SIBO
Società Italiana Banche degli Occhi

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA
SAN GIOVANNI ADDOLORATA

L'ENDOCHERATOPLASTICA

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Azienda Ospedaliera
S. Giovanni Addolorata
Roma

IMOLA, 1 aprile 2017

PK vs EK –Gold standard to treat endothelial disorder

- No postoperative astigmatism/high refractive error
- Faster visual recovery
- Minimal risk of wound dehiscence after trauma
- No open-sky procedure
- NO suture related complications (infection, vascularization and loosening)
- Less problems with ocular surface healing
- Reduced risk of rejection
- None postoperative pain

Un po' di storia :

1.PLK through a 9.0 mm scleral incision using a spoon-shaped glide for insertion of a 7.5 mm donor disc, well-know as deep lamellar endothelial keratoplasty **(DLEK)**

(Melles GRJ, *Cornea* 1998
Melles GRJ, *Am. J. Ophthalmol.* 1999
Melles GRJ, *Ophthalmology* 2000)

2.PLK through a 5.0 mm self-sealing scleral incision using a 9.0 mm folded donor disc, made popular as small-incison **DLEK**

(Melles GRJ, *Cornea* 2002
Terry MA, *Cornea* 2005)

3.PLK by stripping Descemet membrane and insertion of a folded donor disc of 8 to 9 mm, known as Descemet Stripping Endothelial Keratoplasty (**DSEK)** or Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) using a microkeratome to prepare donor tissue

(Price FW Jr and Price MO, *J. Refr.. Surg.* 2005
Gorovoy MS, *Cornea* 2006)

4. Finally we find Descemet membrane endothelial keratoplasty **(DMEK)**

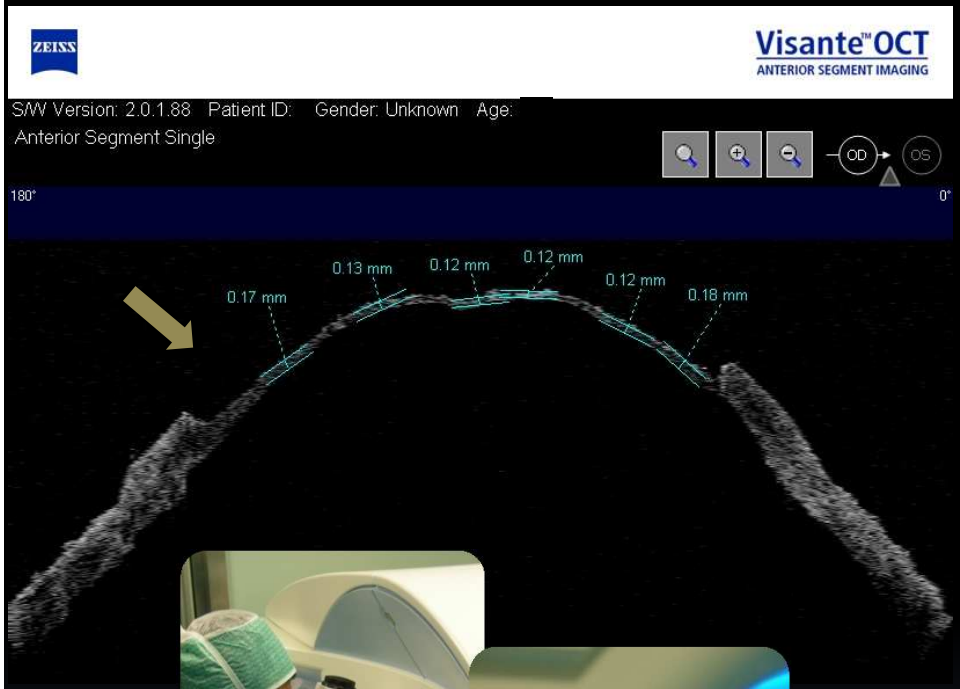
(Melles GR, *Cornea 2006*)

5. Ultrathin Descemet's Stripping Automated Endothelial keratoplasty **(UT_DSAEK)**

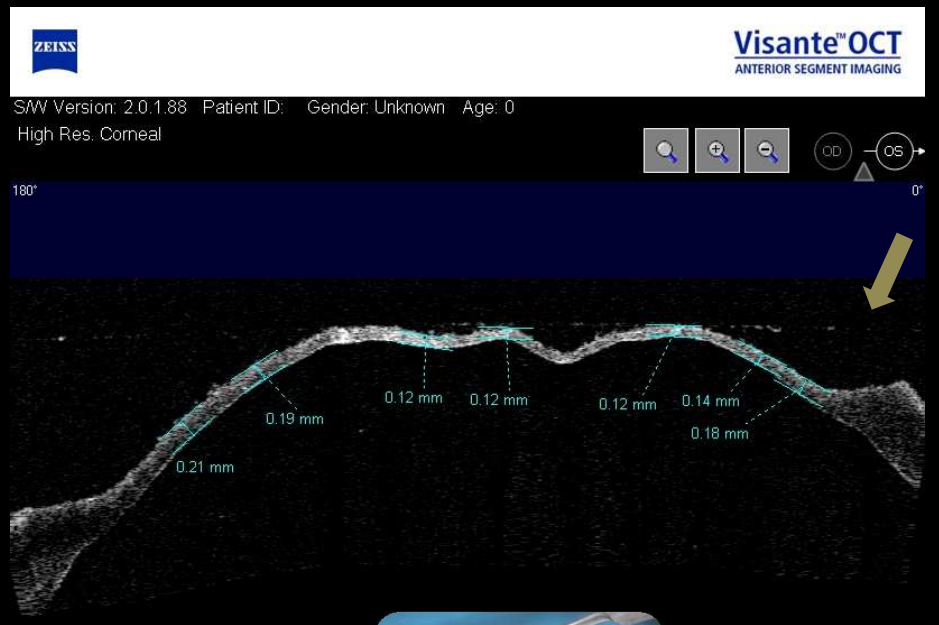
(Busin Ophthalmology 2012 **)**

THE ROLE OF EYE BANK

Femtolaser

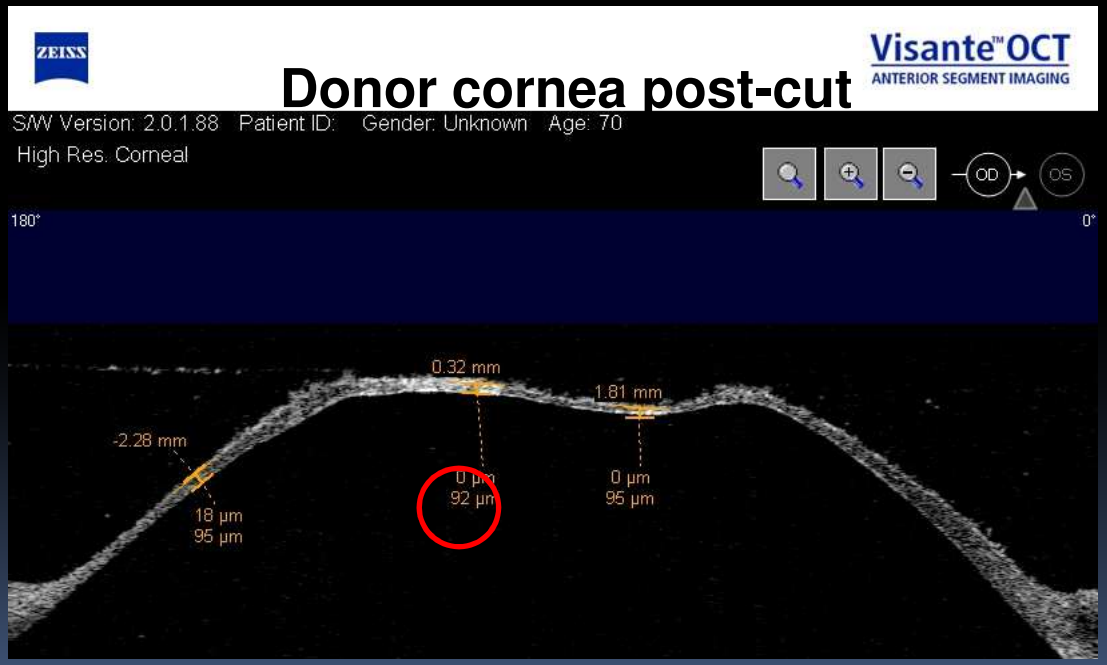


Microkeratome



THE IDEAL THICKNESS ENDOTHELIAL GRAFT

..... would have a thin, planar profile with equal thickness in centre and periphery so as not interfere with normal corneal optics



