

Measurement of Descemet Membrane Thickness with Fourier-domain Optical Coherence Tomography and its Impact on Tissue Handling in the Anterior Chamber

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Financial Disclosure

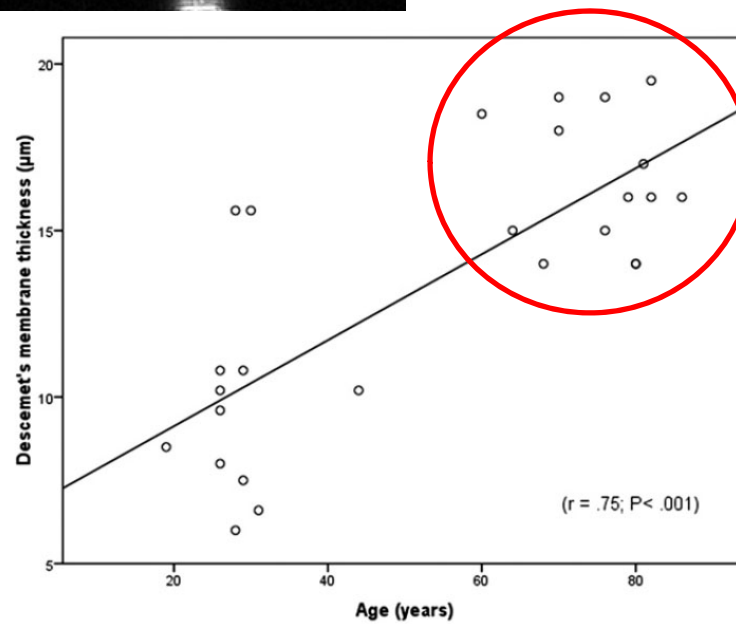
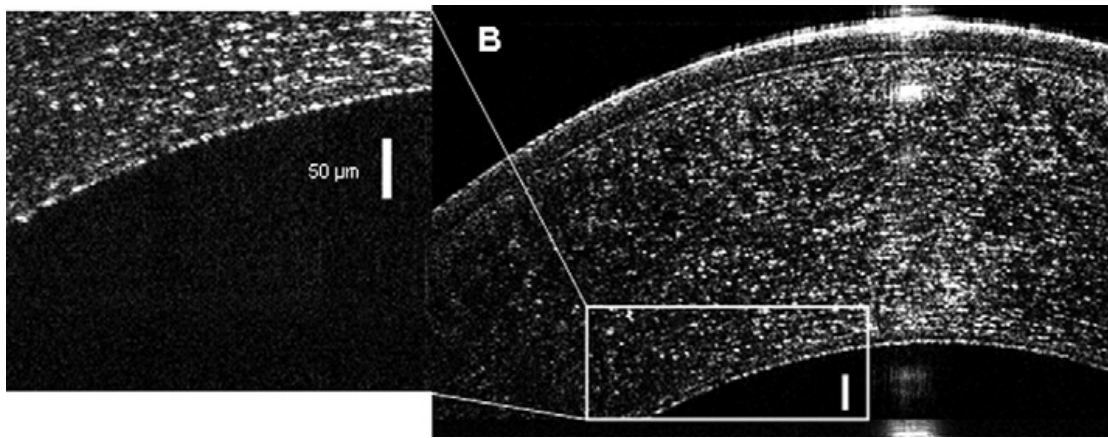
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Purpose

Currently surgeon tissue selection for Descemet membrane endothelial keratoplasty (DMEK) is biased toward older donors¹ in order to increase the likelihood of acquiring thicker, easier to handle Descemet membrane (DM). 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.

