



Deep Anterior Lamellar Keratoplasty

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DALK indications



Visual

- Keratoconus
- Corneal stromal dystrophies and degenerations
- Deep corneal scarring (post traumatic, post infection etc)

Tectonic

- Advanced ectatic (pellucid marginal degeneration)
- Corneal melt (autoimmune, neurotrophic or infectious)
- Traumatic small corneal perforations
- Peripheral corneal thinning (Mooren's, Terrien's, other autoimmune disease)

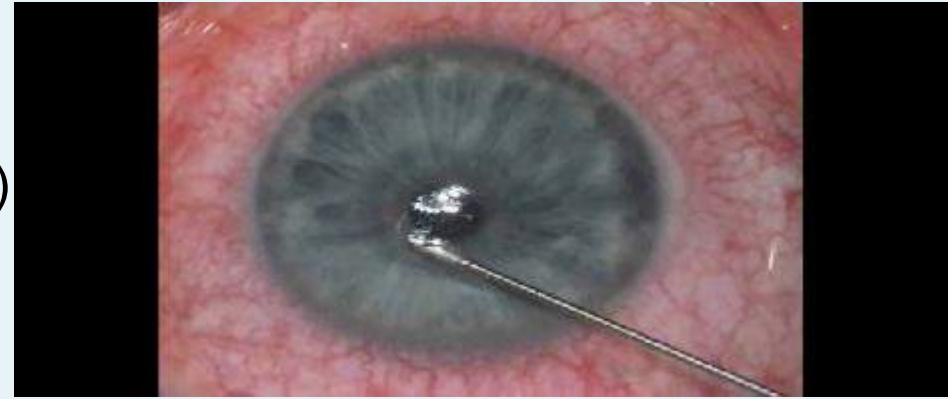


DALK - Big Bubble Technique

(safest and fastest method of Descemet's membrane exposure)

<http://www.anwarbigbubble.com>

Technique



1. Manual dissection techniques
 - Melles (visco – optical reflection)
 - Archilla (pneumatic)
 - Anwar (pre descemetic air bubble)
2. Femto assisted DALK
 - Intra-bubble
 - FALK
3. Excimer assisted DALK
 - CLAK



Pellucid Marginal Degeneration

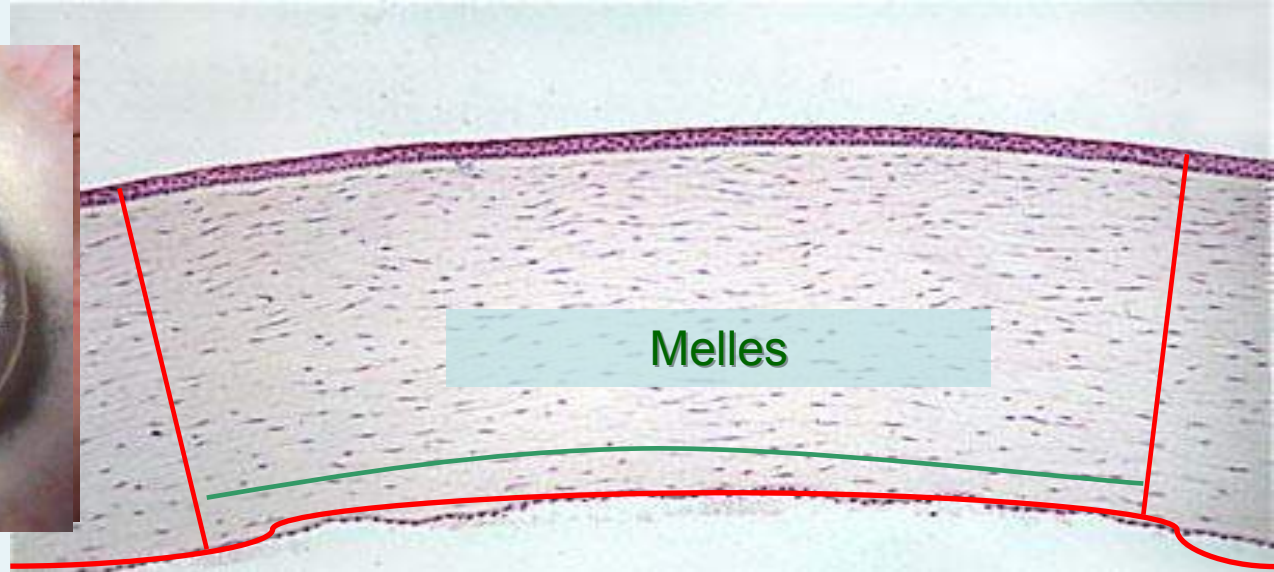
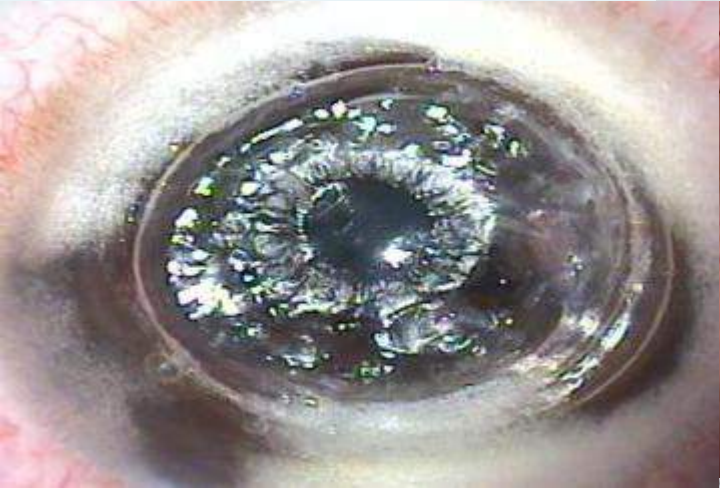
• **Red arrows** : semi-circular, specular light-reflex at the air-to-endothelium interface near the tip of the blade, caused by the indentation of the tissue (*left*)

