

Measurement of Descemet Membrane Thickness with Fourier-Domain Optical Coherence Tomography and its Impact on Tissue Preparation

Christopher Stoeger, CEBT, Yan Li, PhD,
Maolong Tang, PhD, Joshua Galloway, CEBT

EBAA Scientific Session

June 2013



Financial Disclosure

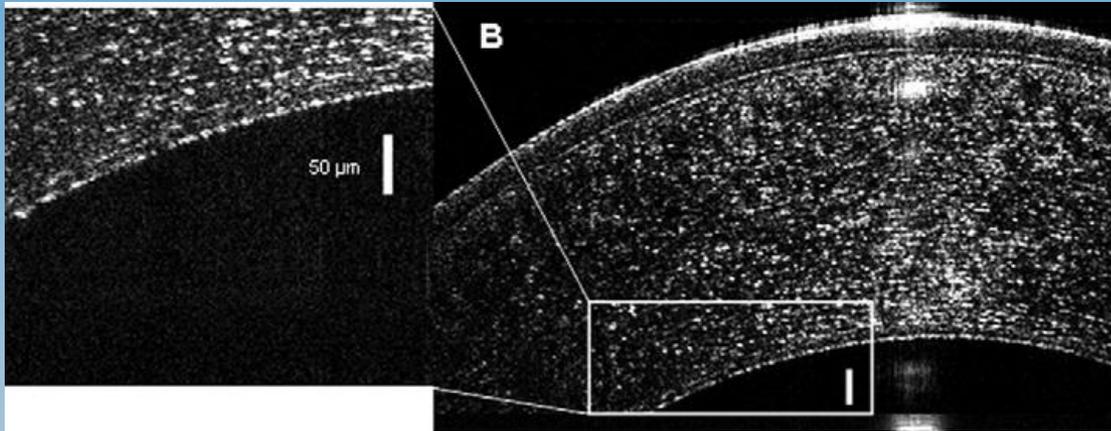
Drs. Tang and Li received research support and patent royalties from Optovue, Inc. This potential individual conflict of interest has been reviewed and managed by OHSU.

Purpose

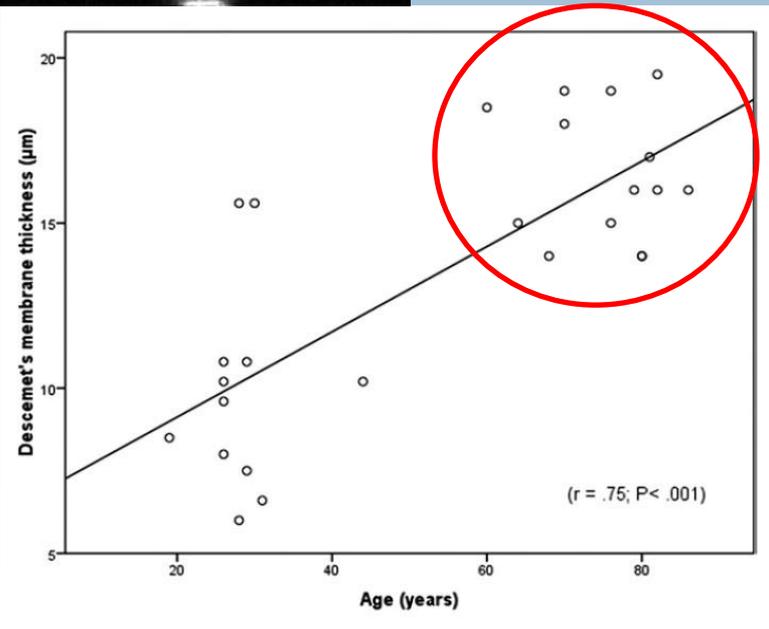
Currently surgeon tissue selection for Descemet membrane endothelial keratoplasty (DMEK) is biased toward older donors in order to increase the likelihood of acquiring thicker, easier to handle Descemet membrane (DM)¹. An objective method to measure the DM thickness could aid tissue selection for DMEK.

