DSAEK VS DMEK: TECNICHE A CONFRONTO

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OSPEDALI PRIVATI FORLÌ

Istituto internazionale per la Ricerca e Formazione in Oftalmologia

EK TODAY

GOLD STANDARD

FOR SURGICAL TREATMENT OF ENDOTHELIAL DECOMPENSATION

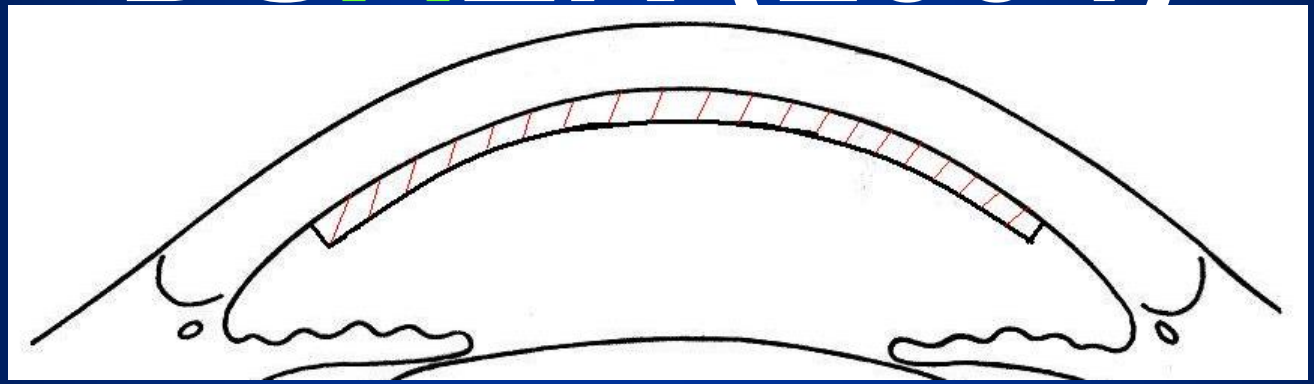
LK POSTERIORE ADDITIVA

(D)escemet (S)tripping

(A)utomated (E)ndothelial

(K)eratoplasty

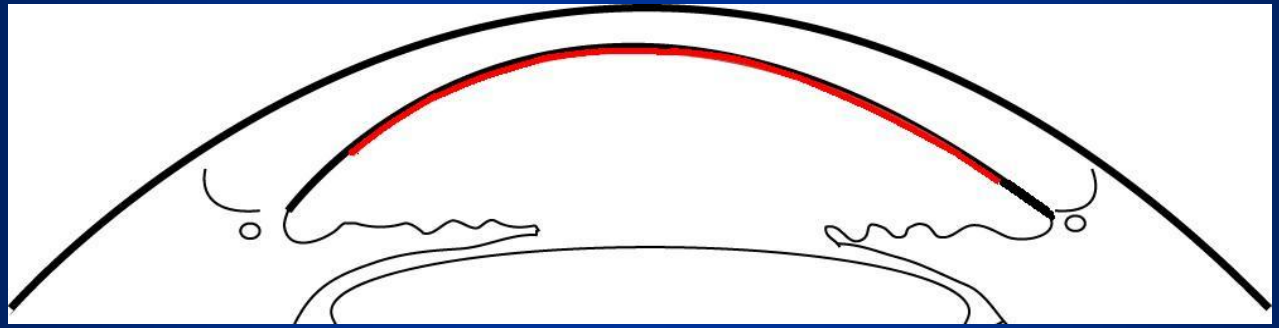
DSAEK (2004)



LK POSTERIORE SOSTITUTIVA

(D)escemet (M)embrane
(E)ndothelial (K)eratoplasty

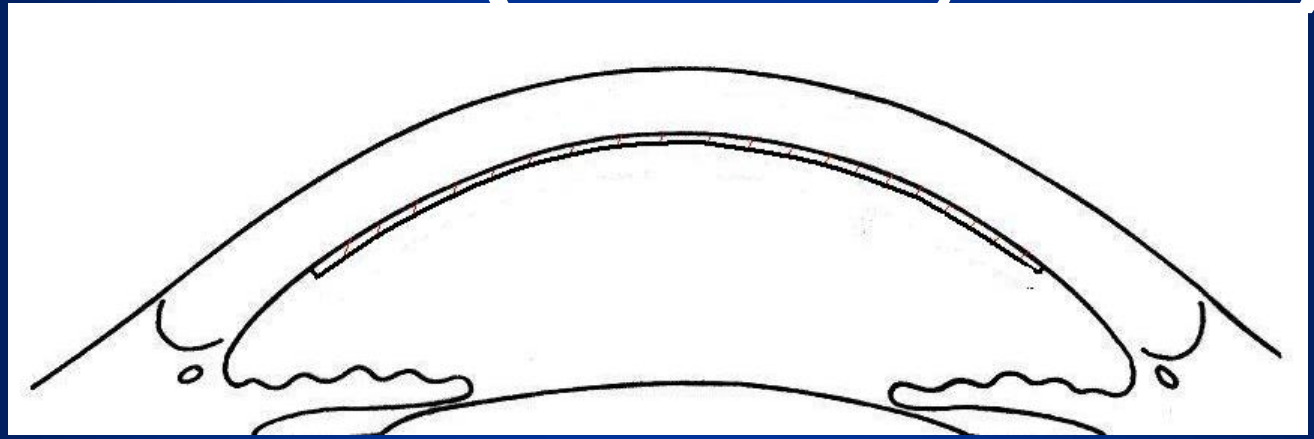
DMEK (Melles, 2006)



LK POSTERIORE ADDITIVA

U(ltra)T(hin)-

DSAEK (BUSIN, 2009)



EK IN THE USA

In 2011:

DSAEK n = 21,100

DMEK n = 343

EK IN THE USA

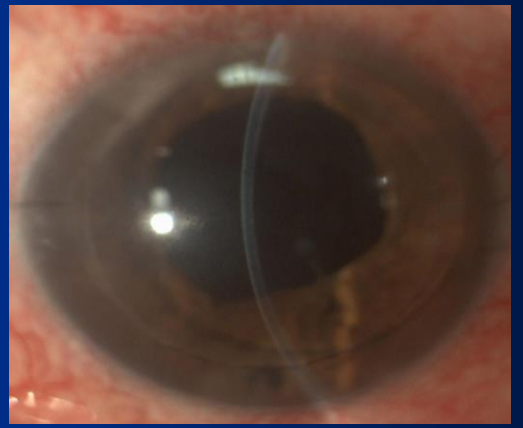
In 2022:

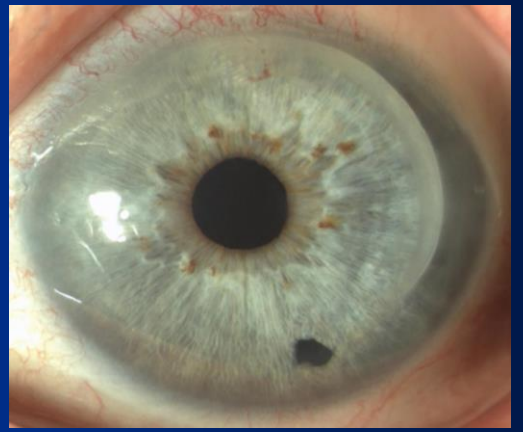
DSAEK n = 15,544

DMEK n = 15,248

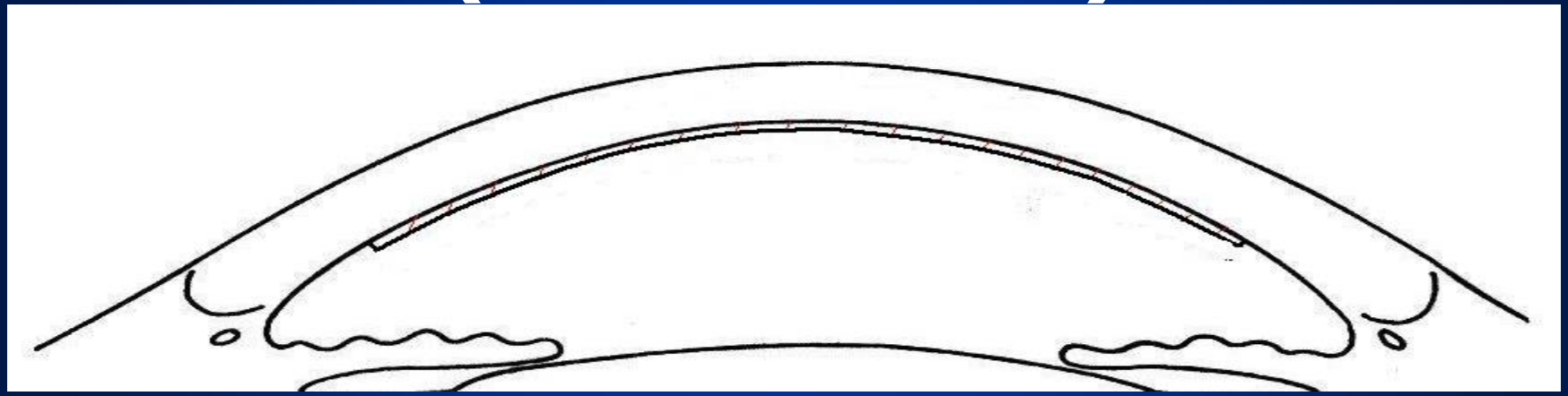
DSAEK

DSAEK Grafts Thinner Than 131 µm Lead to Improved Visual Outcomes (Neff et al. 2010)