• **Yellow arrow.**

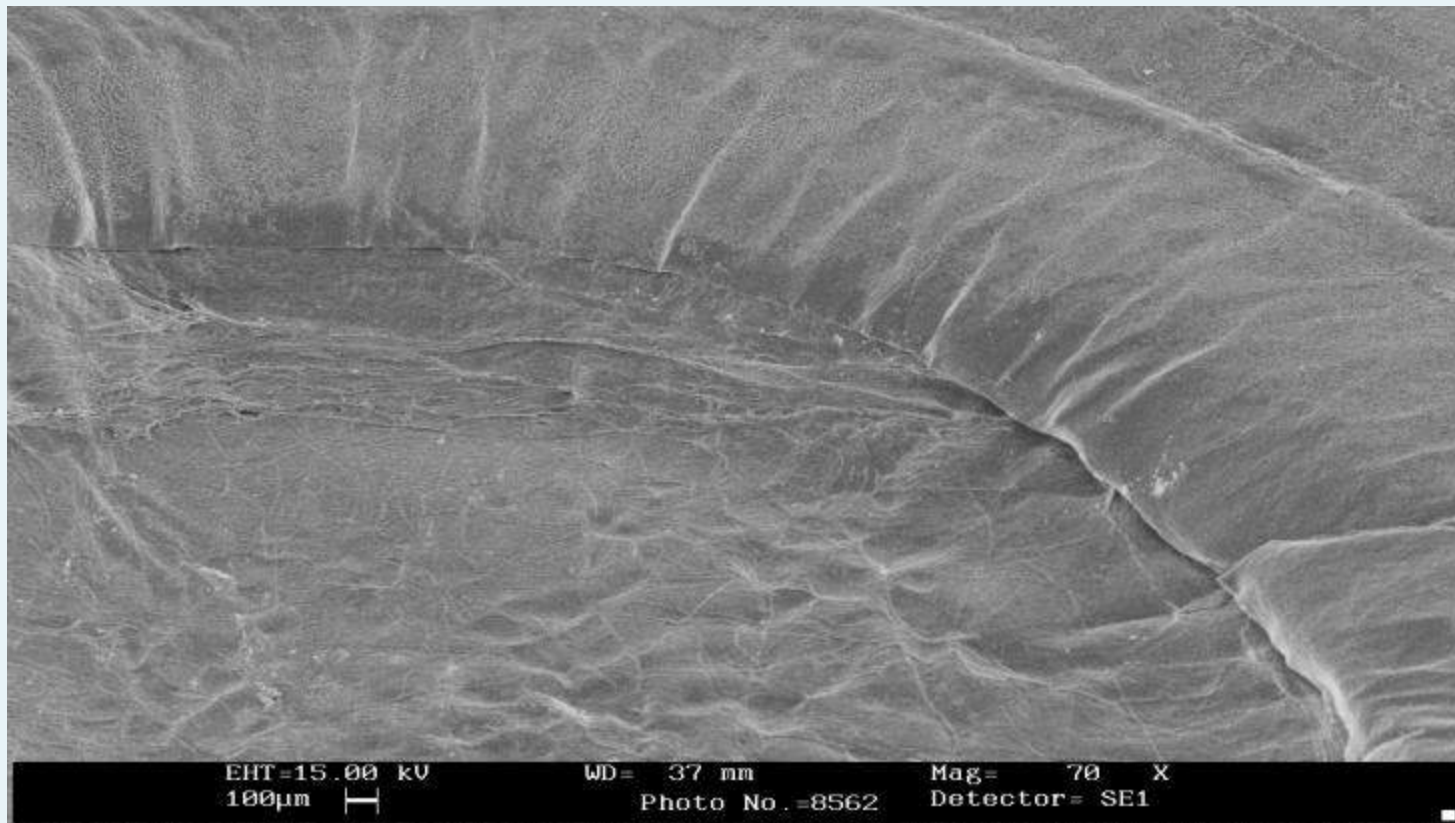
- Optical reflection (*right*)
- Descemet's folds (*left*)



DALK

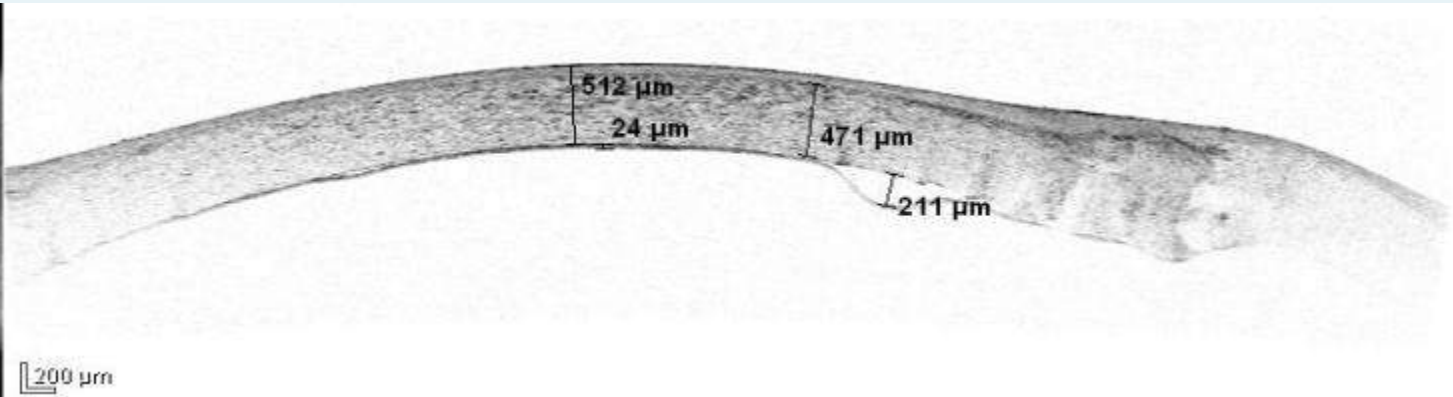
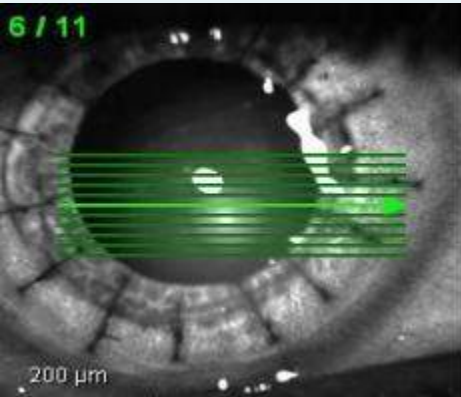


