FONDAZIONE
BANCA DEGLI OCCHI
DEL VENETO - ONLUS

MEMBRANE PRE-STRIPPED PER interventi di DMEK

Alessandro Ruzza

16 Gennaio 2015

IX Corso SIBO

DMEK

- Pavel Studeny et al.**”Descemet membrane endothelial keratoplasty with a stromal rim (DMEK-S)”** Br J Ophthalmol 2010;94:909-914 doi:10.1136/bjo.2009.165134

- Carlindo Da Reitz Pereira et al. **“Descemet's membrane automated endothelial keratoplasty (DMAEK): visual outcomes and visual quality**” Br J Ophthalmol 2011;95:951-954 doi:10.1136/bjo.2010.191494

- Busin et al. “**Pneumatic dissection”.** Ophthalmology. 2010 Aug;117(8):1517-20. Epub 2010 May 13.

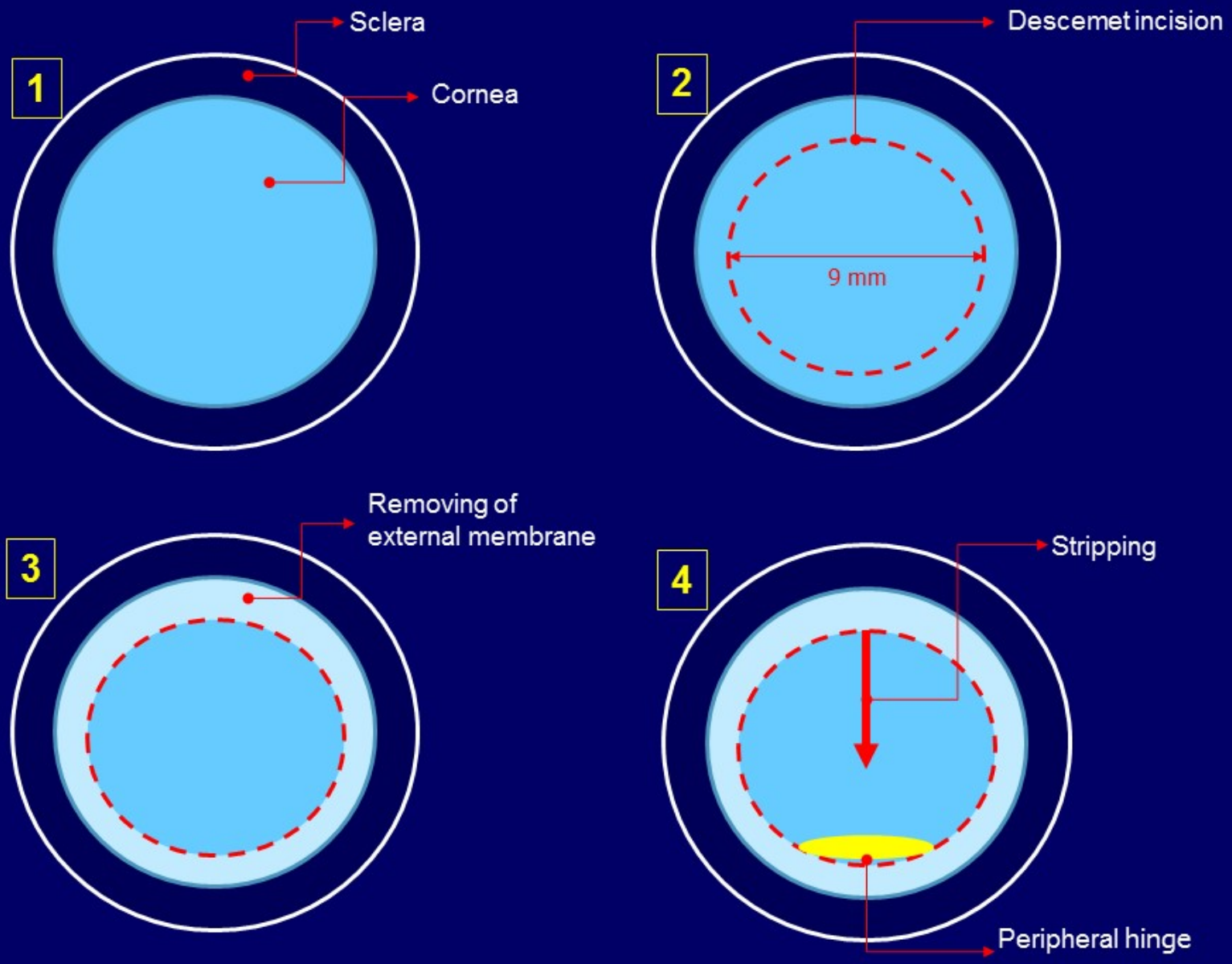
- **Muraine** et al. "**Novel technique for the preparation of corneal grafts for descemet membrane endothelial keratoplasty.“** Am J Ophthalmol. 2013 Nov;156(5):851-9.

- **SubHyS**
  - Parekh et al. Am J Ophthalmol. 2014 Aug;158(2):277-285.e1. doi: 10.1016/j.ajo.2014.04.009
  - Ruzza et al. Acta Ophthalmol. 2014 Aug 27. doi: 10.1111/aos.12520
  - Salvalaio et al. Br J Ophthalmol. 2014 Aug;98(8):1120-5. doi: 10.1136/bjophthalmol-2013-304466

DMEK BY STRIPPING

- Melles GR et al "**Transplantation of Descemet's membrane carrying viable endothelium through a small scleral incision**“ Cornea. 2002 May;21(4):415-8
- Melles GR et al. "**Descemet Membrane Endothelial Keratoplasty (DMEK)**." *Cornea*. 2006; 32:411-418.
- Zhu Z et al "**Technique for preparation of the corneal endothelium-Descemet membrane complex for transplantation**.” Cornea. 2006 Jul; 25(6):705-8.
- Lie JT et al "**Donor tissue preparation for Descemet membrane endothelial keratoplasty**" J Cataract Refract Surg. 2008 Sep;34(9):1578-83. doi: 10.1016/j.jcrs.2008.05.036