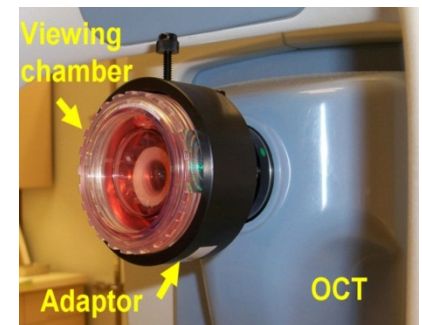
Background



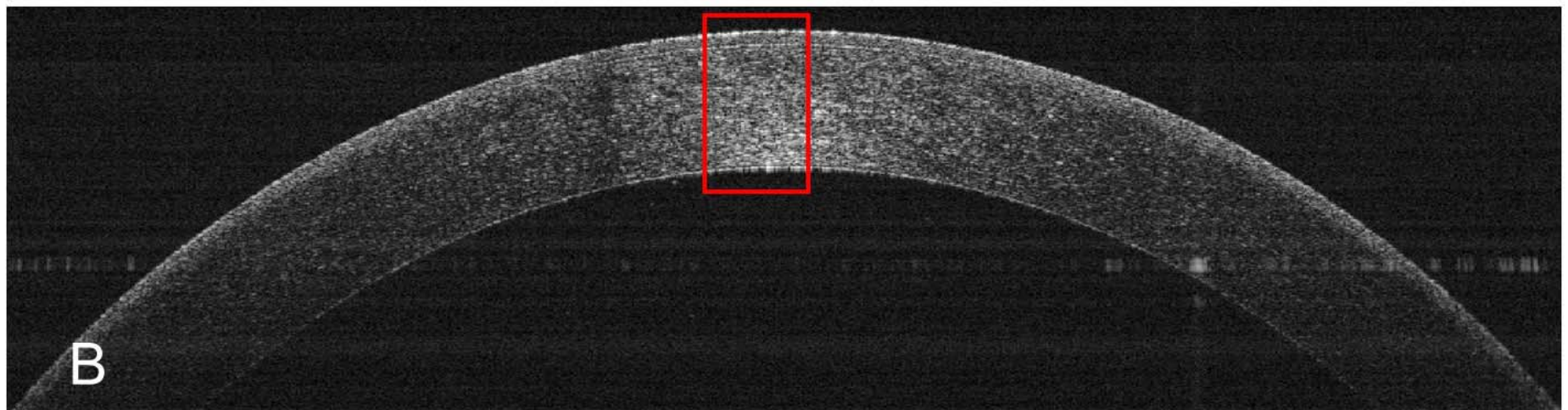
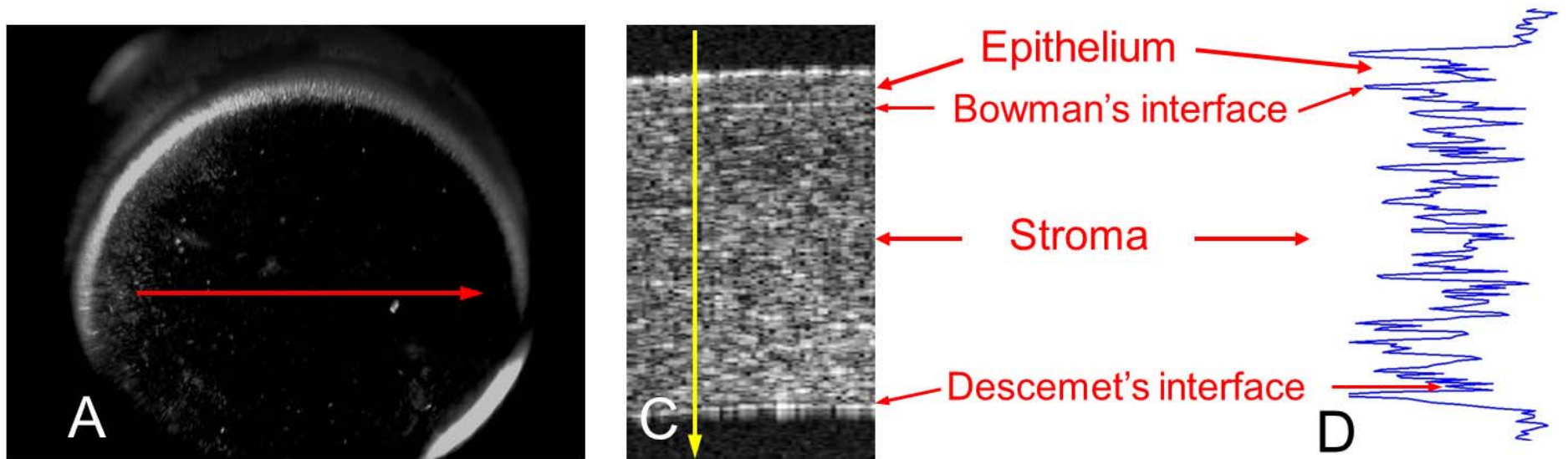
2. Shousha MA, Perez VL, Wang J, et al. Use of ultra-high-resolution optical coherence tomography to detect in vivo characteristics of Descemet's membrane in Fuchs' dystrophy. *Ophthalmology* 2010;117:1220-1227.