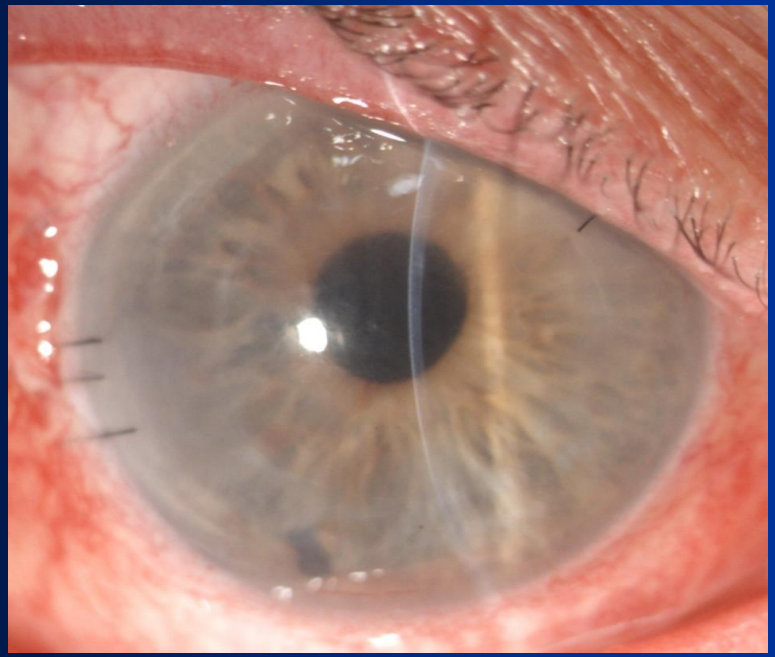
ULTRATHIN (UT) DSAEK
(Busin 2009)



TISSUE REMOVAL = Endothelium

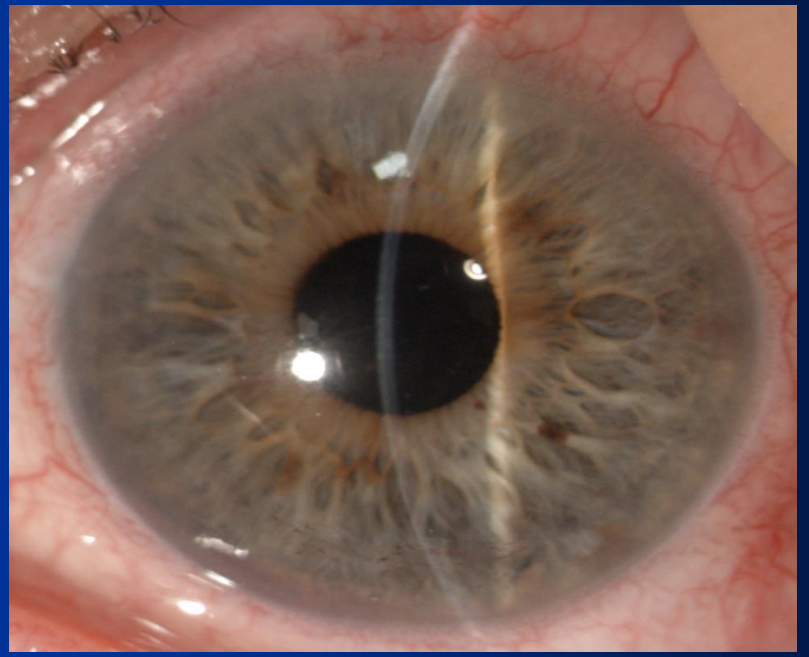
NEW LAMELLA = 30-100 μm

UT-DSAEK/DMEK



OD DMEK

VA = 20/20 (10/10)



OS UT-DSAEK

VA = 20/12.5 (16/10)

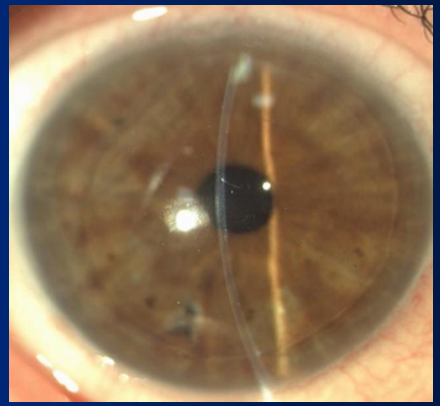
UT-DSAEK/DMEK

OD DMEK VA = 20/20 (10/10)

OS UT-DSAEK VA = 20/12.5 (16/10)

UT-DSAEK (Double Pass)

Busin et al. OPHTHALMOLOGY (2013)



264 UT-DSAEK Grafts

CGT<151µm = 260(98.5%)

CGT<131µm = 233(89.0%)

CGT<101µm = 182(69.0%

Busin Nomogram for Single Pass

AIM = Residual Bed ±150 µm

< 520 µm	350 Head
> 520 < 580 µm	400 Head
> 580 µm	450 Head

Removal of the Epithelium Before Cutting Enhances Depth by ± 40 µm !!!

UT-DSAEK (Single Pass)

Nahum et al., CORNEA (2015)

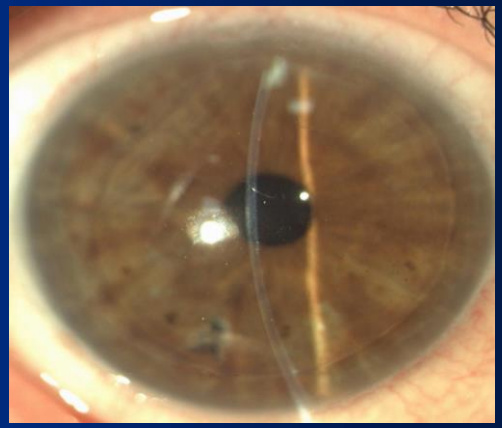
24 UT-DSAEK Grafts

CGT<151µm = 23 (95.8%)

