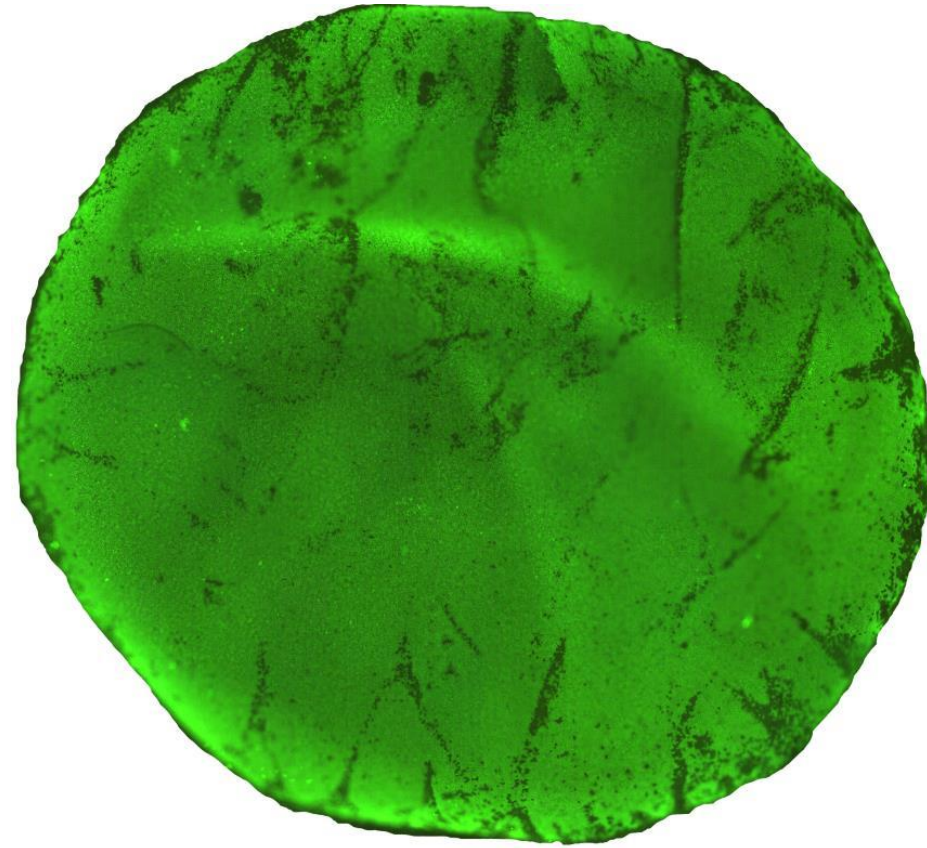


Eye Bank Pre-Stripping of DMEK Grafts: Pre-op Cell Loss and Technician Suitability Ratings

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Disclosures

C. Stoeger, Z. Mayko, J. Galloway, J. Holiman:

- Employed by Lions VisionGift (LVG). LVG is a 501(c)3 non-profit that is reimbursed processing fees for preparing corneal tissue for DMEK and other surgical procedures.
- Non-relevant disclosures M. Terry:
 - Bausch and Lomb (instruments for DLEK and DSAEK)