Big Bubble /
viscodissection



Nubile M, Fontana L. Unpublished data with permission

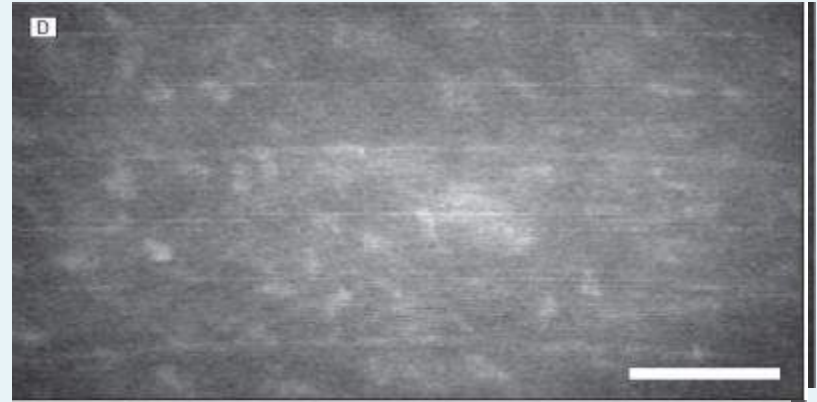




Perfect dissection plane - Close to Descemet's membrane

- Air dissection clearly occurs above the level of Descemet's membrane.
- Reaching the level of Descemet's membrane minimizes the healing process and thus the production of haze, thereby providing good corneal clarity

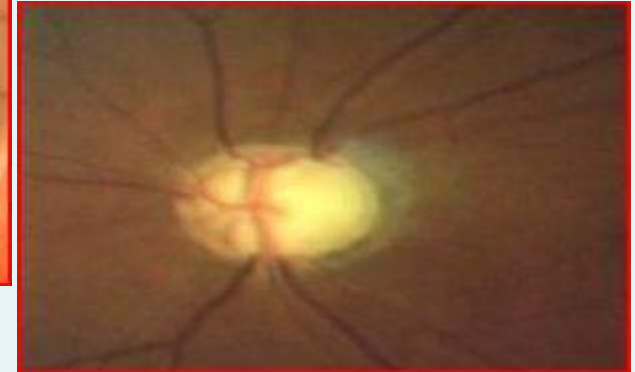
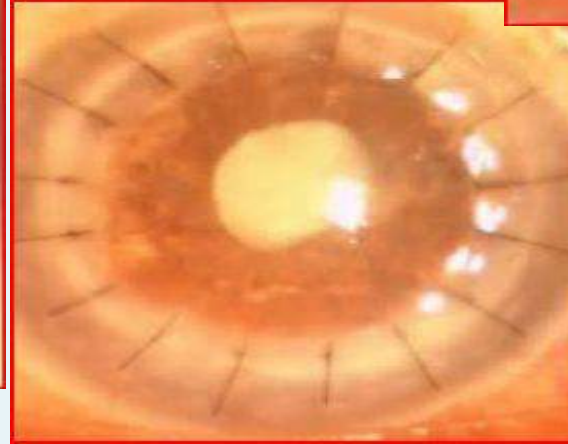
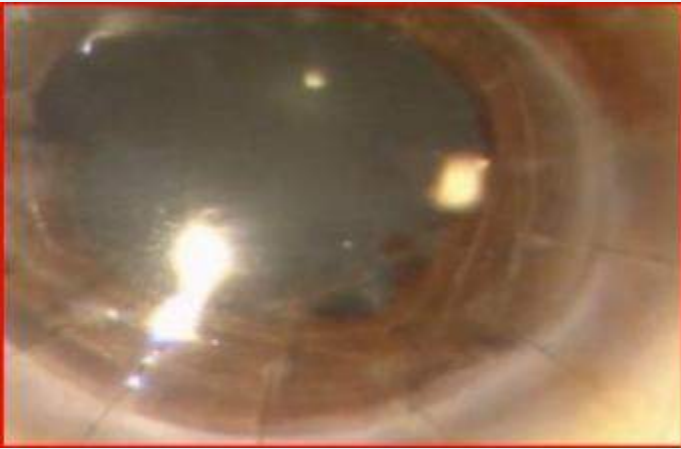
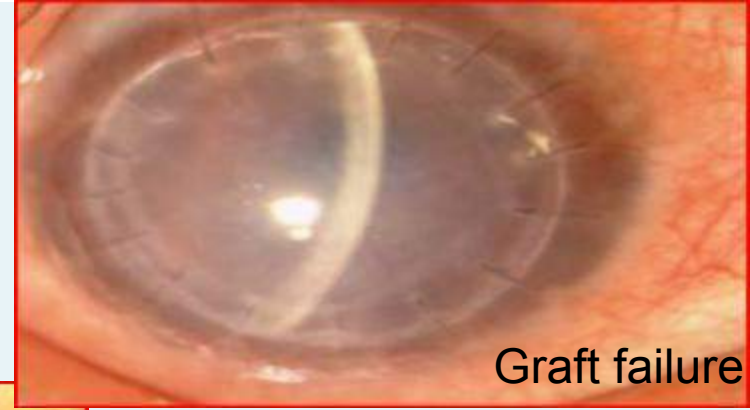
- *Lim P, Bradley, et al. Histopathology of deep anterior lamellar keratoplasty with pneumatic dissection: The "bigbubble" technique. Cornea. 2009; 28(5): 579-582.*
- *Abdelkader et al. Confocal microscopy of corneal wound healing after deep lamellar keratoplasty in rabbits. Arch Ophthalmol. 2010; 128(1): 75-80..*