1. Feng MT, Price MO, Price FW. Update on Descemet Membrane Endothelial Keratoplasty. *International Ophthalmology Clinics* 2013; 53: 31-45.

Background



Shousha MA, Perez VL, Wang J, et al. Use of ultra-high-resolution optical coherence tomography to detect in vivo characteristics of Descemet's membrane in Fuchs' dystrophy. *Ophthalmology* 2010;117:1220-1227.



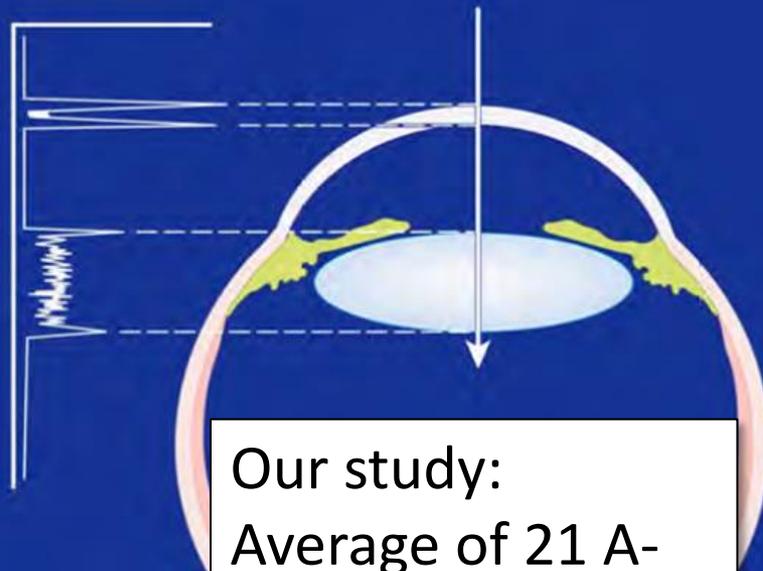
Method

- 22 corneas from 19 donors and performed a cross line scan with FD-OCT (Optovue RTVue)
- Raw data analyzed at OHSU for DM thickness
- 17 corneas prepared for DMEK and rated according to difficulty of peel
- Correlation
 - Is DM thickness related to age?
 - Is DM thickness related to handling?



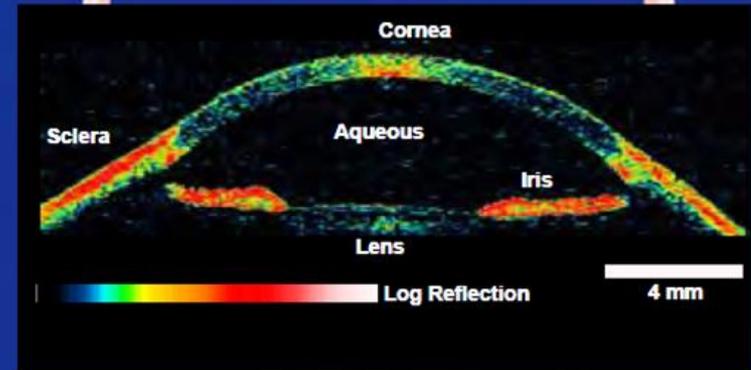
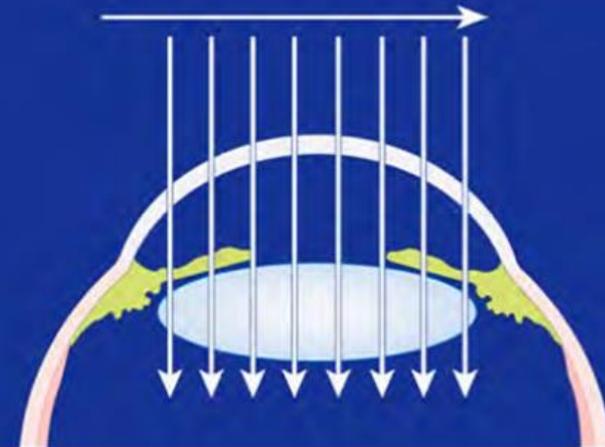
OCT Overview