Method

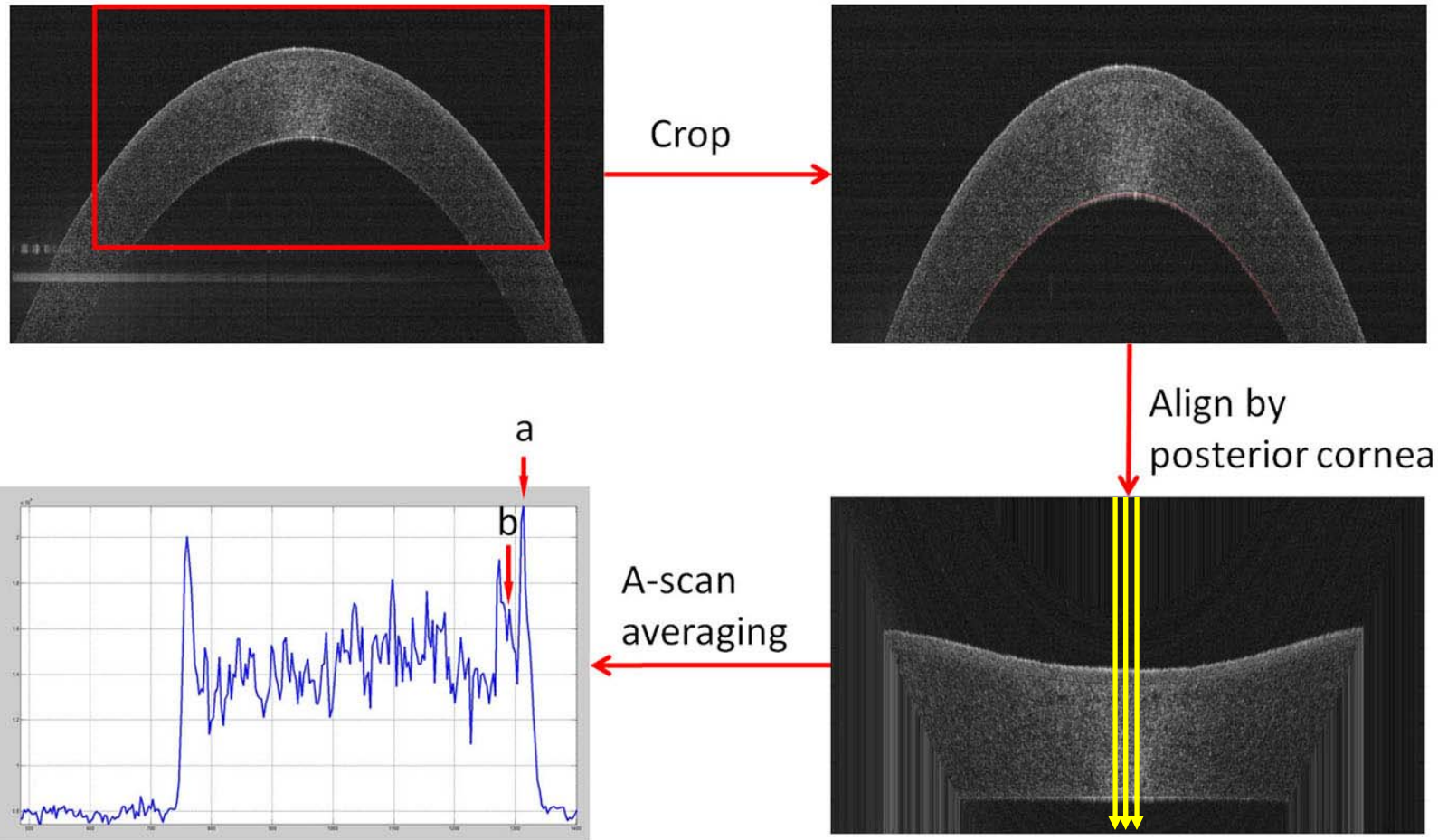
- 47 corneas from 42 donors and a line scan was performed with FD-OCT
- Scans analyzed at OHSU for DM thickness
- Unfold time was recorded for 34 grafts during the DMEK surgery
- Correlation performed to see if DM thickness is related to speed of tissue unfolding



