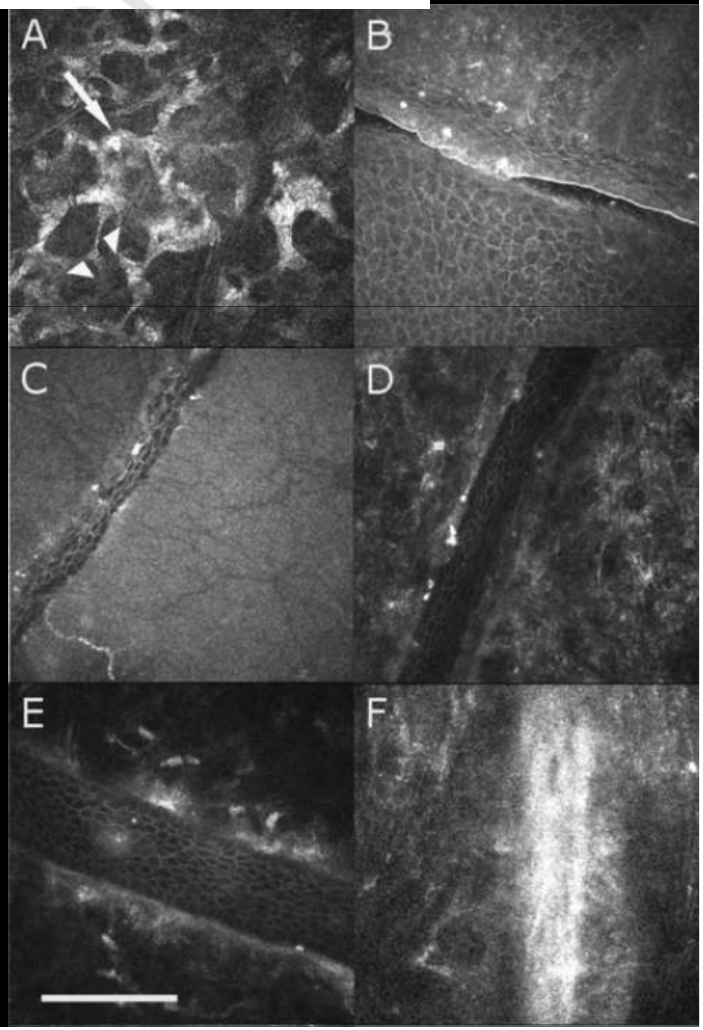
Femtosecond Laser Arcuate Keratotomy for the Correction of High Astigmatism after Keratoplasty

Ophthalmology 2009,

Mario Nubile, MD, Paolo Carpineto, MD, Manuela Lanzini, MD, Roberta Calienno, MD, Luca Agnifili, MD, Marco Ciancaglini, MD, Leonardo Mastropasqua, MD





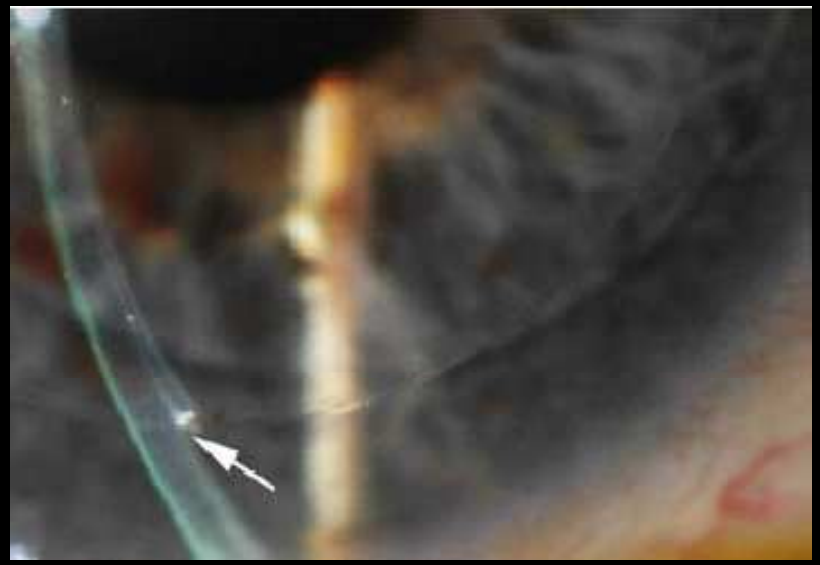


J CATARACT REFRACT SURG - VOL 32, MARCH 2006

Descemet's stripping with endothelial keratoplasty in 200 eyes

Early challenges and techniques to enhance donor adherence

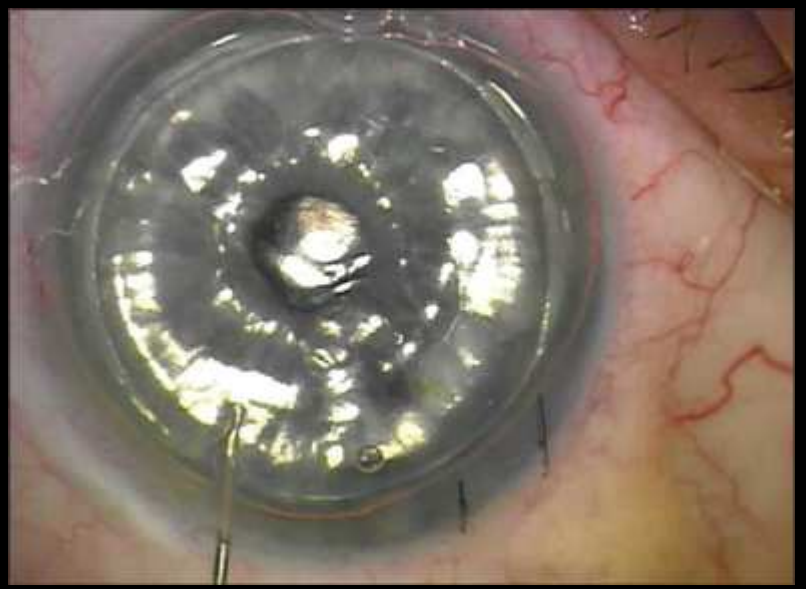
Francis W. Price Jr, MD, Marianne O. Price, PhD



