



Endothelial Keratoplasty: the relationship between preoperative endothelial cell density and the five-year postoperative endothelial cell loss.

Authors: Asem A. Alqudah, M.D, FRCS. ¹, Zachary M. Mayko, M.S. ², Michael D. Straiko, M.D. ³, and Mark A. Terry, M.D.³.

1. Faculty of Medicine, Jordan University of Science and Technology (JUST), Jordan, 2. Lions VisionGift, Portland, OR, United States., 3. Devers Eye Institute, Legacy Research Institute, Legacy Health ,Portland, OR, United States.

Introduction

To determine if the preoperative central Endothelial Cell Density (ECD) in triple and non-triple DSAEK procedures has a relationship with the five-year postoperative Endothelial Cell Density (ECD) or percent loss (ECL).

Methods

We identified a consecutive series of 206 DSAEK transplant patients who had specular images taken at 5 years post surgery. All patients were treated for Fuchs and had no co morbidities that would affect the endothelium. DSAEK cases were stratified into two cohorts: Those taking part in a 'triple' procedure and those not taking part in a triple (non-triple). Endothelial cell counts post op were used to evaluate endothelial cell loss by comparison to endothelial cell counts measured before graft preparation.

Figure 1. Specular microscopy showing ECD before preparation and at 5 years

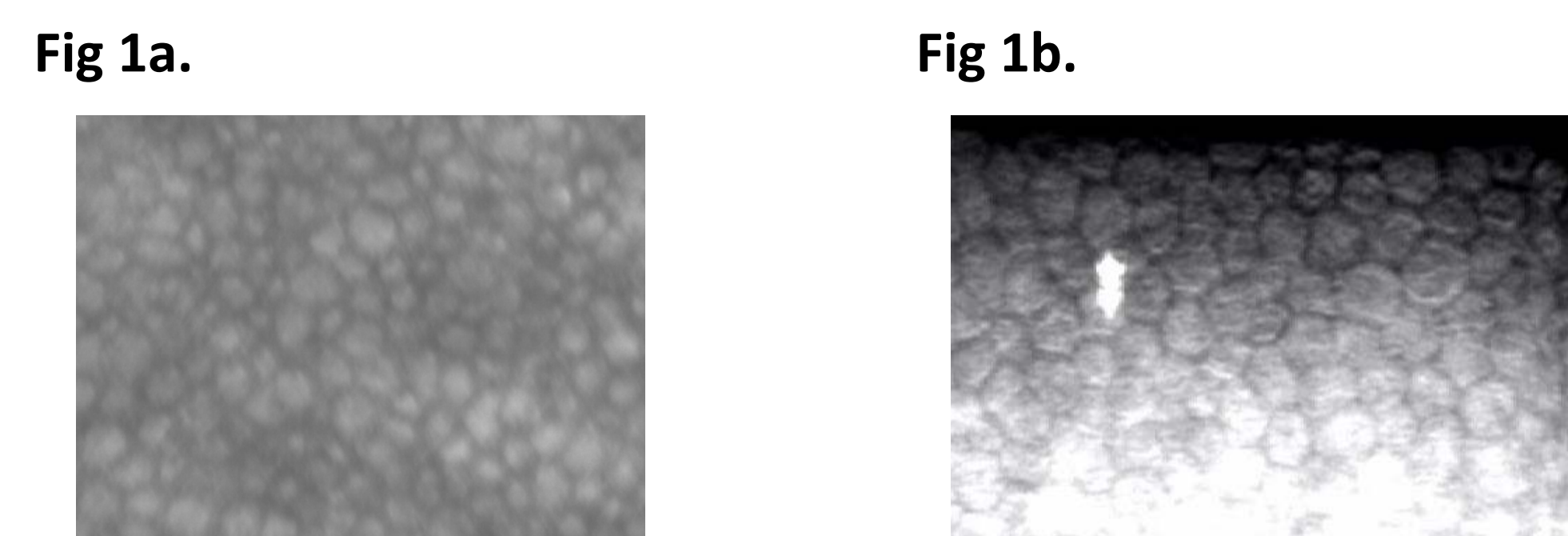


Figure 1a is a specular image of a healthy endothelium before DSAEK preparation taken in the eye bank. Figure 1b is a specular image of the same graft taken in the clinic 5 years after transplant.