A possible solution:

very thin pre-cut-tissues prepared in eye bank

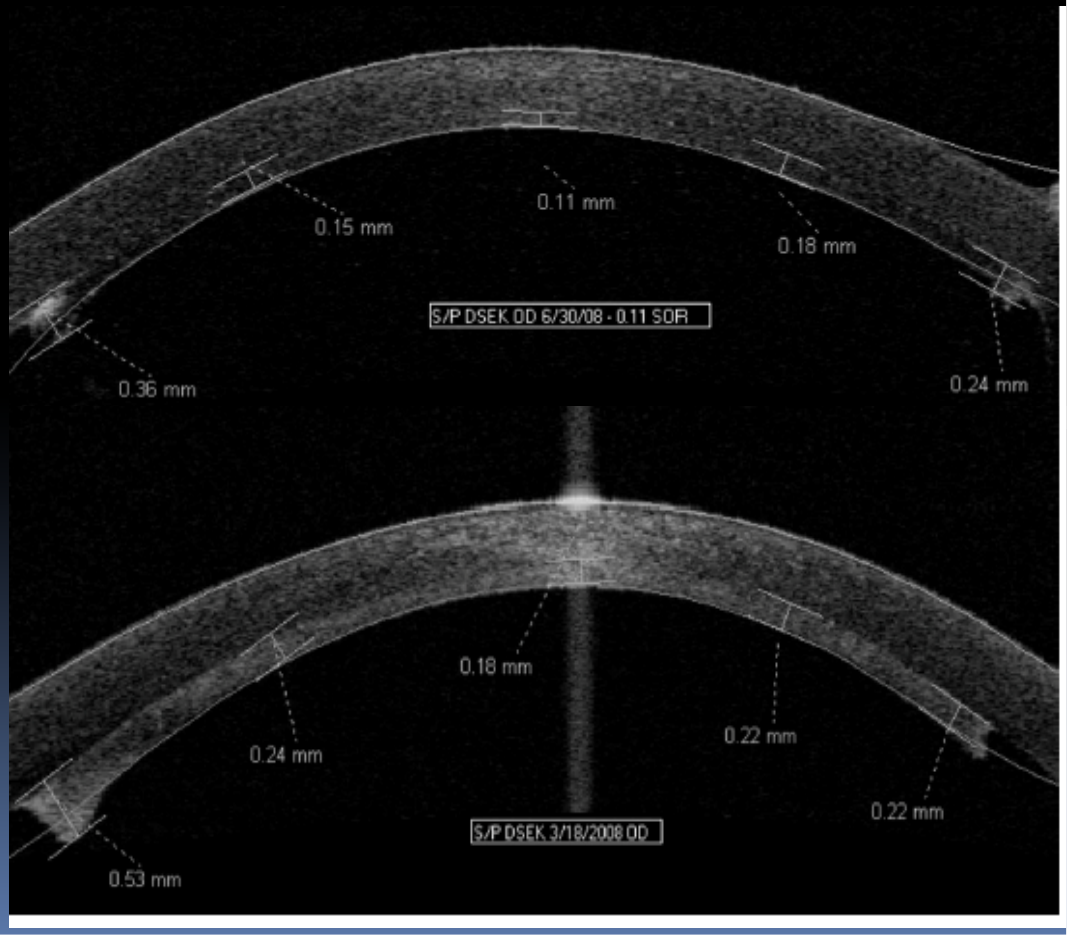
ComparisonofCentralCornealGraftThicknesstoVisualAcuity OutcomesinEndothelialKeratoplasty

*KristianaD.Neff,MD,*JosephM.Biber,MD,†‡andEdwardJ.Holland,MD†‡*

Cornea•Volume30,Number4,April2011

Results: The median postoperative graft thickness of all eyes was 131 μm. The eyes were divided into 2 groups based on this median: thin EK (graft thickness: ≤131 μm; range: 77–131 μm; average: 109 μm) and thick EK (graft thickness: >131 μm; range: 138–182 μm; average: 162 μm). There was no statistically significant difference in age, sex, or preoperative best spectacle–corrected visual acuity (BSCVA) between the 2 groups. Average postoperative follow-up was 12.8 months. The thin EK group showed better postoperative BSCVA compared with the thick EK group ($P < 0.01$). All thin EK eyes had BSCVA greater than or equal to 20/25 with 71% of eyes achieving BSCVA of 20/20. In contrast, only 50% of thick EK eyes reached BSCVA greater than or equal to 20/25 with 19% obtaining BSCVA of 20/20.

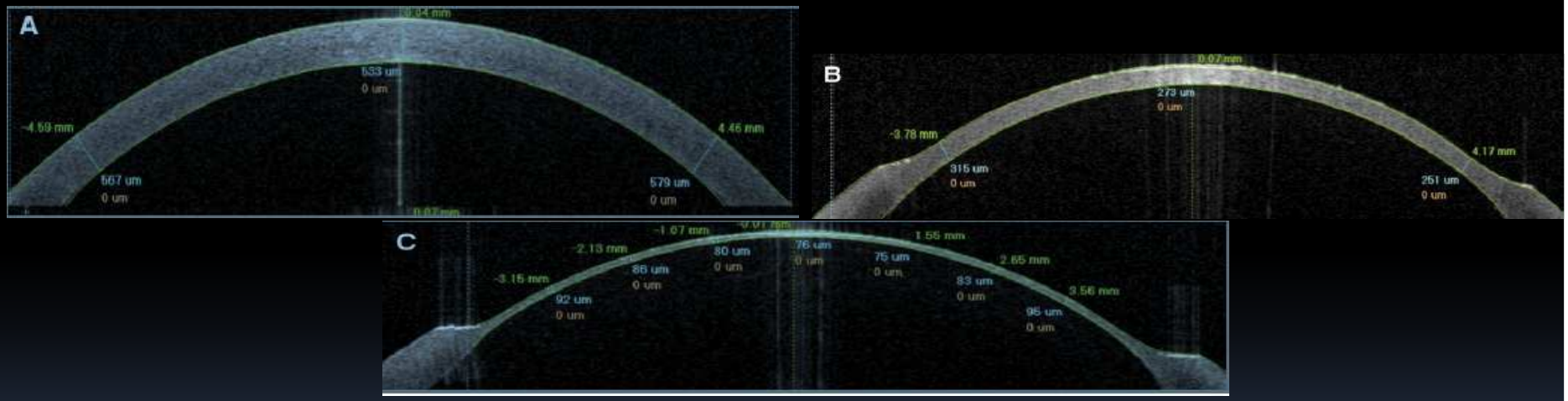
Conclusions: Thin EK versus thick EK, as measured by AS-OCT in the postoperative period, showed a statistically significant improvement in BSCVA.



Ultrathin Descemet's Stripping Automated Endothelial Keratoplasty with the Microkeratome Double-Pass Technique

Massimo Busin, MD,[1,2] Silvana Madi, MD,[1,3] Paolo Santorum, MD,[1,4] Vincenzo Scorcia, MD,[1,2] Jacqueline Beltz, FRANZCO[1,5]

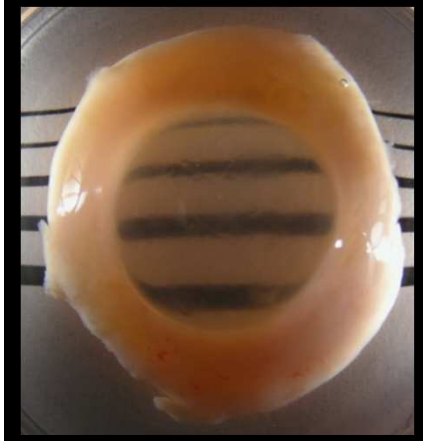
Ophthalmology *Volume 120, Number 6, June 2013*



Conclusions: The visual outcomes of UT DSAEK are comparable with those published for Descemet's membrane endothelial keratoplasty and better than those reported after DSAEK in terms of both speed of visual recovery and percentage of patients with 20/20 final visual acuity. However, unlike with Descemet's membrane endothelial keratoplasty, preparation and delivery of donor tissue are neither difficult nor time consuming. Complications of UT DSAEK do not differ substantially from those recorded with standard DSAEK but are much less frequent than those reported after Descemet's membrane endothelial keratoplasty.

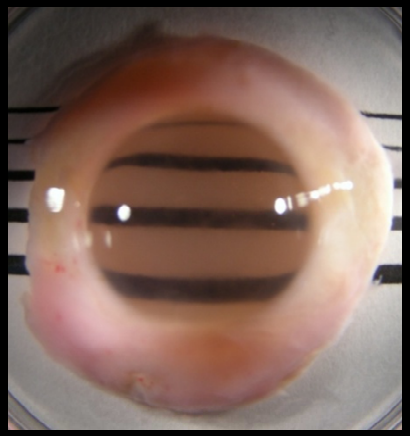
Is it possible to reduce the donor corneal thickness before the microkeratome cut ?