Descemet's Stripping Endothelial Keratoplasty: Safety and Outcomes

A Report by the American Academy of Ophthalmology

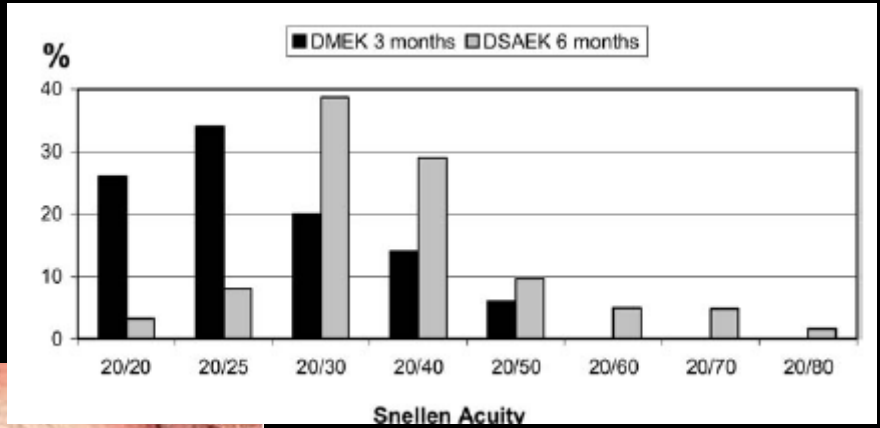
W. Barry Lee, MD, Deborah S. Jacobs, MD, David C. Musch, PhD, MPH, Stephen C. Kaufman, MD, PhD, William J. Reinhart, MD, Roni M. Shtein, MD

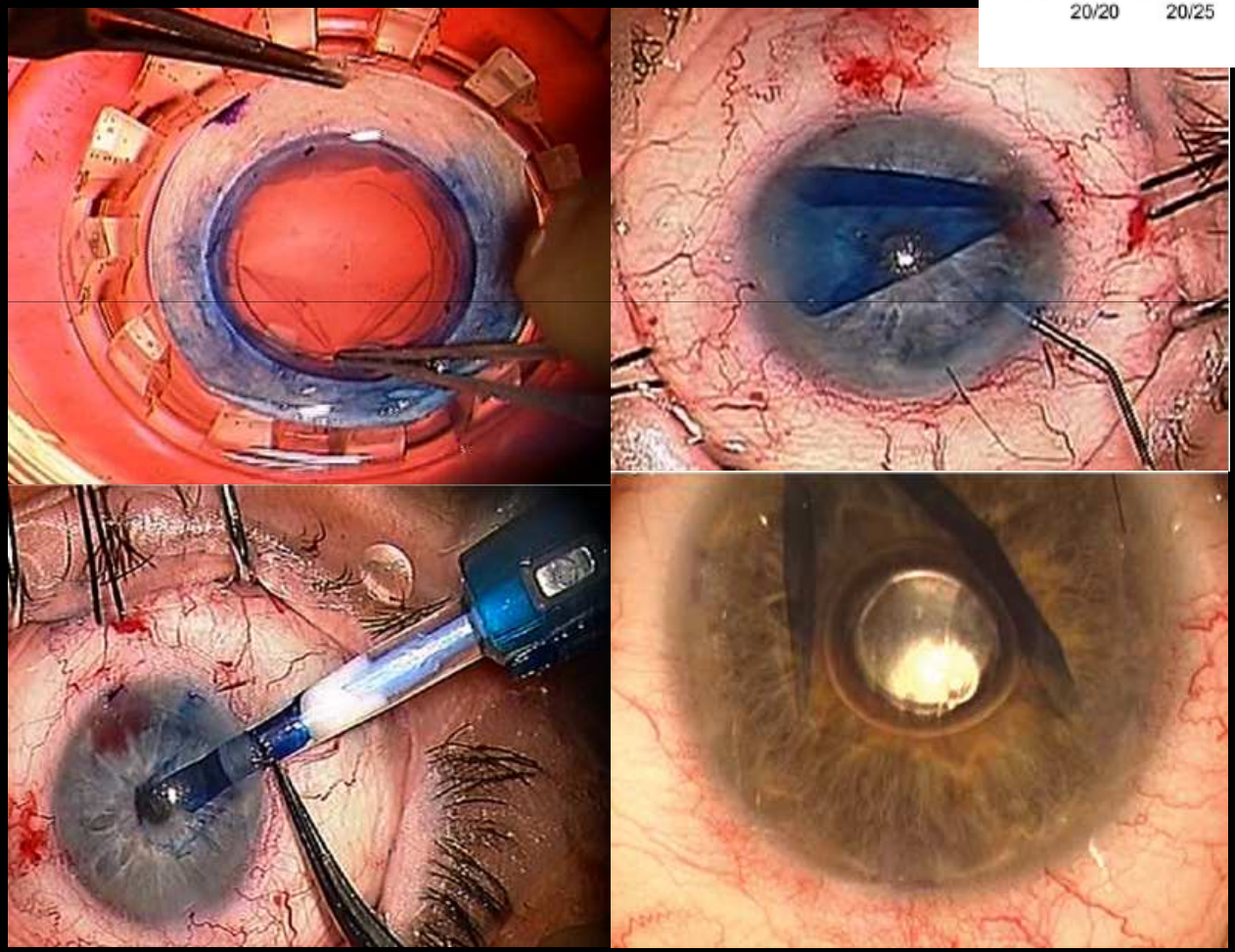


Descemet's Membrane Endothelial Keratoplasty

Prospective Multicenter Study of Visual and Refractive Outcomes and Endothelial Survival

Marianne O. Price, PhD,[1] Arthur W. Giebel, MD,[2] Kelly M. Fairchild,[1] Francis W. Price, Jr, MD[3]