Axial Scan

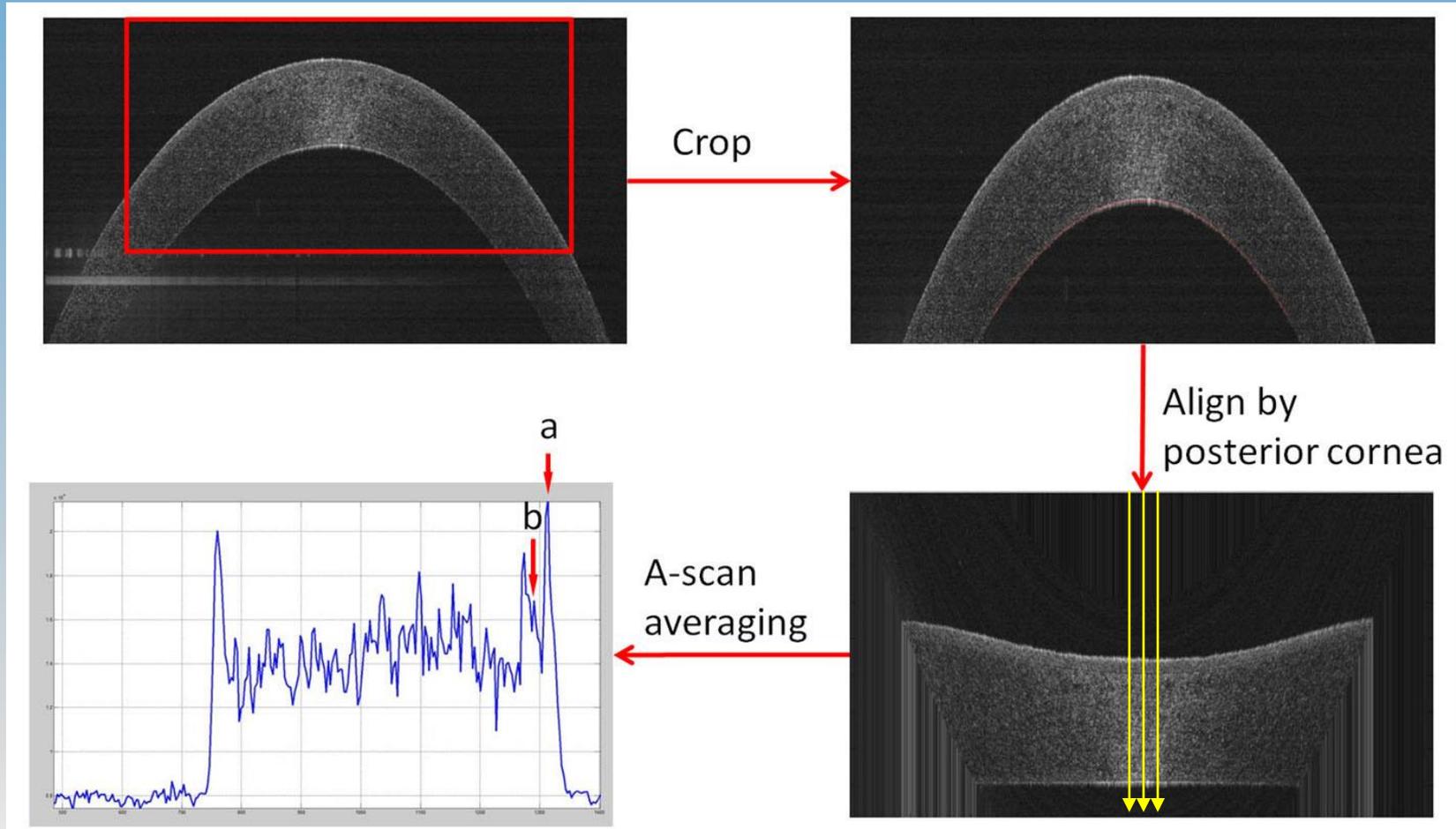


Our study:
Average of 21 A-scans from central