Background – DMEK Preparation

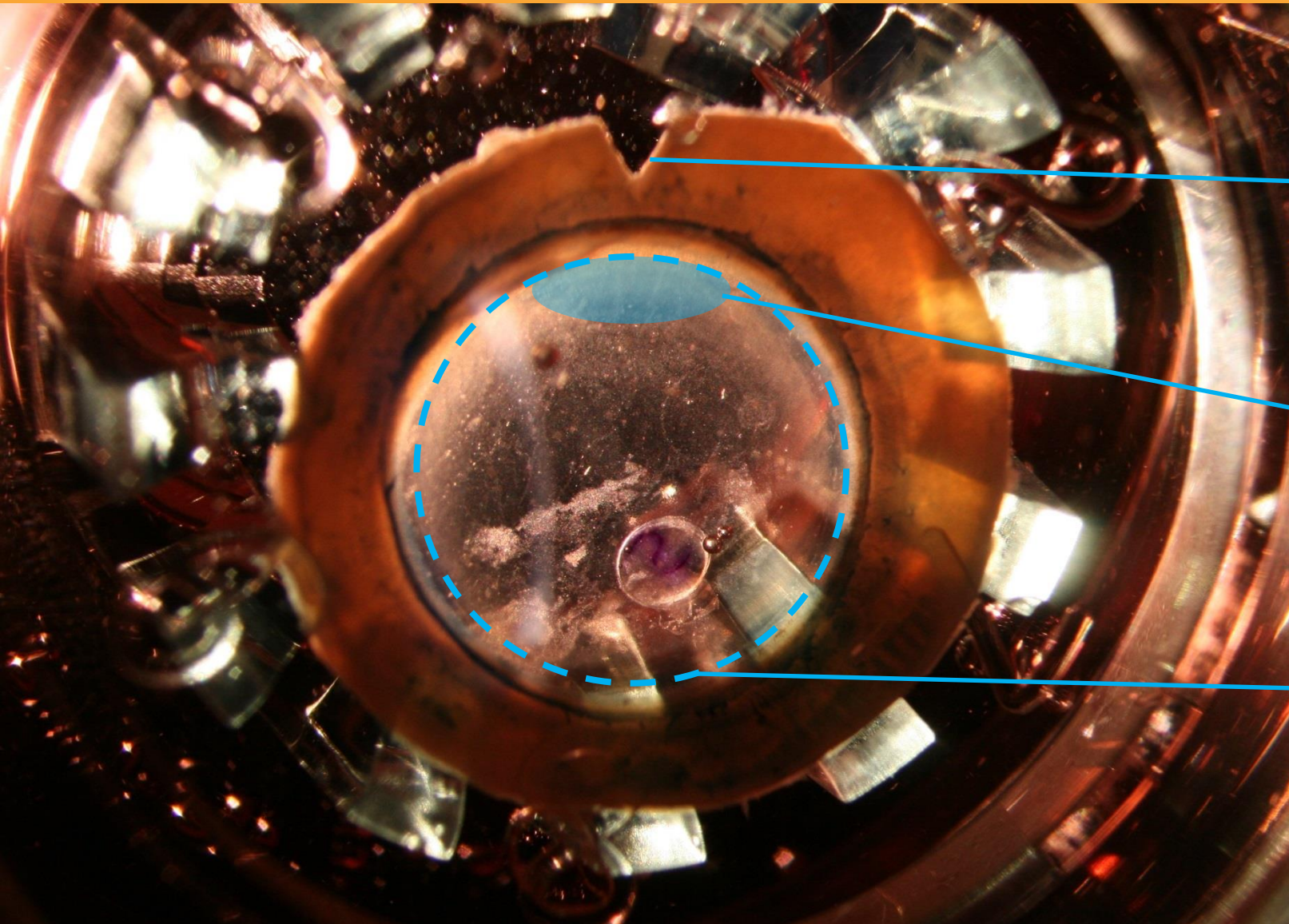
- Eye bank DMEK tissue processing in the US was relatively novel when we provided our first DMEK graft in 2011
- We developed a technique that left the tissue attached at a hinge in order to evaluate it post-preparation

EBAA Requirements for DMEK evaluation

Matrix I:

Post-Processing Tissue Evaluation Matrix			
Processing Type	Slit Lamp Biomicroscopy	Specular Microscopy	Pachymetry
PKP	X	X	
DSAEK	X	X	X
DSEK	X	X	X
DMAEK	X	X	
DMEK	X	X	
ALK	X		X
Long-term preservation			