Eusol-C
after 5 days at 4°C



Thin-C
after 4 hours at 4°C

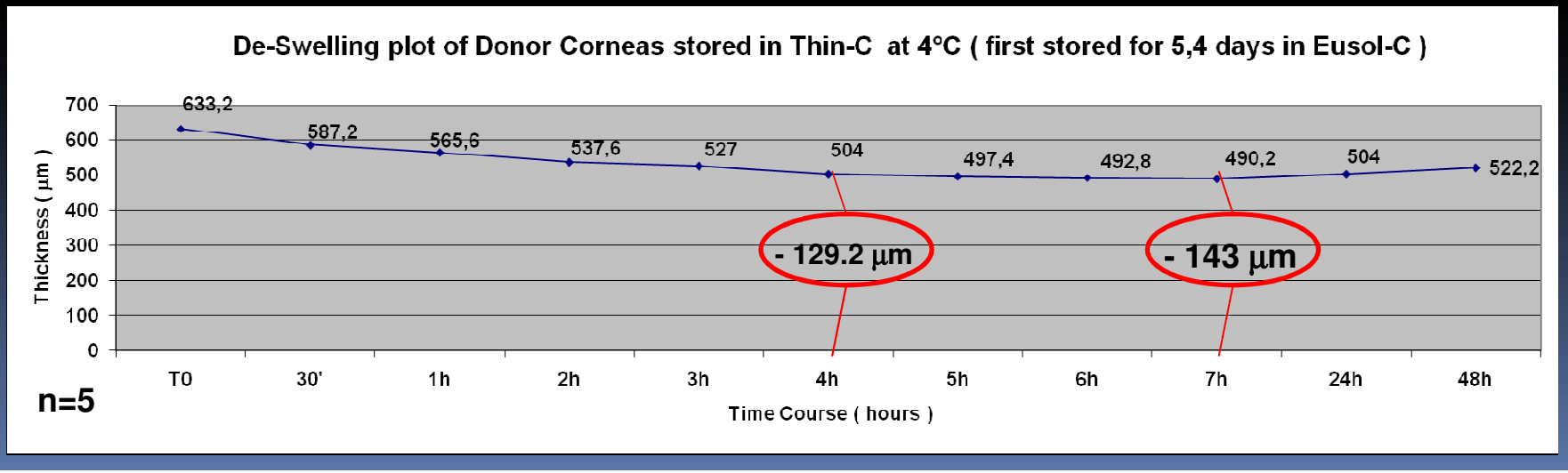
Thin-C
after 24 hours at 4°C

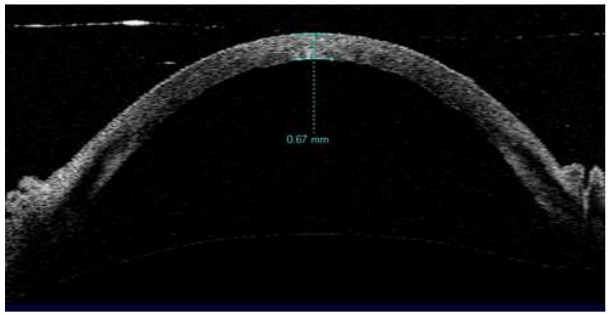


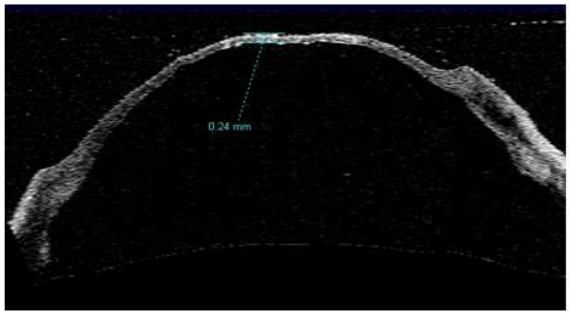
Thin-C ™
(AL.CHI.MI.A. Srl)
Proprietary blend
of High and Low M.W. dextrans

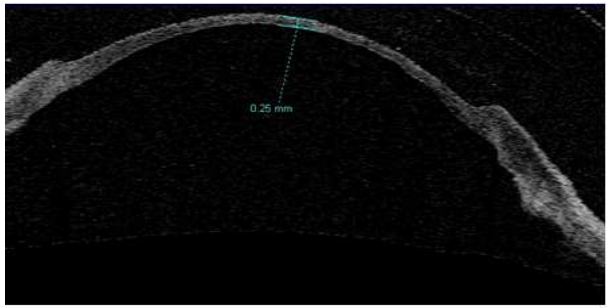
For tissues stored at 4°C
with an intact epithelium