Corneal Descemet Imaging with FD-OCT



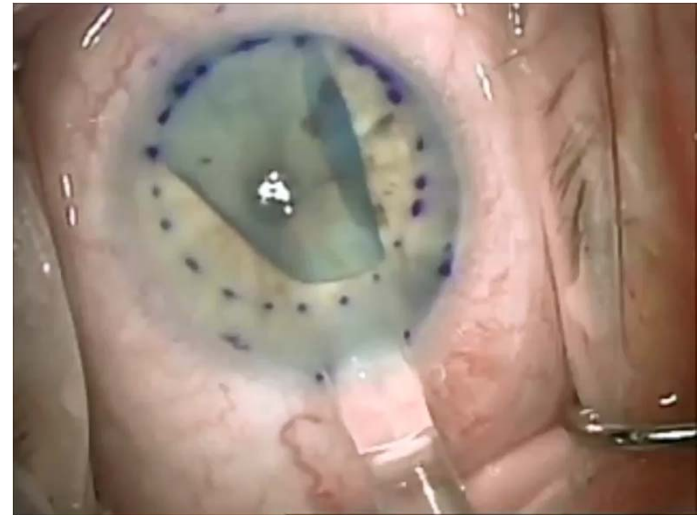
Descemet Membrane Thickness Measurement



Descemet Membrane Thickness = distance between "a" and "b"