How Pre-Stripped DMEK Tissue is Supplied

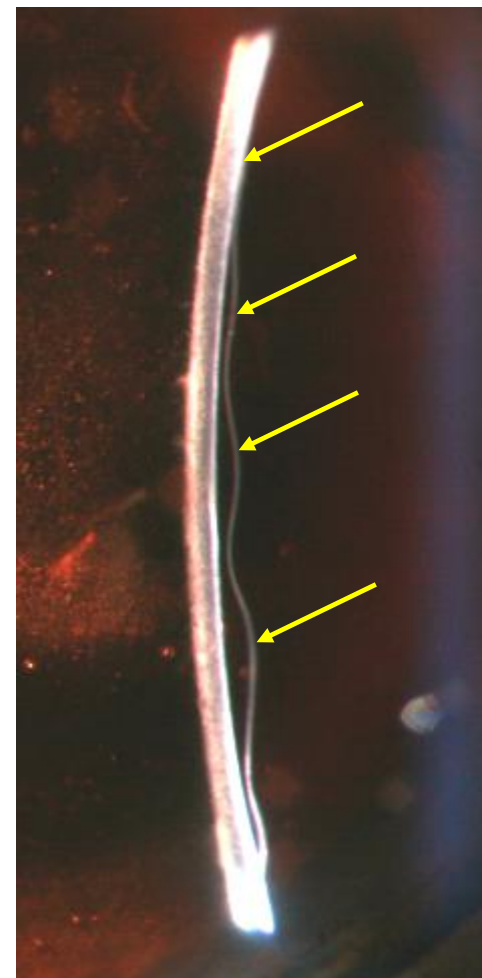
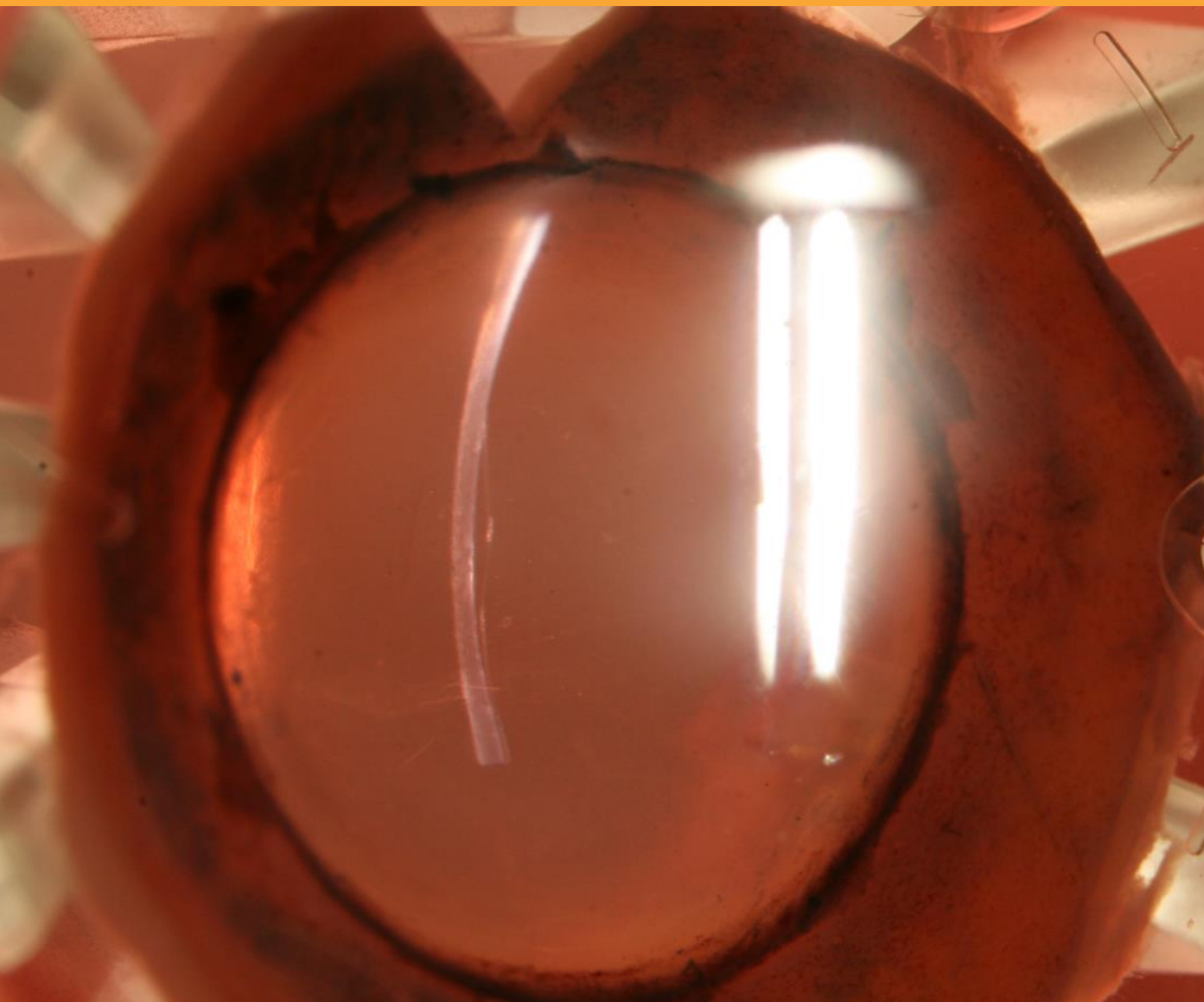