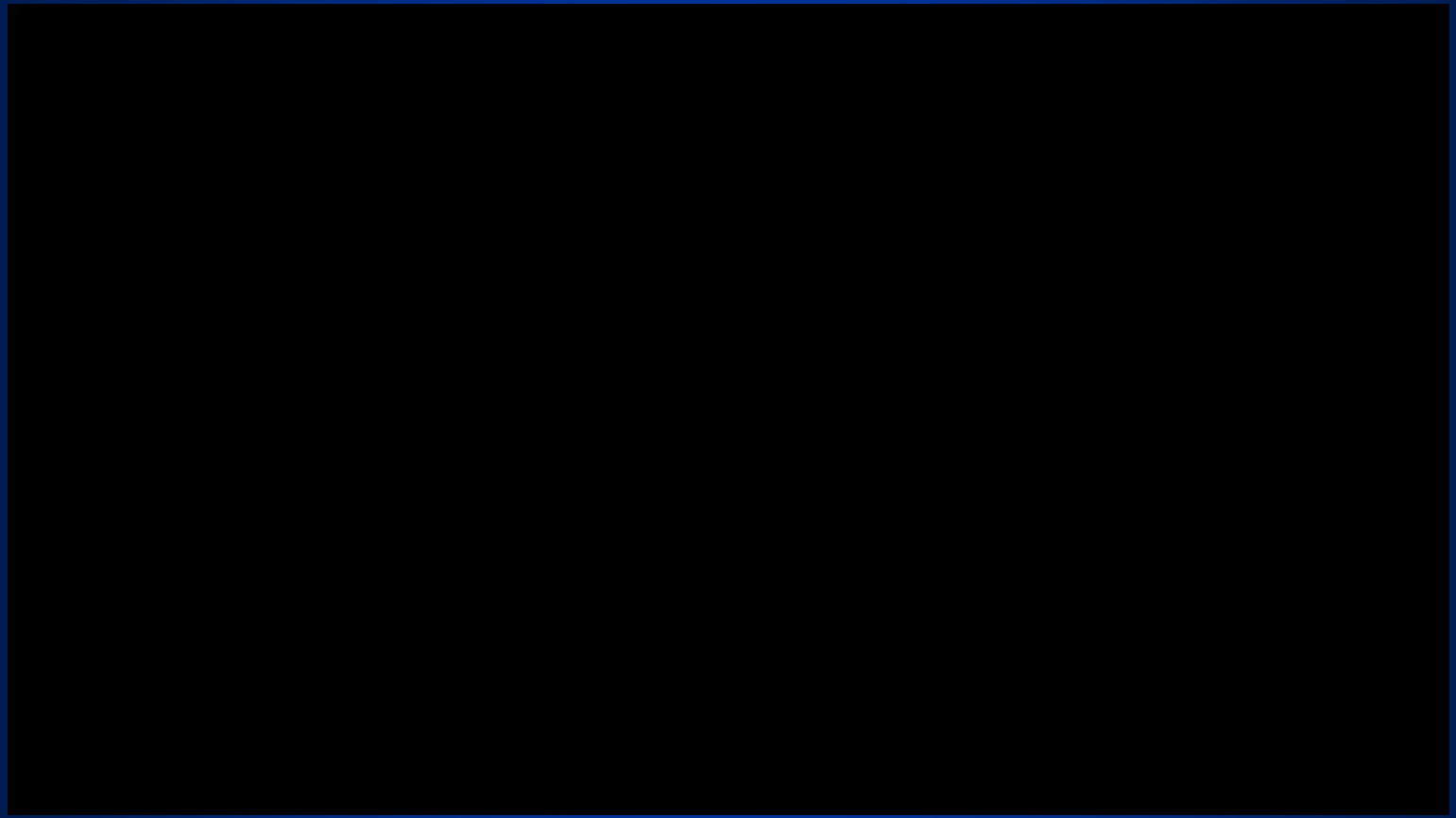
CGT<131µm = 22 (91.6%)

CGT<101µm = 16 (66.7%)

CGT<61µm = 7 (29.2%)



UT-DSAEK (Single-Pass)



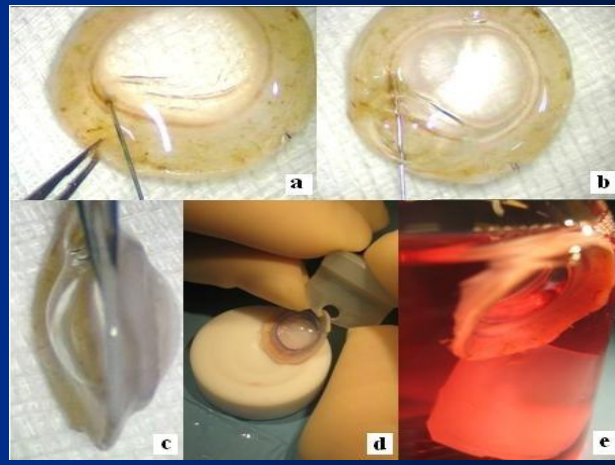
UT-DSAEK/DMEK

DMEK-(PDEK)-UT-DSAEK

Pneumatic Dissection and Storage of Donor Endothelial Tissue for Descemet's Membrane Endothelial Keratoplasty

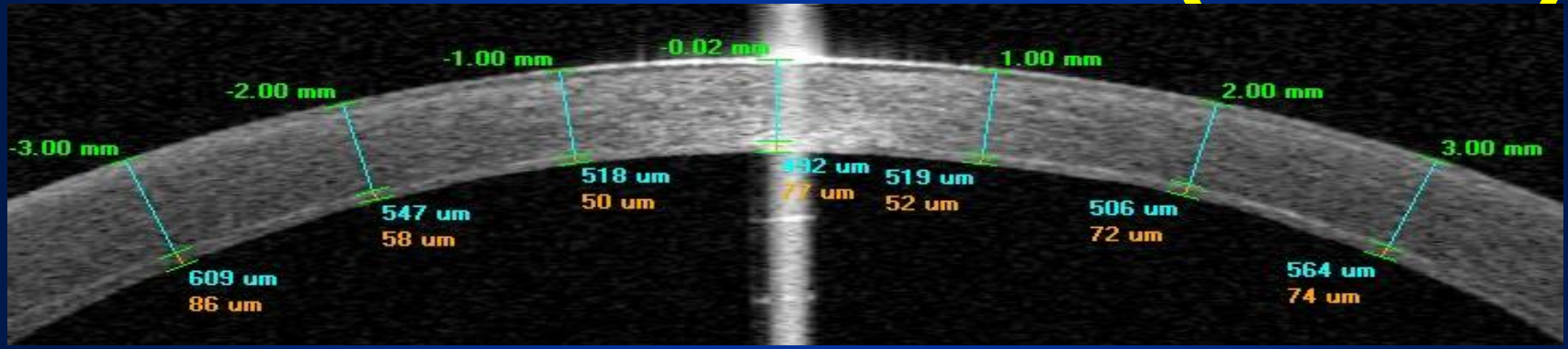
A Novel Technique

Massimo Busin, MD,[1,2,3] Vincenzo Scorcia, MD,[1,2] Amit K. Patel, FRCOphth,[1,3] Gianni Salvalaio,[3] Diego Ponzin, MD[3]

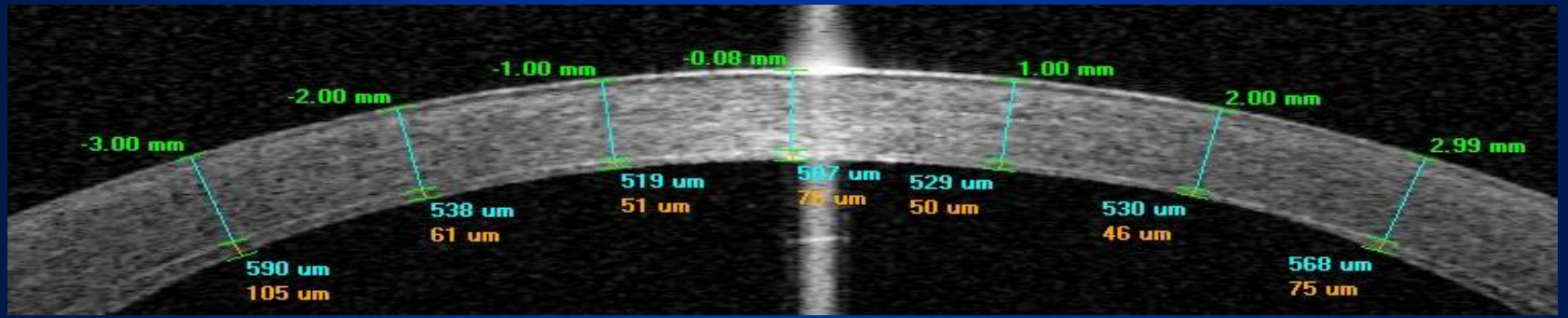


(2008-2010) ECL ↑↑↑

UT-DSAEK vs DMEK(PDEK)



UT-DSAEK



DMEK??? →(PDEK) UT-DSAEK

DSAEK/UT-DSAEK/DMEK

UT-DSAEK vs DMEK

=

PD-DALK vs DALK

WHY
20/20 VA Potential
Does NOT Equal
20/20 BSCVA ???

DSAEK/UT-DSAEK/DMEK

IS THE INTERFACE THE TRUE PROBLEM ???

DSAEK/UT-DSAEK/DMEK

DMEK Graft Variables

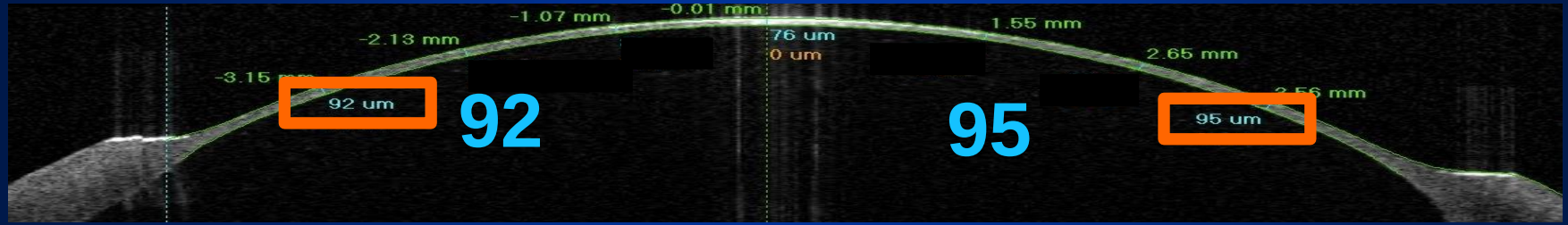
- ECC
- Diameter
- ???