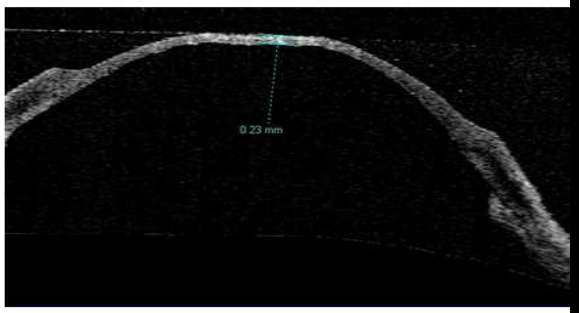
Tissue wastage: NONE

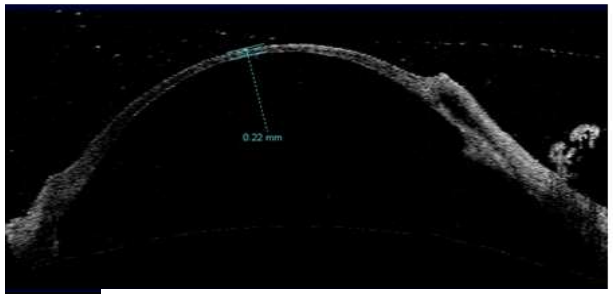


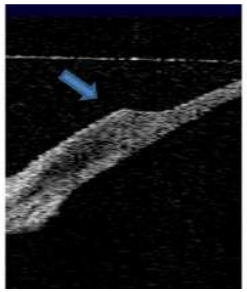




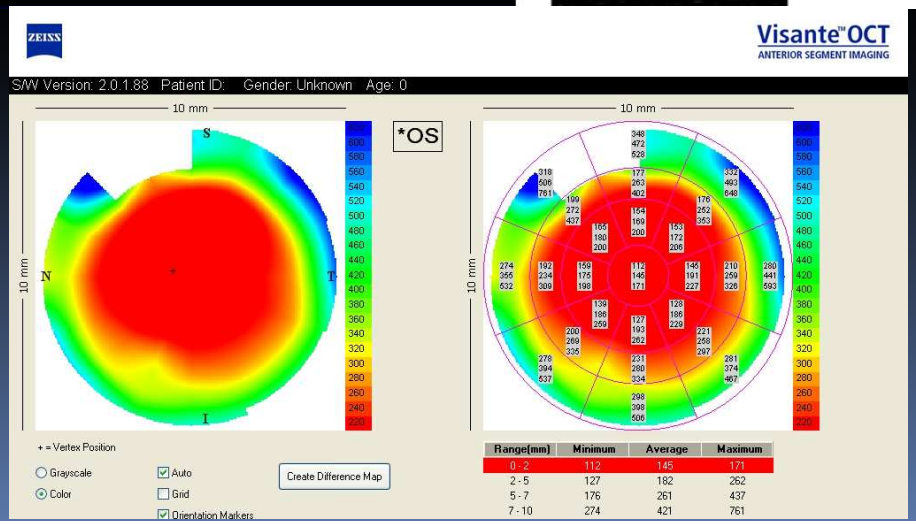


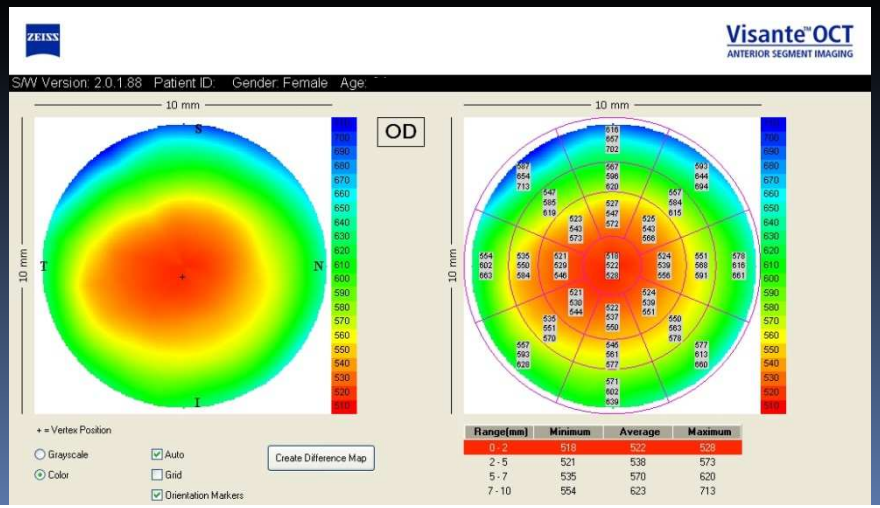


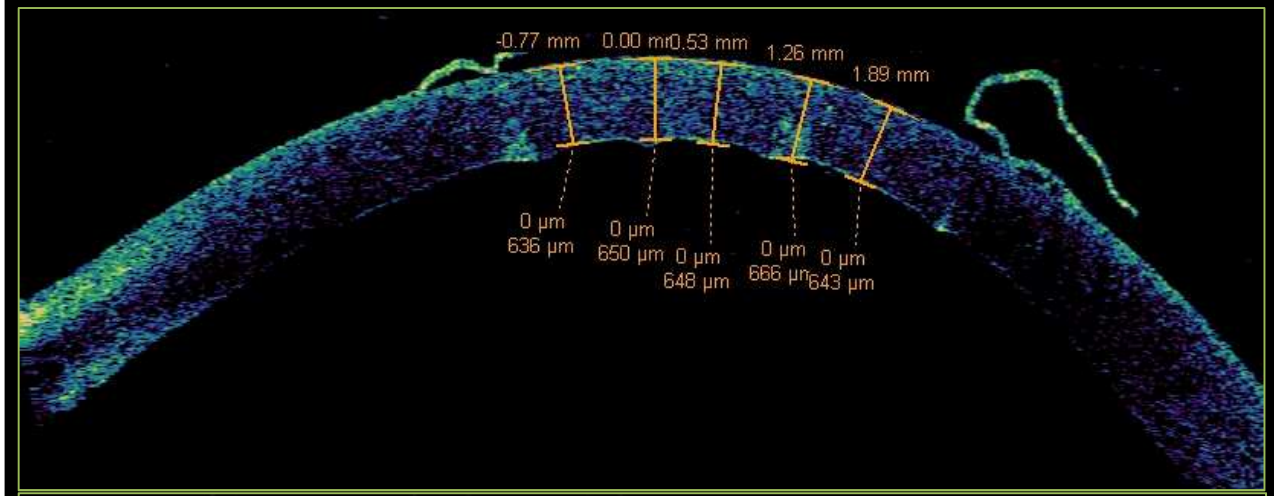


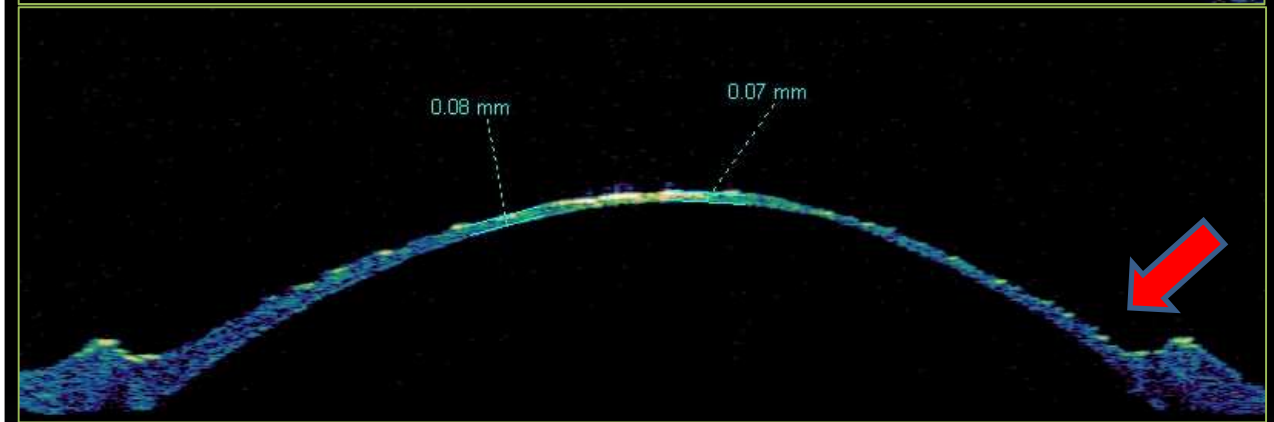


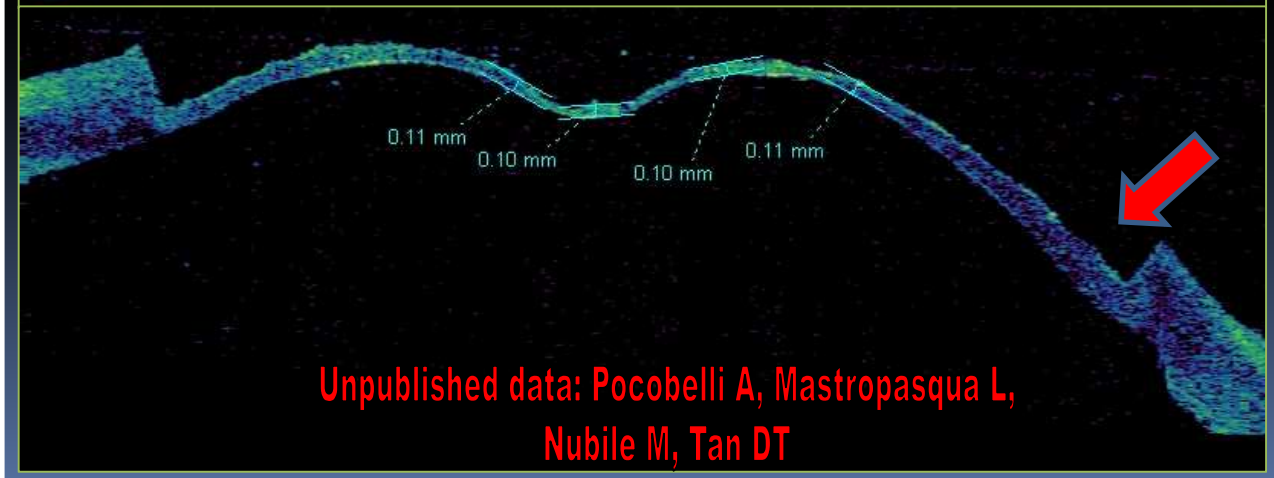
DONOR GRAFT MORPHOLOGY











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

Ultra-thin FSL - DSEK

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

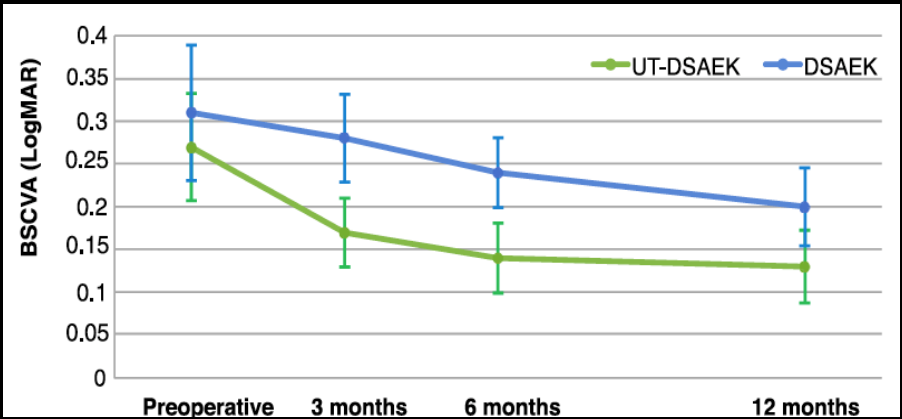
b) AS-OCT pachymetry Of posterior residual stroma after: 550 microns FSL dissection
75 microns in AC

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

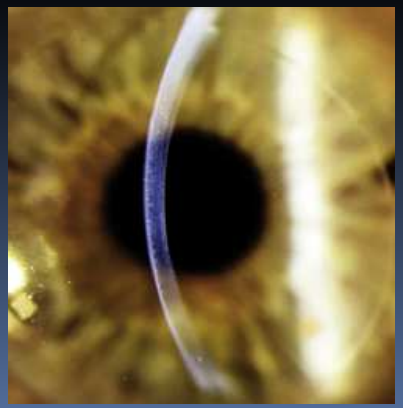
ARandomizedMulticenterClinicalTrialofUltrathin DescemetStrippingAutomatedEndothelial Keratoplasty(DSAEK)versusDSAEK

MorM.Dickman,MD,[1] PieterJ.Kruit,MD,PhD,[2] LiesRemeijer,MD,PhD,[3] JeroenvanRooij,MD,[3] AllegondaVanderLelij,MD, PhD,[4] RobertH.J.Wijdh,MD,[5] FrankJ.H.M.vandenBiggelaar,PhD,[1] TosT.J.M.Berendschot,PhD,[1] RudyM.M.A.Nuijts,MD, PhD[1]

Ophthalmology Volume 123, Number 11, November 2016



A comparable hyperopic shift
DSAEK: 0.8 D UT-DSAEK 0.7 D



GRAFT DISLOCATION

16% in DSAEK
15% in UT-DSAEK

DSAEK limits

1. Visual rehabilitation after DSAEK is still relatively slow (mean of 6 months)

2. The presence of stroma interface can somehow limit the final visual acuity to 20/40

3. Residual astigmatism after DSAEK not always acceptable

4. Post DSAEK hyperopic shift up to 1.5 D

DMEK.....
UN PO'DI
STORIA.....

Melles 2006 Cornea (Descemet Membrane Endothelial Keratoplasty DMEK)

peeling manuale del descemet endotelio in BSS
4-7% mortalità endoteliale

Price and Giebel 2009 Ophthalmology : (Descemet's Membrane Endothelial Keratoplasty: prospective multicenter study of visual and refractive outcomes and endothelial survival)

SCUBA technique

(cornea immersa in Optisol o BSS per diminuire la tensione superficiale)

Kruse 2011 Cornea: (Stepwise approach to donor preparation and insertion increases safety and outcome of DMEK)

1% di insuccesso

PREPARAZIONE DEL ROLL

IN BANCA DEGLI OCCHI O DIRETTAMENTE IN SALA OPERATORIA

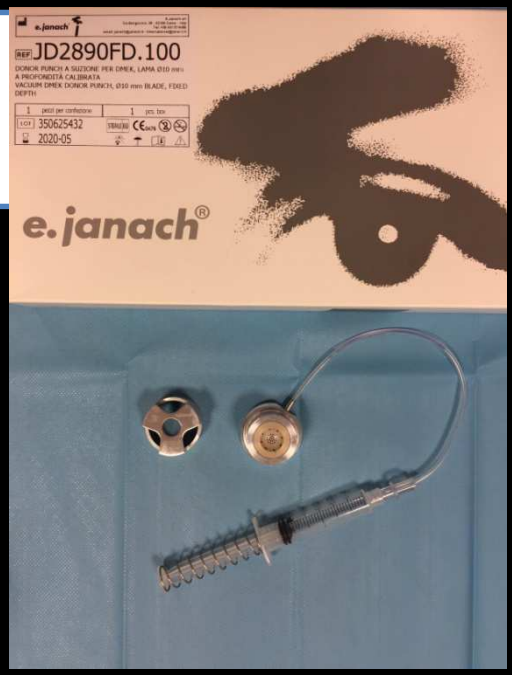
ETA' DEL DONATORE > 55 anni

TIPO DI CONSERVAZIONE DEL TESSUTO (31° / 4°)