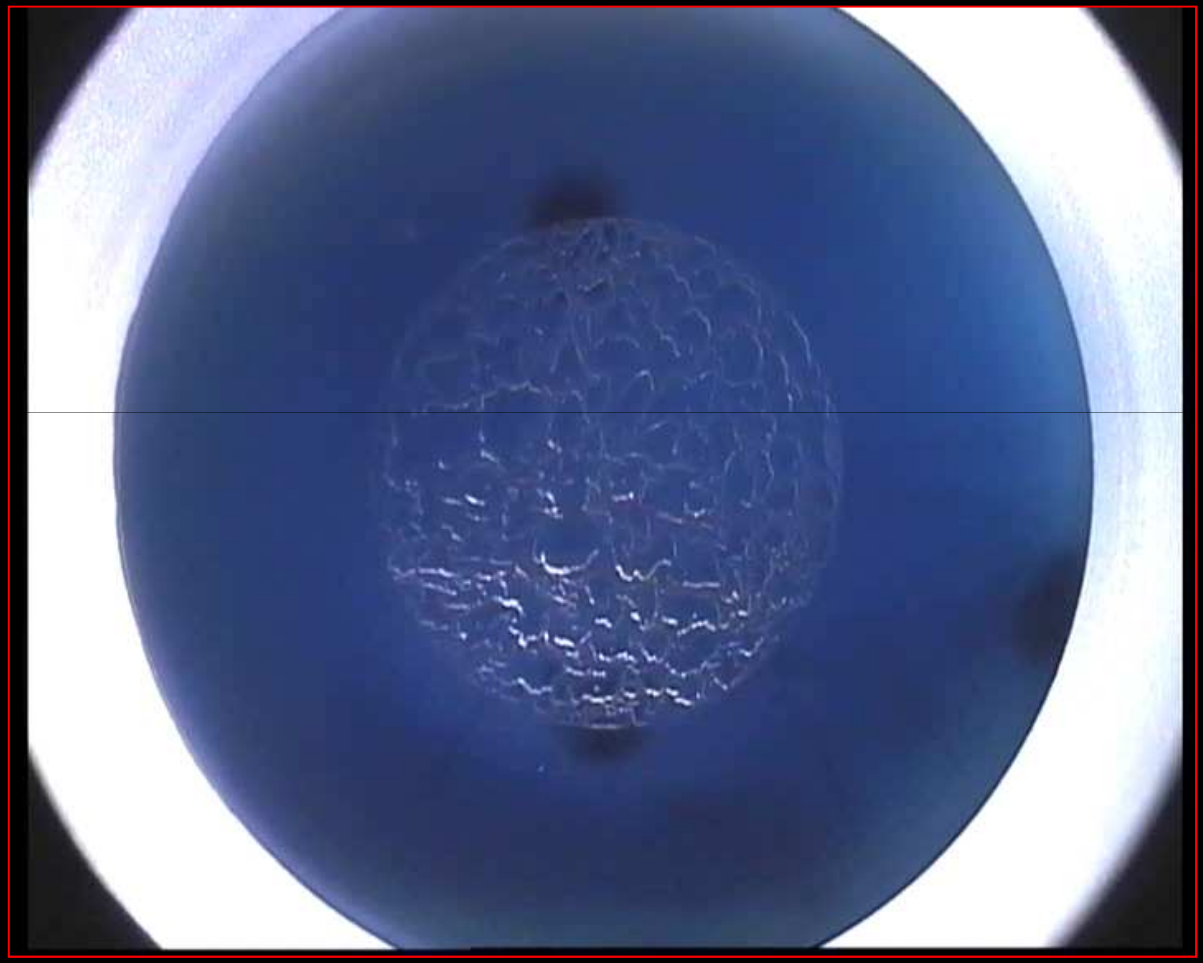




DMEK seems to be an Alternative to DSEK

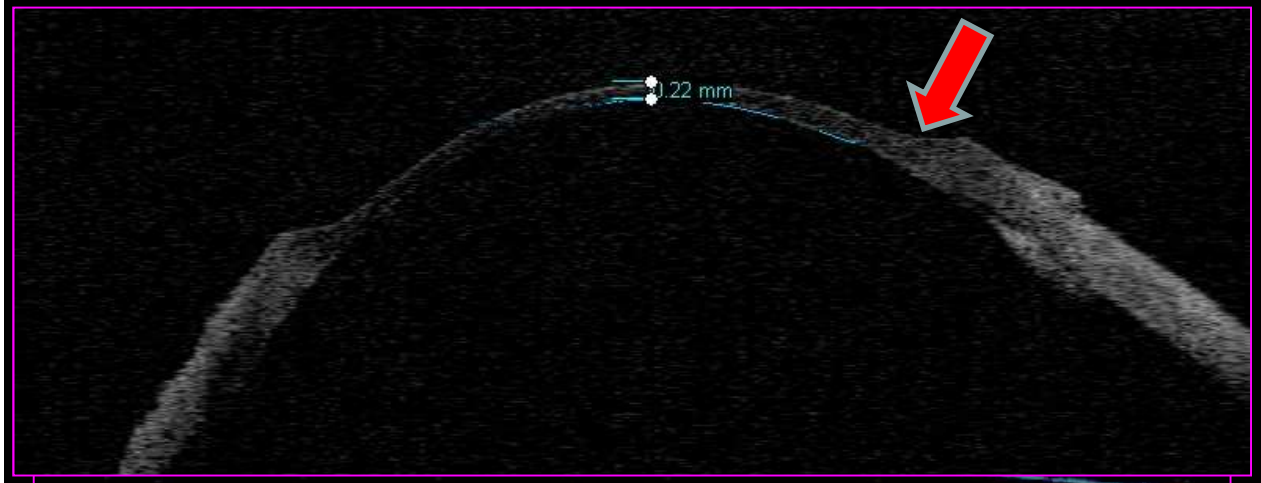
Greater visual acuity
But difficult manipulation
Of the thin DM layer

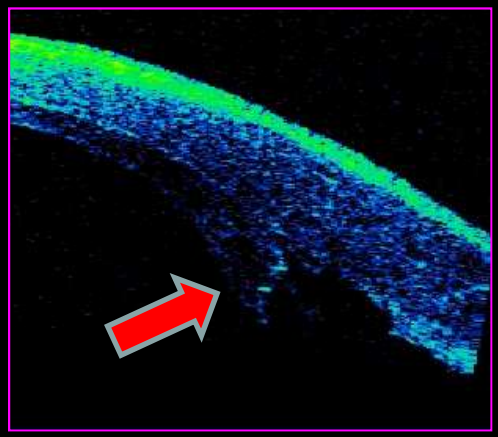
VisuMax 500 KhZ deep dissection for DSAEK lenticule creation