5 mm area

Transverse Scan

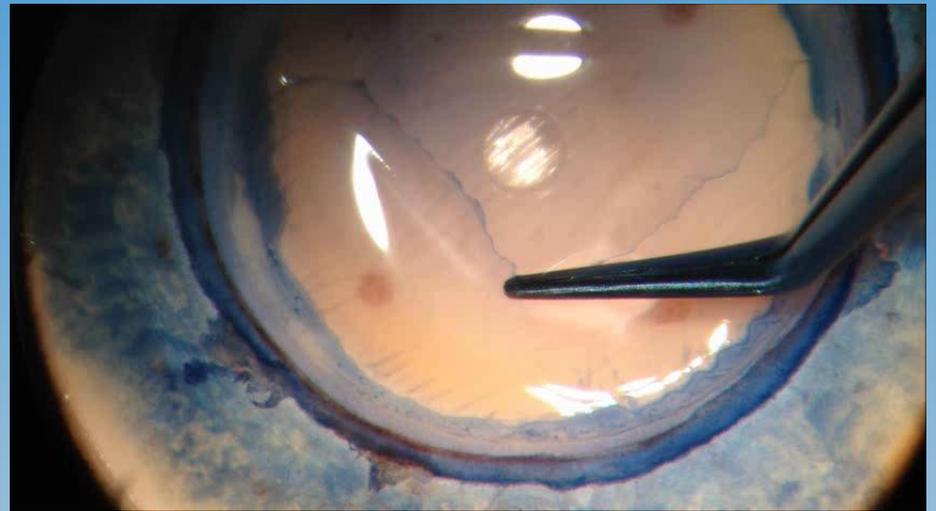


Descemet Membrane Thickness



