

Comparison of Donor Insertion Device to Sheets Glide Technique in DSAEK: 3-Year Outcomes

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Financial Disclosure: Donald Tan and Jodhbir S Mehta, inventors of the EndoGlide, have financial interests in the device (AngioTech, Reading, Pennsylvania, USA/Network Medical Products, North Yorkshire, UK).

Introduction

- * Descemet's stripping automated endothelial keratoplasty (DSAEK) is progressively becoming the surgery of choice for endothelial diseases such as Fuchs' endothelial dystrophy and pseudophakic bullous keratopathy
- * Most studies suggest that the average endothelial cell (EC) loss is around 37% (25% - 54%) at 6 months; and 41% EC loss (24% - 61%) at 1 year.¹
- * Longer-term studies have suggested that the rate of this EC loss decreases after the initial period to plateau and stabilize up to 5 years after DSAEK.²

1. Lee WB, Jacobs DS, Musch DC, Kaufman SC, Reinhart WJ, Shtein RM. Descemet's stripping endothelial keratoplasty: safety and outcomes: a report by the American Academy of Ophthalmology. *Ophthalmology* 2009;116(9):1818-30.

2. Price MO, Fairchild KM, Price DA, Price FW, Jr. Descemet's stripping endothelial keratoplasty five-year graft survival and endothelial cell loss. *Ophthalmology* 2011;118(4):725-9.

Introduction

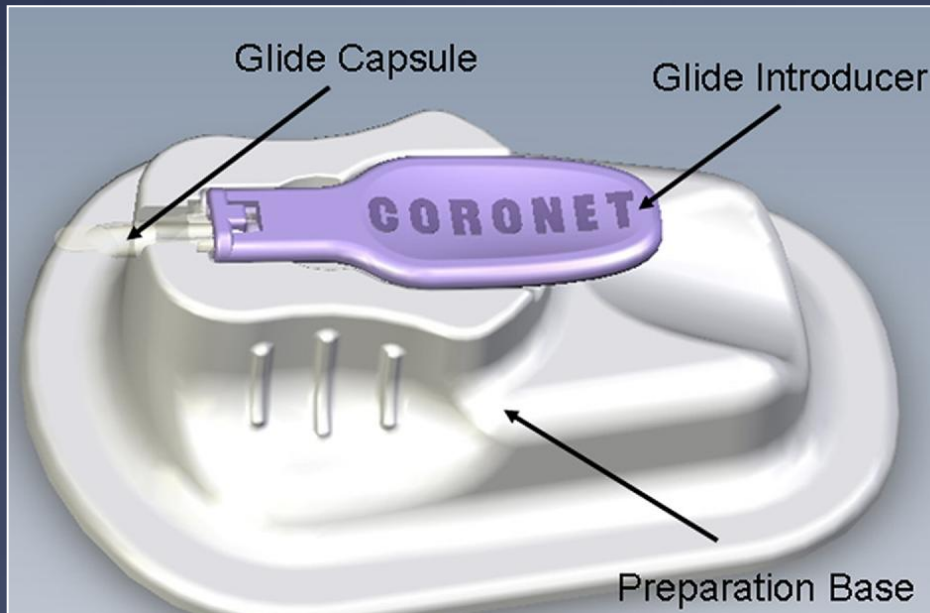
- * Recent efforts have focused on further reducing endothelial cell damage associated with surgical manipulation upon insertion of the donor during DSAEK
- * The observations from our early studies using the Sheets glide led to the development of the FDA-approved **EndoGlide** (AngioTech, Reading, Pennsylvania, USA/Network Medical Products, North Yorkshire, UK).¹
- * Our preliminary studies found EC loss of 13.5% at 6 months, and 14.9% at 12 months, with a low rate of postoperative complications in uncomplicated eyes.¹

1. Khor WB, Han SB, Mehta JS, Tan DT. Descemet stripping automated endothelial keratoplasty with a donor insertion device: clinical results and complications in 100 eyes. *Am J Ophthalmol* 2013;156(4):773-779 e2.