Financial Interest Disclosures - None

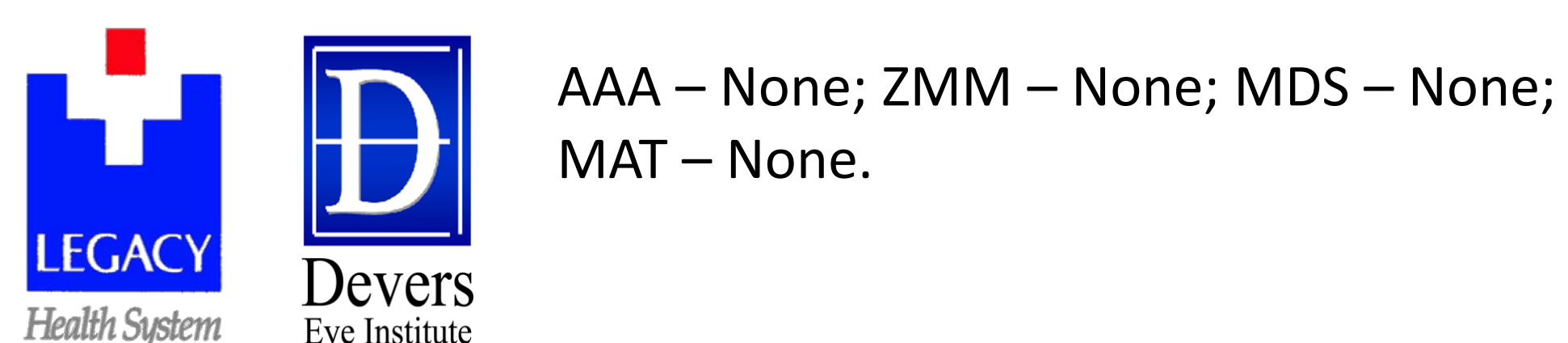


Figure 2. Relationship between preoperative ECD and 5 years ECD in the whole group