DSAEK/UT-DSAEK/DMEK

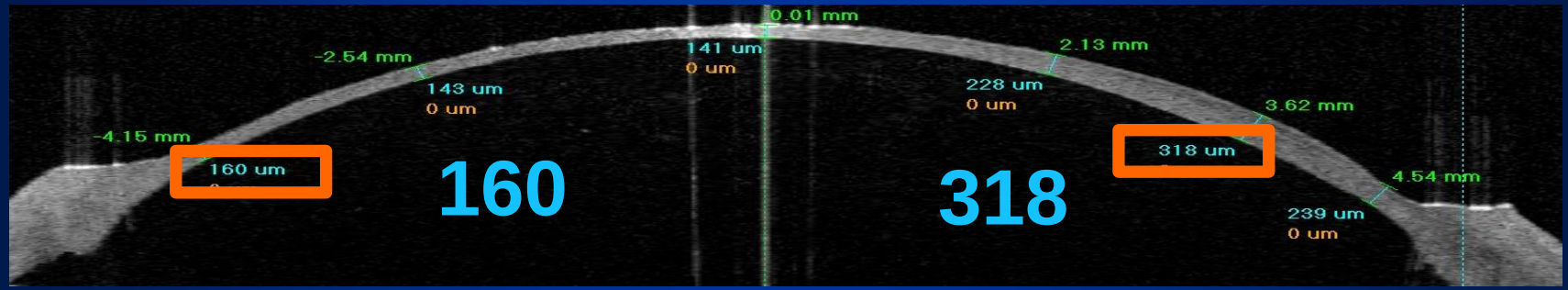
DS(A)EK Graft Variables

- ECC
- Diameter
- STROMA (Thickness,Regularity, Orientation)→QUALITY CONTROL

DSAEK/UT-DSAEK/DMEK

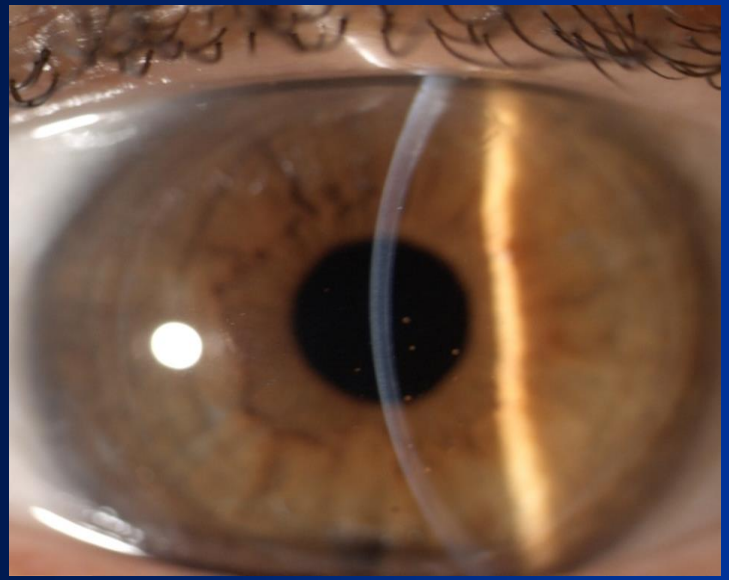


Thin, Regular Shape = No HOA



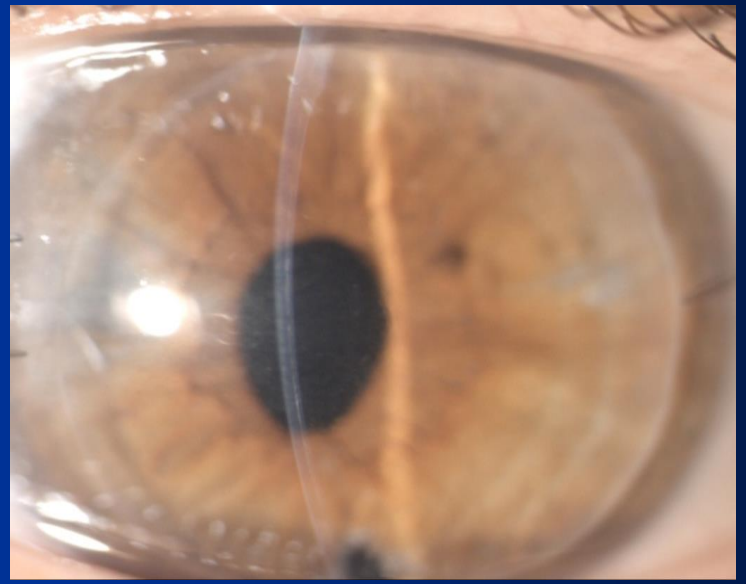
Thick, Irregular Shape = HOA

UT-DSAEK/DSAEK



OD UT-DSAEK

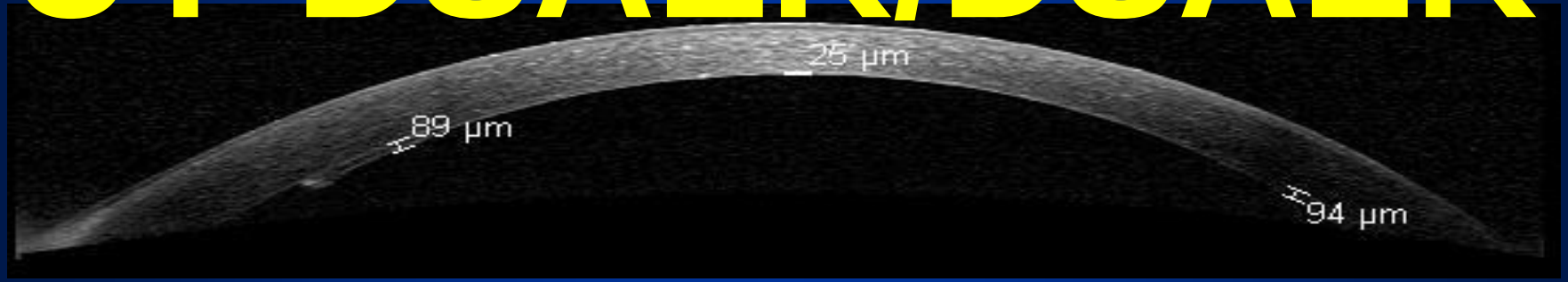
VA = 20/17 (1.2)



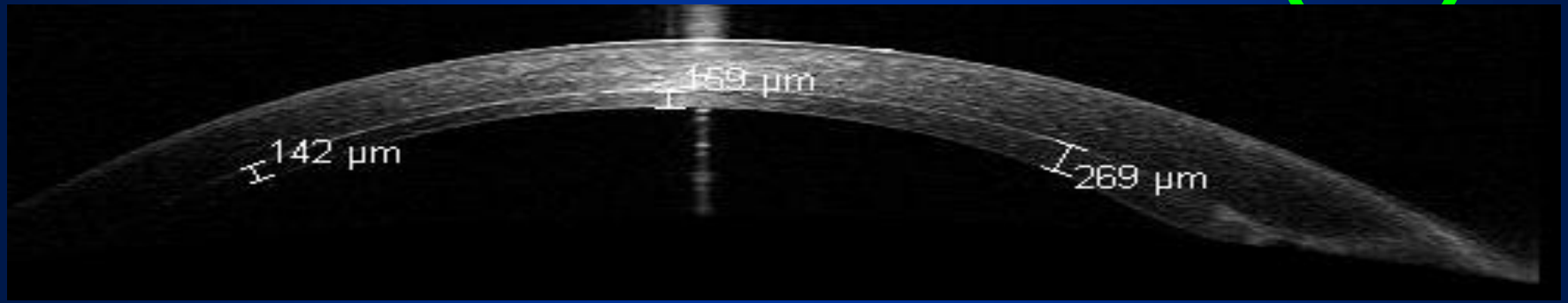
OS DSAEK

VA = 20/30 (0.6)