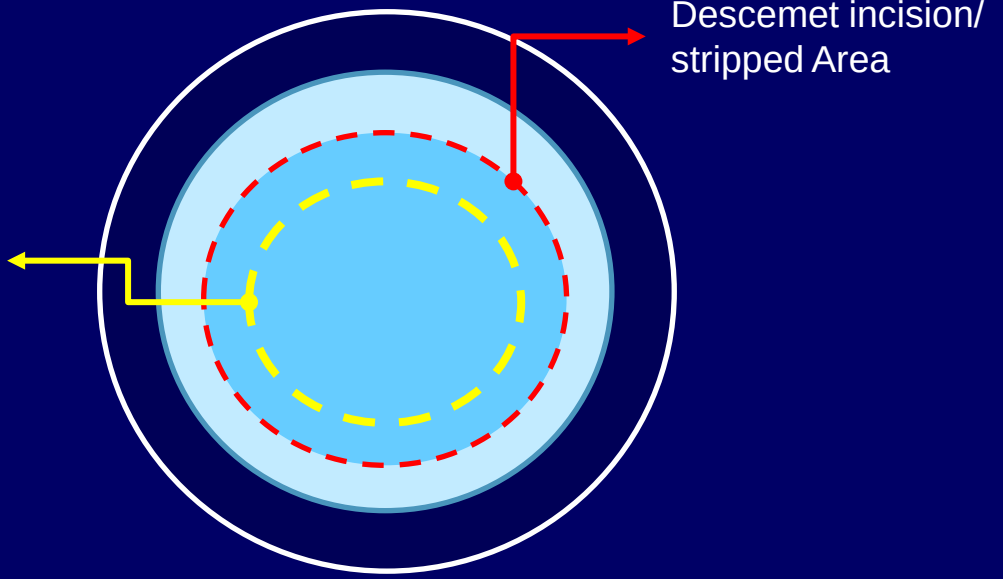
Pre-STRIPPED preparation



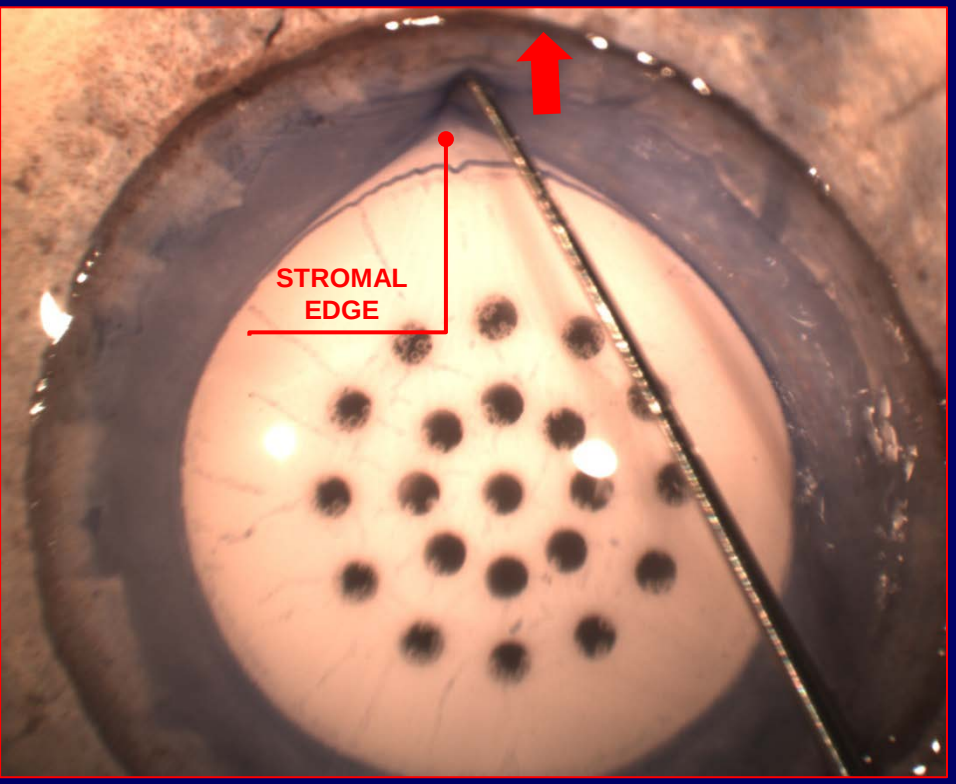
DESCEMET INCISION

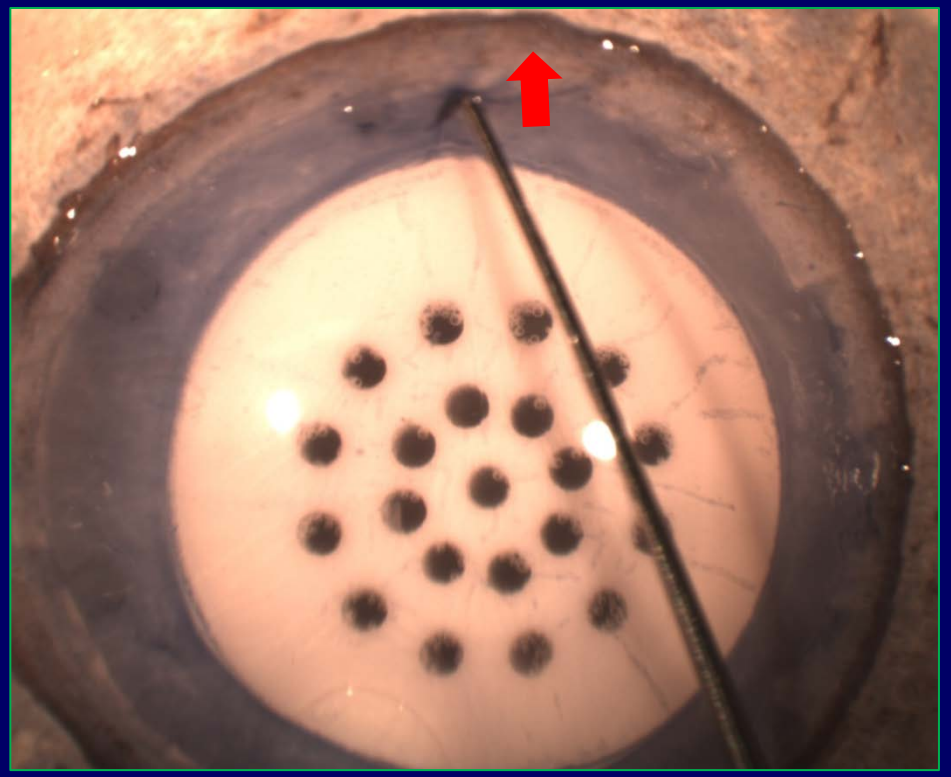
- Knife (Y-hook)
- Punch (Moria, Janach, Barron)
  - From 9 to 10 mm

Difficult increase

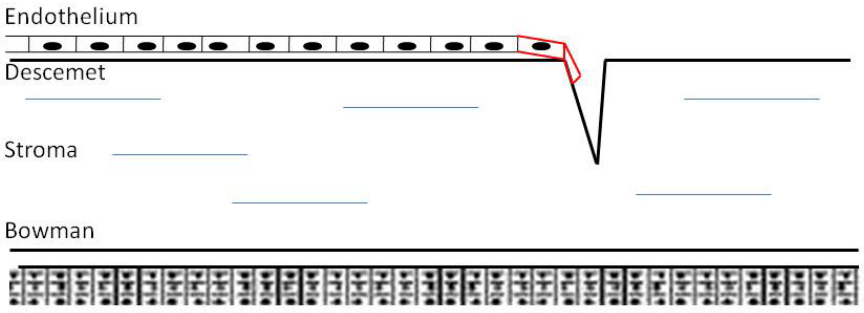


DESCEMET INCISION: not deep!!