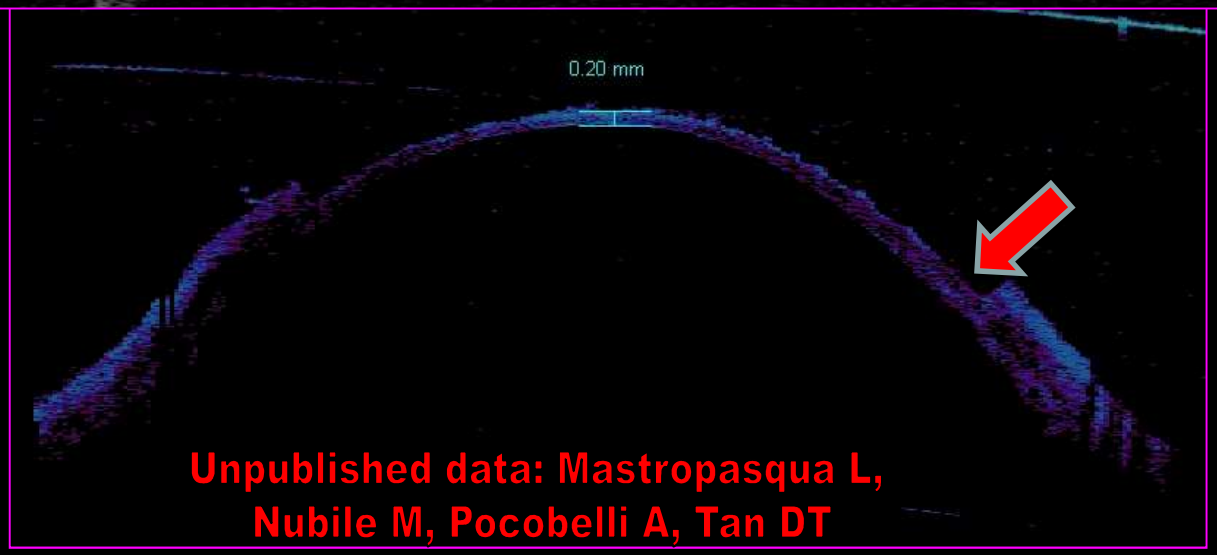


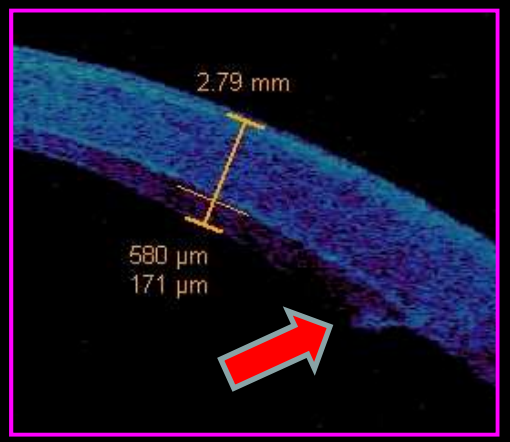
450 microns depth
9.00 mm diameter

OCT imaging of the cornea to calculate dissection profiles and thicknesses in posterior lamellar keratoplasty





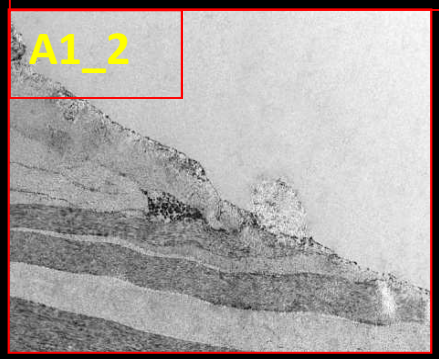


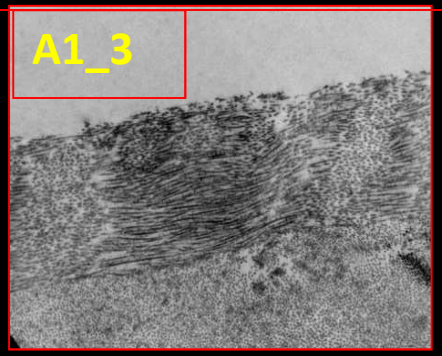


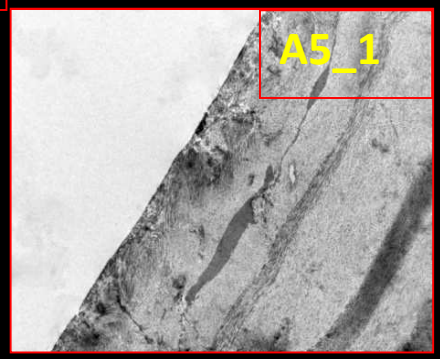
More predictable PLD thickness
And regular profile in the periphery
In FSL dissections

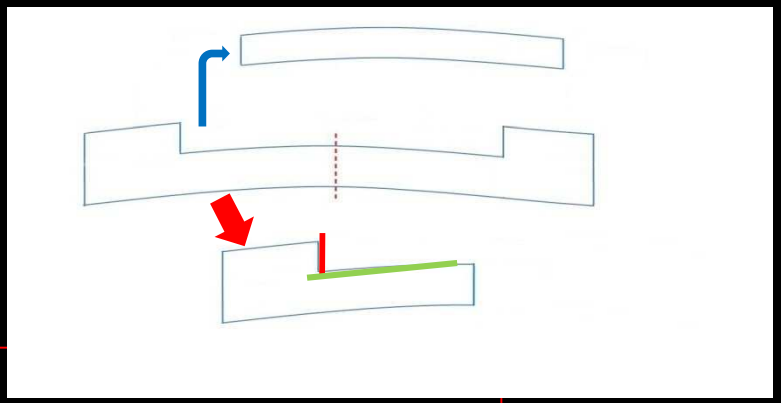
TEM: Dissection quality in DSAEK VisuMax lenticules creation

