An Analysis of Tissue Loss Due to Descemet Membrane Endothelial Keratoplasty Preparation in an Eye Bank

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Scientific Symposium

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Introduction

- Descemet Membrane Endothelial Keratoplasty (DMEK) surgeries are increasing in frequency
  - 344 DMEK cases in 2011*
  - 748 DMEK cases in 2012*
- Demand for pre-stripped DMEK tissue is growing for LVG
  - 113 total in 2012, 82 in first 5 months of 2013
- Our initial concerns surrounded the amount of tissue wastage and an eye bank's ability to handle the tissue loss reported in literature[1-3]

*2012 EBAA Statistical Report

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Purpose

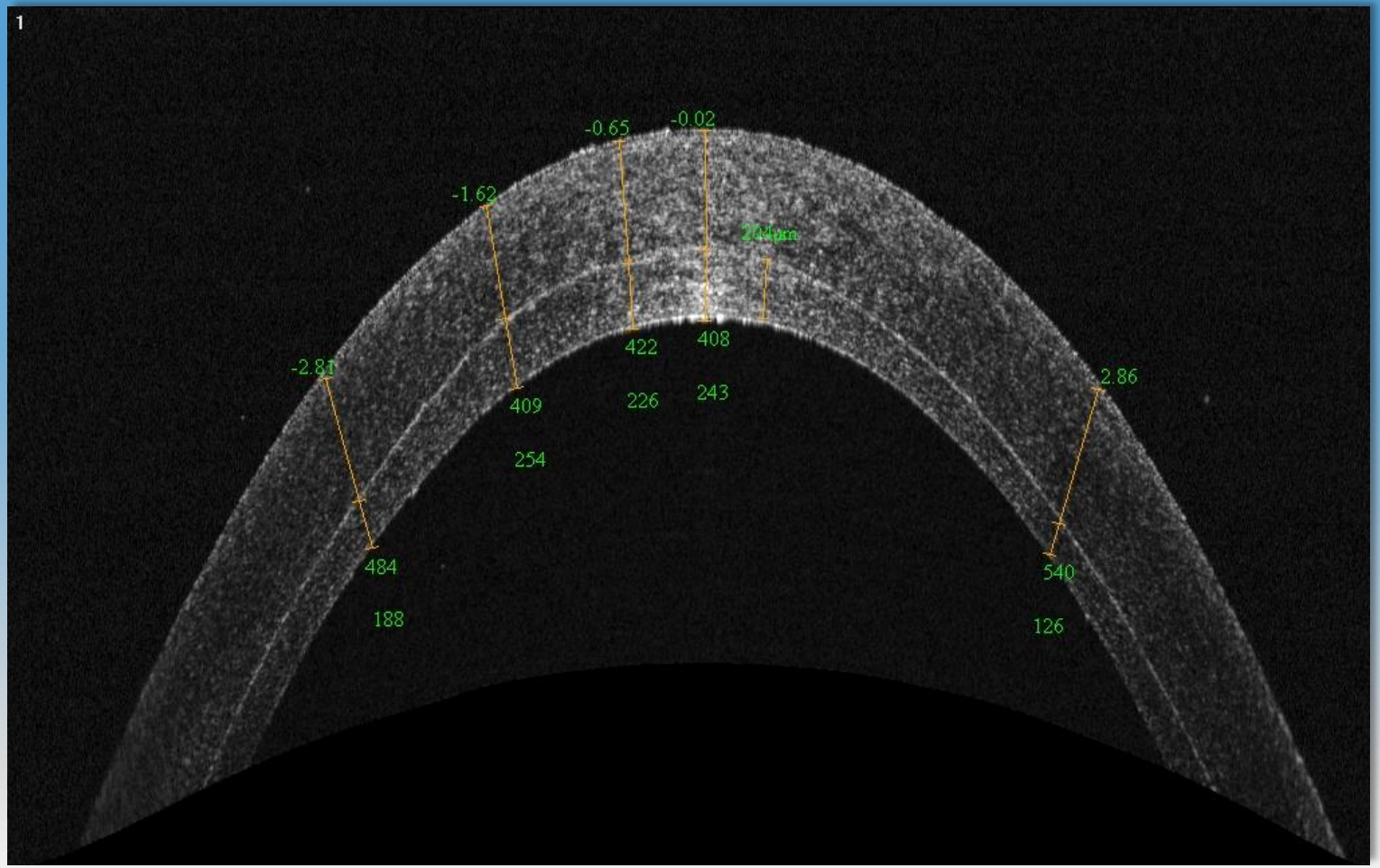
- To determine the real impact of a DMEK program on the pool of available donor tissue in one eye bank