Scleral notch indicates hinge location

Shaded area indicates zone of attachment

The scored line indicates the area of free DM which creates a surgical trephination zone

Challenges to Tissue Evaluation



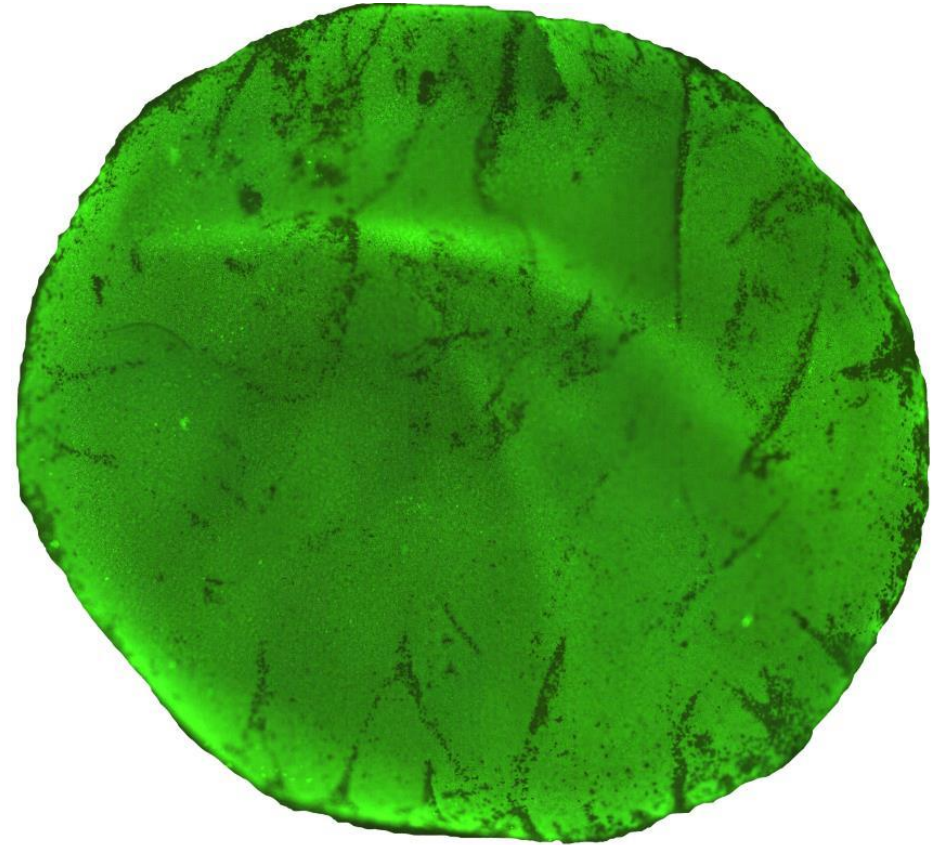
Purpose: A Laboratory Validation of DMEK Prepared Graft Evaluation

To determine the percentage cell loss from pre-stripping DMEK tissue and the validity of technician clearance of tissue for DMEK transplantation.

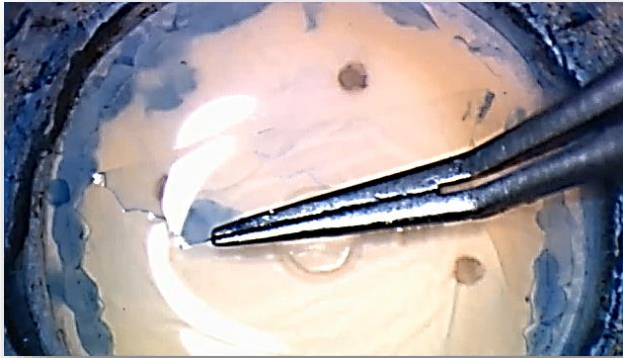
**Can eye bank technicians
adequately rate DMEK
prepared grafts?**