Determining Unfold Time

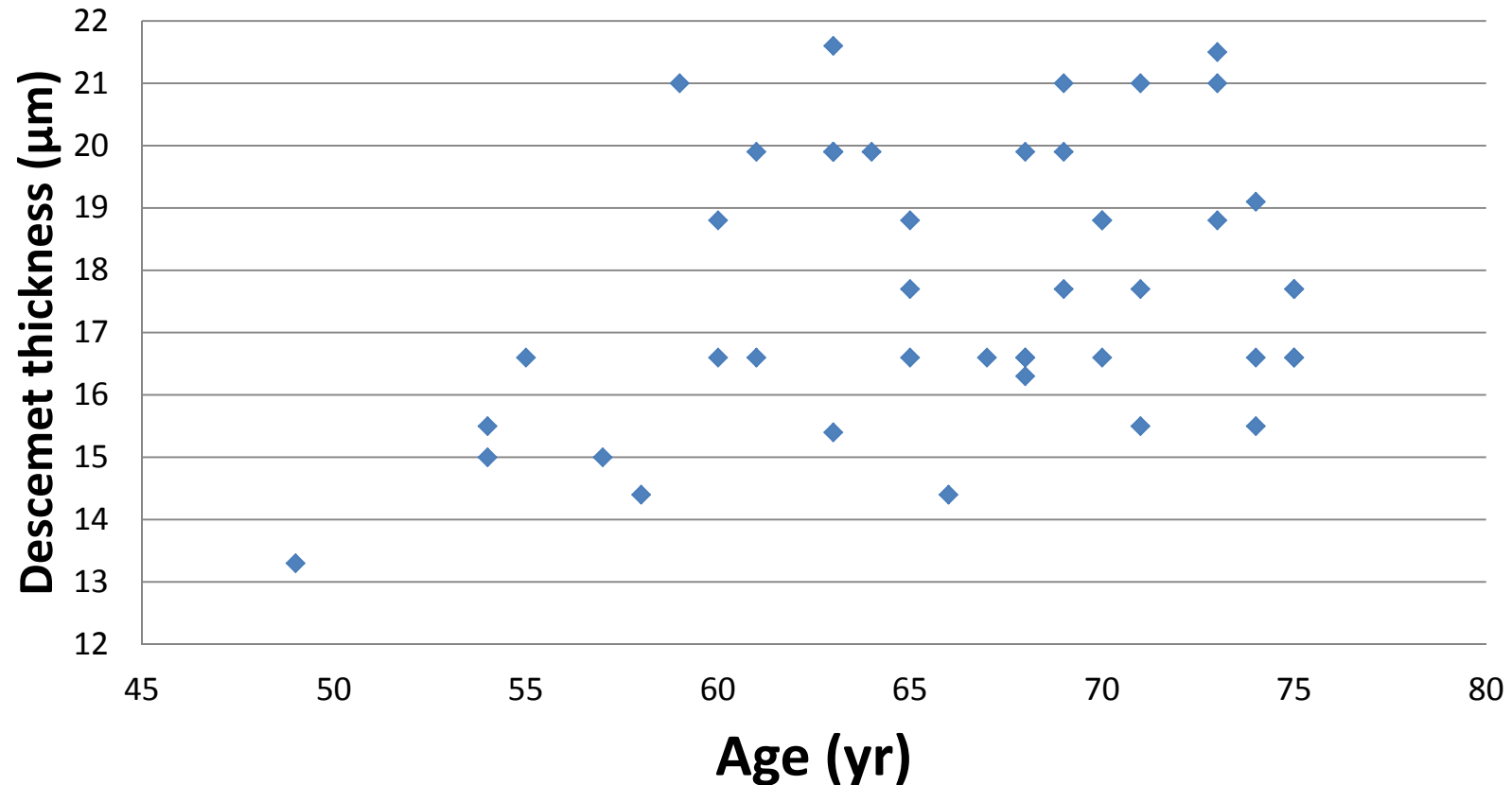
- Standard DMEK protocol utilized by three separate surgeons (Yoeruek tap³)
- Graft unfold time measured from first tap until the graft is totally opened and ready for final positioning with a bubble



Courtesy Michael Straiko, MD

3. Yoeruek E, Bayyoud T, Hofmann J, and Bartz-Schmidt K. Novel Maneuver Facilitating Descemet Membrane Unfolding in the Anterior Chamber. *Cornea* 2013; 32: 370-373.