500 KhZ FSL SURFACE OF DEEP DISSECTION





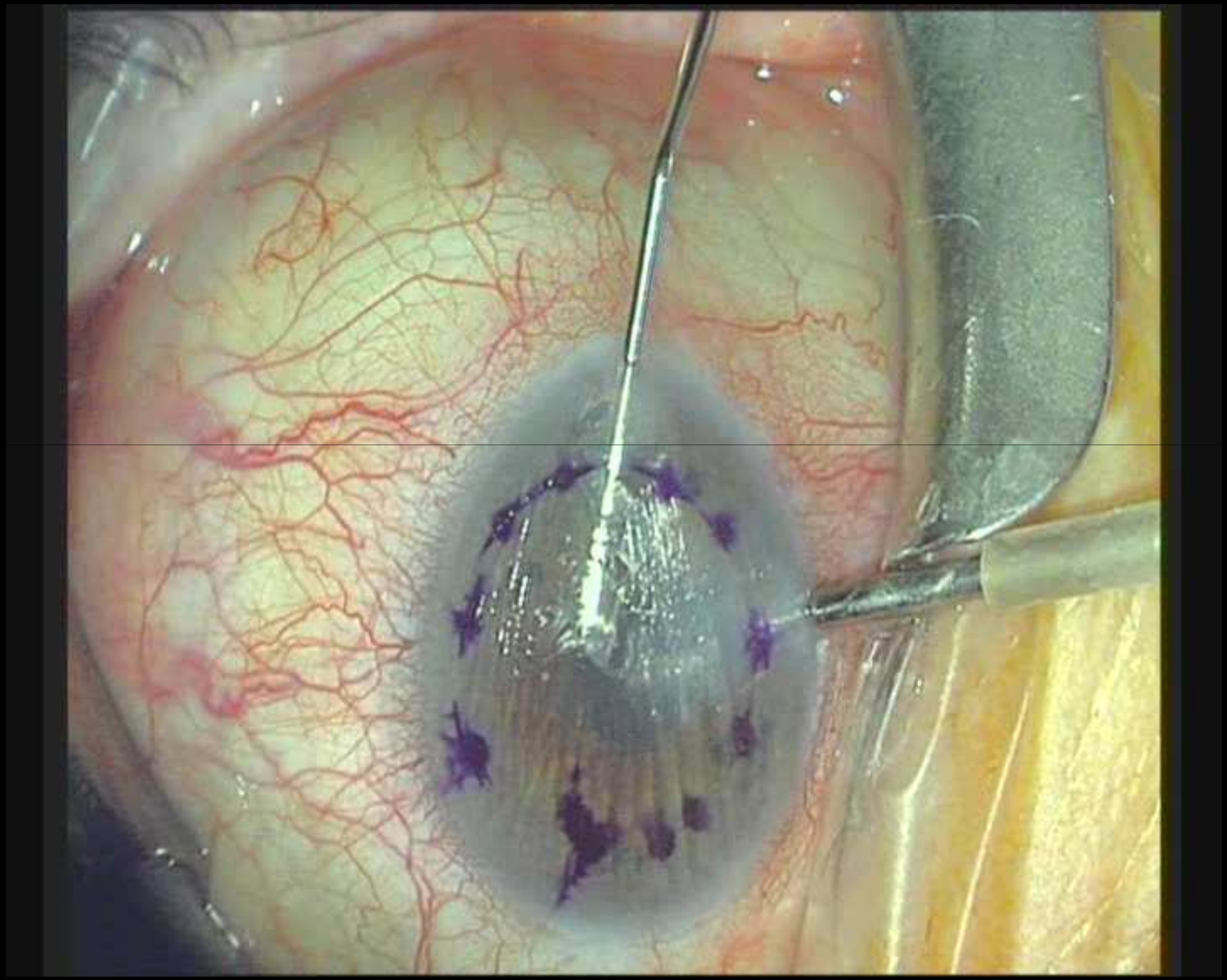




500 KhZ FSL CUT BORDERS

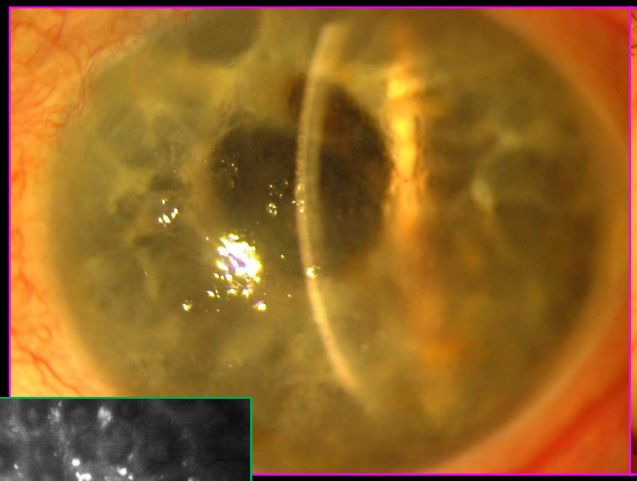
CESI laboratories

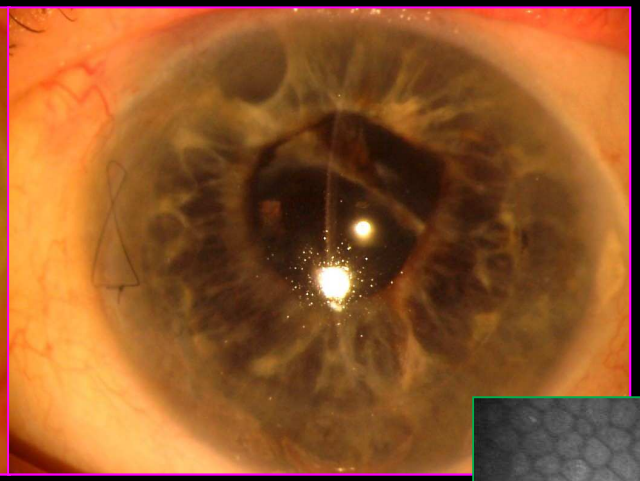
FSL assisted FSL DSEK