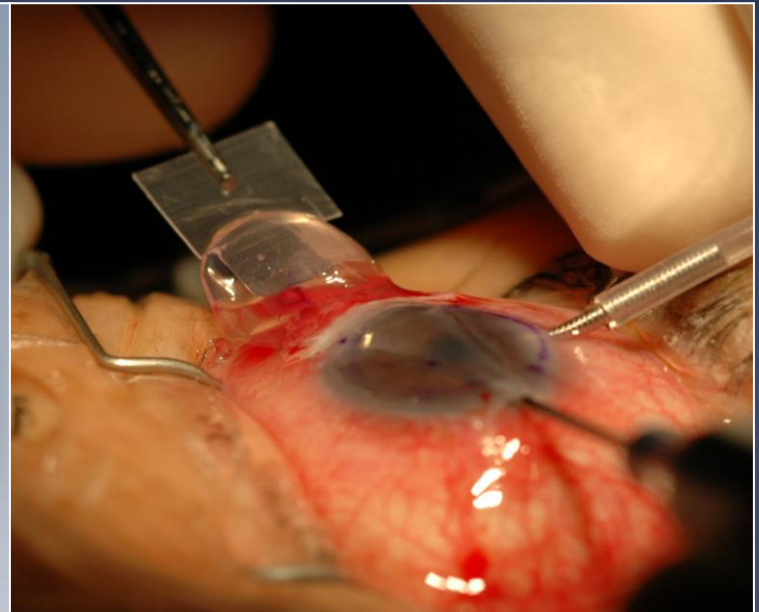
Objective

- * To compare 3-year endothelial cell loss and graft survival following DSAEK using EndoGlide donor insertion device compared to donor insertion using the Sheets glide (SG) technique.

EndoGlide:



Sheets glide:

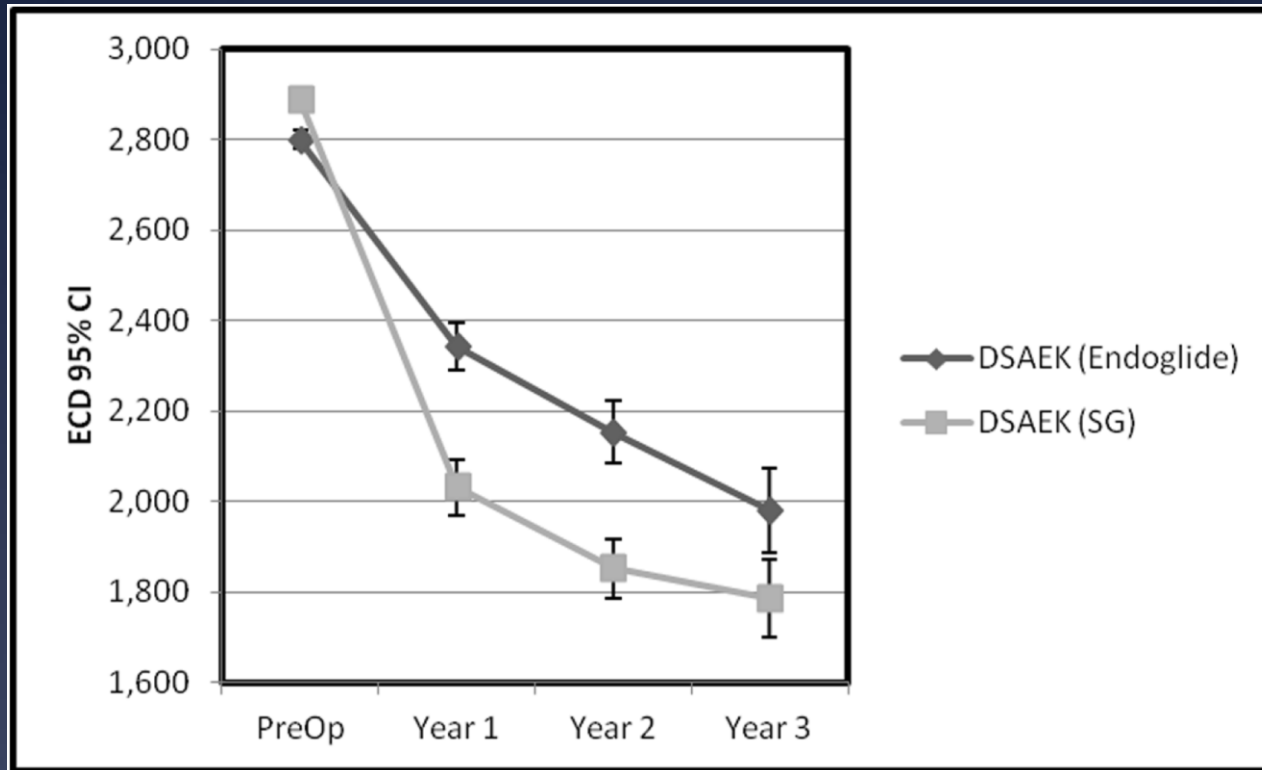


Methods

- * Retrospective comparative case series
- * Consecutive patients who underwent DSAEK with Fuchs' endothelial dystrophy (FED) or pseudophakic bullous keratopathy (PBK) at a single tertiary center.
- * Clinical data with outcomes, donor and recipient characteristics were obtained from our ongoing prospective cohort from the Singapore Corneal Transplant Study.¹
- * DSAEK surgeries were performed either using a Sheets glide (SG), or the EndoGlide technique (as previously described).^{2,3} All surgeries were performed by the 5 consultant corneal surgeons with similar surgical experience at our centre.