DALK Advantage

- Lower rejection rate
- Ease of re-grafting
- Lower endothelial cell loss
- Faster recovery
- Avoiding complications associated with ‘open sky surgery’

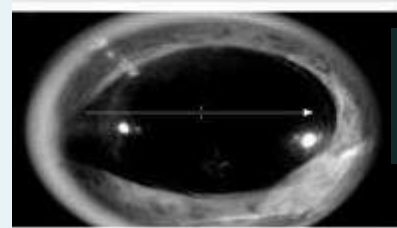
Complication of open sky procedure



Suture induced reaction,cheese wiring & loose suture

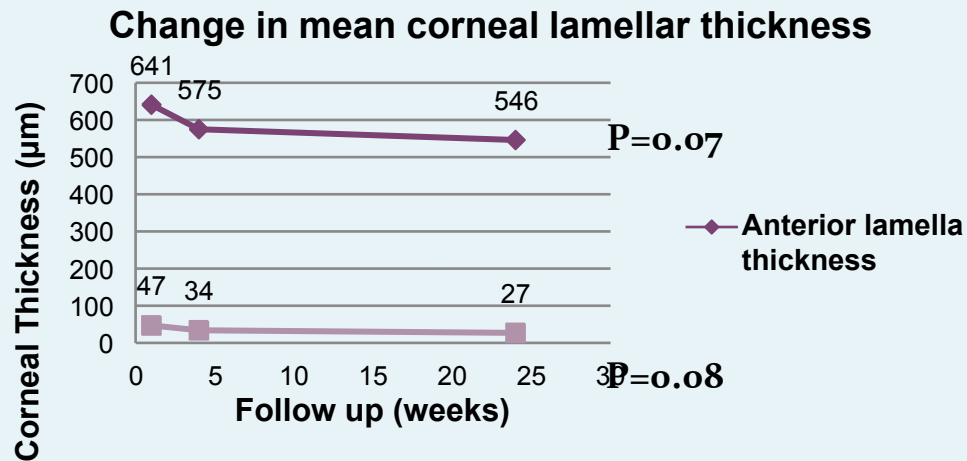


Pseudo anterior chamber



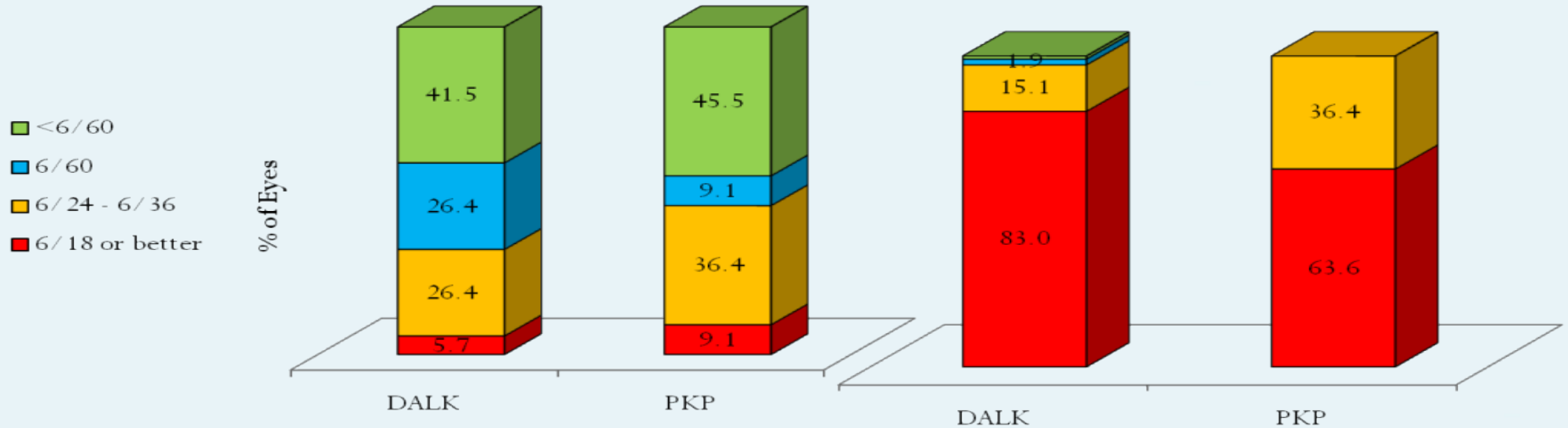
Uretts Zavalia

complication	Rate	Action
Descemets micro-perforation	2 (22%)	Conservative
Graft rejection (suture vascularisation only)	1 (11%)	Topical steroids - resolved
Graft detachment	2 (22%)	Air reinjection. 1 failed 1 resolved
Double AC	1 (11%)	Air reinjection corneal massage - resolved
Epithelial defect	1 (11%)	BCL
Loose suture	3 (33%)	Suture removal
Gaping corneal cataract wound following suture removal	1 (11%)	Wound re-sutured
Steroid response (raised IOP)	1 (11%)	Switch to alternative topical steroid



- Evaluation of Corneal Graft Profile Following Deep Anterior and Posterior Lamellar Keratoplasty Procedures by Fourier-Domain Optical Coherence Tomography
Deepak Parmar et al