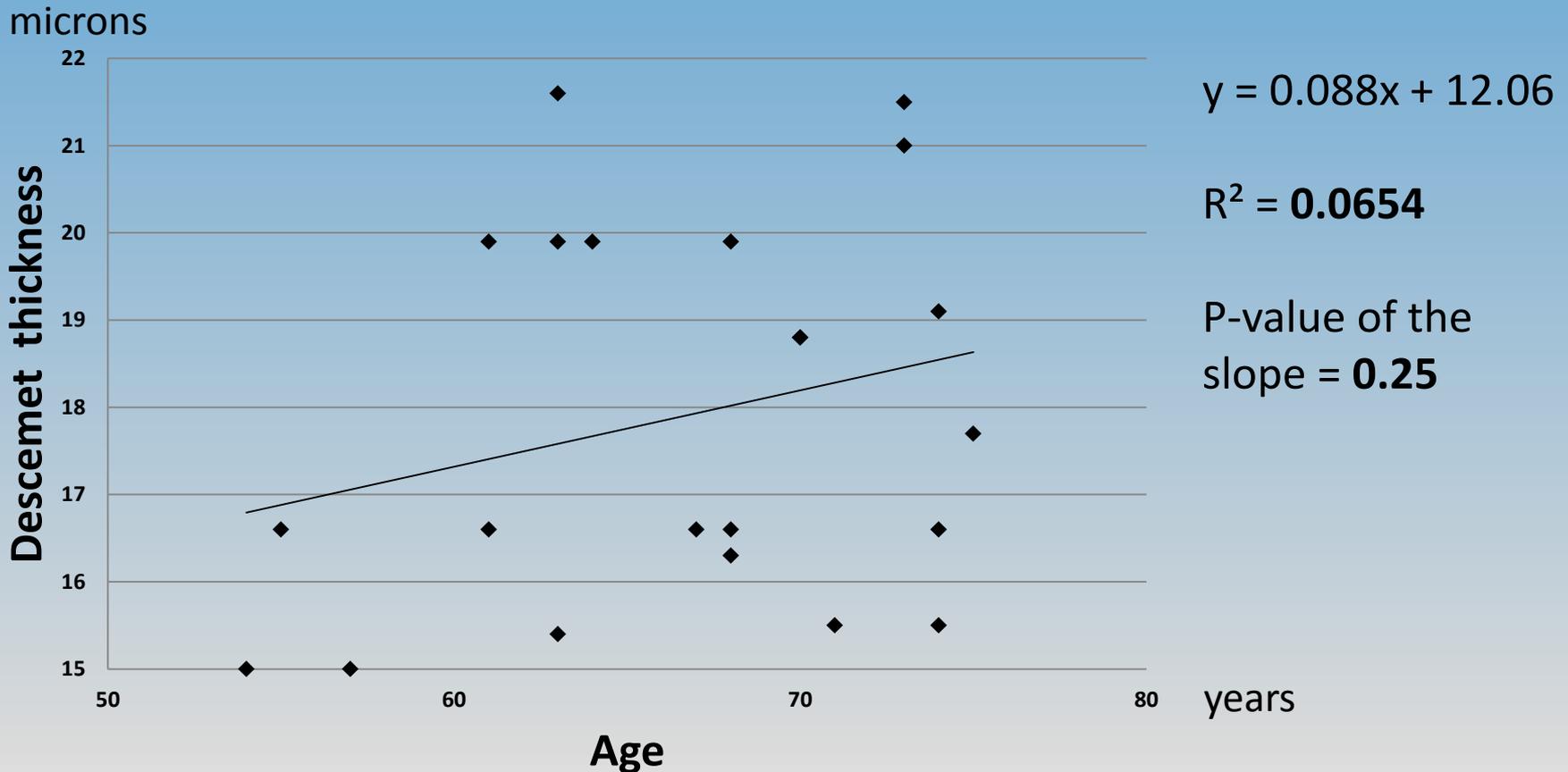
Descemet Membrane thickness = distance between “a” and “b”