- * Main outcome measures were percent endothelial cell (EC) loss and graft survival up to 3 years.

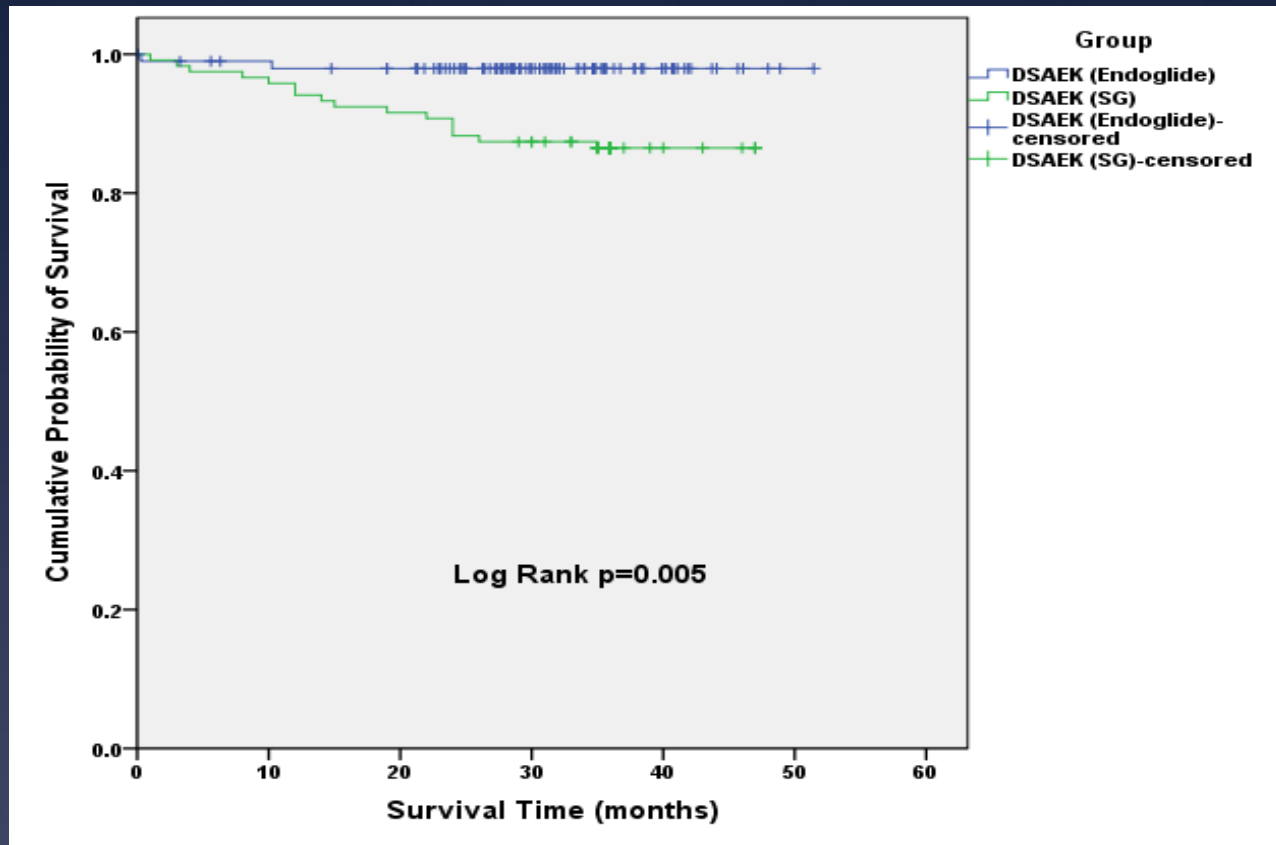
1. Tan DT, Janardhanan P, Zhou H, et al. Penetrating keratoplasty in Asian eyes: the Singapore Corneal Transplant Study. *Ophthalmology* 2008;115(6):975-982 e1.
2. Mehta JS, Por YM, Poh R, Beuerman RW, Tan D. Comparison of donor insertion techniques for descemet stripping automated endothelial keratoplasty. *Arch Ophthalmol* 2008;126(10):1383-8.
3. Khor WB, Mehta JS, Tan DT. Descemet stripping automated endothelial keratoplasty with a graft insertion device: surgical technique and early clinical results. *Am J Ophthalmol* 2011;151(2):223-32 e2.