Visual Outcome at 1 month

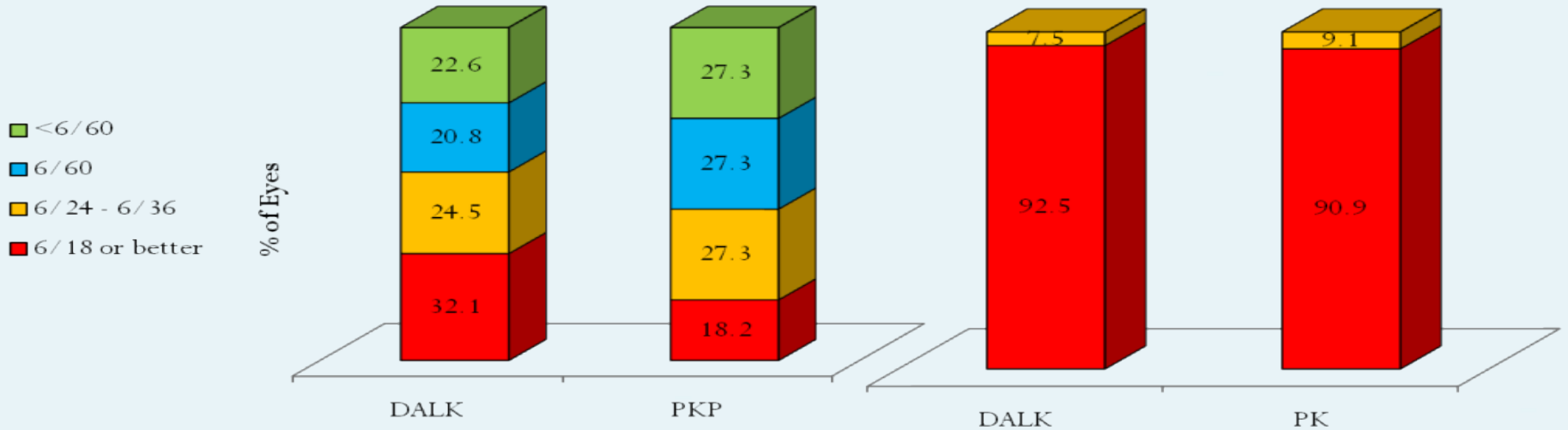


Uncorrected Visual acuity
p-0.639 (NS)

Best corrected Visual acuity
p-0.242 (NS)



Visual Outcome at 1 Year



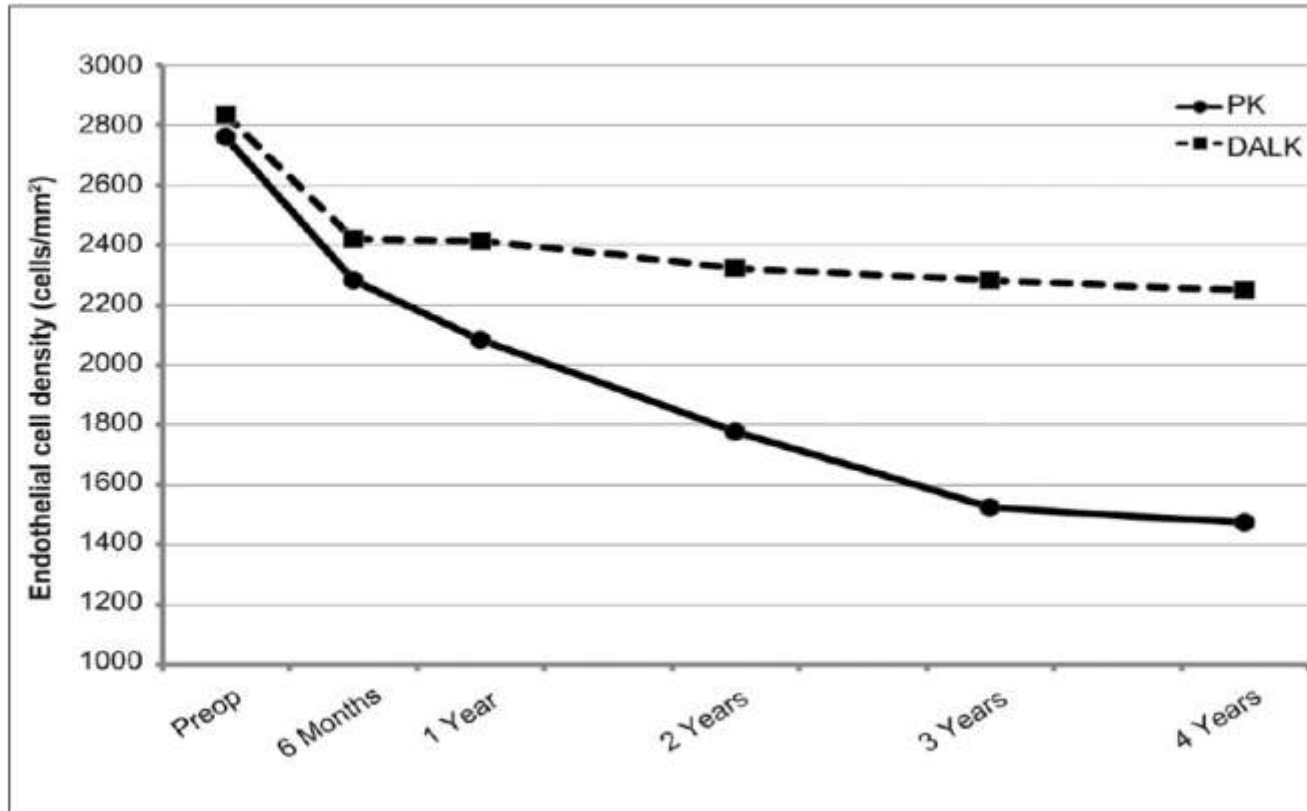
Uncorrected Visual acuity
p-0.830 (NS)

Best corrected Visual acuity
p-0.862 (NS)



Endothelial cell rate loss

Figure 1: Endothelial cell density after penetrating keratoplasty and deep anterior lamellar keratoplasty (PK: penetrating keratoplasty, DALK: deep anterior lamellar keratoplasty)