Methods

- $<25\%$ cell loss was established for “pass”
- 10 corneas were prepared for DMEK using a peeling method
- Technician slit lamp rating of “pass” or “no pass” given
- Corneas were stained and analyzed with FIJI trainable segmentation to objectively determine the % cell loss (Jardine, *et al*)
- Compared tech rating versus established objective rating criteria



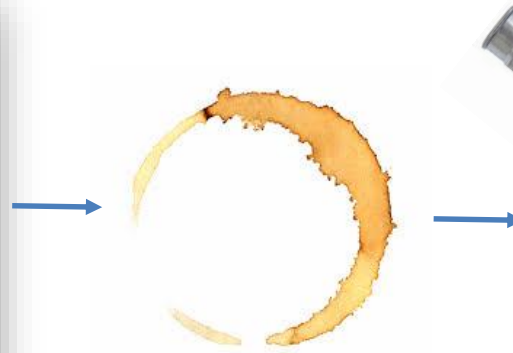
Staining and Imaging



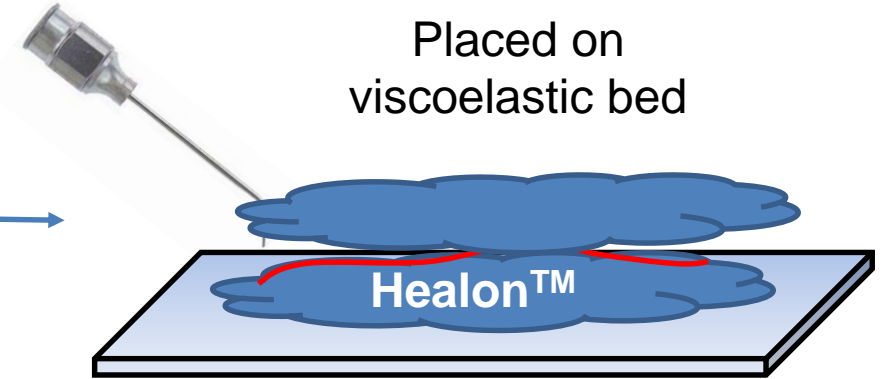
10 Corneas prepared
with peeling method



Technician slit
lamp eval



Tissue Stained
with CAM

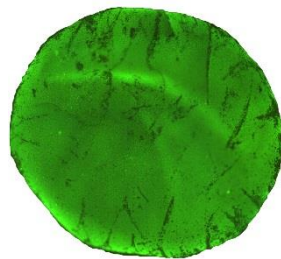


Placed on
viscoelastic bed

Healon™



Imaged at 40X



15-20 images
stitched into
montage

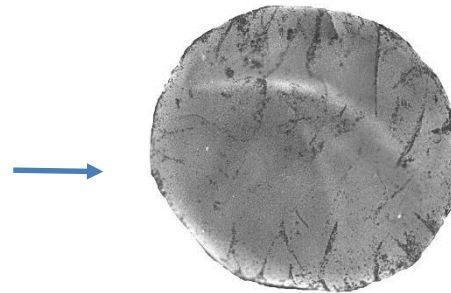
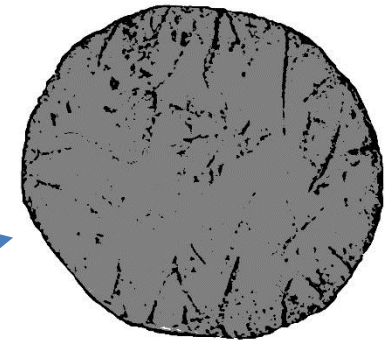