Main Results



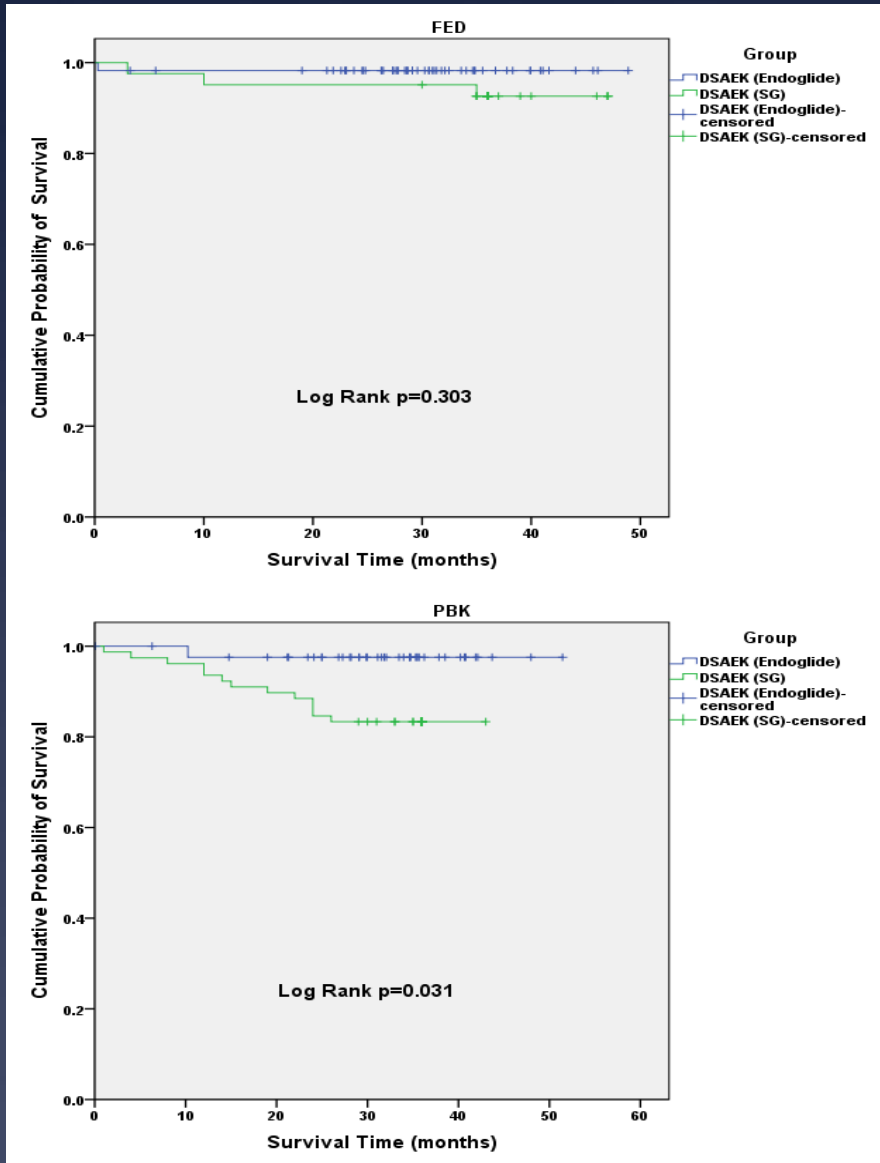
- * Overall percent EC loss was significantly lower in the EndoGlide group (100 eyes) compared to SG group (119 eyes) at 1 year ($16.3 \pm 16.6\%$ vs. $29.5 \pm 22.2\%$, $P < 0.001$), 2 years ($23.8 \pm 17.8\%$ vs. $39.5 \pm 26.7\%$, $P < 0.001$) post-operatively; and at 3 years ($29.7 \pm 10.9\%$ vs. $38.5 \pm 24.1\%$, $P = 0.015$).

Main Results



- * Overall graft survival was greater in the EndoGlide compared to SG group up to 3 years (97.9% vs. 86.5%, log-rank **P value=0.005**).

Main Results

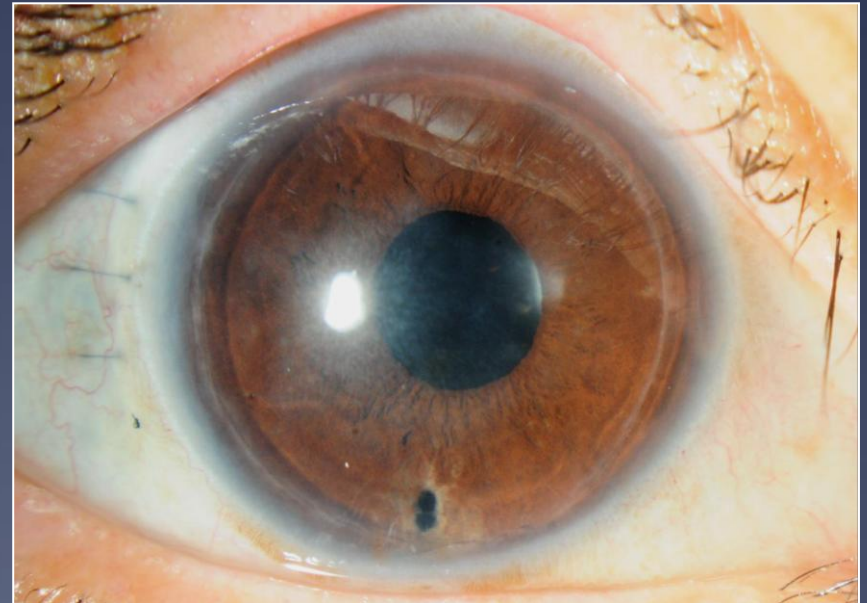


* In FED eyes, EC loss was significantly lower in the EndoGlide group (3-year: $28.2 \pm 17.9\%$ vs. $43.4 \pm 27.1\%$, $P=0.032$)

* In PBK eyes, EndoGlide group had a superior graft survival compared to SG (log-rank $P=0.031$).