UT-DSAEK/DSAEK



OD UT-DSAEK VA = 20/17 (1.2)



OS DSAEK VA = 20/30 (0.6)

ISSUES (UT)DSAEK vs DMEK

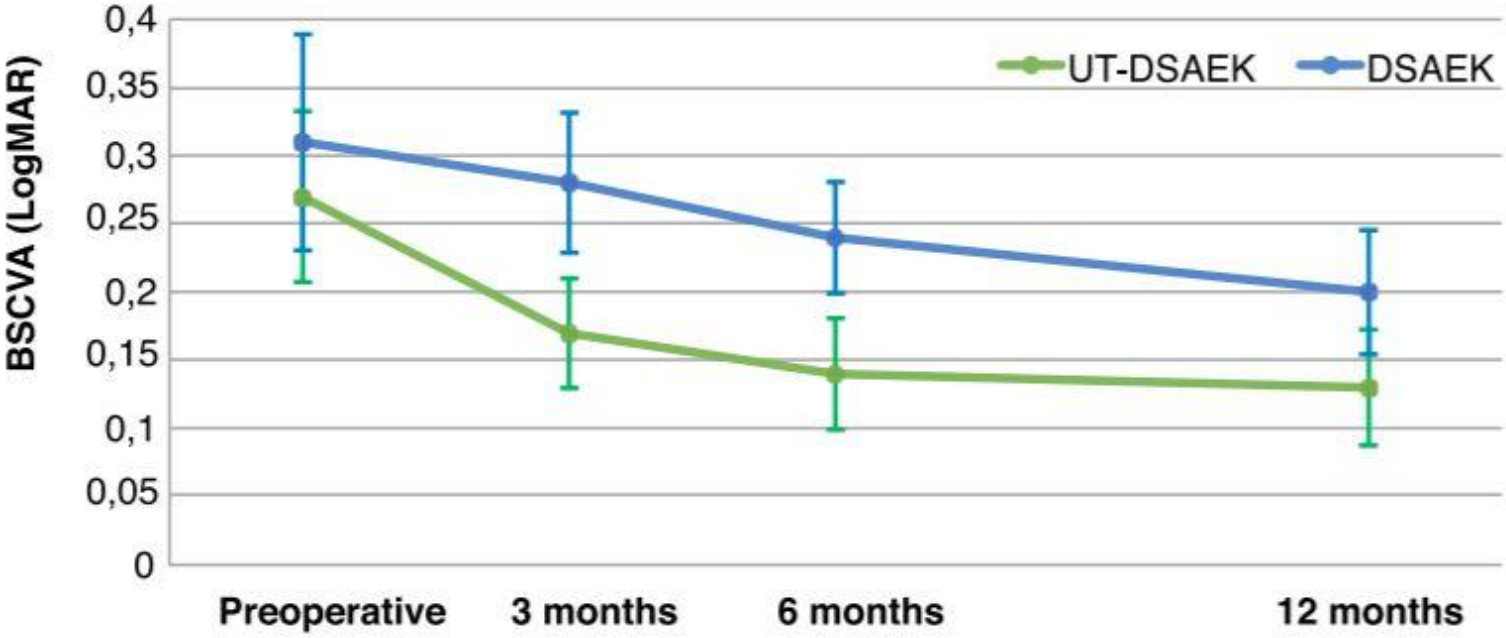
A Randomized Multicenter Clinical Trial of Ultrathin Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) versus DSAEK

Mor M. Dickman, MD,[1] Pieter J. Kruit, MD, PhD,[2] Lies Remeijer, MD, PhD,[3] Jeroen van Rooij, MD,[3] Allegonda Van der Lelij, MD, PhD,[4] Robert H.J. Wijdh, MD,[5] Frank J.H.M. van den Biggelaar, PhD,[1] Tos T.J.M. Berendschot, PhD,[1] Rudy M.M.A. Nuijts, MD, PhD[1]

Ophthalmology 2016;■:1–9

ISSUES (UT)DSAEK vs DMEK

DSAEK vs UT-DSAEK in NL



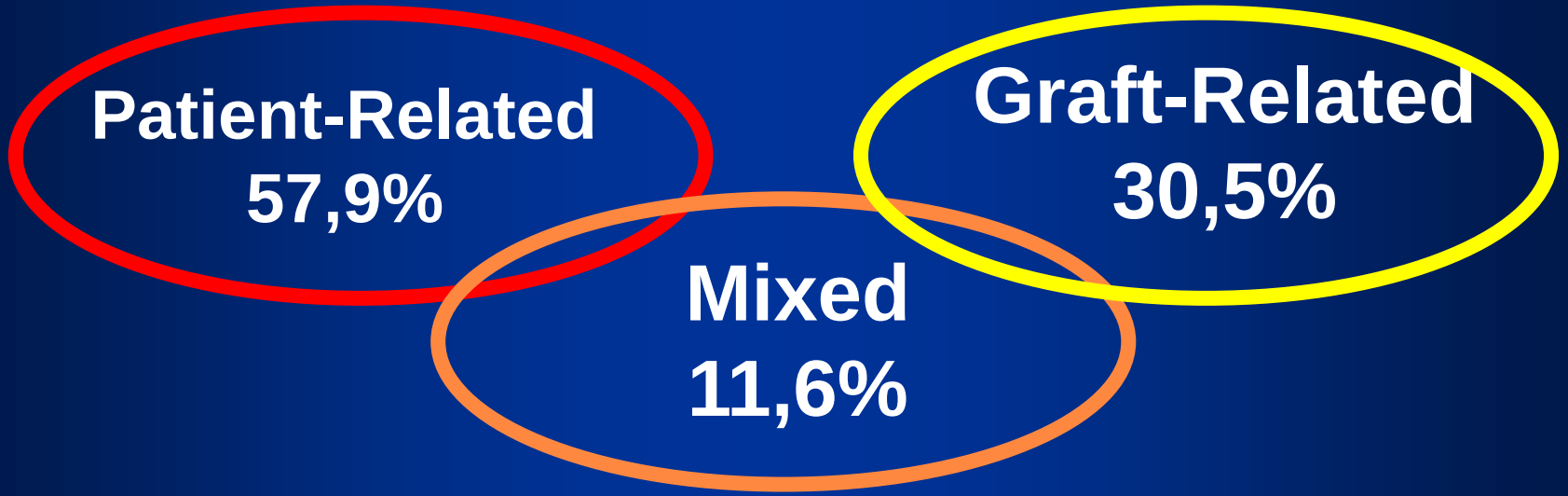
DMEK

Eyes with BSCVA ≥ 20/20

≥20/20 = 61% to 20%

<20/20 = 39% to 80%

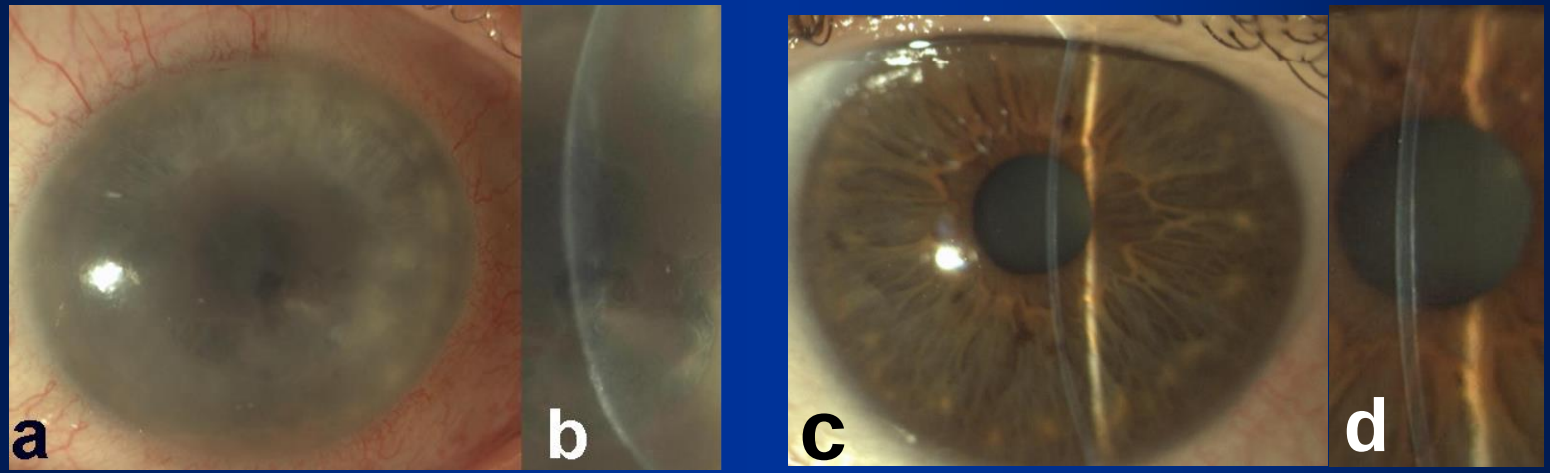
DSAEK/UT-DSAEK/DMEK



DAPENA et al. *Potential Causes of Incomplete Visual Rehabilitation at 6 Months Postoperative After Descemet Membrane Endothelial Keratoplasty*
Am J Ophthalmol 2013;156:780–788