- Is our DMEK program really wasting tissue?

Methods

- A retrospective analysis of all preparation attempts
- Success rate was broken down into three categories:
  - Tissue suitable for any use at time of preparation
  - Tissue suitable for DMEK only at time of preparation
  - Overall success rate

Is this suitable for transplant?



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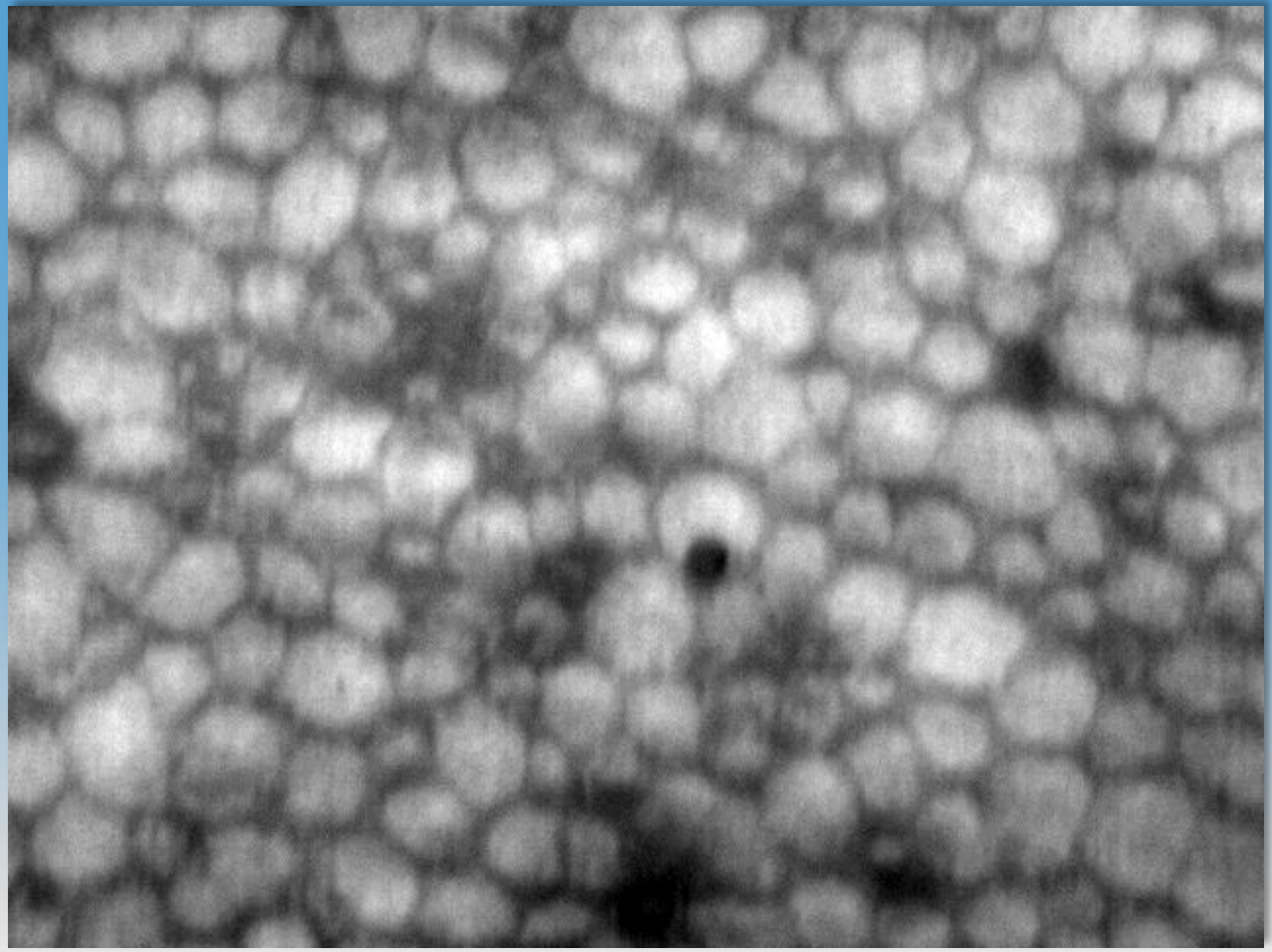
Is this suitable for transplant?