Descemet Thickness vs. Age

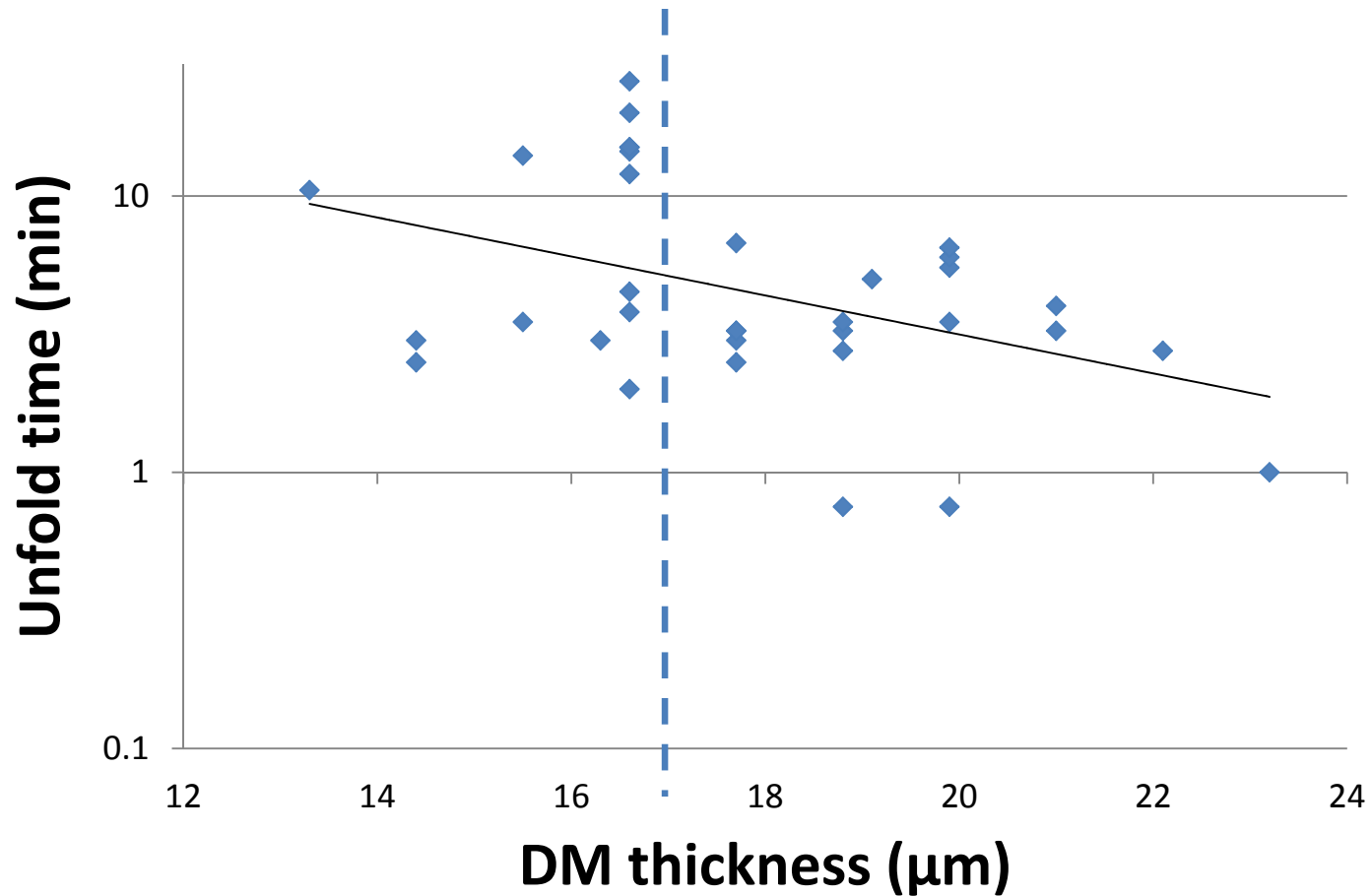


Age: average 66.3 ± 6.5 (range 54-75) yr

DM thickness: average 18.0 ± 2.3 μm

Pearson correlation: $r = 0.2825$, p -value = 0.054 (marginally significant)