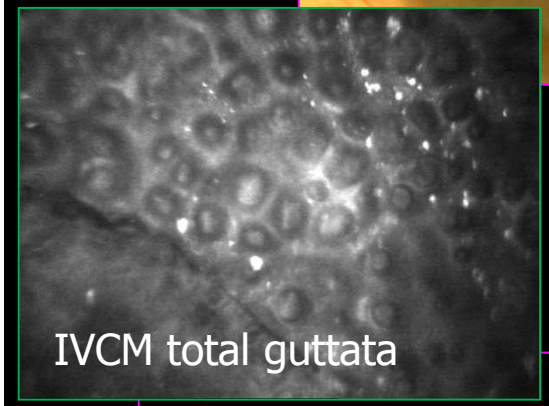
Visumax FSL-DSEAK Outcomes

Preop
BK in Fuchs dystrophy

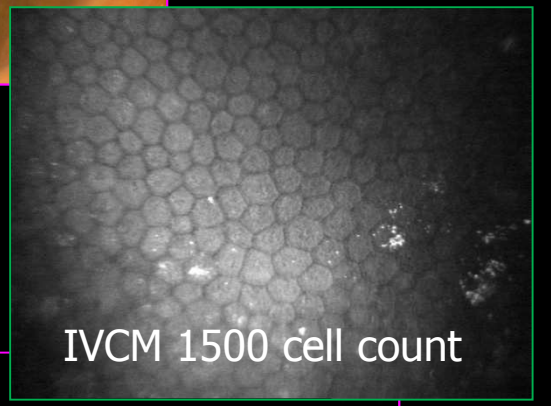




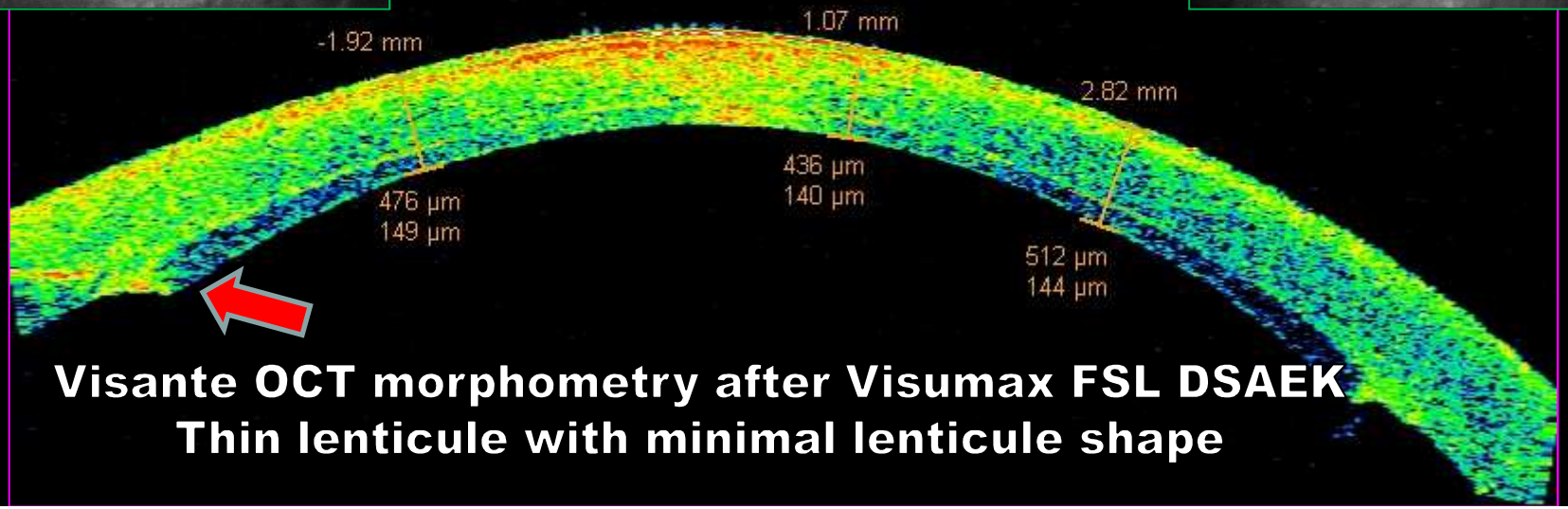
3 Months postop



IVCM total guttata

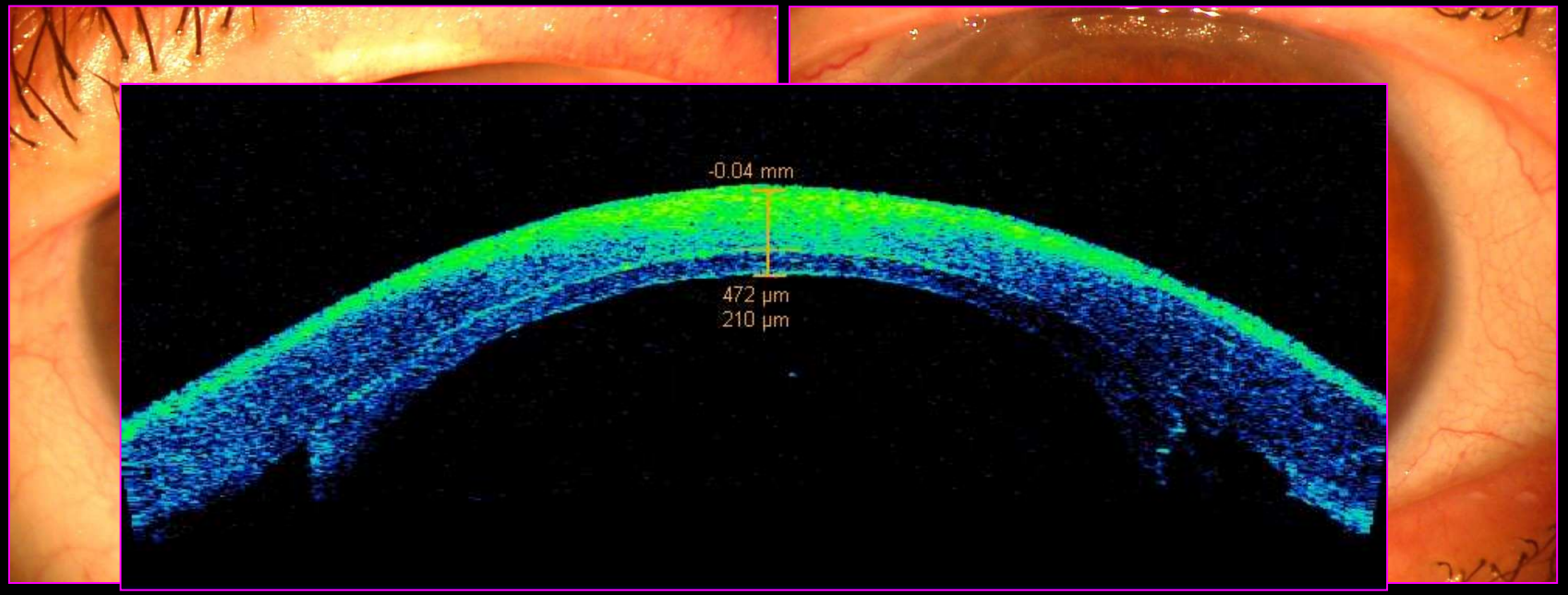