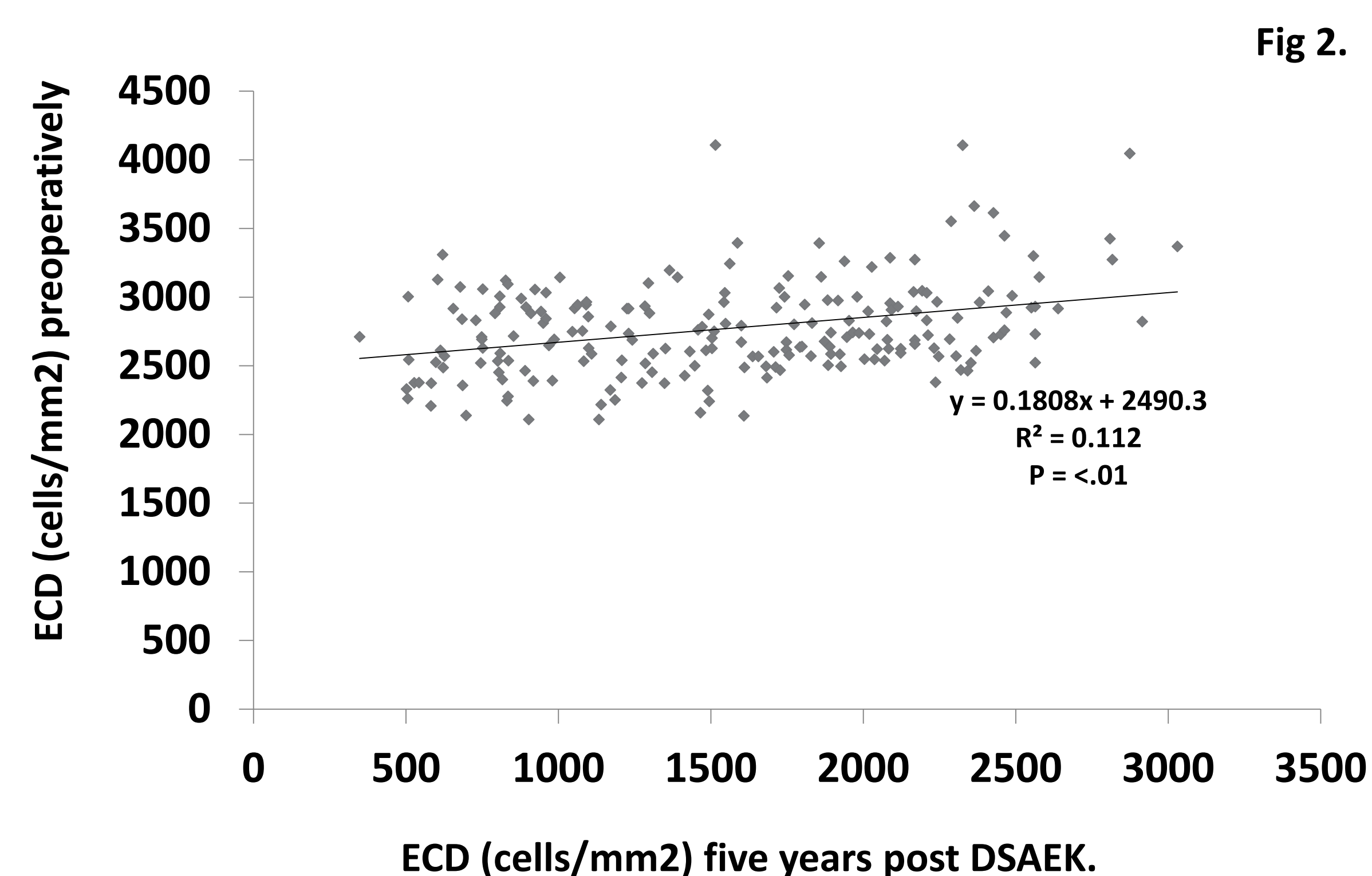


Figure 3. Relationship between preoperative ECD and 5 years ECD in non-triple and triple procedures