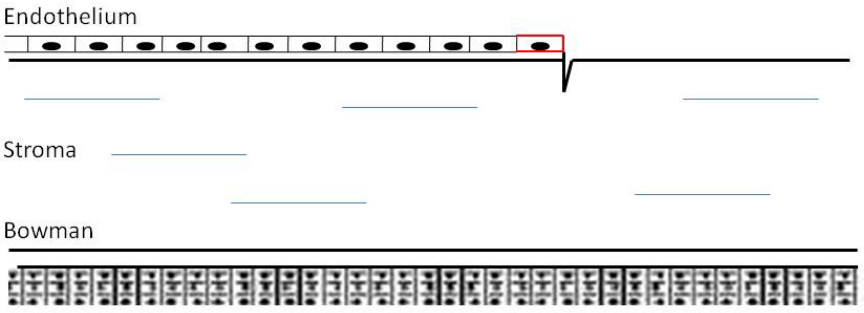


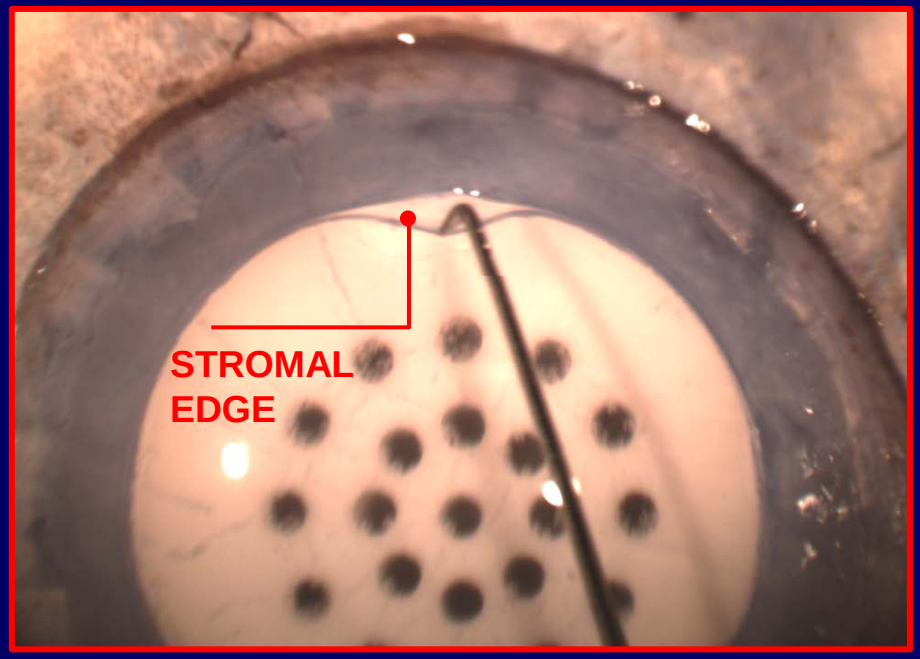


DEEP CUT

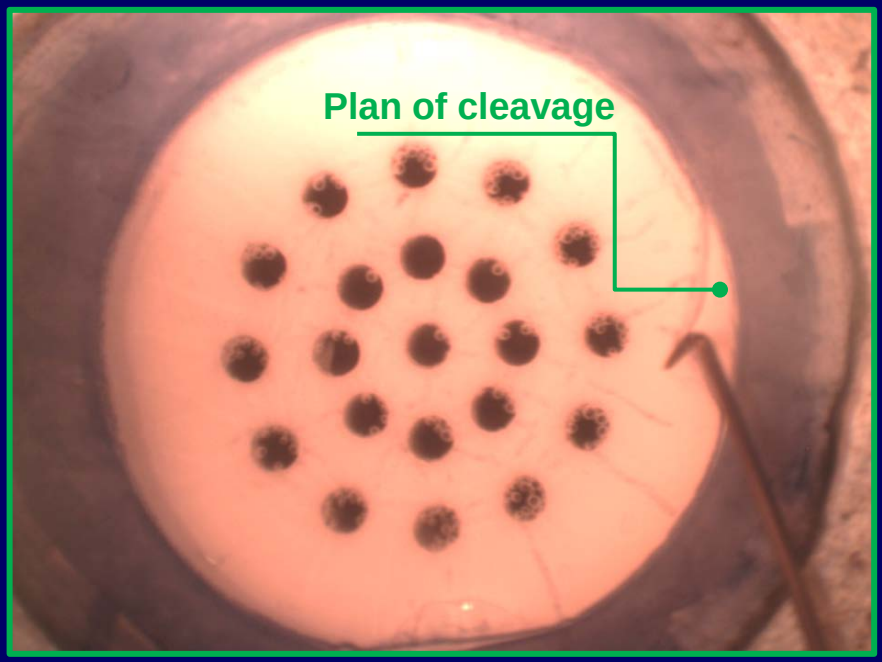


SUPERFICIAL CUT

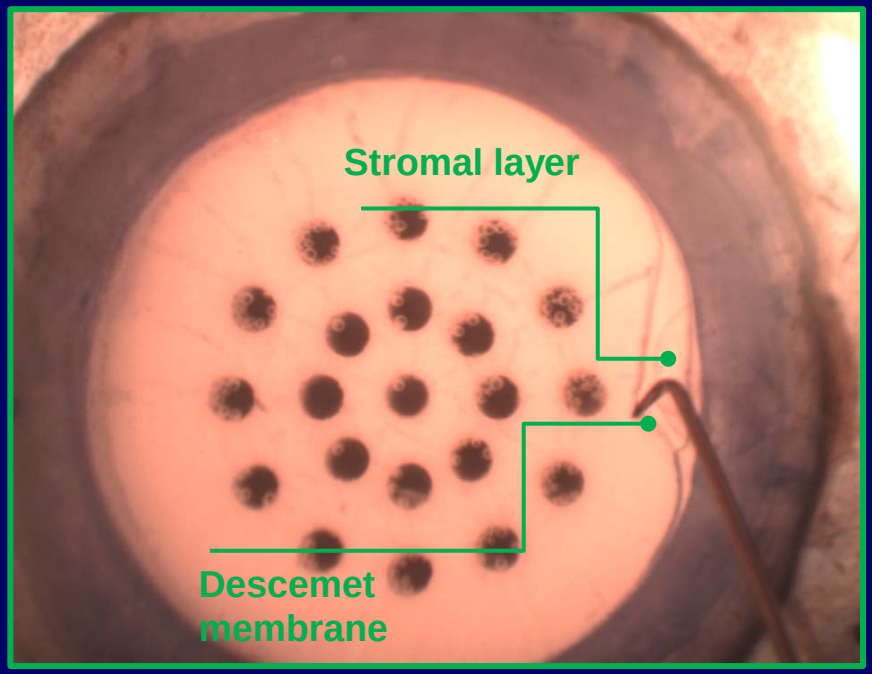




DEEP CUT

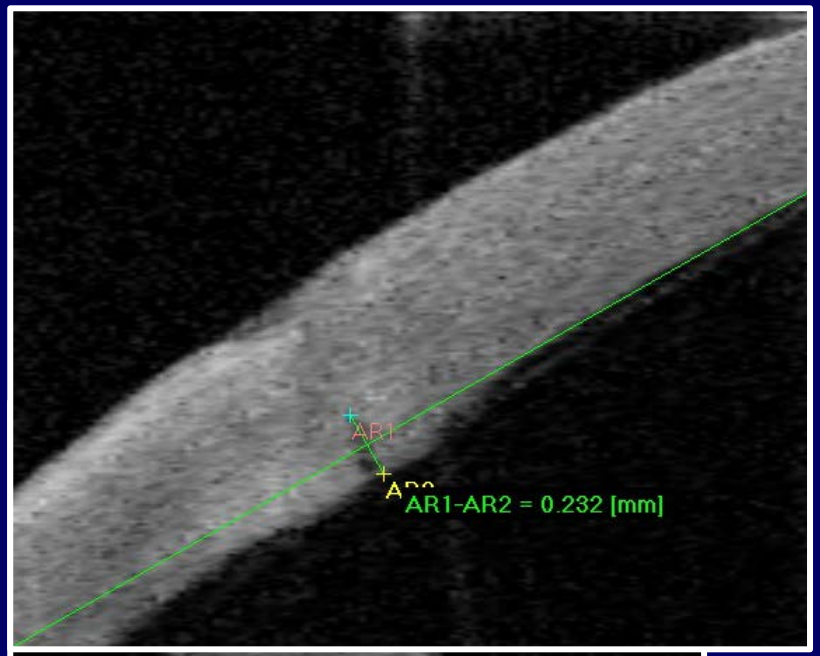


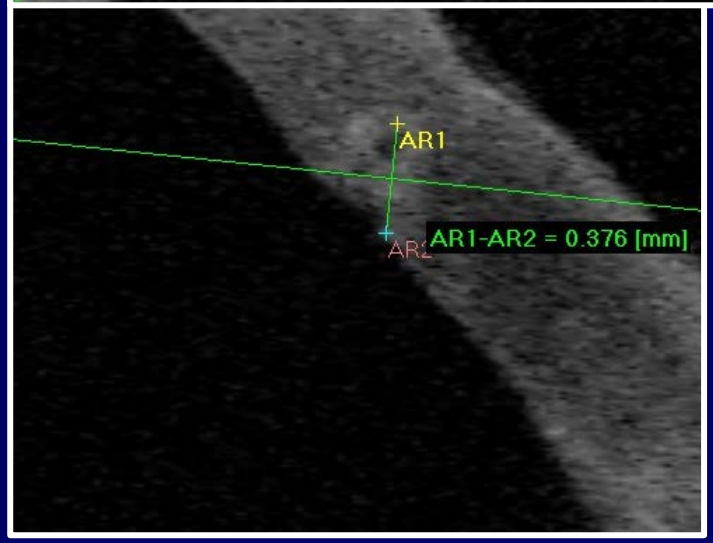