ECD = 2639

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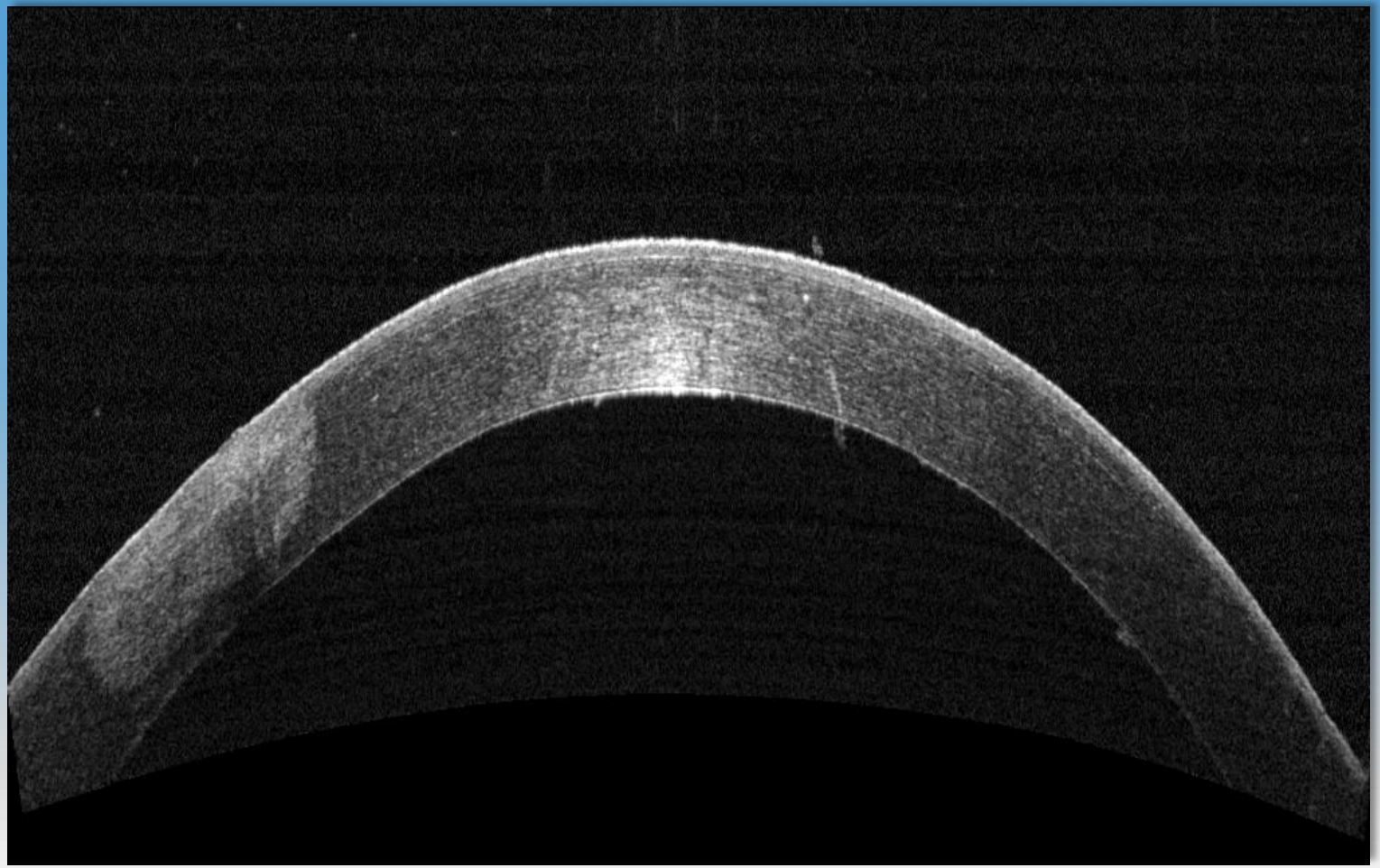
Is this suitable for transplant?