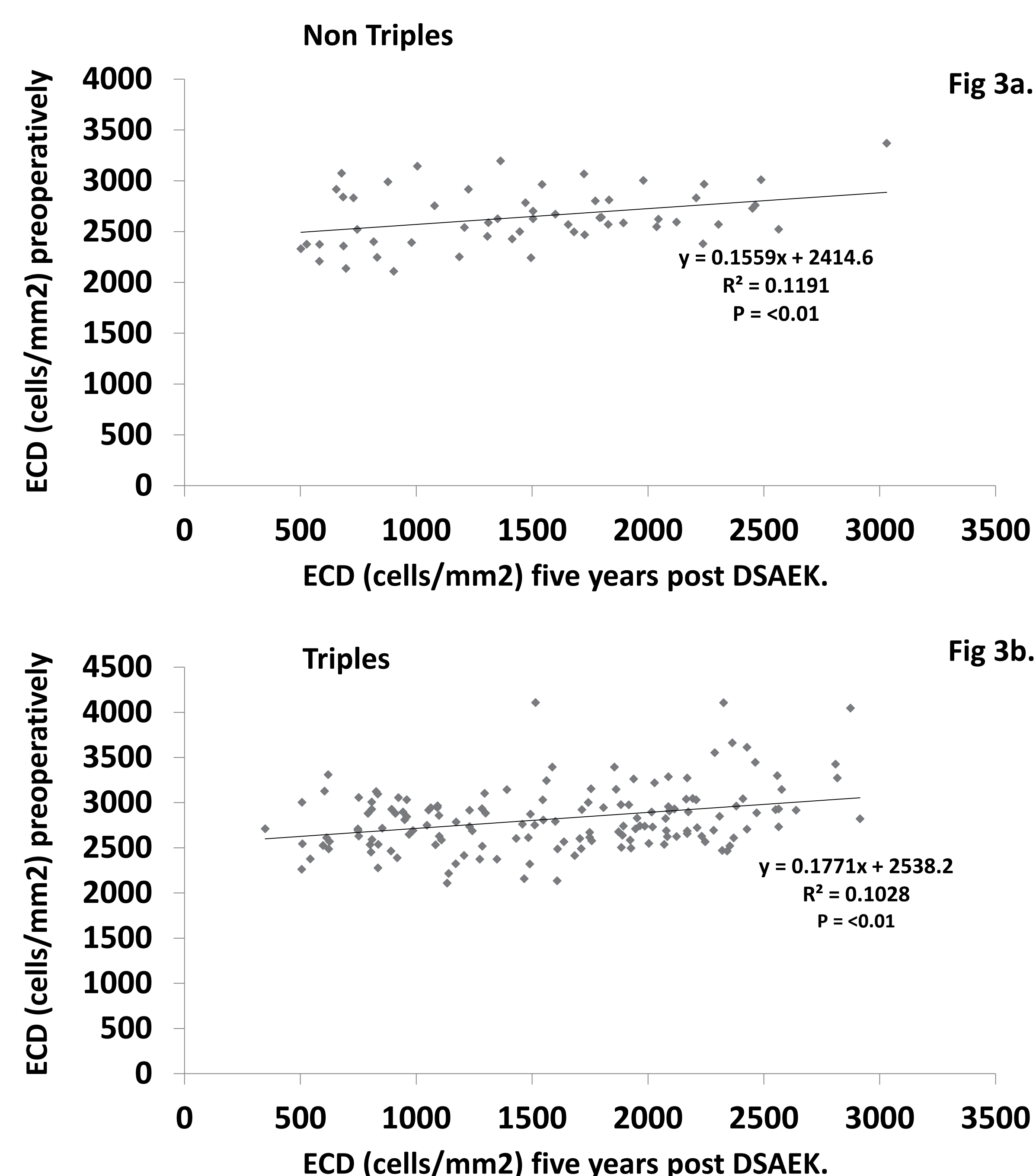
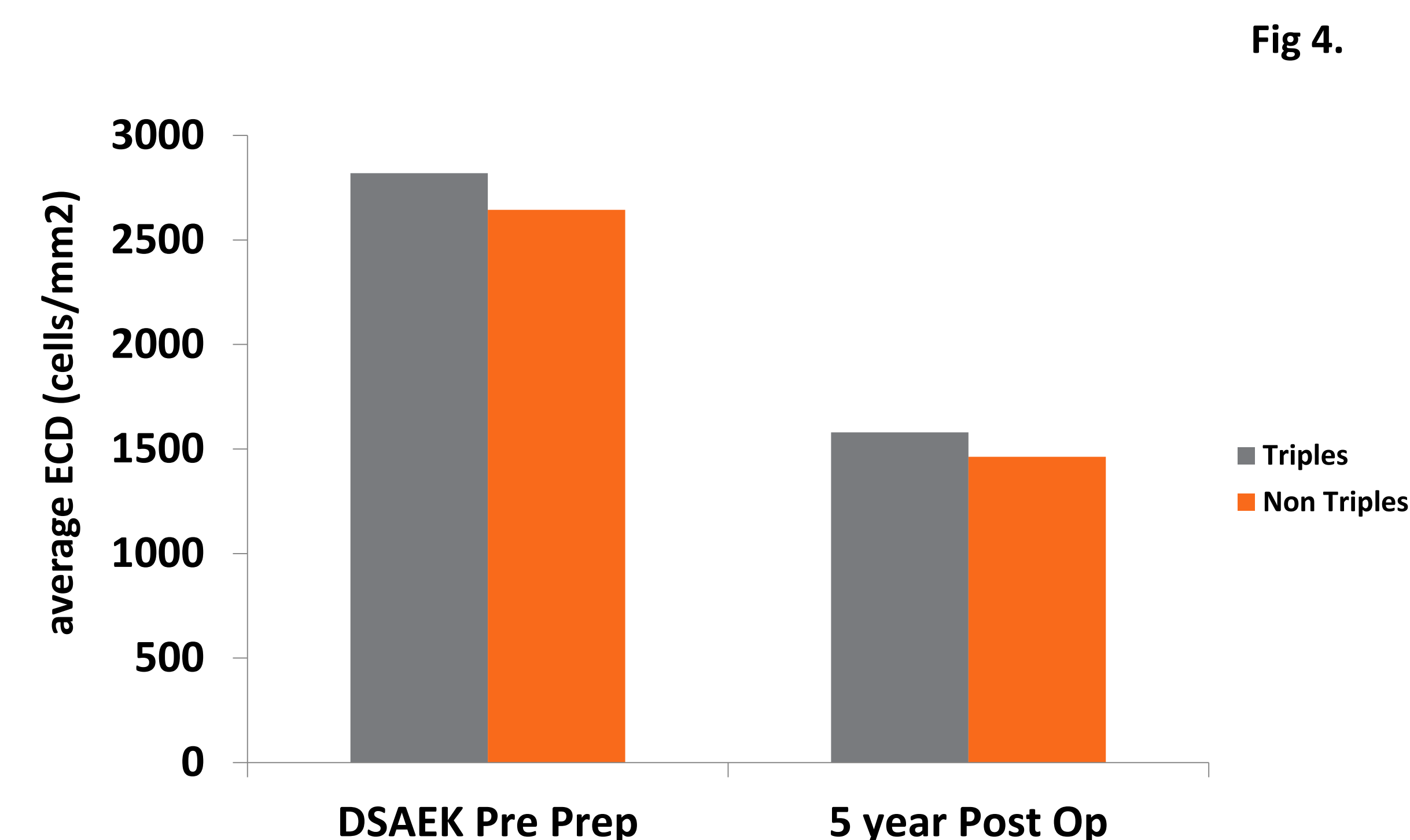