SUPERFICIAL CUT



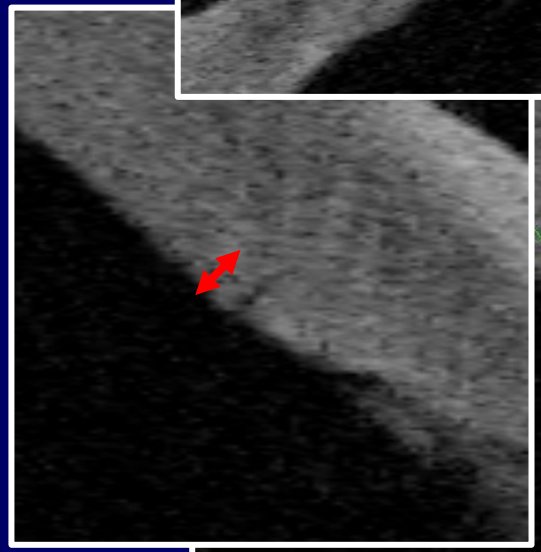
DESCEMET INCISION: different punch

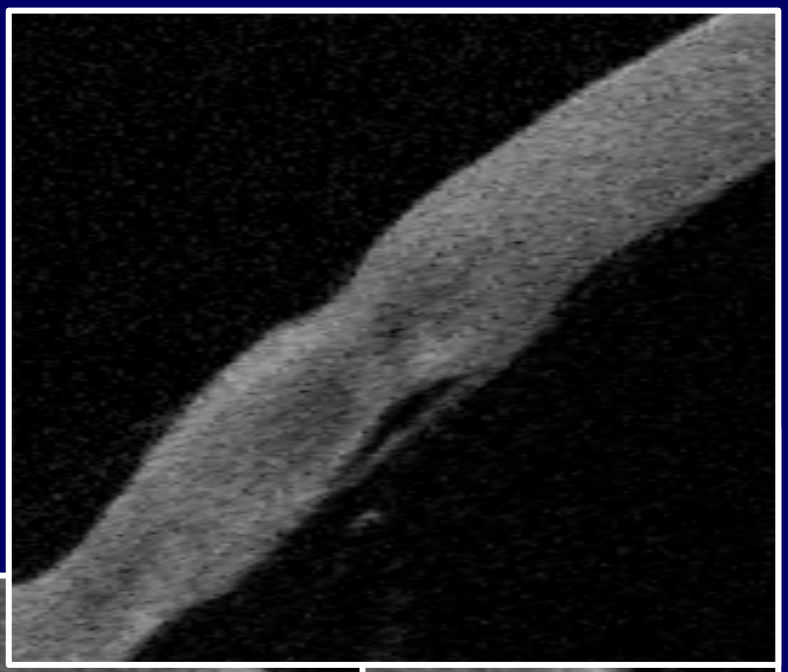
NORMAL PUNCH

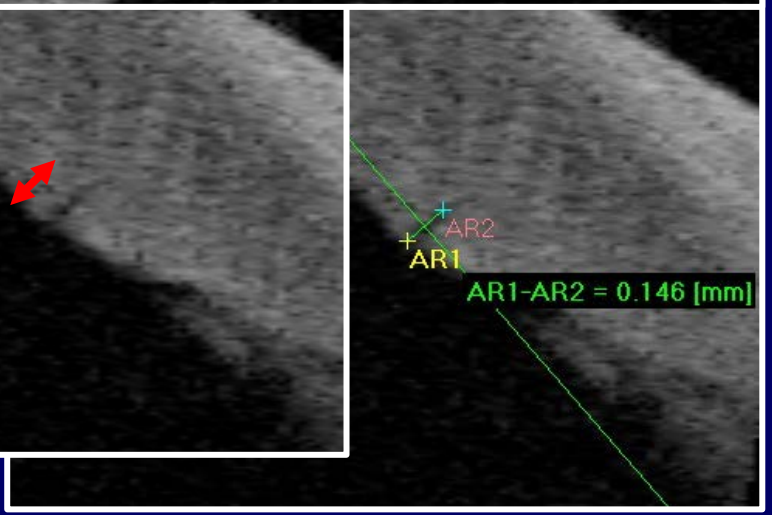




CALIBRATED PUNCH

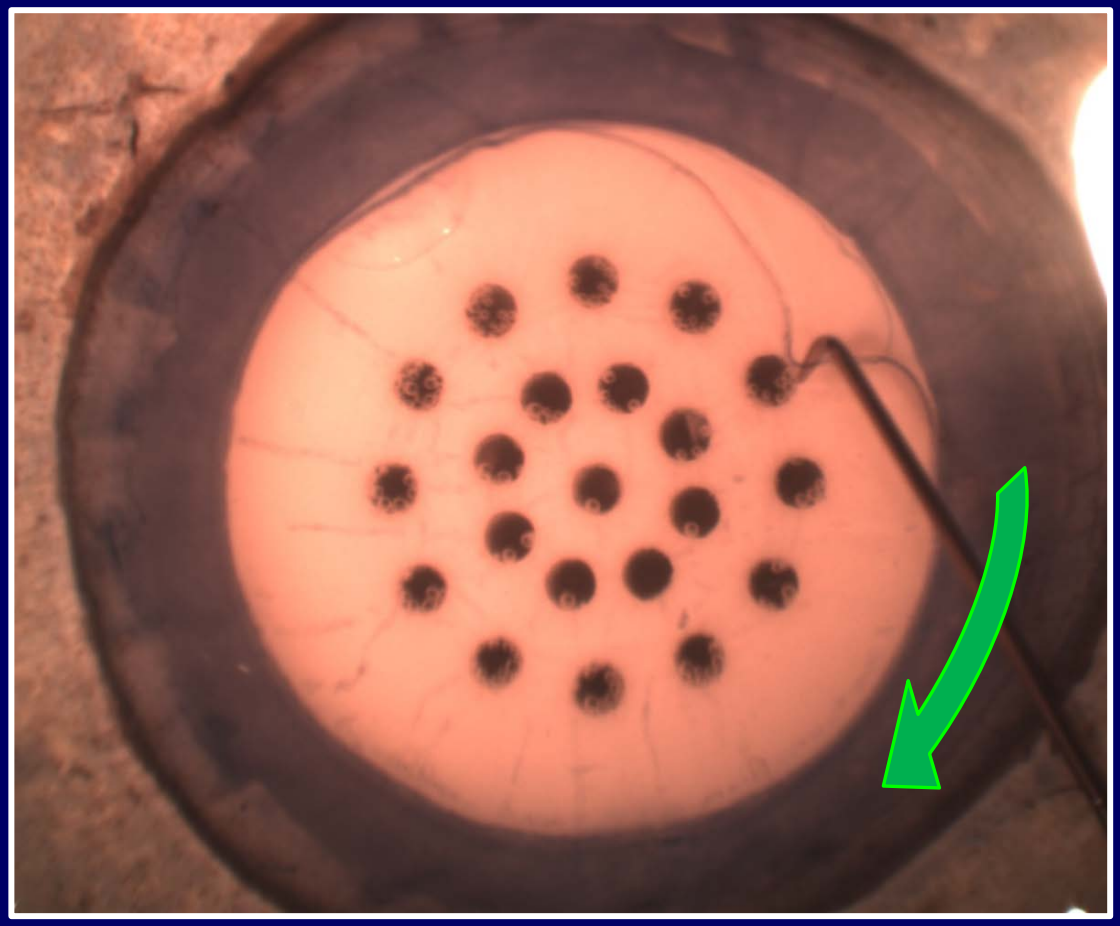