Peel Rating Scale



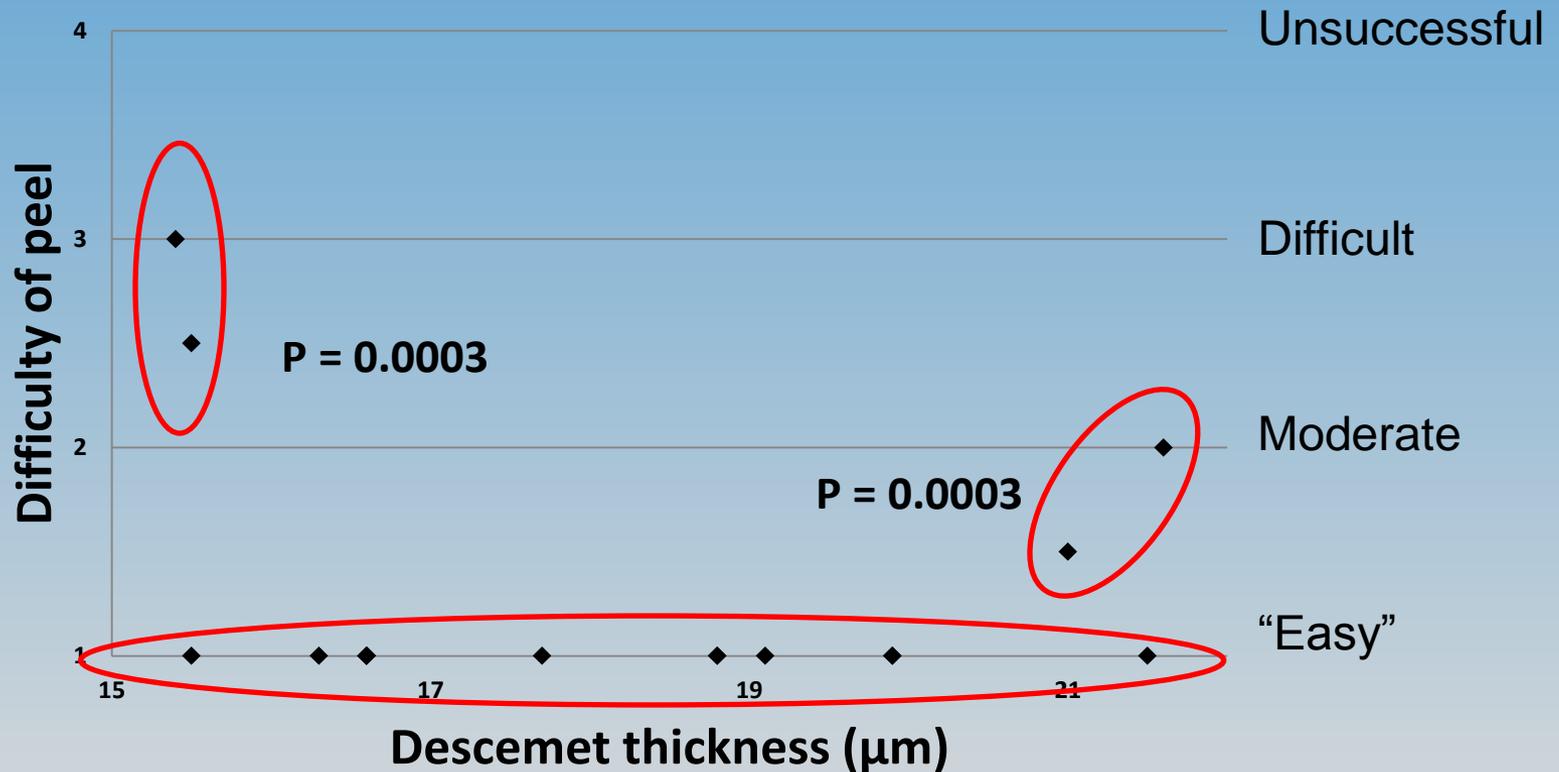
Scale	Criteria
1	Easy peel
1.5	Easy peel, tissue broke off edges during peel without adverse impact on graft zone
2	Moderate difficulty
2.5	Moderate difficulty, tissue broke off edges during peel without adverse impact on graft
3	Difficult peel but successful
3.5	Difficult peel and tears present at periphery but tissue still suitable for grafting
4	Unsuccessful