DSAEK/UT-DSAEK/DMEK

RECIPIENT CORNEA



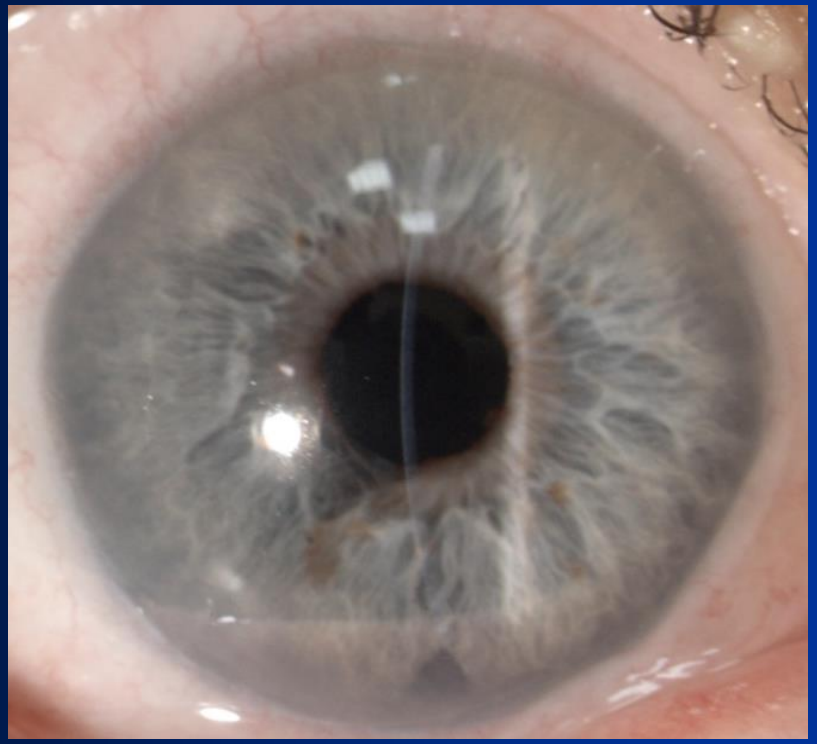
DIFFERENT PREOPERATIVE CONDITION !!!

OUTCOMES

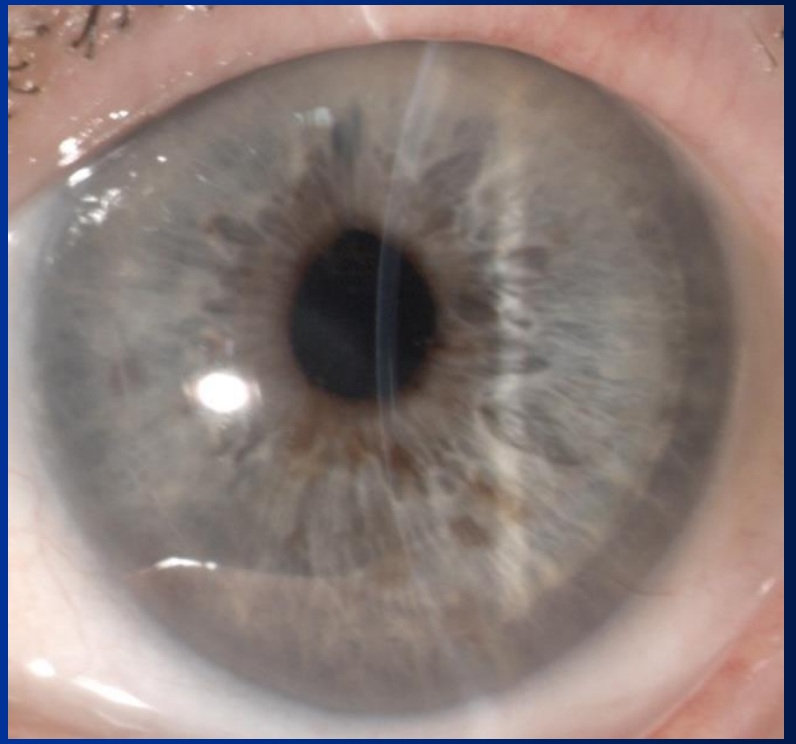
ULTRATHIN DSAEK

VS

DMEK

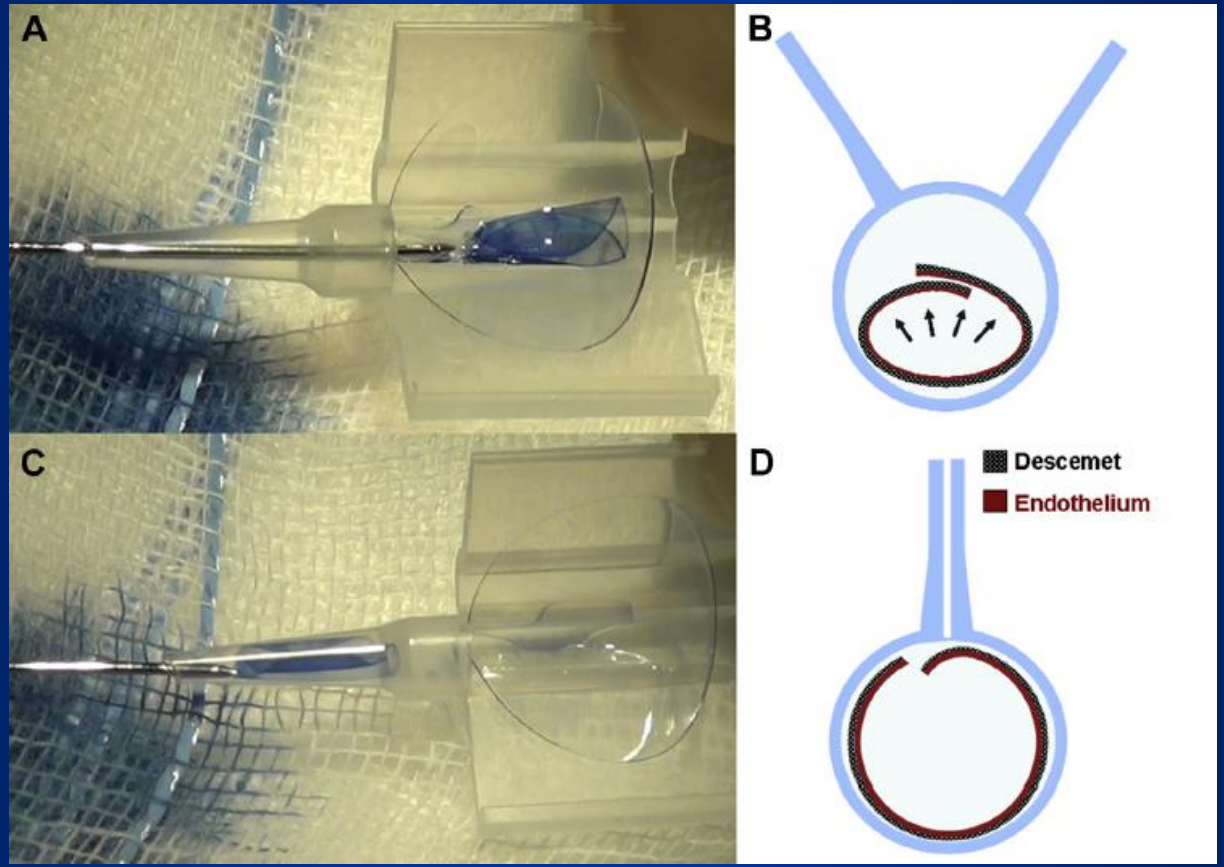


OD: 4y after DMEK
VA: 20/20



OS: 6y after UT-DSAEK
VA: 20/20

2014



ENDOTHELIUM-IN DMEK

2016

Ophthalmology. 2016 Mar;123(3):476-83. doi: 10.1016/j.ophtha.2015.10.050. Epub 2015 Dec 11.