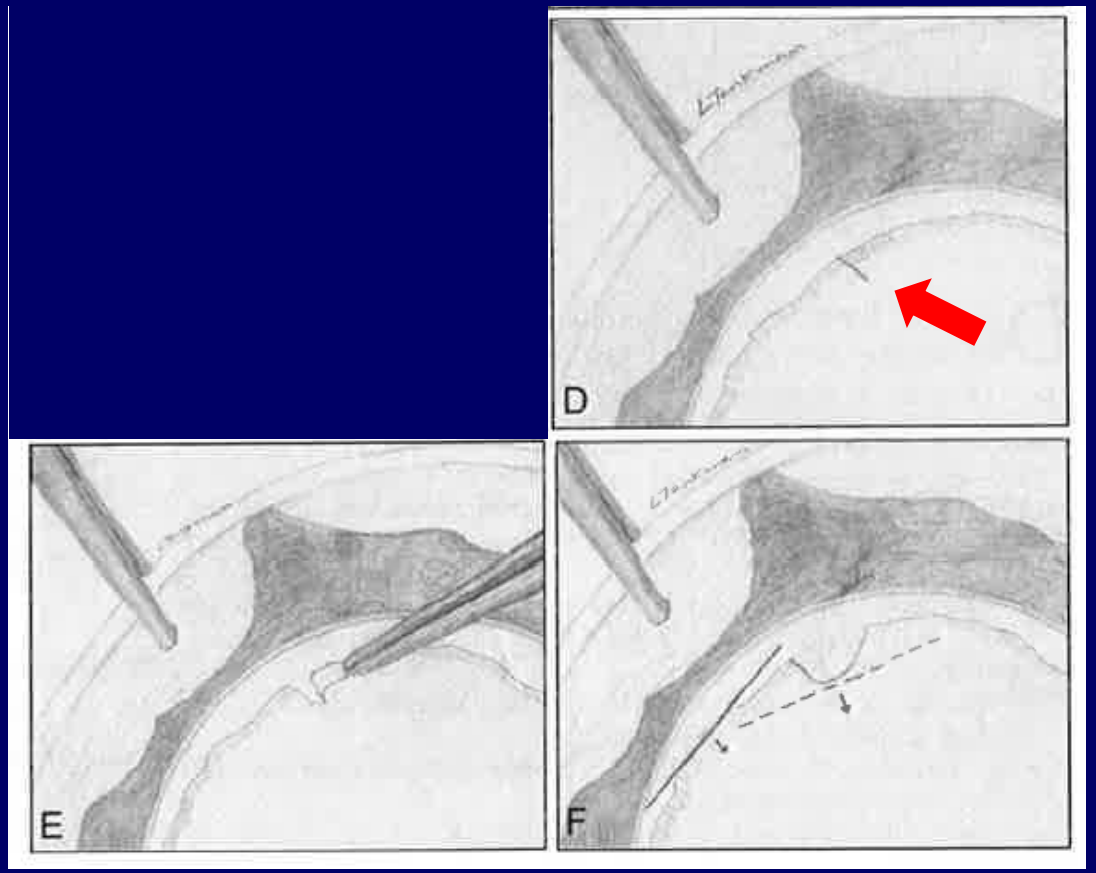
MEMBRANE CLEAVAGE

- Reducing the peripheral adherences
- Checking for peripheral **tears**
- Under MEM+Dextran/PBS



MEMBRANE CLEAVAGE: tears

Tenkman et al. **DMEK donor preparation: navigating challenges and improving efficency**.
Cornea 2014; 33:319-325