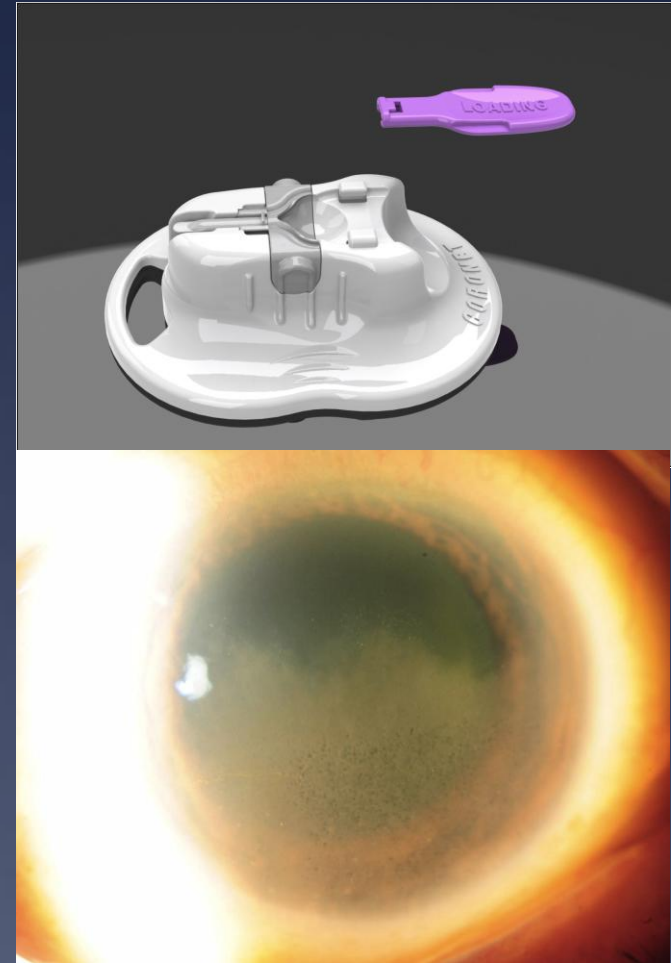
Summary of Results

- * Our study in Asian eyes demonstrated that using the EndoGlide donor insertion device resulted in lower EC loss as compared to DSAEK using the Sheets glide (SG) technique at 1, 2 and 3 years post-operatively.
- * We also found that the overall graft survival was greater in the EndoGlide compared to SG group up to 3 years follow-up (log-rank P value = 0.005).