Preoperati
6 months
1 year
2 years
3 years
4 years

*For EC den

Preoperi
6 month:
1 year
2 years
3 years
4 years

*For COV

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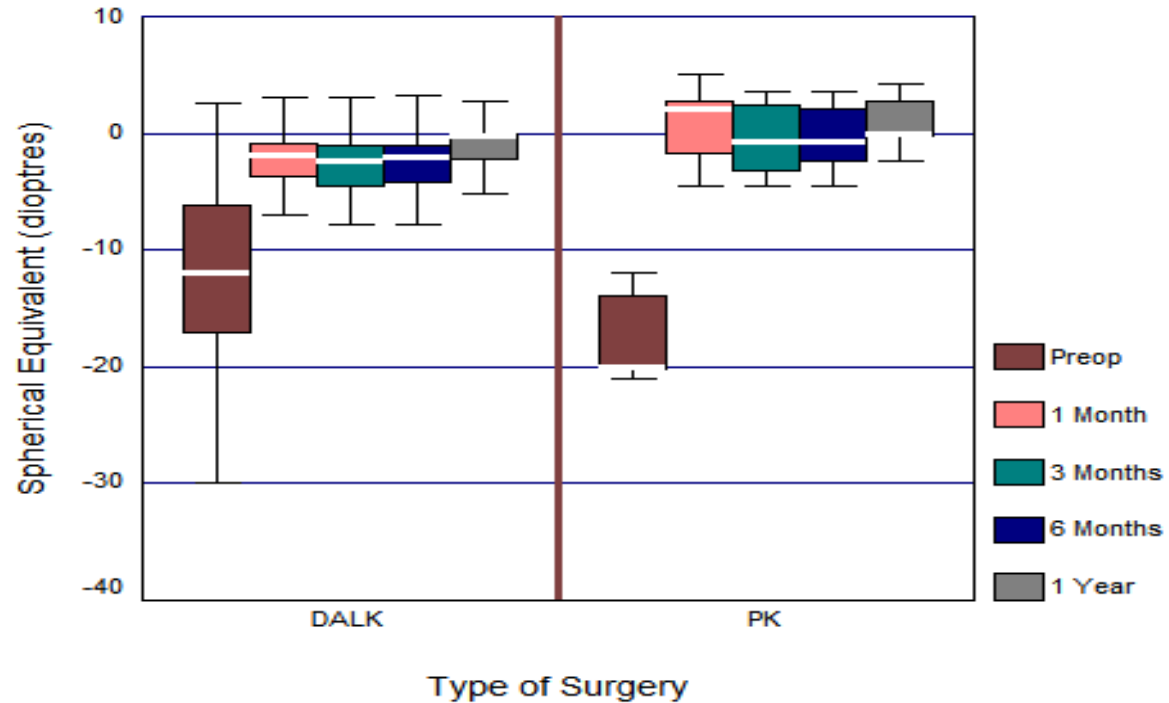
Astigmatism

	DALK	PKP	
Krumeich	2.9	3.5	automated
Rama 2012	2.27		Melles
Tan	2.7	3.5	BB
Hamdi	2.8 -3.8 (1-2/12)	2.88-3.18	Hydro v pkp
DLCTS	3.38	4.1	BB
Coombs	3.85		BB+Hydro
Noble			Melles
Vabres	3 D	3.5 D	BB vs PKP

I ♥ DALK

Spherical Equivalent

*K.S.Siddharthan
et al2011*



- Sarnicola et al retrospective study of 660 consecutive DALK procedures in 502 patients with a mean follow-up of 4.5 years (range, 6 months to 10 years).
- Average graft survival rate was 99.3%.
- Endothelial cell loss averaged 11.0% at final follow-up.
- Endothelial cell density was unchanged between 6 months postoperative and the last follow-up visit.

Author	n.	rejection	graft failure	re-graft
Coombes AG 2001	44	0	0	0
Watson SL 2005	25	2 (8%)	0	0
Al-Torbak A 2006	127	4 (3%)	0	0
Watson SL 2006	-	7	2	0
Fontana L 2006	78	2 (2.5%)	0	0
Noble BA 2007	58	6 (10%)	0	0
Javadi MA 2010	46	10 (23.8%)	0	0
Kubaloglu A 2011	234	4 (1.7%)	0	0
Smadja D 2012	37	0 (0%)	0	0

Randomized Clinical Trial of Deep Lamellar Keratoplasty Vs Penetrating Keratoplasty

JUN SHIMAZAKI, MD, SHIGETO SHIMMURA, MD, MISAKI ISHIOKA, MD,

I ♥ DALK

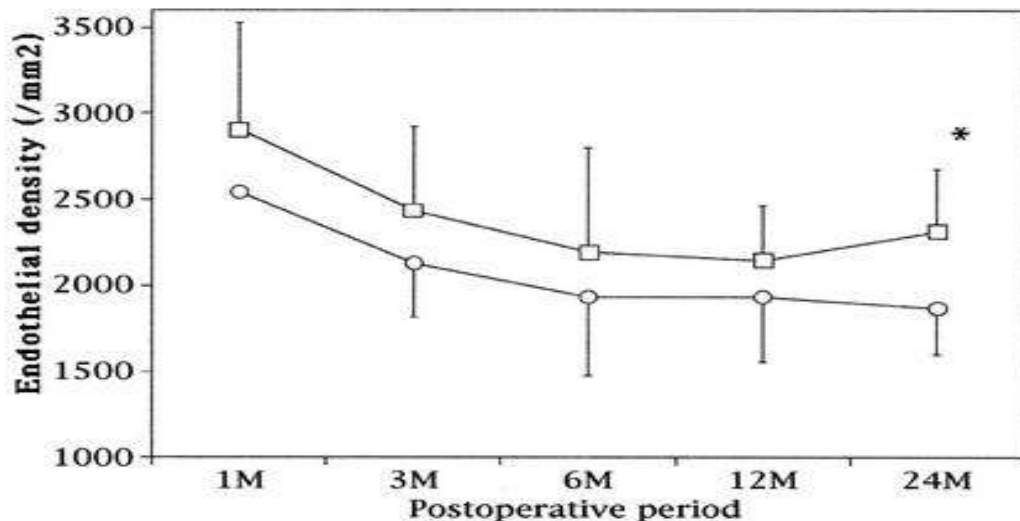


FIGURE 5. Mean endothelial density from 1–24 months after deep lamellar keratoplasty (DLKP) (squares) and penetrating keratoplasty (PKP) (circles). At 24 months following surgery, endothelial density was significantly higher in the DLKP group than the PKP group (P 044. =).