Descemet Thickness vs. Age



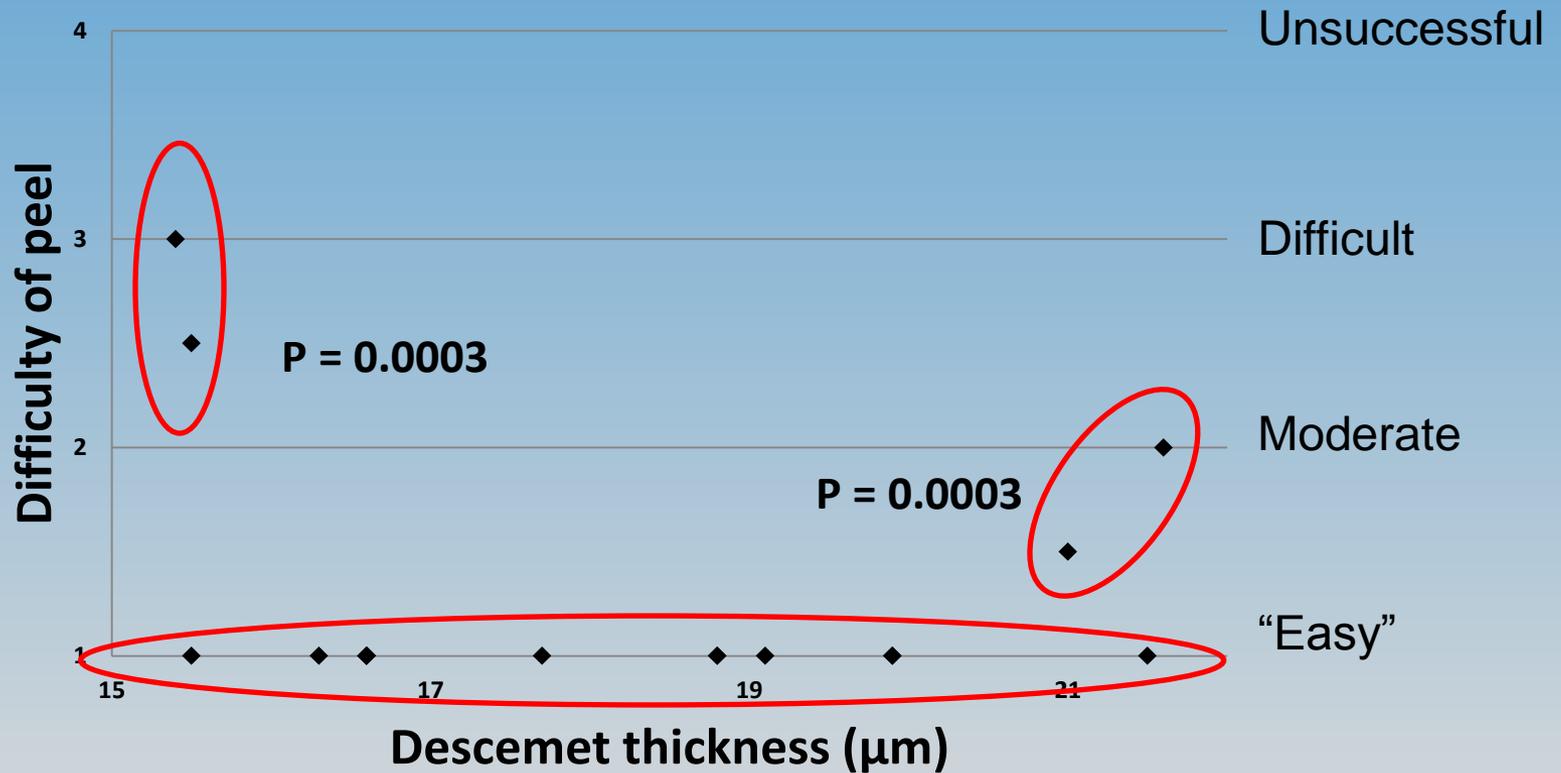
- Age: average 66.6 ± 6.4 (range 54-75) yr
- DM thickness: average 17.9 ± 2.2 (15-21.6) μm
- $n=22$

Descemet Thickness vs. Difficulty of Peel V1



- Difficulty of peel = 1, average Descemet thickness 18.0 μm (15.5-21.5, n=13)
- Descemet thickness is either significantly thinner (Ave 15.5 μm , n=2)
- Descemet thickness is significantly thicker (Ave 21.3 μm , n=2)

Descemet Thickness vs. Difficulty of Peel V2



Group	Peel Rating	Ave DM Thickness μm	Range μm	n	p
easy	1	18.0	15.5-21.5	13	
thin	>1 (2.5-3)	15.5	15.4-15.5	2	0.003
thick	>1 (1.5-2)	21.3	21-21.6	2	0.003

Conclusion

- DM thickness could be measured with OCT.
- No statistically significant correlation was detected between age and thickness of DM in our study.
- Age information by itself may not be sufficient in donor cornea selection.

Conclusion

- In this small sample, there was a trend for either very thin or thick grafts to be more difficult to prepare for DMEK.
- A larger sample to determine the significance of these measurements is warranted.

Acknowledgements

Phil Dye, CEBT

Jeff Holiman, CEBT

Tucker Hikes, CEBT

David Huang, MD, PhD

Questions?

Contact information
chris@visiongift.org