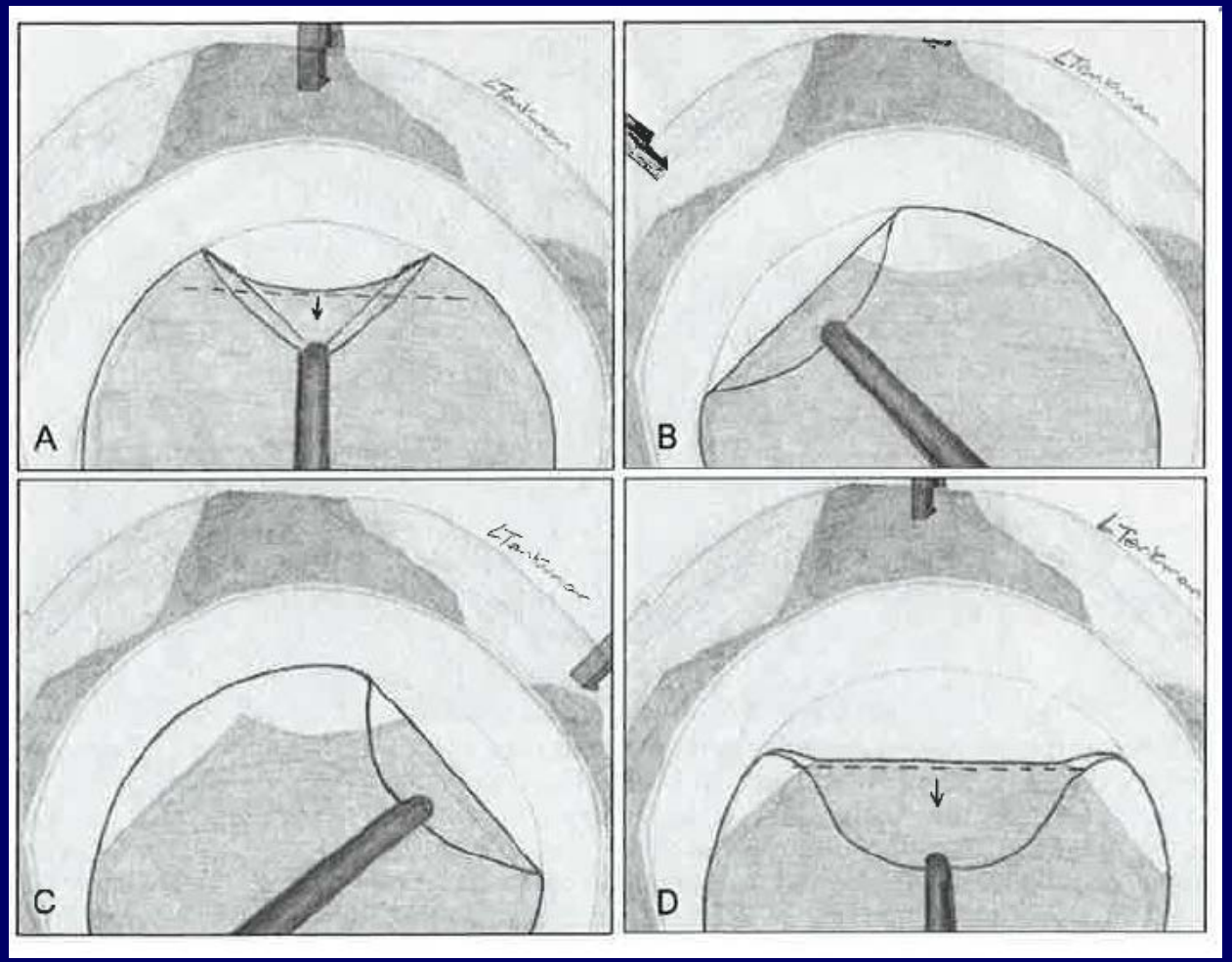


STRIPPING: quadrants

Tenkman et al. **DMEK donor preparation: navigating challenges and improving efficency**.
Cornea 2014; 33:319-325

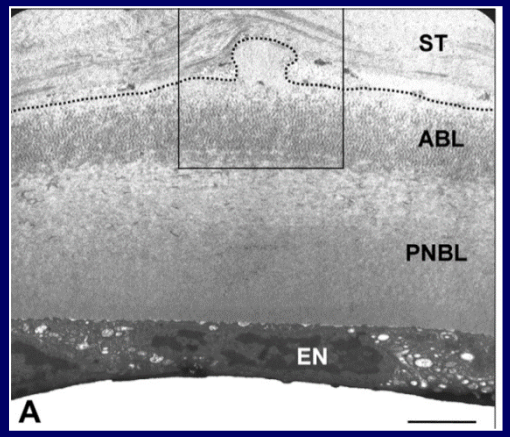
How to handling a tissue with a **strong adherence** between Stroma and Descemet

Strong adherence in the middle of the tissue respect the periphery

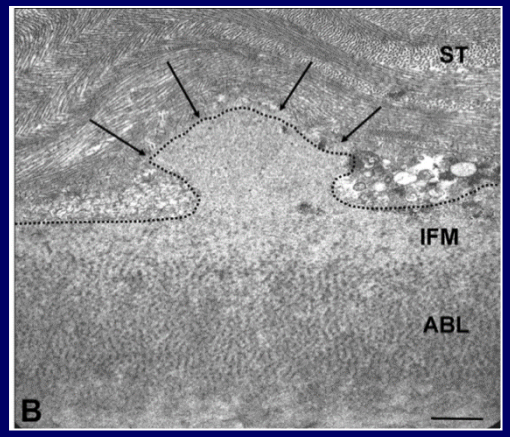


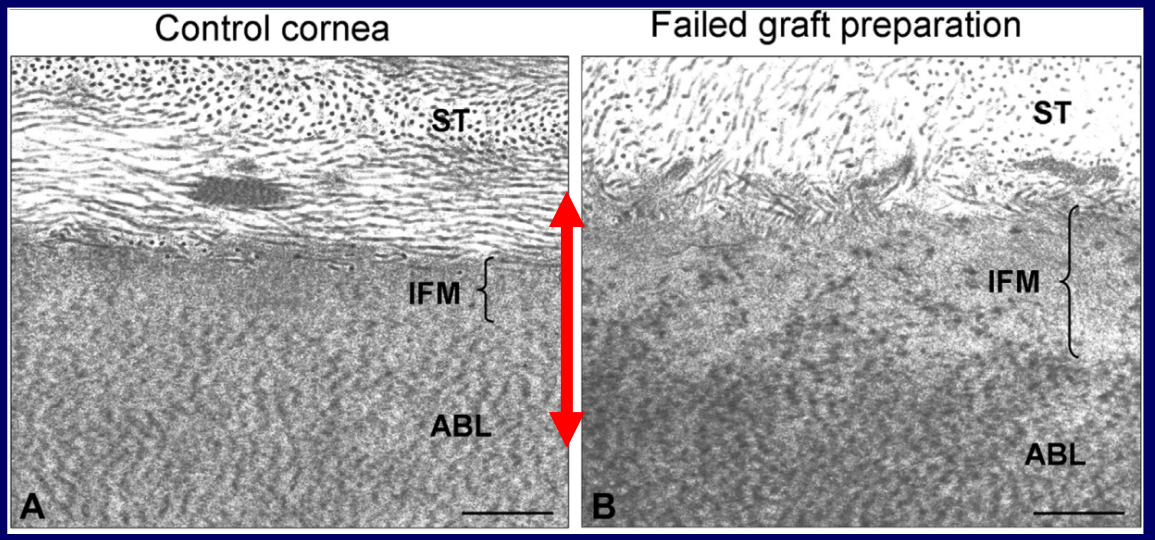
STRIPPING: issues

Schlötzer-Schrehardt et al **“Reproducibility of Graft Preparations in Descemet's Membrane Endothelial Keratoplasty”** Ophthalmology. Volume 120, Issue 9, Pages 1769–1777, September 2013

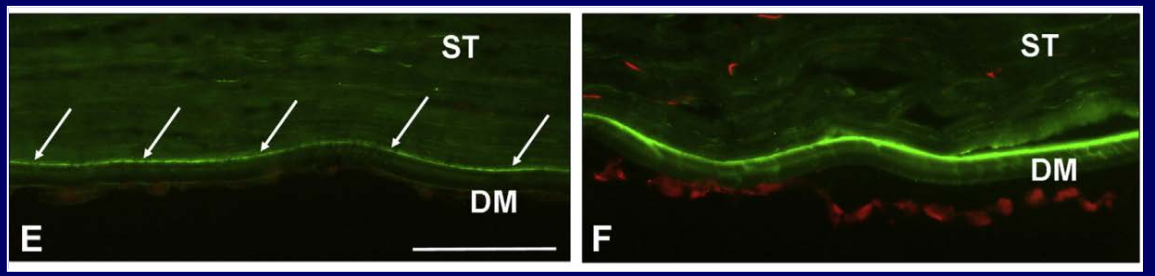


Peg-like interlockings (n=1/350)





Difference in thickness and structure of the interfacial matrix zone (n=6/350)



High amounts of Adhesive Glycoproteins

STRIPPING: issues

Greiner, Mark A. et al." **Diabetes Mellitus Increases Risk of Unsuccessful Graft Preparation in DMEK: A Multicenter Study".** Cornea: November 2014 - Volume 33 - Issue 11, 1129-1133.