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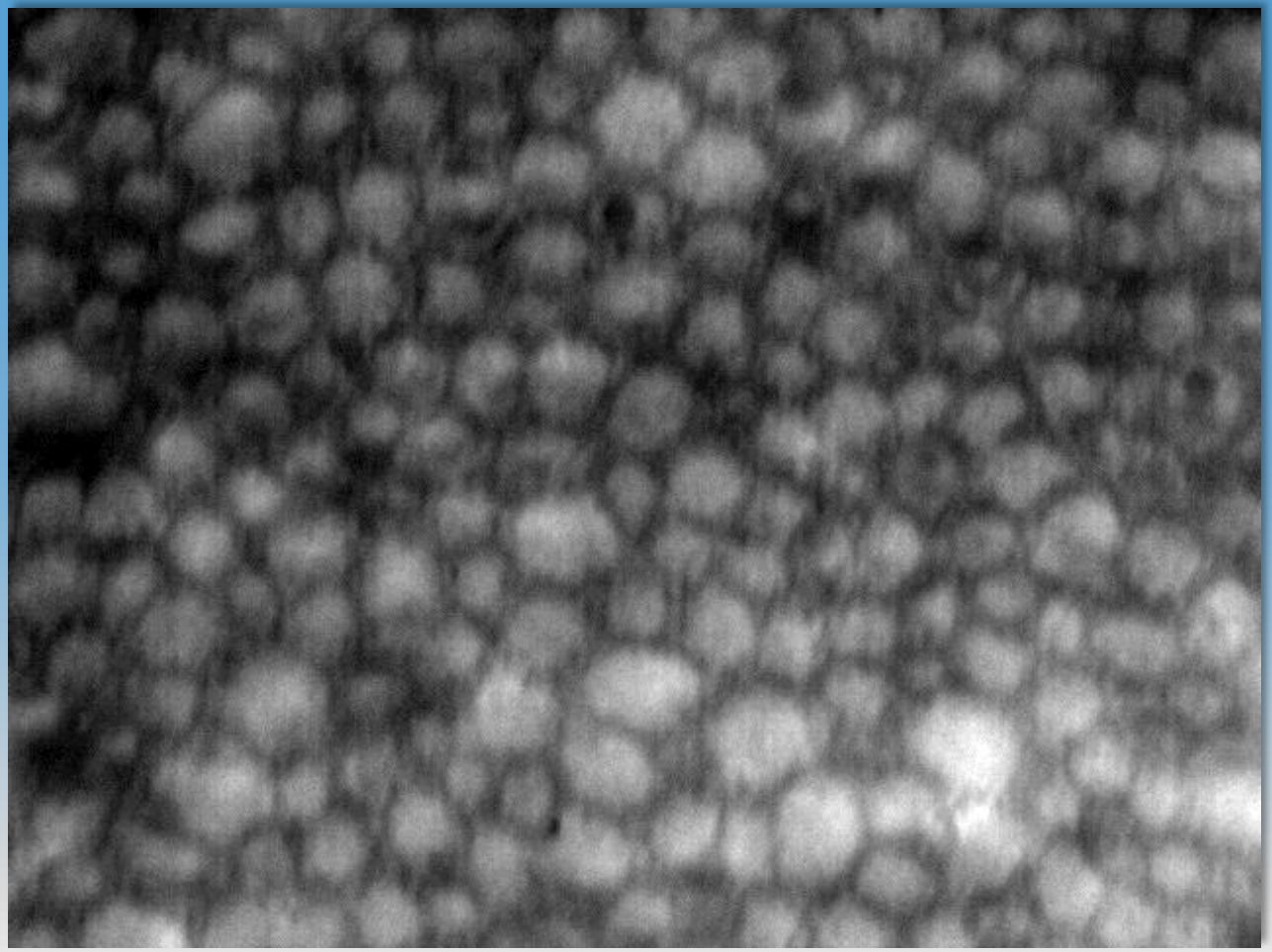
Is this suitable for transplant?