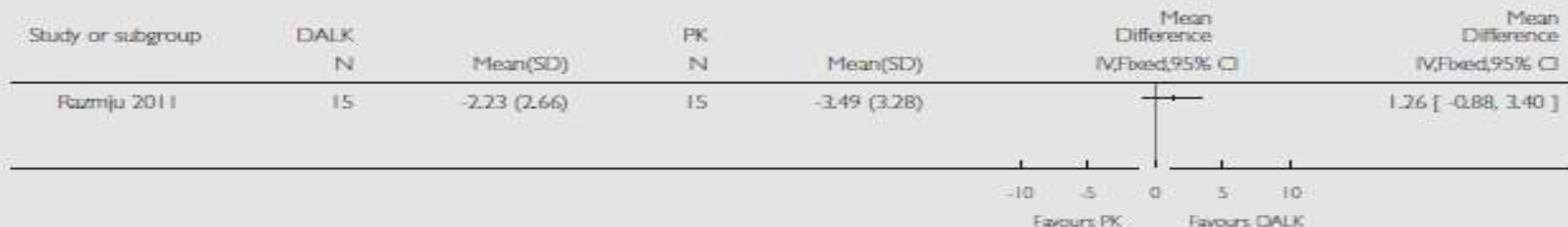


Analysis 1.9. Comparison 1 Deep anterior lamellar keratoplasty (DALK) versus penetrating keratoplasty (PK), Outcome 9 Postoperative spherical equivalent (12 months) (D).

Review: Deep anterior lamellar keratoplasty versus penetrating keratoplasty for treating keratoconus

Comparison: 1 Deep anterior lamellar keratoplasty (DALK) versus penetrating keratoplasty (PK)

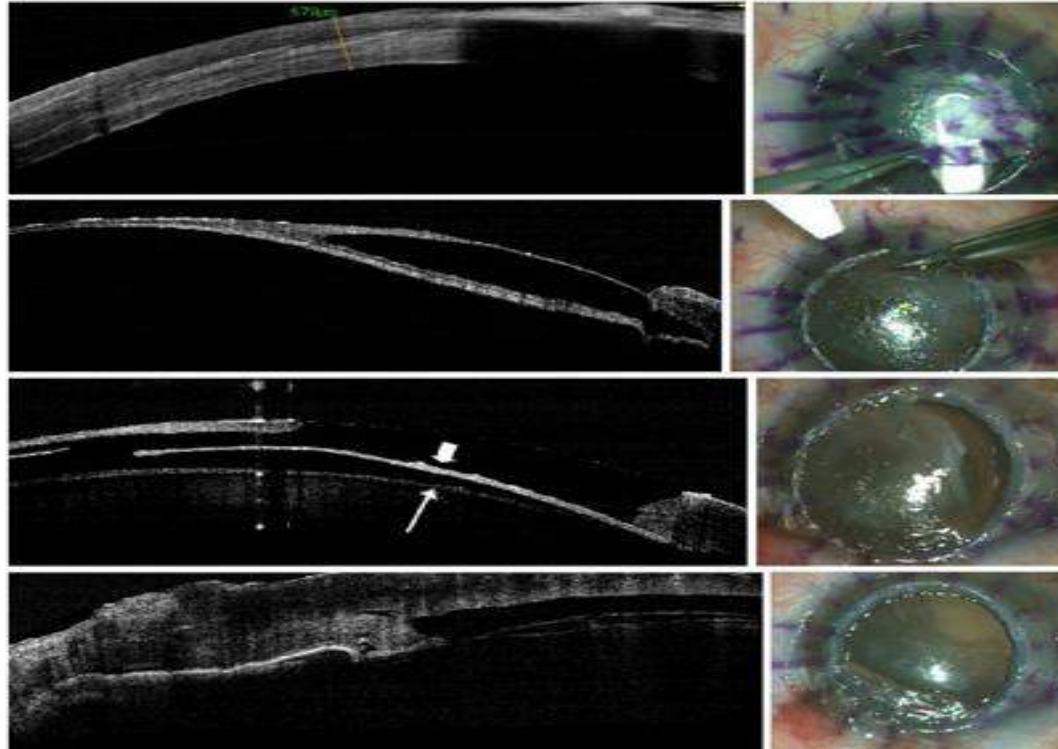
Outcome: 9 Postoperative spherical equivalent (12 months) (D)



- Improving DALK
incorporating new technologies

Intraoperative Anterior Segment Optical Coherence Tomography: A Novel Assessment Tool during Deep Anterior Lamellar Keratoplasty