DMEK Failure

DIABETIC	NON-DIABETIC
15,3%	1,9%
(n=114)	(n=245)

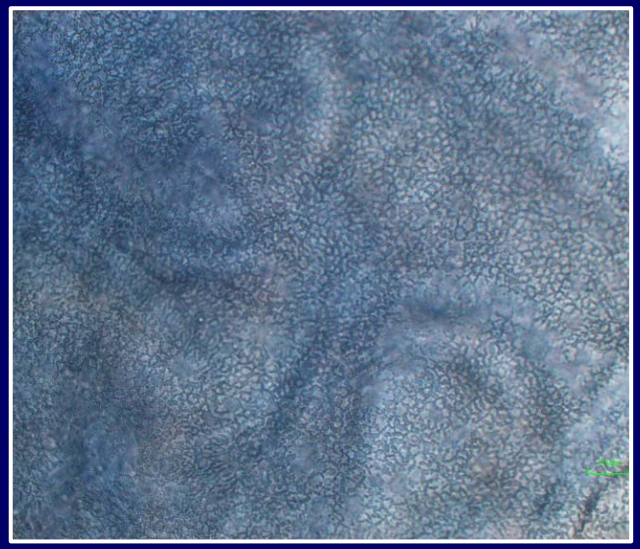
P=0,001

ENDOTHELIAL EVALUATION: validation study

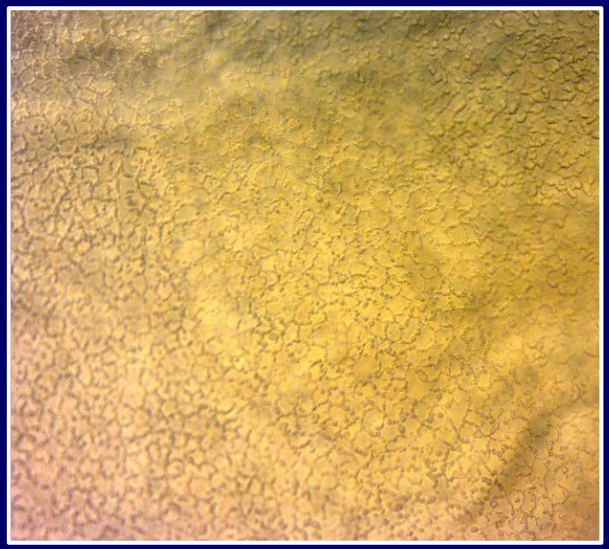
	Media	PRE PREPARATION		POST PREPARATION		AFTER 7 DAYS	
		ECD (cells/mm²)	Trypan Blue positive cells (%)	ECD (cells/mm²)	Trypan Blue positive cells (%)	ECD (cells/mm²)	Trypan Blue positive cells (%)
n=10	Transport*	1994±317	0	1975±306	**2±2,7** (n=3)	1902±303	**0**

* days at Storage average 38,8±21 days

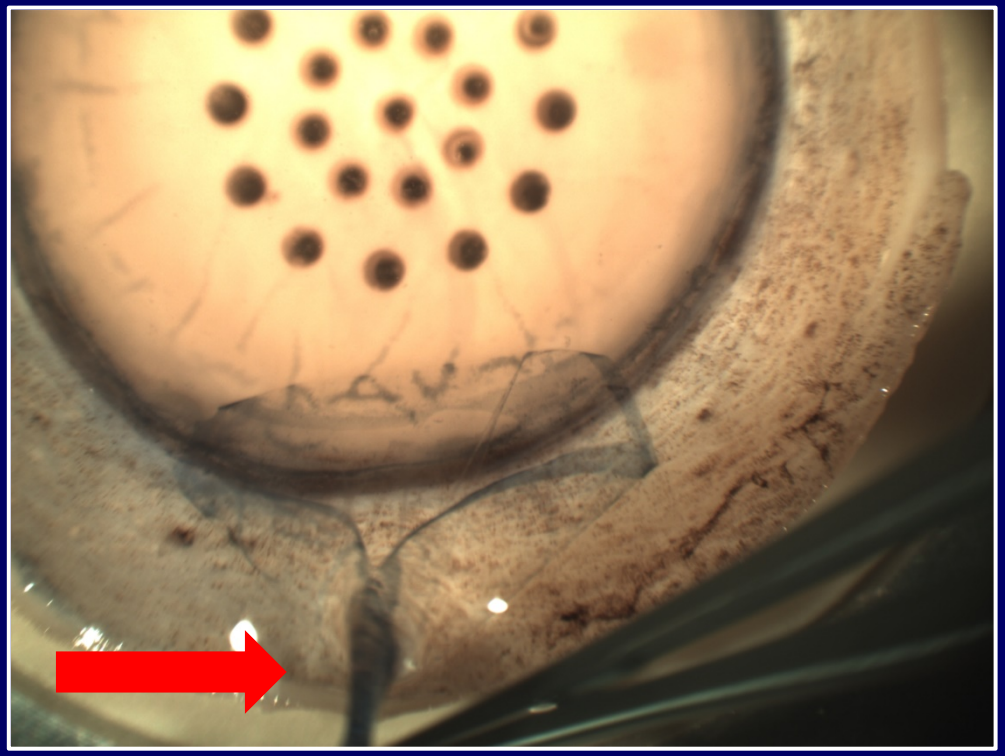
100x – TB/sucrose
PRE-stripping (after the first punch)