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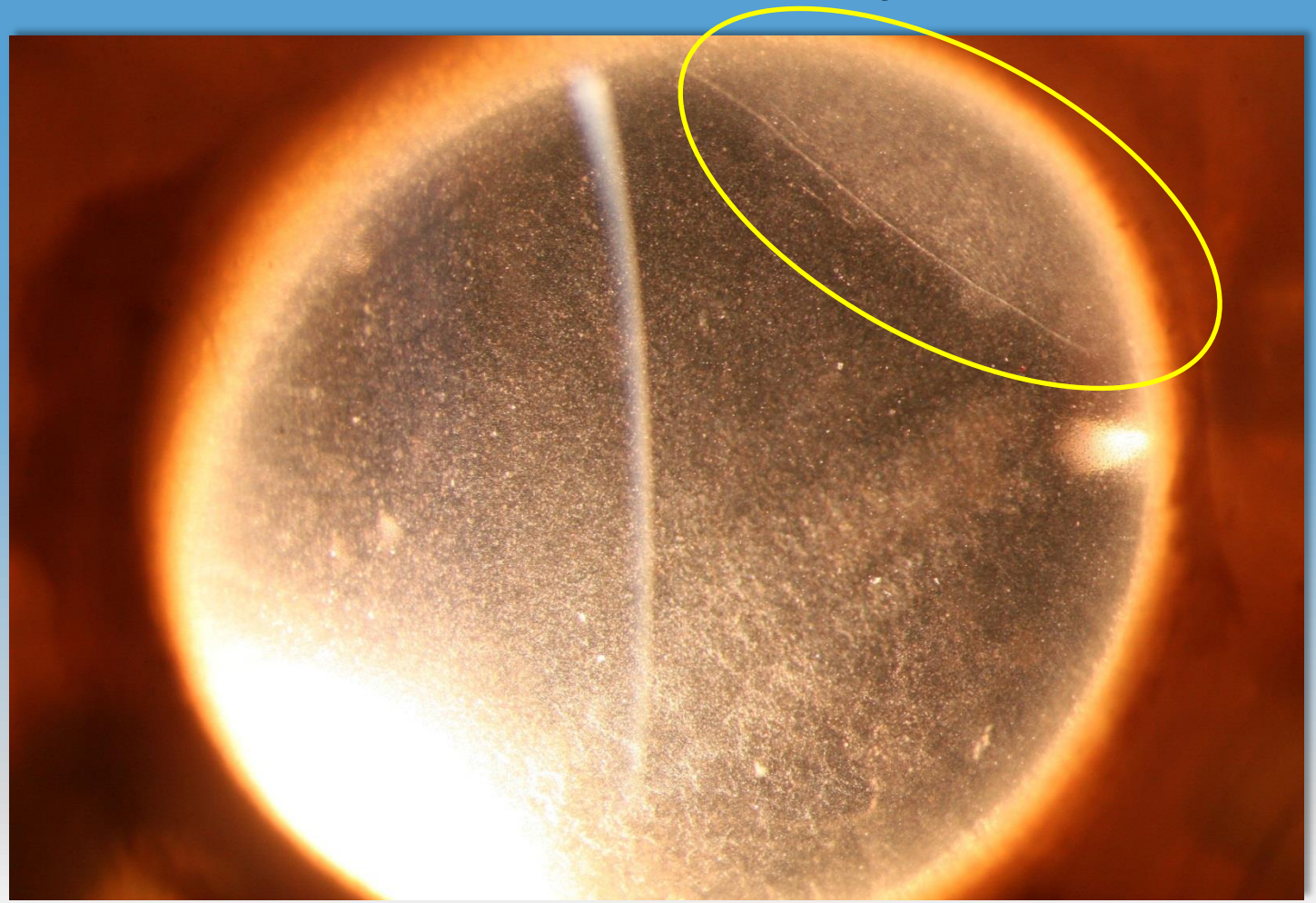
Defects in Descemet Membrane… Suitable for Transplant?