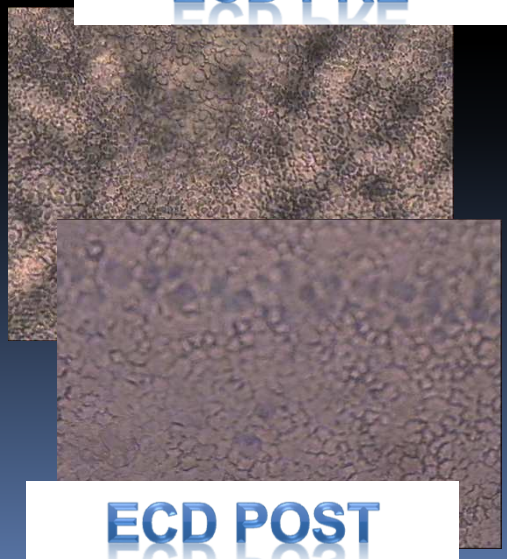
TECNICA SCUBA (preparazione di lembi per DMEK)

PNEUMODISSEZIONE (BOLLA tipo 1 per PDEK e tipo 2 per DMEK)

TECNICA SCUBA



ECD PRE

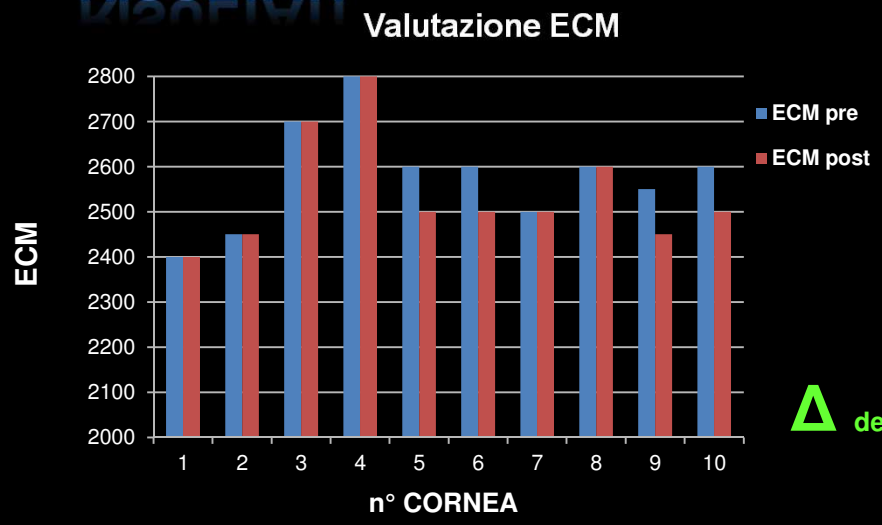


ECD POST

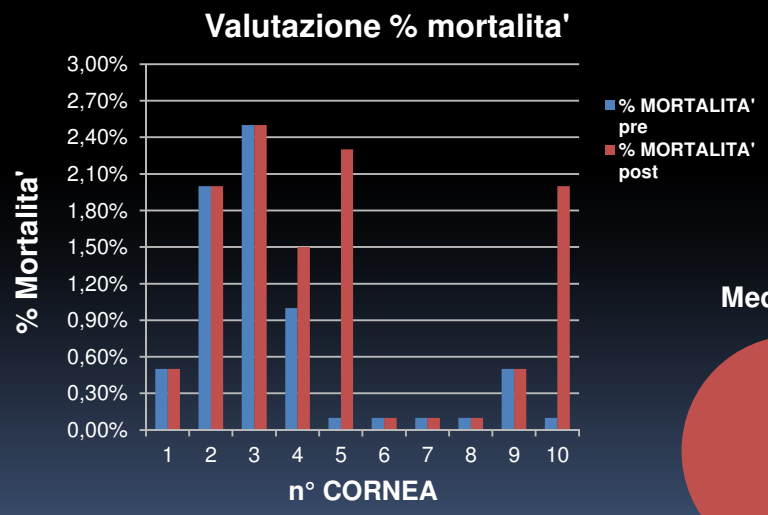
Validazione con tessuti non idonei
Mortalità endoteliale indotta < 2%

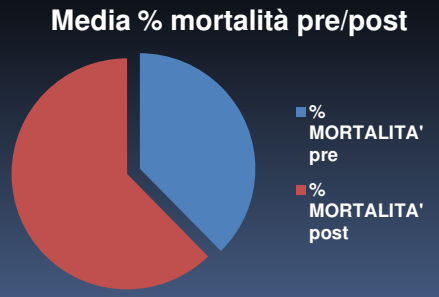
VALIDAZIONE DELLA PROCEDURA IN BANCA DEGLI OCCHI
RISULTATI

n° Cornea	Eta' Donatore	Ø UTILE
1	68	8,5 mm
2	76	9 mm
3	66	8,75 mm
4	76	8,5 mm
5	61	8,5mm
6	76	8,5mm
7	65	9 mm
8	68	9 mm
9	77	8,75 mm
10	71	8,75 mm
10	**70,4**	**8,70**



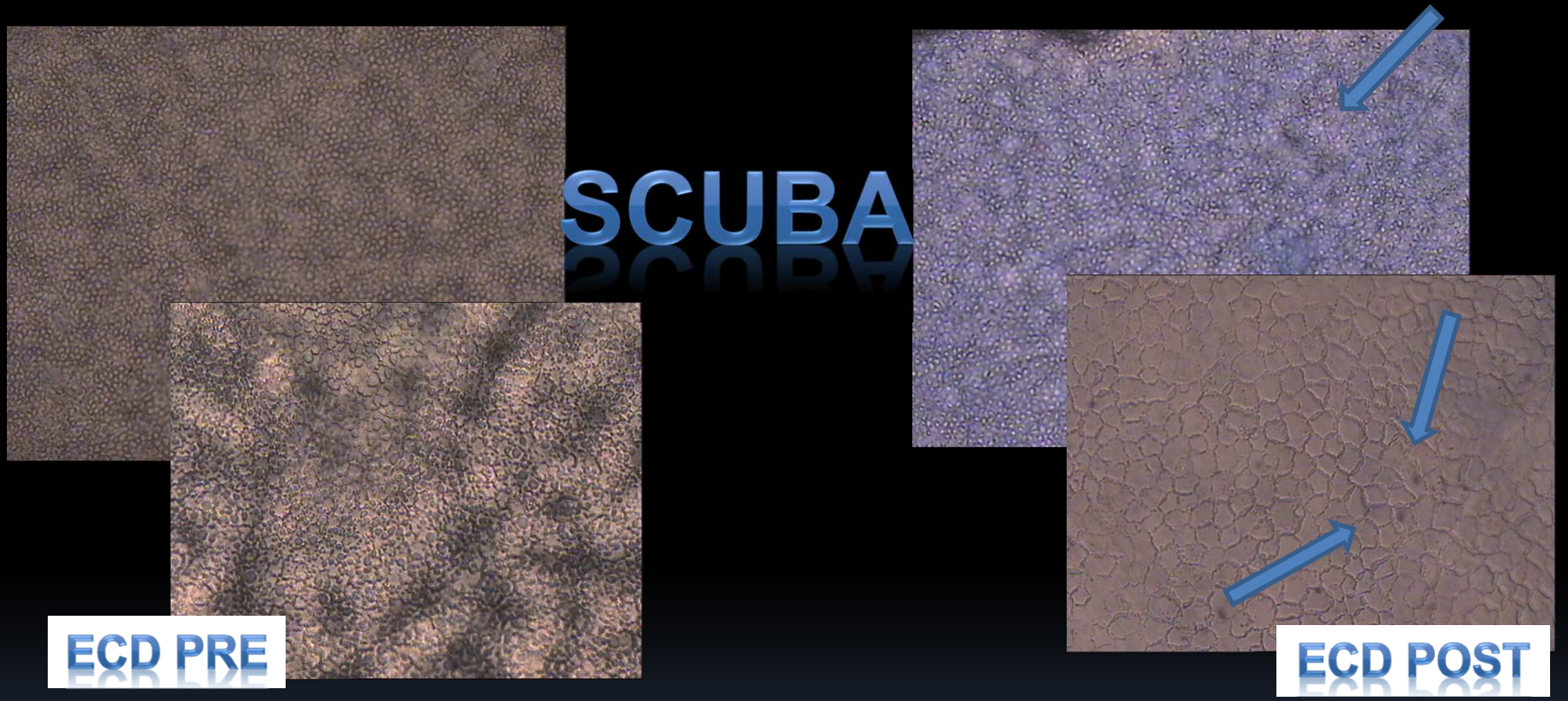
Δ densità = 1%





Δ mortalità = 0,6%

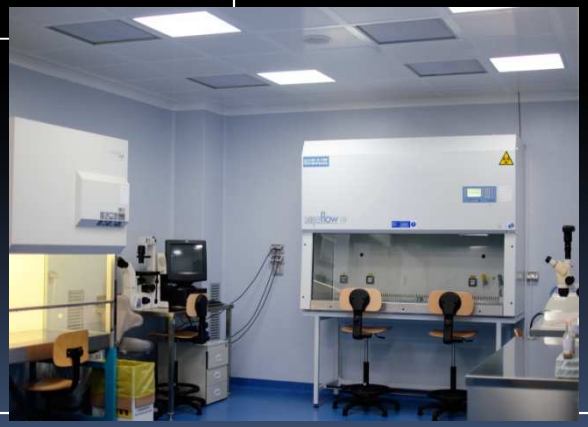
1) VALUTAZIONE DEL DANNO ENDOTELIALE INDOTTO



2) CONTROLLO MICROBIOLOGICO SU TERRENO DI TRASPORTO

Per monitorare una eventuale contaminazione del tessuto indotta dalla procedura
si esegue esame colturale su CARRY-C 4 ore dopo la preparazione del roll