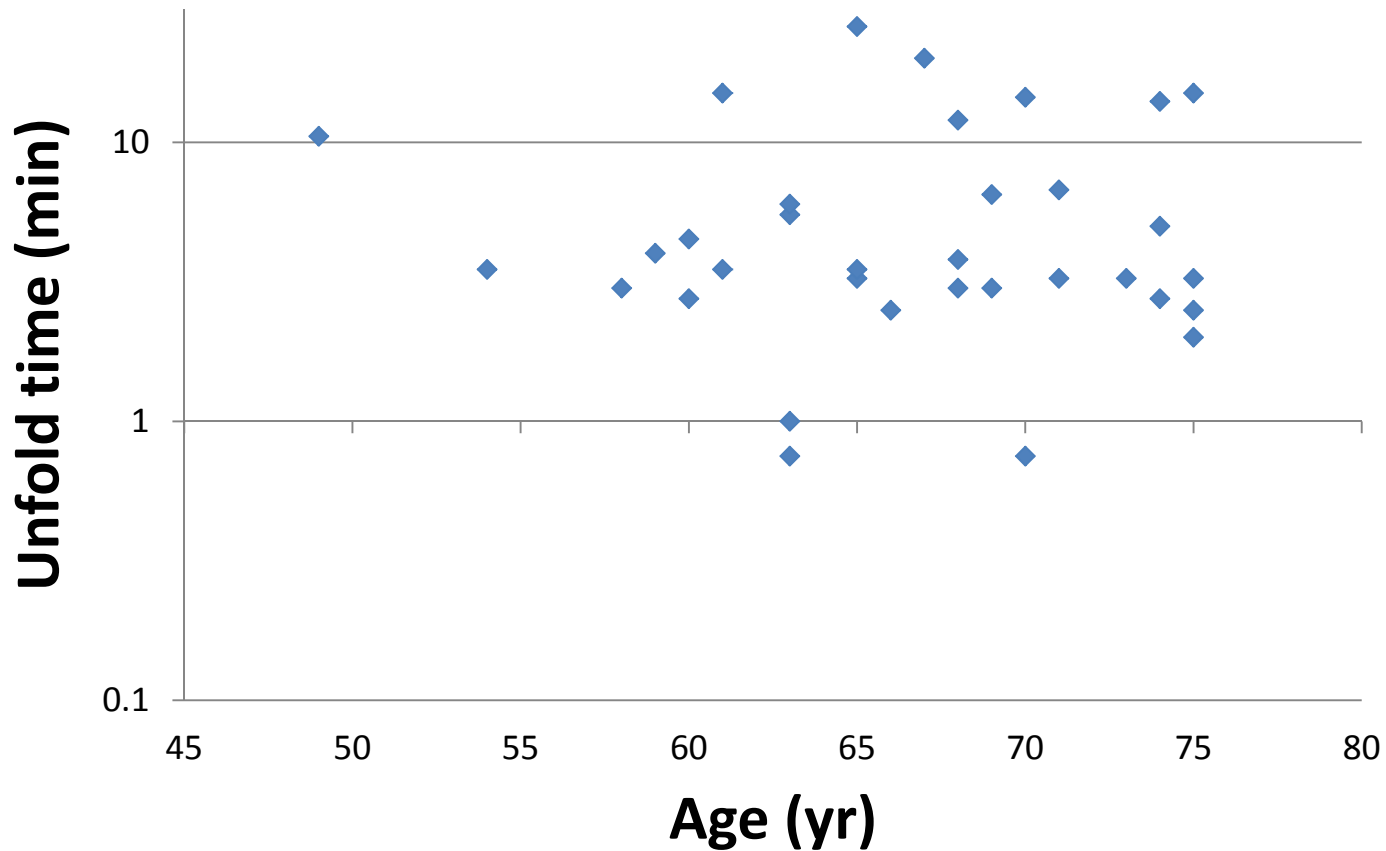
Descemet Thickness vs. Unfold Time



Pearson's correlation $r = -0.42$, p -value 0.013 (significant)

*Logarithmic (log) transform was performed on variable "unfold time" to meet the data normality assumption of parametric statistical tests.

Age vs. Unfold Time



Pearson correlation $r = -0.0137$, p-value 0.94 (non-significant)

*Logarithmic transform was performed on variable “unfold time” to meet the data normality assumption of parametric statistical tests.

Conclusion

- DM thickness could be measured with OCT.
- Marginal statistically significant correlation was detected between age and DM thickness in our study.
- Thicker grafts unfolded faster during DMEK .

Conclusion

- Age information by itself may not be sufficient in donor cornea selection.
- OCT DM thickness measurements may aid the surgeon with more predictable DMEK surgery.

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