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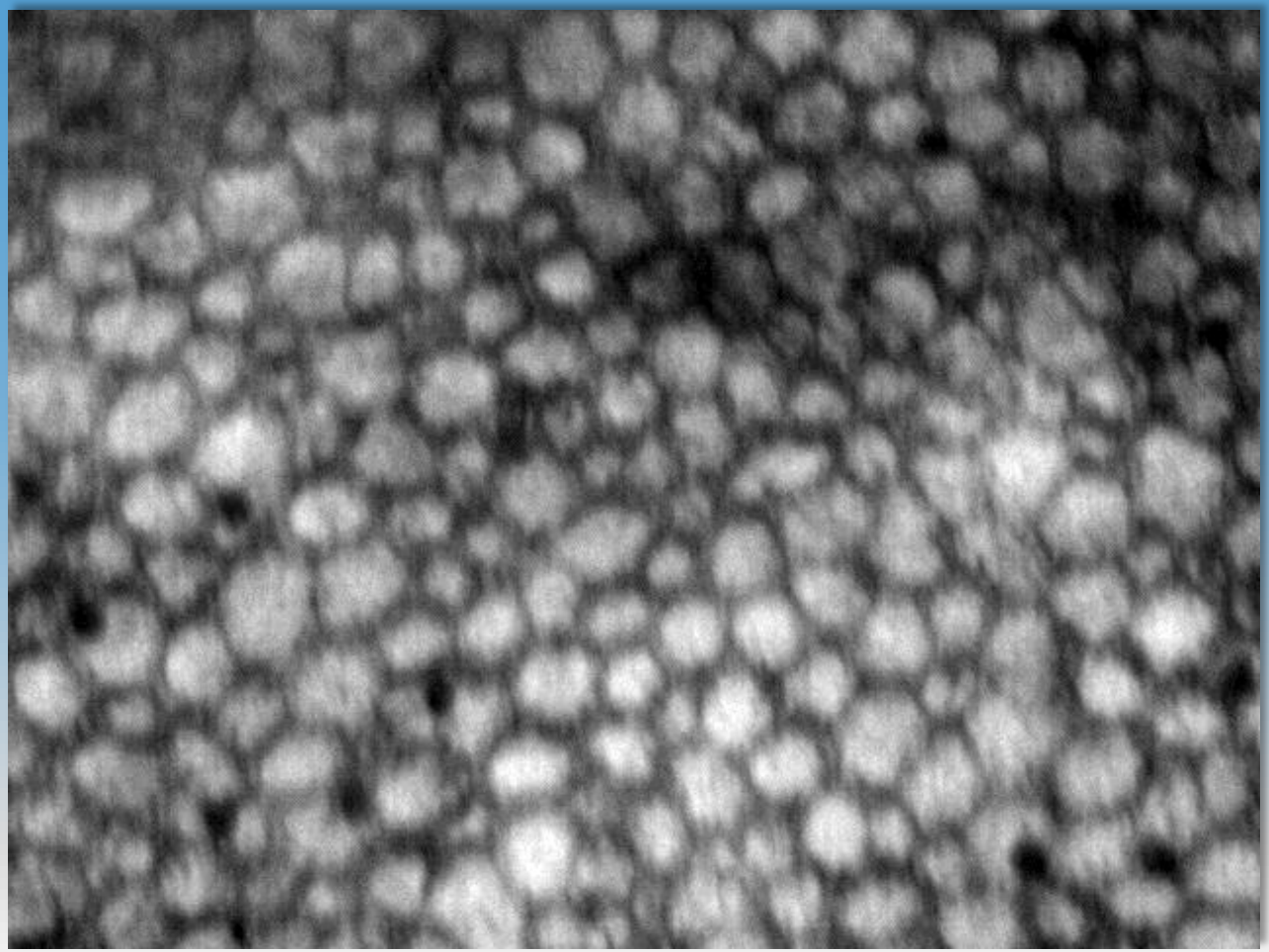
Suitable for Transplant?