Il lembo per DMEK è utilizzabile fino a 48 ore dopo la preparazione in Banca Occhi



Il certificato che accompagna il lembo indica la tecnica di preparazione e il diametro utilizzabile dal chirurgo

NOSTRA ESPERIENZA

PNEUMODISSEZIONE CON AGO 30G

PNEUMODISSEZIONE

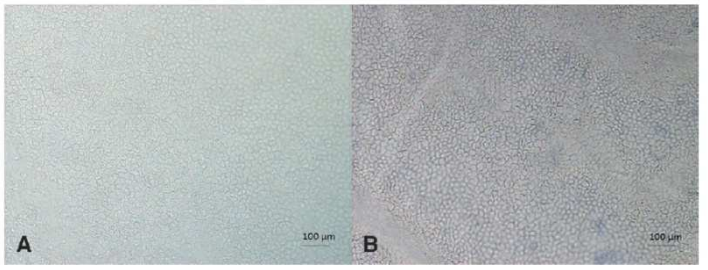
Nella tecnica della pneumodissezione, l'enfisema stromale indotto impedisce l'acquisizione di immagini del mosaico endoteliale per la valutazione della ECD

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, RN,[3] Diego Ponzin, MD[3]

Ophthalmology 2010



Endothelial cell loss after 7 days of tissue culture medium storage was 4.44±4.3%.

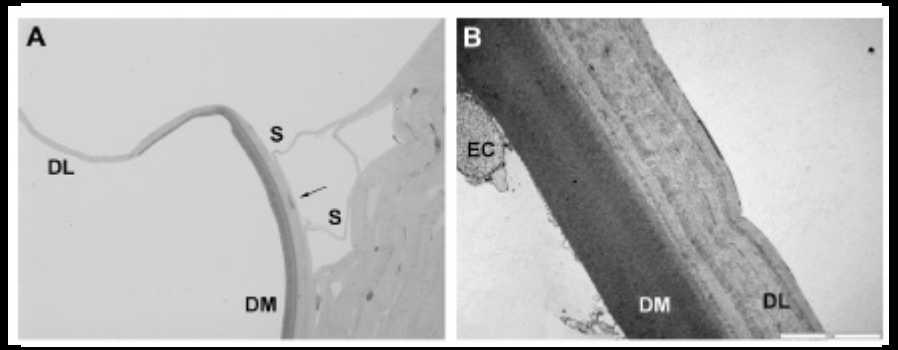
Human Corneal Anatomy Redefined

A Novel Pre-Descemet's Layer (Dua's Layer)

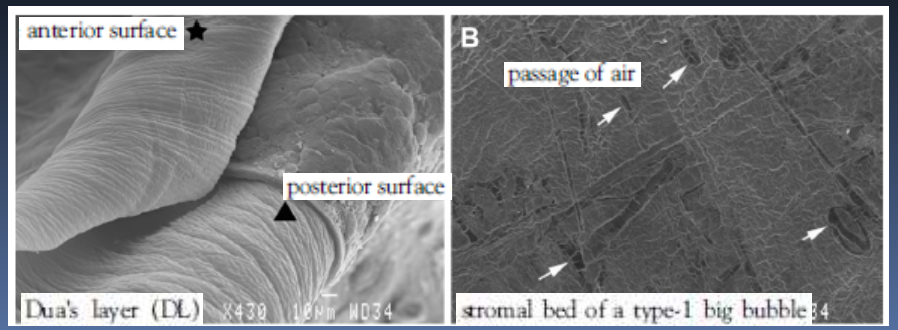
Harminder S. Dua, MD, PhD,[1] Lana A. Faraj, MD, MSc,[1] Dalia G. Said, MD, FRCS,[1] Trevor Gray, MSc,[2] James Lowe, MD, FRCPath[2]

Ophthalmology 2013;

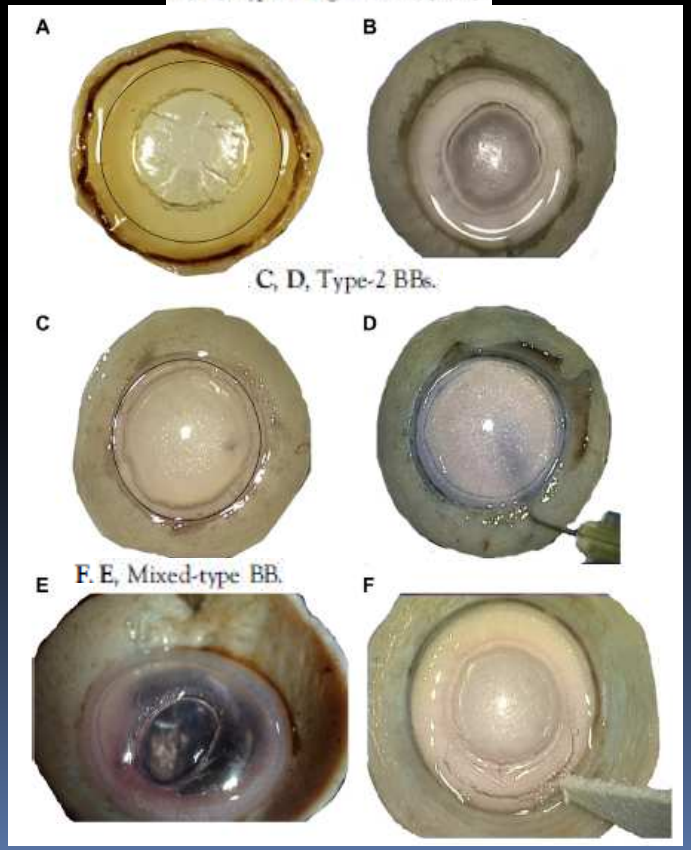
Conclusions: There exists a novel, well-defined, acellular, strong layer in the pre-Descemet's cornea. This separates along the last row of keratocytes in most cases performed with the BB technique. Its recognition will have considerable impact on posterior corneal surgery and the understanding of corneal biomechanics and posterior corneal pathology such as acute hydrops, Descematocele and pre-Descemet's dystrophies.



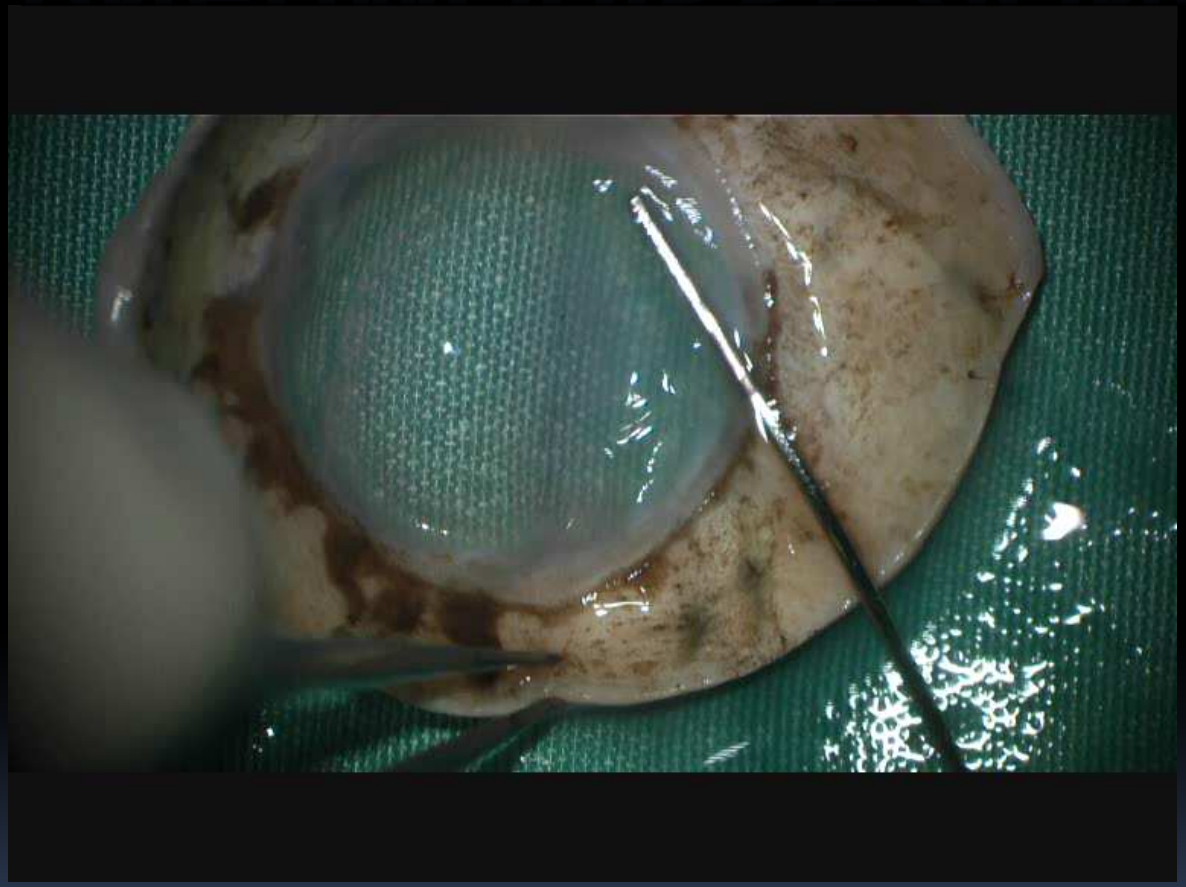
Light and electron microscopy revealed that the posterior wall of the type-1 and mixed type (primary) BBs was consistently made of DM and DL (Fig 4A, B); type-2 BB was made of DM only (Fig 4C), and those created after removing the DM were made of DL only (Fig 4D).