Contact Lens-Assisted Pull-Through Technique for Delivery of Tri-Folded (Endothelium in) DMEK Grafts Minimizes Surgical Time and Cell Loss

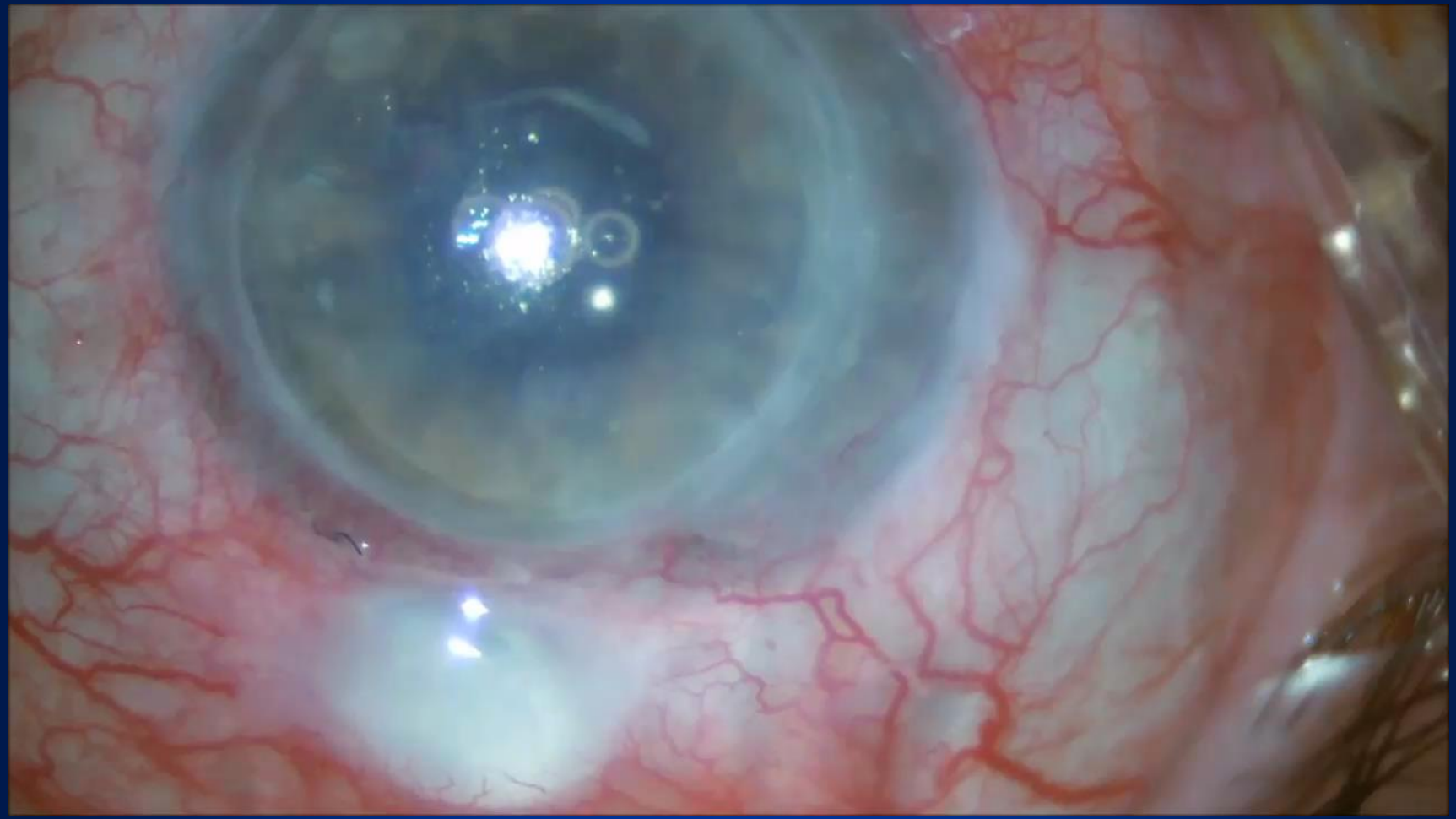
Massimo Busin [1], Pia Leon [2], Vincenzo Scorcia [3], Diego Ponzin [4]

2020

Am J Ophthalmol. 2020 Nov;219:121-131. doi: 10.1016/j.ajo.2020.07.004. Epub 2020 Jul 11.

Three-Year Outcomes of Tri-Folded Endothelium-In Descemet Membrane Endothelial Keratoplasty With Pull-Through Technique

Angeli Christy Yu [1], James Myerscough [2], Rossella Spena [1], Fiorella Fusco [3], Sergiu Socea [4], Luca Furiosi [1], Luigi De Rosa [5], Cristina Bovone [1], Massimo Busin [6]



IS DMEK SUPERIOR?

2017

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Ophthalmic Technology Assessment

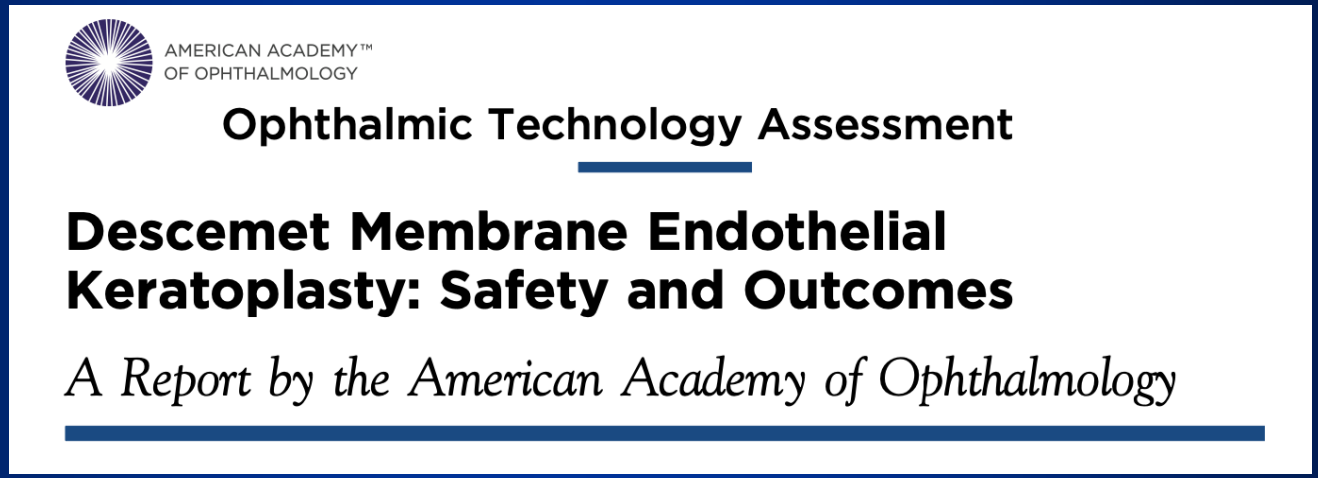
Descemet Membrane Endothelial Keratoplasty: Safety and Outcomes

A Report by the American Academy of Ophthalmology

Conclusions: The evidence reviewed supports DMEK as a safe and effective treatment for endothelial failure. With respect to visual recovery time, visual outcomes, and rejection rates, DMEK seems to be superior to DSEK and to induce less refractive error with similar surgical risks and EC loss compared with DSEK. The rate of air injection and repeat keratoplasty were similar in DMEK and DSEK after the learning curve for DMEK. *Ophthalmology 2017;■:1–16 © 2017 by the American Academy of Ophthalmology*

IS DMEK SUPERIOR?

2017



DID NOT COMPARE DMEK WITH UT-DSAEK!

IDEAL COMPARATIVE TRIAL

- Prospective, Randomized
- Well-powered
  - ↑ Statistical Power ↓ Magnitude of Difference → ↑↑ Sample Size
- Equal Baseline Characteristics
- Same Interventions for each group
- No Patient Drop-out (Attrition)

COMPARATIVE STUDIES ARE ROBUST ???

	Prospective	Ff-up (mo)	Triple Procedure	DSAEK CGT (um)	N / Diagnosis	Preop BCVA
Hamzaoglu	X	6	≠	*nr*	=	≠
Heinzelmann	X	≠	≠	*nr*	≠	≠
Tourtas	X	6	≠	~150	≠	=
Droutsas	X	12	=	140	=	=
Phillips	X	6	=	141	=	≠
Rudolph	X	6.5	≠	*nr*	≠	*nr*

nr – not reported

DMEK vs DSAEK

DSAEK Is Tried and Tested but Has Also Evolved (UT-DSAEK !!!)