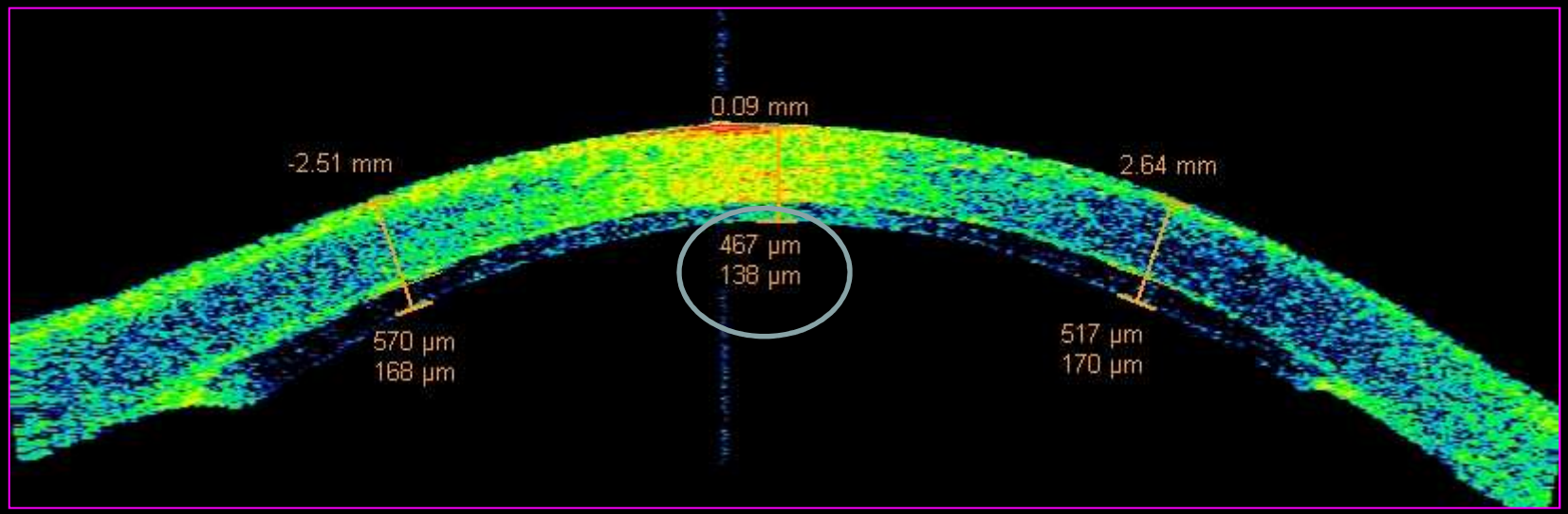
IVCM 1500 cell count

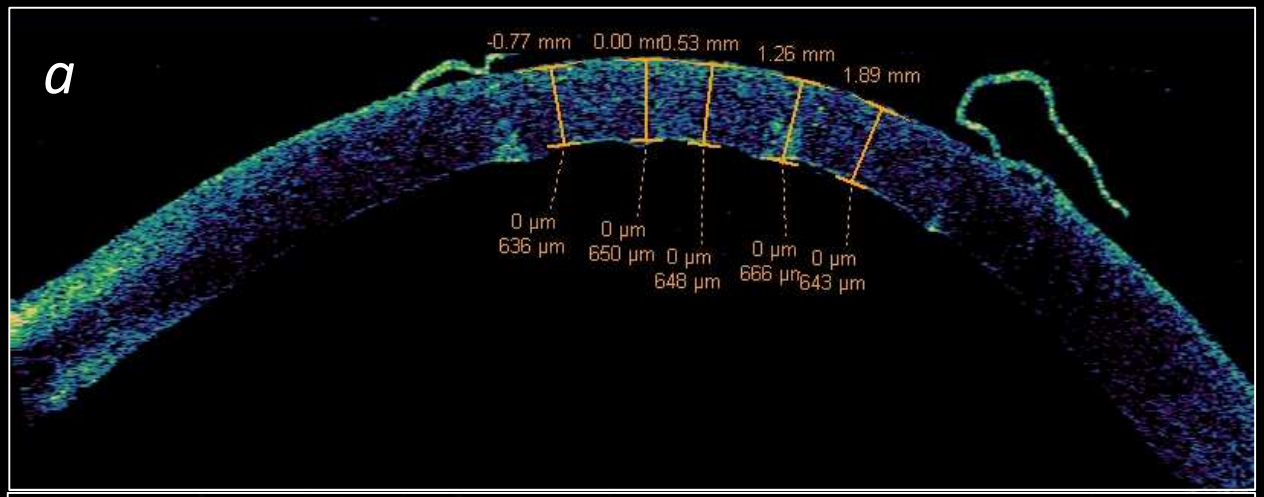


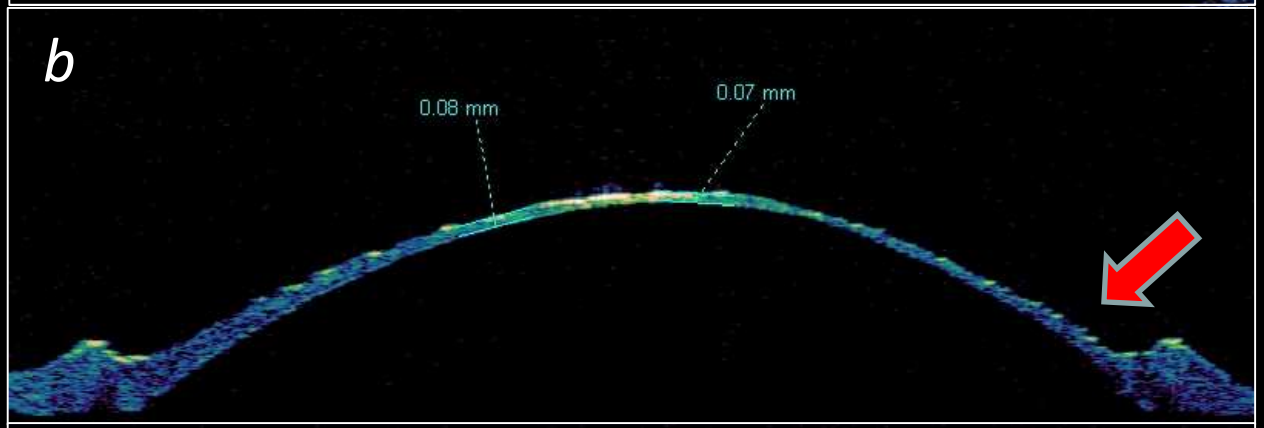
Visante OCT morphometry after Visumax FSL DSAEK
Thin lenticule with minimal lenticule shape