LAURA DE BENITO-LLOPIS, JODHBIR S. MEHTA, ROMESH I. ANGUNAWELA, MARCUS ANG, AND DONALD T.H. TAN



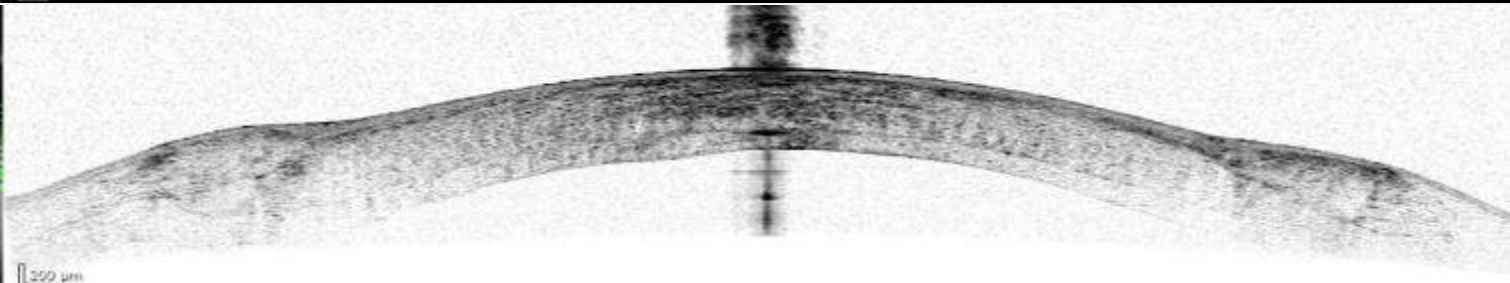
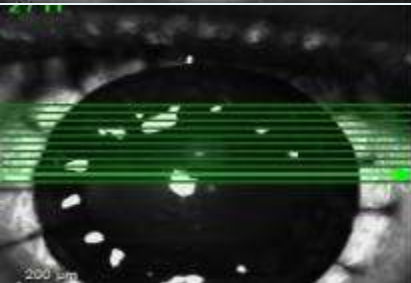
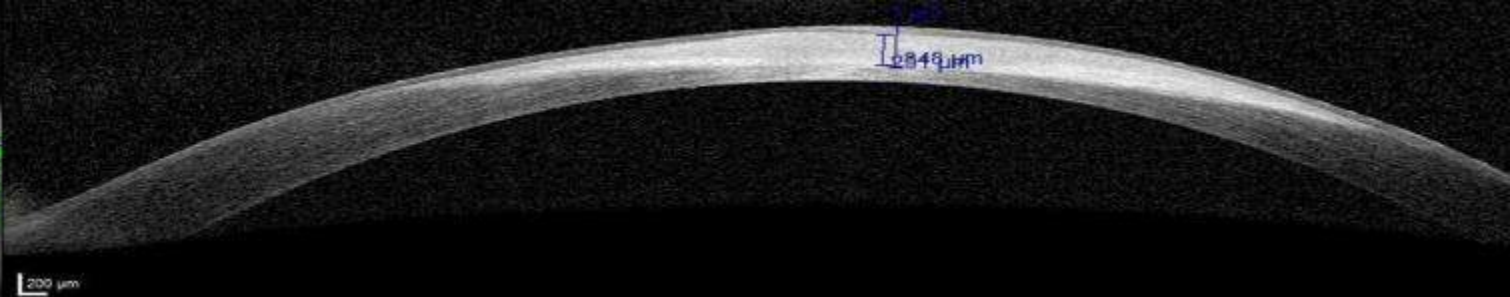
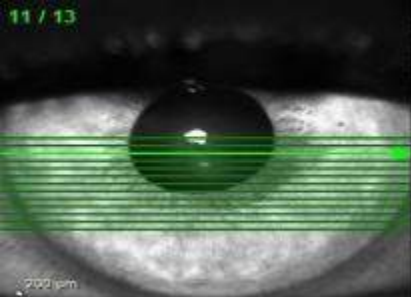
Femtosecond assisted ?

Why yes

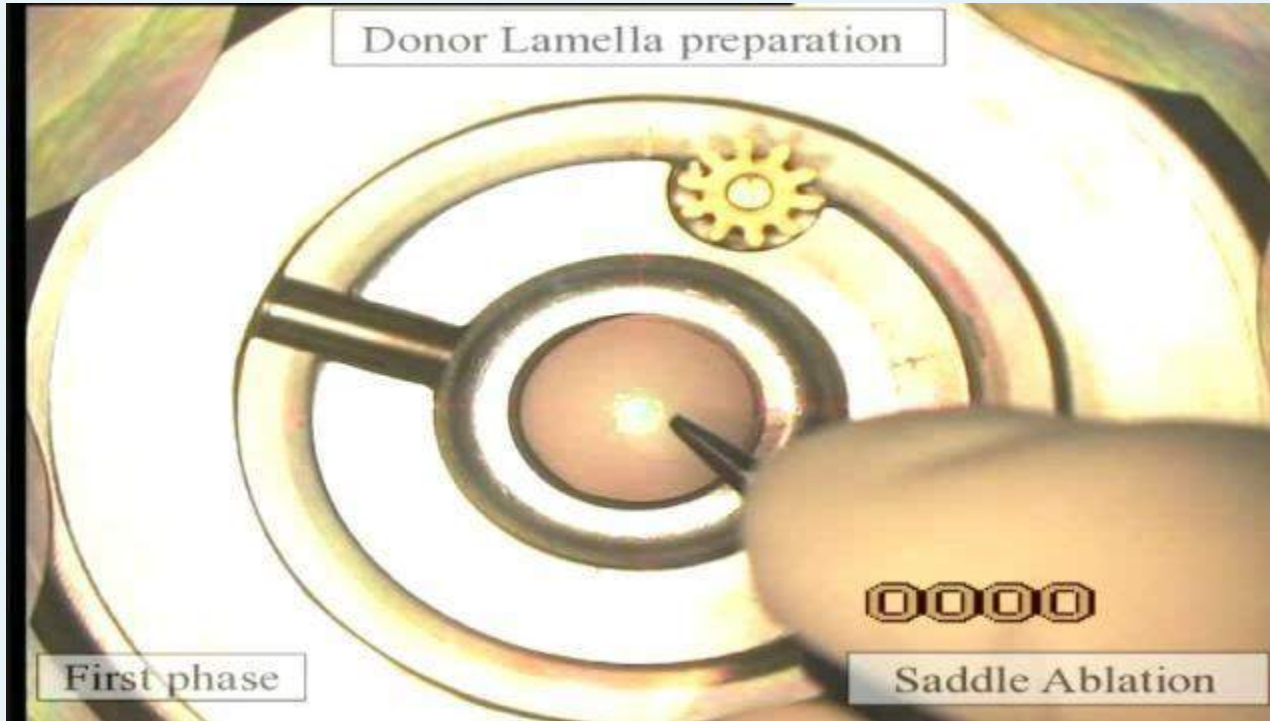
- Lamellar keratoplasty. Surgically demanding technique
- Easier to perform with Femto
- Pre planned dimensions and accurate results
- New designs
 - Top hat lamellar
 - intralamellar

Why not

- Endothelial damage
- Interface reaction
- Penetration through opacities
- Expensive



CLAT





Σας ευχαριστώ



Σας ευχαριστώ