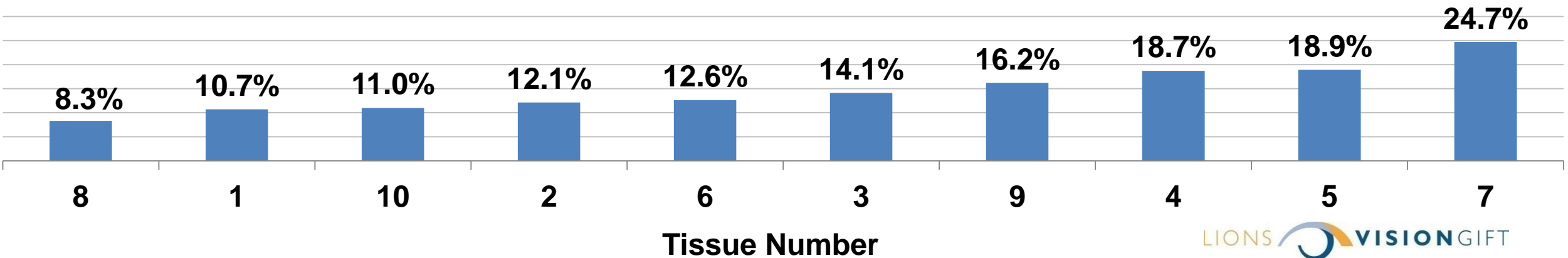
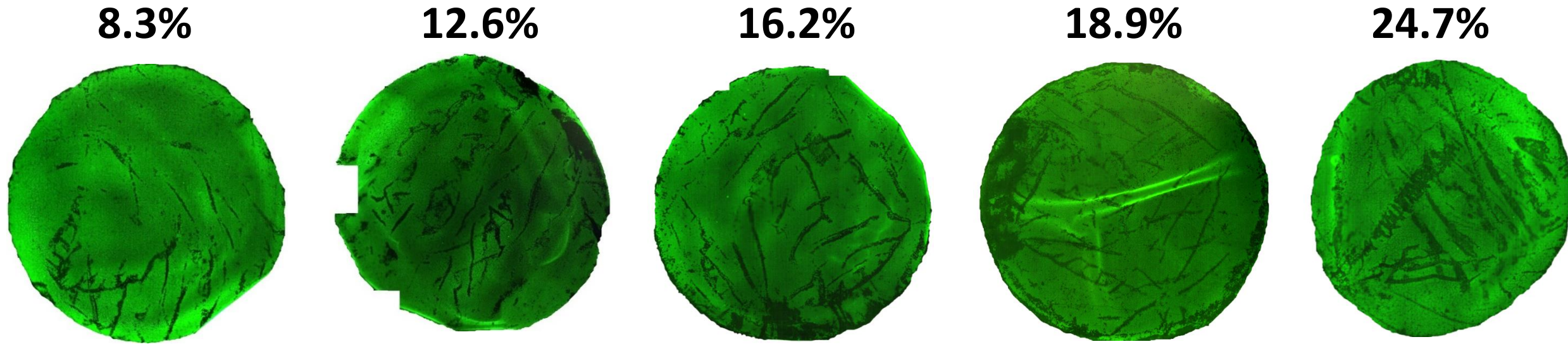
Image to
grayscale