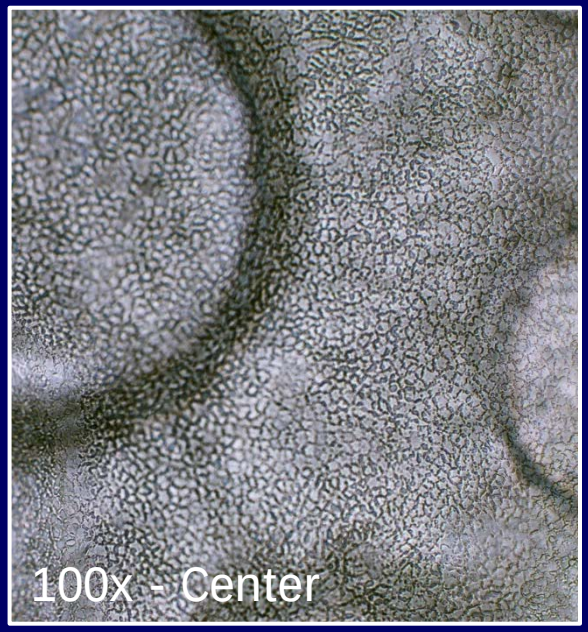


100x – TB/sucrose
POST-stripping

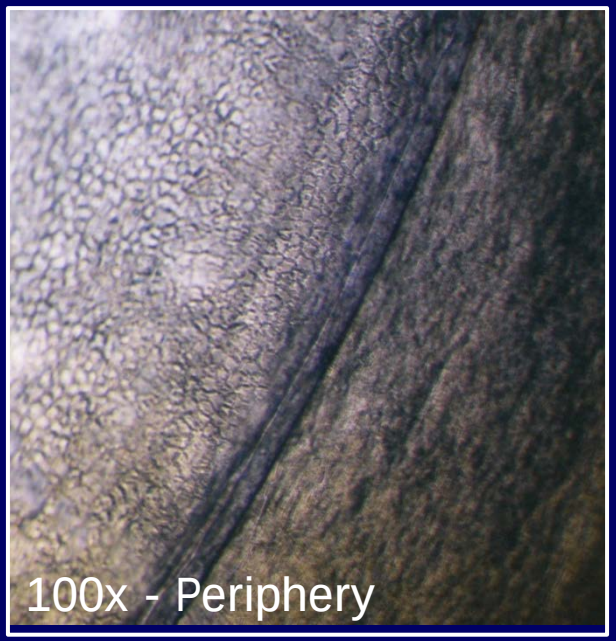


200x – TB/sucrose.
After 7 days




100x - Center


200x - Center


100x - Periphery

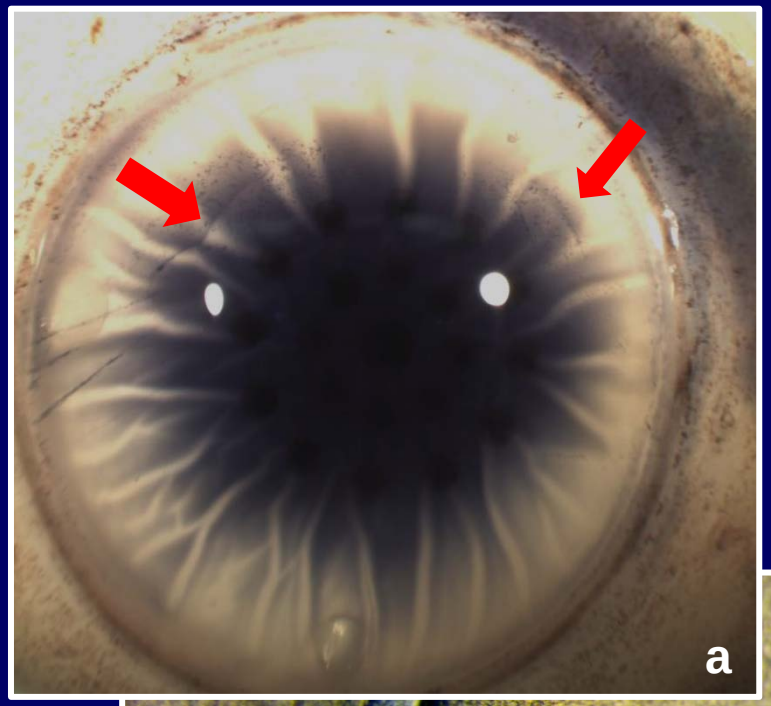
DONOR/TISSUE CHARACTERISTICS

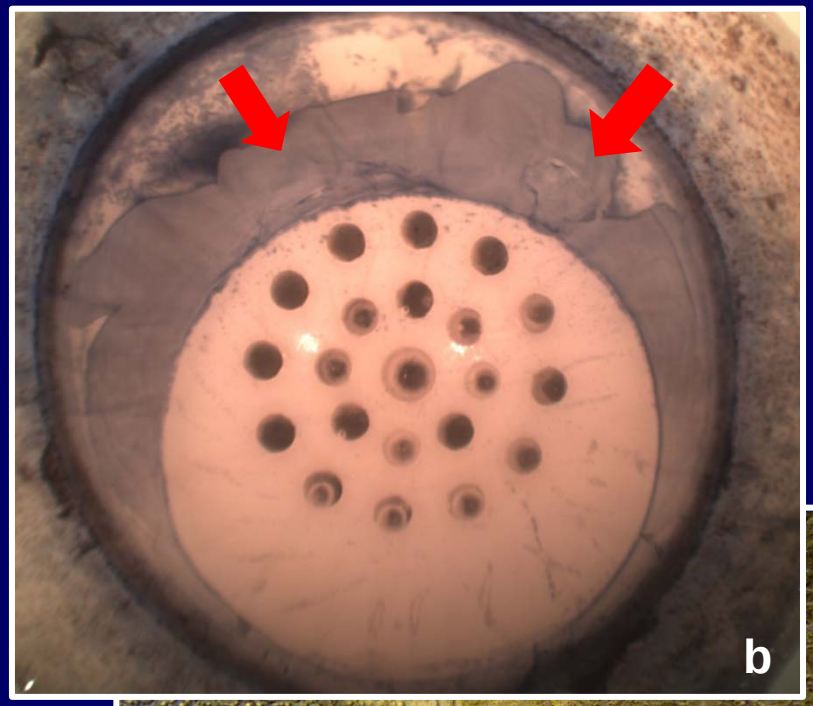
- Age ≥ 65
  - Less adherence between Descemet-Stroma
  - Less propension to rolling
- ECD ≥ 2300 cell/mm^2

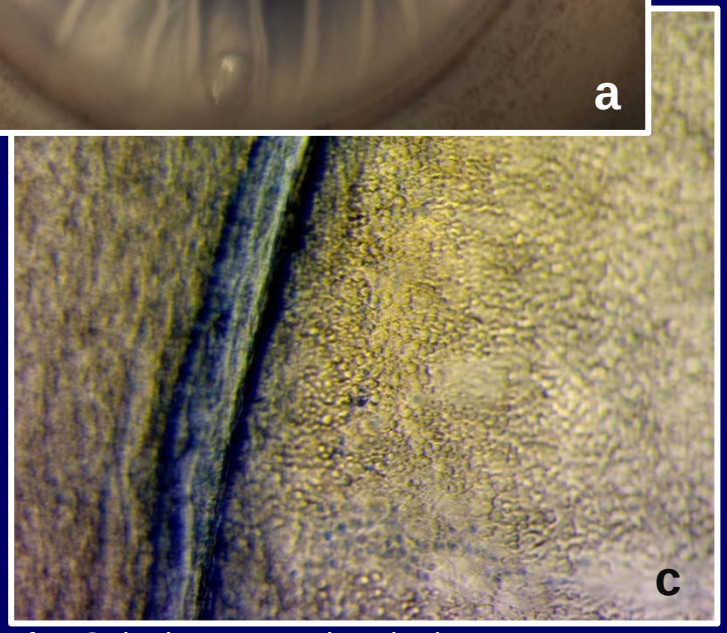
Heinzelmann S et al. **Influence of donor characteristics on descemet membrane endothelial keratoplasty.** Cornea. 2014 Jun;33(6):644-8.

- Min 2 days in Transport medium
  - DM become more "tight"
- Contraindications: Diabetes Mellitus (?!) Cataract surgery

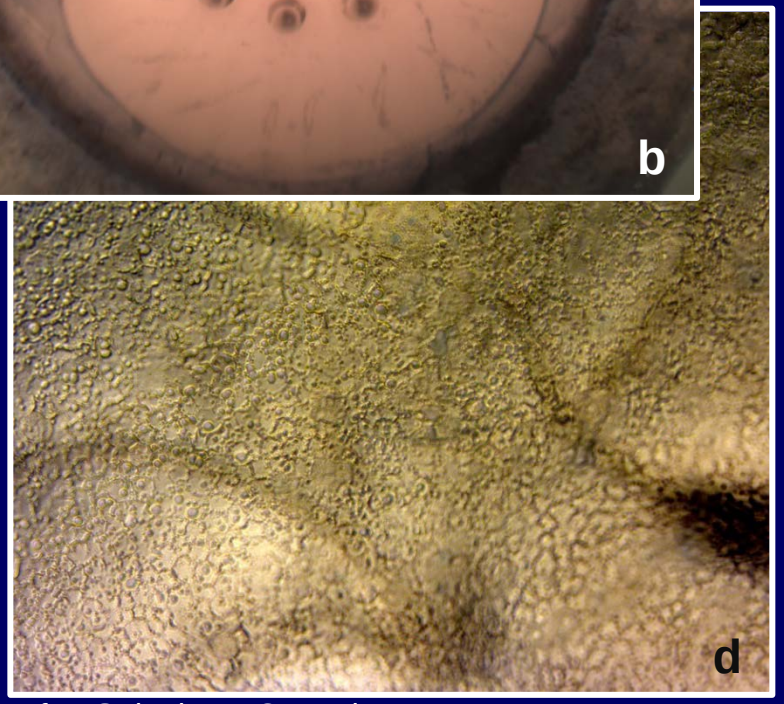
CATARACT SURGERY







After Stripping – Perypheral edge:
100x - Trypan Blu/Sucrose



After Stripping – Central area:
100x - Trypan Blu/Sucrose

CONCLUSION

- PRE-stripped membrane
  - n=52 tissue from May 2014
  - 6 surgeons
  - From corneas in MEM+Dextran
  - **Trypan blue positive cells: <1%**
  - Expiration: 7 days from the preparation
  - Tissue wastage: <9%