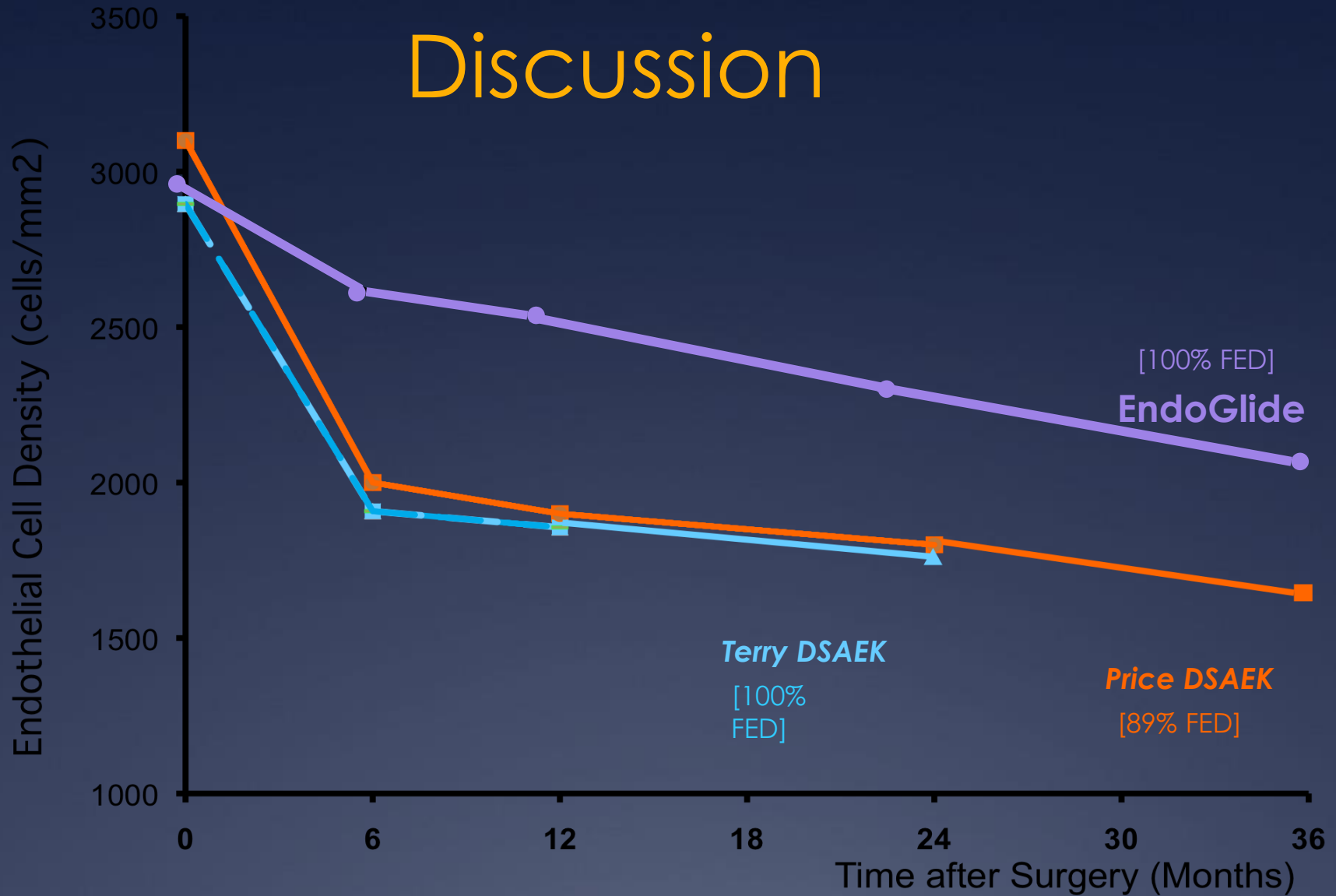
Discussion

- * The flat anterior surface (akin to the Sheets glide) modified to have a complete wound seal protects the donor, prevents iris prolapse and maintains the anterior chamber using a sealed back plate.¹
- * This design was especially useful in Asian eyes with shallow anterior chambers and high vitreous pressures; or even in complex eyes with previous glaucoma filtration surgeries, floppy irises or to hold down an anterior chamber intraocular lens.²



1. Mehta JS, Por YM, Poh R, Beuerman RW, Tan D. Comparison of donor insertion techniques for descemet stripping automated endothelial keratoplasty. *Arch Ophthalmol* 2008;126(10):1383-8.
2. Khor WB, Teo KY, Mehta JS, Tan DT. Descemet stripping automated endothelial keratoplasty in complex eyes: results with a donor insertion device. *Cornea* 2013;32(8):1063-8.

Discussion



* Endothelial cell loss reported in this study are promising, compared to existing literature on DSAEK with long-term follow-up.

Conclusion

- * Endothelial cell loss was lower using a donor insertion device during DSAEK, compared to using the Sheets glide technique for DSAEK in Asian eyes with FED.
- * Graft survival using a donor insertion device during DSAEK was significantly better than Sheets glide insertion, in eyes with PBK.