DMEK vs UT-DSAEK

2020

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Check for updates

Commentary

The Ongoing Debate: Descemet Membrane Endothelial Keratoplasty Versus Ultrathin Descemet Stripping Automated Endothelial Keratoplasty

Massimo Busin, MD - *Forlì, Italy, and Ferrara, Italy*
Angeli Christy Yu, MD - *Forlì, Italy*

DMEK vs UT-DSAEK

Descemet Endothelial Thickness Comparison Trial

A Randomized Trial Comparing Ultrathin Descemet Stripping Automated Endothelial Keratoplasty with Descemet Membrane Endothelial Keratoplasty

Winston Chamberlain, MD, PhD,[1] Charles C. Lin, M
Jameson Clover,[4] Stephen D. McLeod, MD,[5] Travis C
Jennifer Rose-Nussbaumer, MD[3,5]

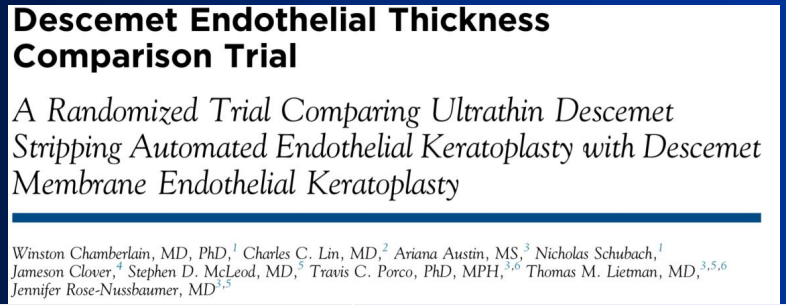
DETECT

Descemet Membrane Endothelial Keratoplasty versus Ultrathin Descemet Stripping Automated Endothelial Keratoplasty

A Multicenter Randomized Controlled Clinical Trial

Suryan L. Dunker, MD,[1] Mor M. Dickman, MD, PhD,[1,2] Robert P.L. Wisse, MD, PhD,[3] Siamak Nobacht, MD,[4] Robert H.J. Wijdh, MD,[5] Marjolijn C. Bartels, MD, PhD,[6] Mei L. Tang, MD,[7] Frank J.H.M. van den Biggelaar, PhD,[1] Pieter J. Kruit, MD, PhD,[8] Rudy M.M.A. Nuijts, MD, PhD[1,2]

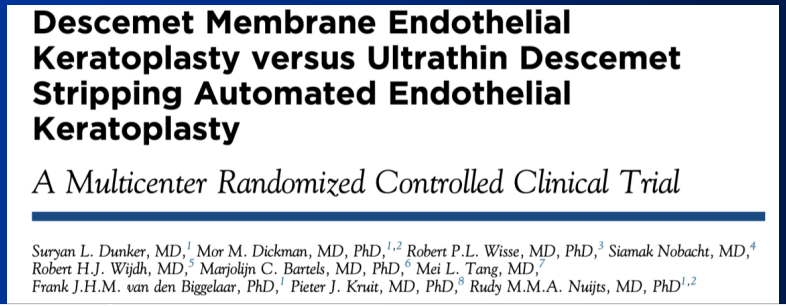
NL TRIAL



Descemet Endothelial Thickness Comparison Trial

A Randomized Trial Comparing Ultrathin Descemet Stripping Automated Endothelial Keratoplasty with Descemet Membrane Endothelial Keratoplasty

Winston Chamberlain, MD, PhD,[1] Charles C. Lin, MD,[2] Ariana Austin, MS,[3] Nicholas Schubach,[1] Jameson Clover,[4] Stephen D. McLeod, MD,[5] Travis C. Porco, PhD, MPH,[3,6] Thomas M. Lietman, MD,[3,5,6] Jennifer Rose-Nussbaumer, MD[3,5]



Descemet Membrane Endothelial Keratoplasty versus Ultrathin Descemet Stripping Automated Endothelial Keratoplasty

A Multicenter Randomized Controlled Clinical Trial

Suryan L. Dunker, MD,[1] Mor M. Dickman, MD, PhD,[1,2] Robert P.L. Wisse, MD, PhD,[3] Siamak Nobacht, MD,[4] Robert H.J. Wijdh, MD,[5] Marjolijn C. Bartels, MD, PhD,[6] Mei L. Tang, MD,[7] Frank J.H.M. van den Biggelaar, PhD,[1] Pieter J. Kruit, MD, PhD,[8] Rudy M.M.A. Nuijts, MD, PhD[1,2]

	DETECT	NL Trial
Indication	50 (96% Fuchs)	54 (100% Fuchs)
Triple Procedure	72% DMEK vs 68% UT-DSAEK	0%
Stat. Power	80% 6 letters ETDRS	90% 10 letters ETDRS
VA	DMEK > UT-DSAEK	DMEK = UT-DSAEK
ECD	DMEK = UT-DSAEK (NP)	
Complications	DMEK = UT-DSAEK(?)	DMEK > UT-DSAEK(?)

Adverse Events	DETECT		NL Trial	
	UT-DSAEK	DMEK	UT-DSAEK	DMEK
Glaucoma			4	5
Medical	2	2	-	-
Surgical	1	1	-	-
Graft Displacement	1	0	0	0
Graft Failure	1	1	1	4*
Post. Synechiae	0	1	0	0
Re-bubble	1	6	1	7*
Retinal tear	0	1	0	0
Others	3	4	0	1
Total	9	16	6	17 in 15 eyes
	P=0.31# (NP)		P=0.01 (NP)	

*** of which 2 occurred in the same eye**

 # χ^2 p value is significant (p<.05) if based on total AE: 9 in UT-DSAEK vs 16 in DMEK (some AE may have occurred in the same eye)

Corneal Higher-Order Aberrations in Descemet Membrane Endothelial Keratoplasty versus Ultrathin DSAEK in the Descemet Endothelial Thickness Comparison Trial

Effect of Unilateral Endothelial Keratoplasty on Vision-Related Quality-of-Life Outcomes in the Descemet Endothelial Thickness Comparison Trial (DETECT)
A Secondary Analysis of a Randomized Clinical Trial

Quality of vision and vision-related quality of life after Descemet membrane endothelial keratoplasty: a randomized clinical trial

Suryan L. Dunker,[1] Mor M. Dickman,[1] Robert P.L. Wisse,[2] Siamak Nobacht,[3] Robert H.J. Wijdh,[4] Marjolijn C. Bartels,[5] N.E. Mei-Lie Tang,[6] Frank J.H.M. vanden Biggelaar,[1] Pieter J. Kruit,[7] Bjorn Winkens[8] and Rudy M.M.A. Nuijts[1,9]

	DETECT*	NL Trial*
Total Combined HOA	DMEK = UT-DSAEK	
Contrast Sensitivity, Straylight	Not tested	DMEK = UT-DSAEK
Vision Related QOL	DMEK = UT-DSAEK	

*** Both studies were not powered to detect differences in any of these parameters**

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Descemet Endothelial Thickness Comparison Trial: Two-year Results from a Randomized Trial Comparing Ultrathin Descemet Stripping Automated Endothelial Keratoplasty to Descemet Membrane Endothelial Keratoplasty

Jennifer Rose-Nussbaumer • Charles C. Lin • Ariana Austin • ... Beth Ann Benetz • Jonathan H. Lass • Winston Chamberlain • Show all authors

Published: December 23, 2020 • DOI: https://doi.org/10.1016/j.ophtha.2020.12.021

At 24 months post-operatively, our study suggests that DMEK provides superior visual outcomes to UT-DSAEK in patients with isolated endothelial dysfunction when performed by experienced surgeons. BSCVA outcomes were similar to 12 months (which had 100% follow-up) but could reflect a type 1 error due to loss to follow-up of 4 eyes (8%) at 24 months. A larger multi-center randomized clinical trial is warranted to further clarify differences in visual acuity, graft survival, re-bubble rates, graft rejection, and ECL.

There is NO Compelling (Long-Term) Evidence that DMEK>(UT-)DSAEK *Esp. for Complex Eyes

Ophthalmology @AAOjournal · Sep 9, 2020

Commentary: The Ongoing Debate: Descemet Membrane Endothelial Keratoplasty Versus Ultrathin Descemet Stripping Automated Endothelial Keratoplasty ow.ly/ohRx50B3S4d #ophthalmology

2 2

THANK YOU !!!