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Results

- Success rate for tissue suitable for any use at time of preparation: 132/137 (96.3%)
- Success with tissue suitable for DMEK only at time of preparation: 5/6 (83.3%)
- Combined success rate for total DMEK program: 137/143 (95.8%)

- Guerra, *et al.* reported 136 successful DMEK preparations in first 142 cases (95.8%)[2] in 2011

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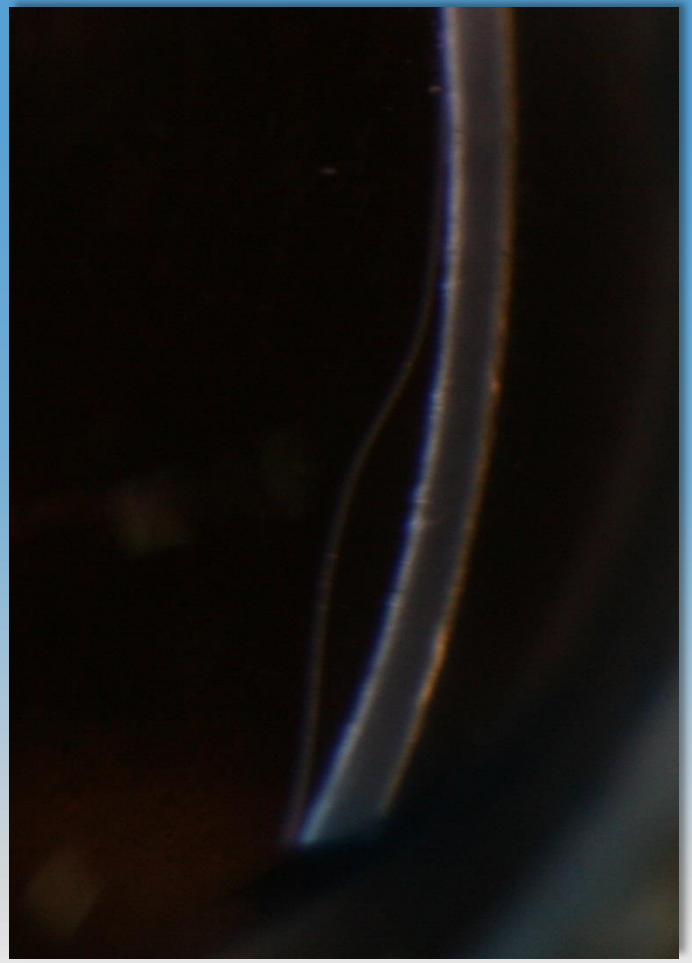
Results

- Tissue suitable for DMEK only at time of preparation fell into these categories:
  - Graft irregularities & unsuitable graft thicknesses post cut (3)
  - Conductive Keratoplasty (1)
  - DM detachment induced at time of recovery (1)
  - Deep stromal scar/probable old ulcer (1)



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Results

Tissues suitable for DMEK only		
Tissue	Reason suitable for DMEK only	DMEK preparation outcome
1473.CNOS	Irregular graft	Success
0166.CNOD	Graft thickness >200µ	Success
0358.CNOS	Irregular graft	Success
0169.CNOS	Conductive Keratoplasty	Success
0372.CNOS	DM Detachment	Success
0035.CNOD	Well healed ulcer	Failure*

*failure due to inability to evaluate endothelium under area of scarring

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Discussion

- Take a look at our numbers again…
  - Overall reported success rate: 137/143
  - 132/137 means we lost five corneas that otherwise might have been transplanted
  - 5/6 corneas suitable for DMEK only were rescued- adding five corneas back into the donor pool