Segmented
binary image

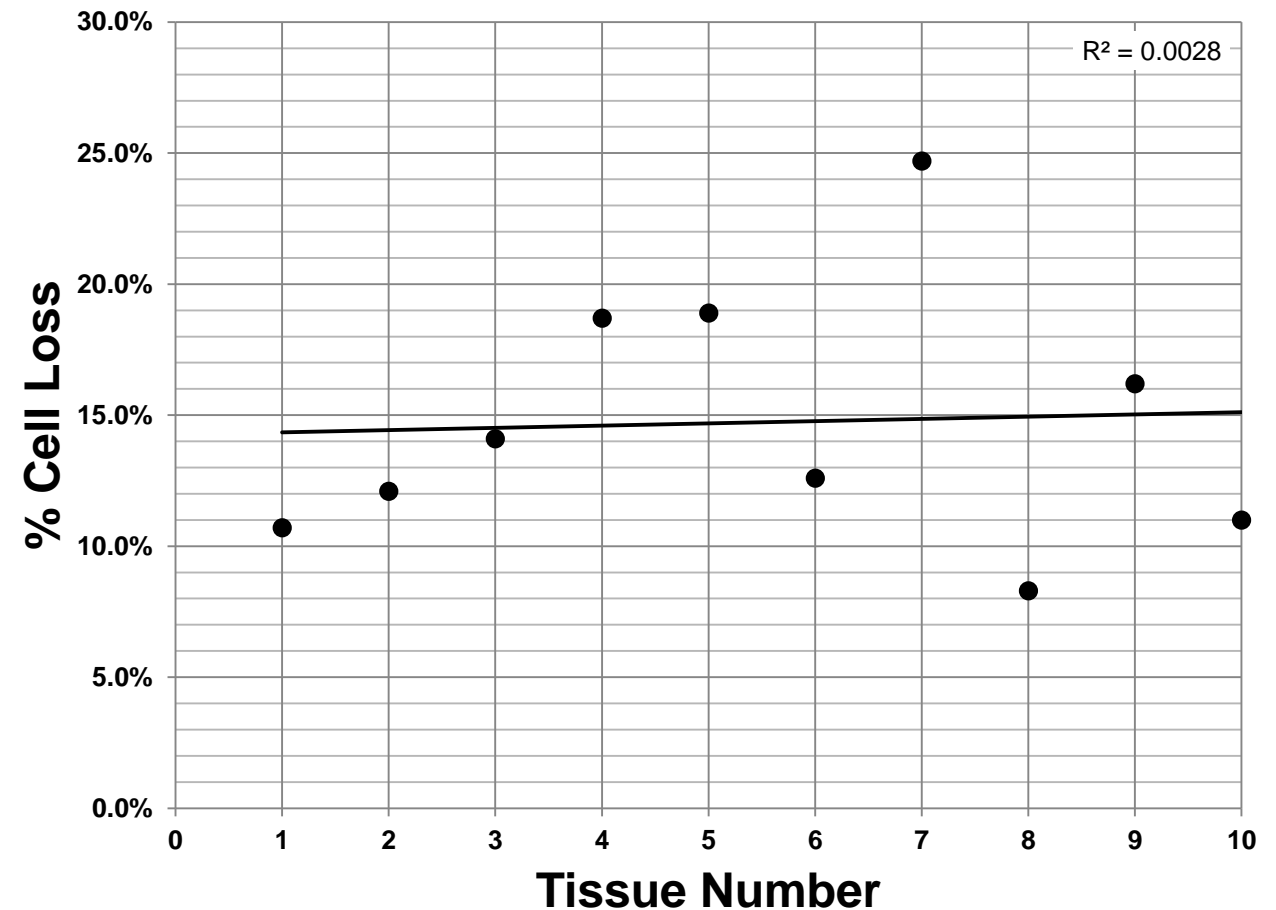
12.1%

Percent Cell Loss



Results of Technician Evaluations

Tissue #	Tech Rating	% Cell Loss	<25%
1	Pass	10.7%	Yes
2	Pass	12.1%	Yes
3	Pass	14.1%	Yes
4	Pass	18.7%	Yes
5	Pass	18.9%	Yes
6	Pass	12.6%	Yes
7	Pass	24.7%	Yes
8	Pass	8.3%	Yes
9	Pass	16.2%	Yes
10	Pass	11.0%	Yes

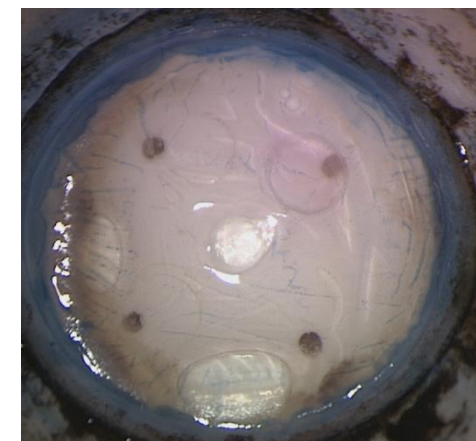


Conclusion

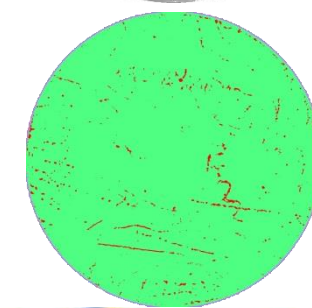
We have demonstrated in this small series that technicians can evaluate eye bank prepared DMEK grafts as validated by calcein AM vital dye staining.

Limitations

- 25% cell loss was determined using clinical judgment, but the true cut-off for suitability determination is not known.
- All our tissue “passed” based on 25% cell loss criteria. Inclusion of samples with known trauma but masked to the technician is the subject of additional internal studies.
- How much cell loss is from the trauma of peeling versus the trauma of tissue transfer?



1.97%



Thank you!



Questions?