Figure 4. Average properative ECD and average 5 years post operative ECD in both triple and non triple procedures



Results

206 underwent DSAEK (triple and non-triple)

ECD at 5 years: 1556 ± 632

Percent ECL: 43.8

Relationship between preoperative ECD and 5 years postoperative ECD (p < 0.01)

150 eyes underwent Triple

ECD at 5 years: 1580 ± 638

Percent ECL at 5 Years: 43.6%

Relationship between preoperative ECD and 5 years postoperative ECD (p value = < 0.01)

56 eyes were non triple procedures

ECD at 5 Years: 1463 ± 620

Percent ECL at 5 Years: 44.7%

Relationship between preoperative ECD and 5 years postoperative ECD (p = < 0.01)

Percent endothelial cell loss was statistically significant between properative ECD and 5 years postoperative ECD for the whole group and the two subgroups.

Percent endothelial cell loss was *not statistically significant* between the two groups p = 0.75

Figure 3, Relationship between preoperative ECD and 5 years postoperative ECD in both non-triple (Fig 3a) and triple (Fig 3b) procedures.

Conclusion

In Descemet's stripping automated endothelial keratoplasty grafts, higher preoperative donor ECD was correlated with higher ECD at 5 year postoperatively but was unaffected by a concurrent triple procedure.

Clinical Significance

Preoperative ECD is routinely provided by eye banks to surgeons for DSAEK grafts, but the parameters of what is considered to be acceptable need to be better supported by evidence of a correlation with the medium- and long-term postoperative ECD.

In a previous study for DSAEK eyes, we did not find a significant correlation between the preoperative central Endothelial Cell Density (ECD) and the one-year postoperative (ECD). In this experience, we compared the preoperative ECD with the five-year postoperative ECD and found significant correlation between the two in both triple and non-triple procedures. We also found that postoperative ECD was unaffected by the concurrent triple procedure.

Whether this should affect our minimum preoperative ECD or not needs to be elaborated by further similar experiments.