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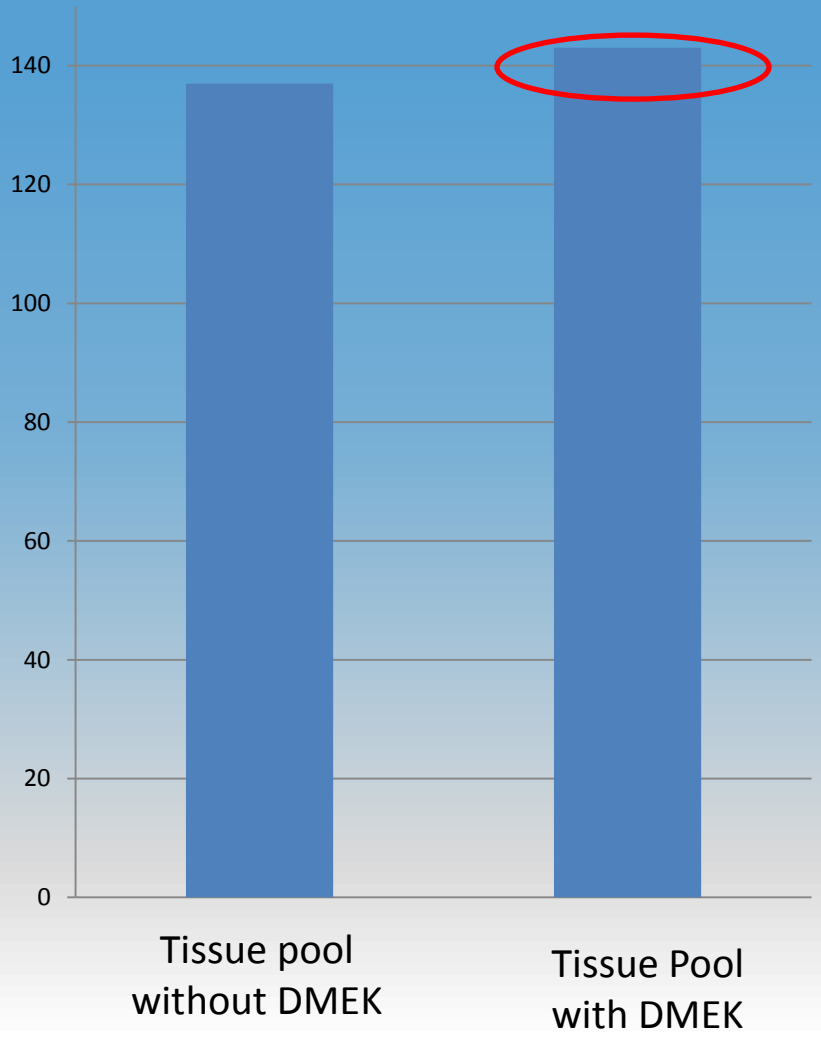
Conclusion

- In a high volume processing eye bank, DMEK can become a nearly waste-neutral procedure
- When evaluating tissue loss due to DMEK processing, it is important to consider tissue unsuitable for other uses can still be used for DMEK

Conclusion



- As DMEK grows, the relative percentage of these grafts that are suitable for only DMEK may diminish, but as stewards of a precious gift, it is still important to consider this.

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References

- [1]Zhu, Z., Rife, L., Yiu, S., *et al.* Technique for preparation of the corneal endothelium-Descemet membrane complex for transplantation. Cornea. 2006;25:705-8.
- [2]Guerra, FP, Anshu, A., Price, MO, *et al.* Descemet's Membrane Endothelial Keratoplasty: Prospective Study of 1-Year Visual Outcomes, Graft Survival, and Endothelial Cell Loss. Ophthalmology. 2011;118:2368-73.
- [4]Kruse FE, Loaser K, Cursiefen C, *et al*. A stepwise approach to donor preparation and insertion increases safety and outcome of descemet membrane endothelial keratoplasty. Cornea. 2011;30:580–587.

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Thank You

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