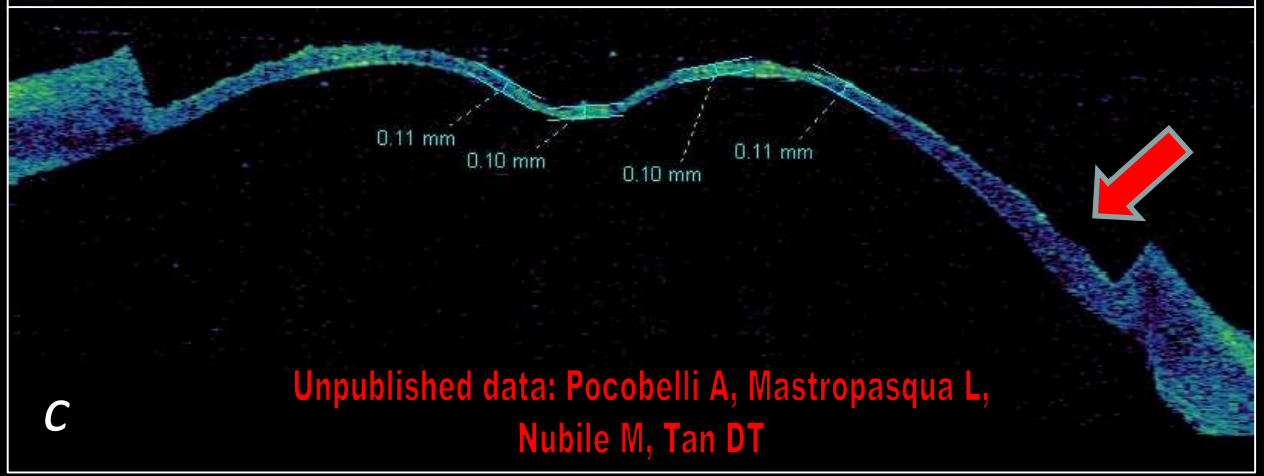
Visumax FSL-DSEAK Outcomes











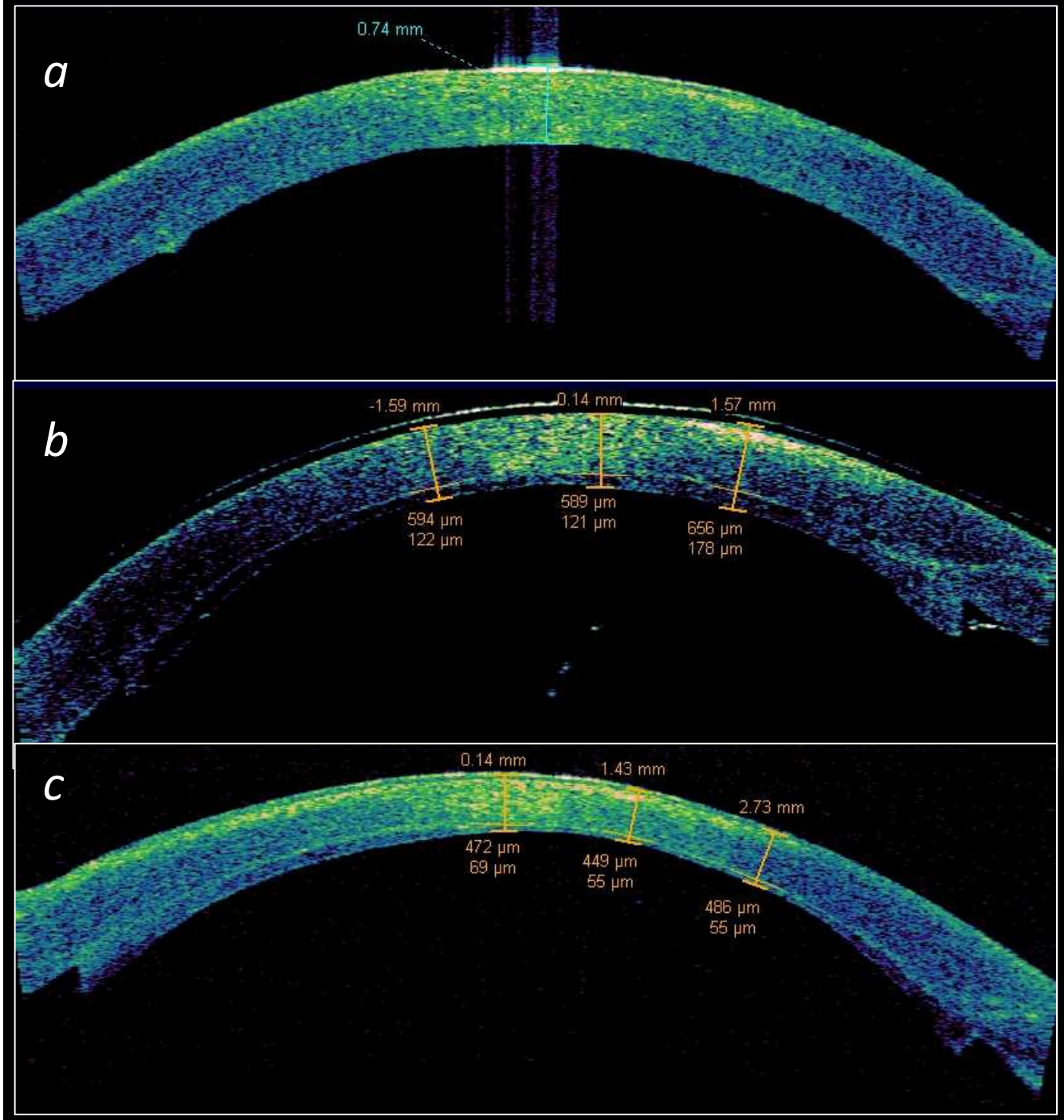
Unpublished data: Pocobelli A, Mastropasqua L, Nubile M, Tan DT

Ultra-thin FSL - DSEK

a) AS-OCT average pachymetry of donor cornea: 650 microns

b) AS-OCT pachymetry Of posterior residual stroma after: 550 microns FSL dissection 75 microns in AC

c) AS-OCT pachymetry Of posterior residual stroma after: 550 microns FSL dissection 100 microns free



Ultra-thin FSL - DSEK

a) AS-OCT average pachymetry of preop cornea: 740 microns

b) AS-OCT pachymetry Of host cornea and posterior lenticule 120 microns at 48 hours

c) AS-OCT pachymetry Of host cornea and posterior lenticule 55 microns at 2 weeks

Small Incision lenticule extraction - SMILE