A, B, Type-1 big bubbles (BBs).



PNEUMODISSEZIONE

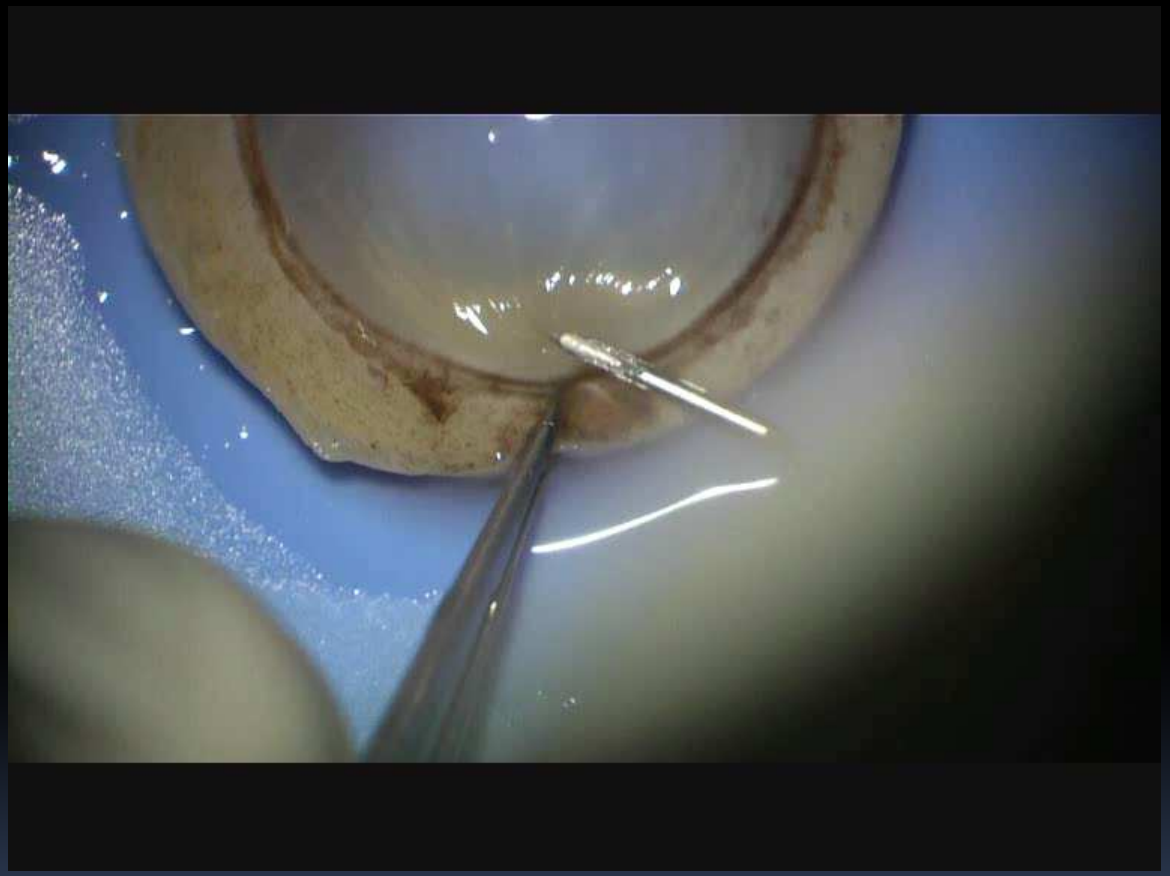


BOLLA TIPO 1

LEMBO PER PDEK
DUA'S LAYER+DESCEMET+STROMA

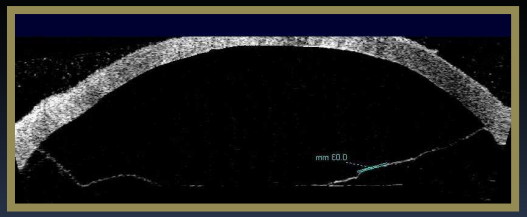
L'ARIA CLIVA IL DUA'S LAYER DALLO STROMA PROFONDO

PNEUMODISSEZIONE



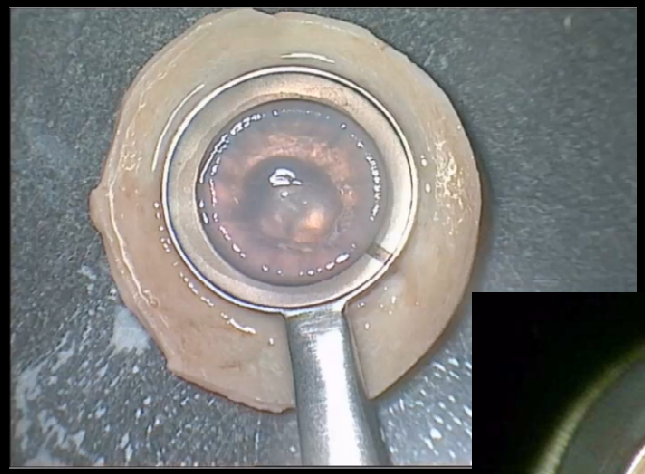
BOLLA TIPO 2

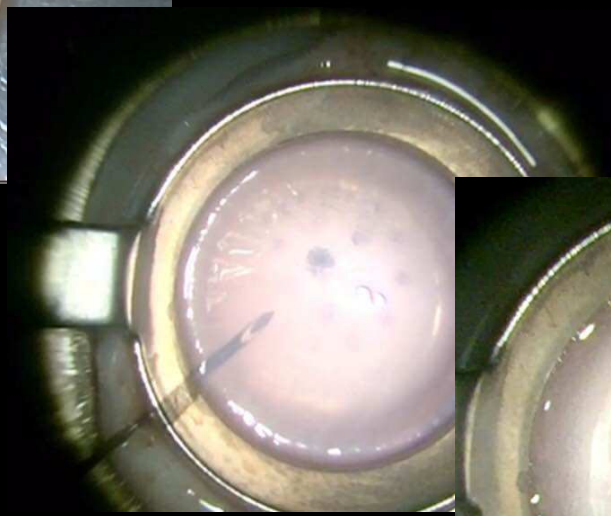
LEMBO PER DMEK
DESCEMET + ENDOTELIO



L'ARIA CLIVA IL COMPLESSO DESCEMET- ENDOTELIO DAL DUA'S LAYER

BOLLA TIPO 1 CON CLAMP JANACH

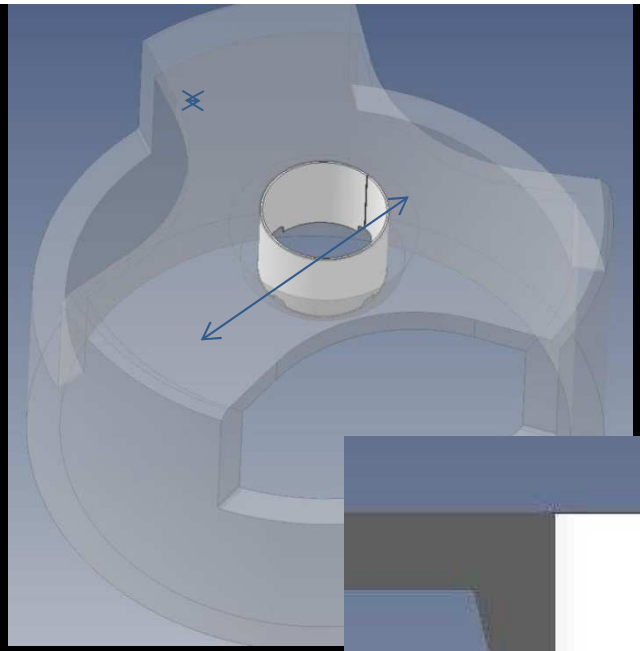


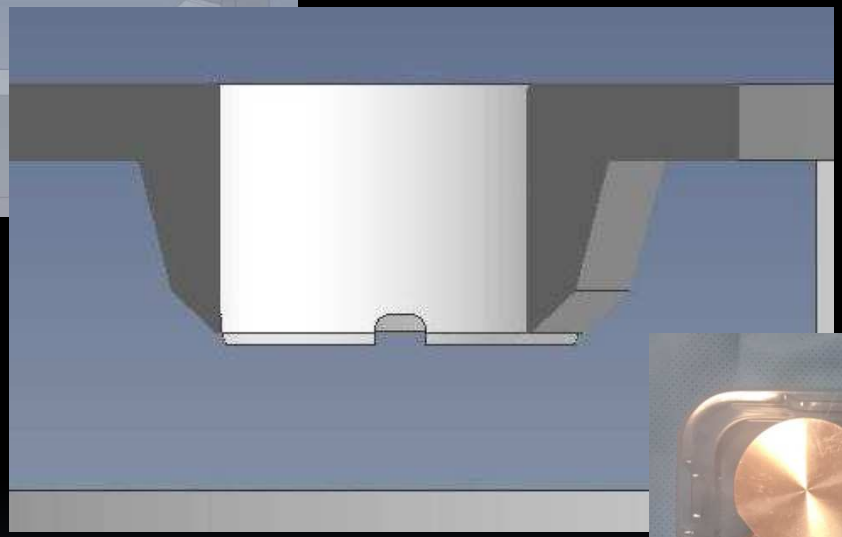


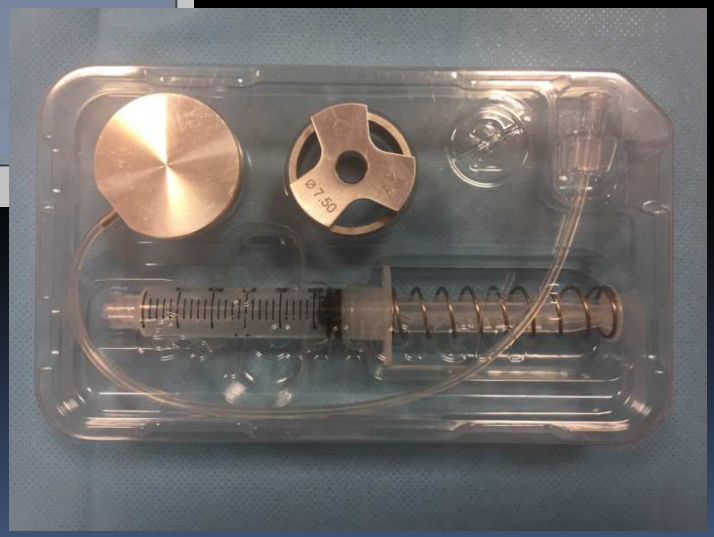
La tecnica di pneumodossezione con Bolla tipo 1 per PDEK non comporta un danno endoteliale statisticamente significativo

(Agarwal A, et al Br J Ophthalmol 2014)
(Altaan SL et al., Br J Ophthalmol 2015)

PDEK DONOR PUNCH JANACH







Diametro 6/7,5 mm
Profondità di taglio 0,1mm
4 finestre sul bordo lama

Scrolling Characteristics of Pre-Descemet Endothelial Keratoplasty Tissue: An Ex Vivo Study

HARMINDER S. DUA, KAROLIEN TERMOTE, MOHAMED B. KENAWY, DALIA G. SAID, RAKESH JAYASWAL, MARIO NUBILE, LEONARDO MASTROPASQUA, AND SIMON HOLLAND

(Am J Ophthalmol 2016;166:84–90.

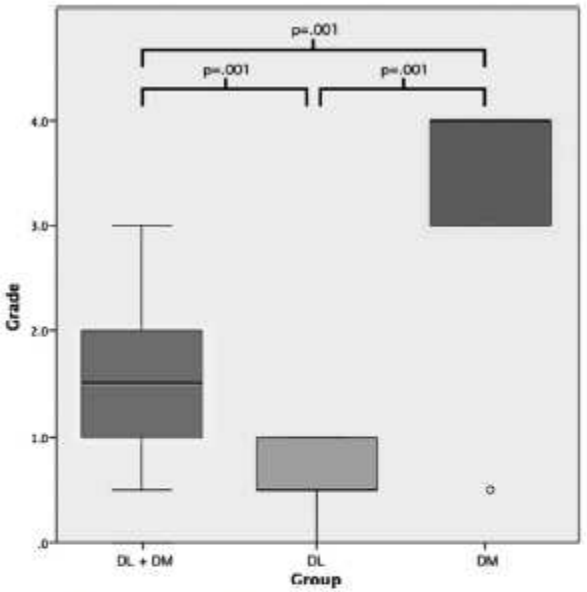


FIGURE 2. Box plot illustrating the difference in grade of scrolling of Descemet membrane (DM) and pre-Descemet layer (Dua's layer) (DL) compared to that of pre-Descemet's endothelial keratoplasty (PDEK) tissue (DM + DL). DM scrolled the most and DL the least. Scrolling of PDEK tissue was in between, scrolling more than DL but less than DM. The differences were all statistically significant.

La presenza del DL condiziona la morfologia del roll

take home messages...

D IVIDING ENDOTHELIUM FOR DMEK and PDEK PROCEDURE IT'S POSSIBLE

M ANUALLY WITH SCUBA TECHNIQUE OR PNEUMATICALLY USING AIR

E YE BANK CAN PROVIDE PRE-CUT TISSUES for EK surgery

thanK you

THANK YOU FOR ATTENTION

CONSIDERAZIONI

NEL 2% DEI CASI DI INSUCCESSO
PRESENZA DI ADESIONE MAGGIORE TRA DM E STROMA
(Schlotzer-Schrehardt U et al, Ophthalmol 2013)

Rischio di contaminazione dei tessuti preparati per EK sovrapponibile a quello per PK e ALK
(Rauen MP et al, Cornea 2012)

CARATTERISTICHE DEL ROLL AGE- RELATED

NESSUNA DIFFERENZA TRA TESSUTI CONSERVATI A FREDDO O IN ORGANO CULTURA

S.I.TRA.C.
SOCIETÀ ITALIANA TRAPIANTO DI CORNEA

SOI Società Oftalmologica Italiana
Associazione Medici Oculisti Italiani
ENTE MORALE
dal 1879 a difesa della vista

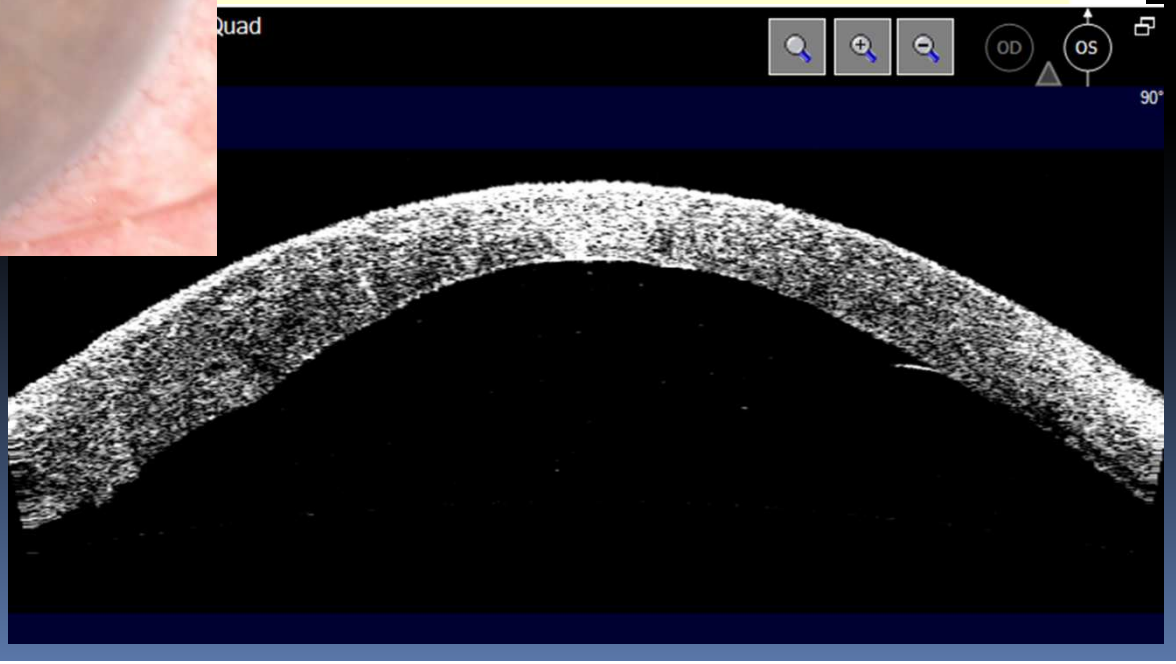
SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA
SAN GIOVANNI ADDOLORATA

COME PREPARARE IL LEMBO PER LA DMEK

ROSSELLA A.M. COLABELLI GISOLDI
Azienda Ospedaliera
S. Giovanni Addolorata
Roma

Roma, 23 Novembre 2016

1 DAY AFTER



UN PO'DI STORIA.....
.....DISSEZIONE CON BSS

Muraine et al, American J. Ophthalmol. 2013
(Novel technique for preparation of corneal grafts for DMEK.)

Dissezione con cannula e BSS
dopo trapanazione su camera anteriore artificiale
4% ECL
4% insuccesso

TECNICA CHIRURGICA