




# Posterior Lamellar Corneal Surgeries Different Strokes

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## Introduction

- Is it needed ?
- Whether to cataract surgeon or cornea surgeon or anterior segment surgeon

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## Indications

- Pseudophakic corneal decompensation (After Cat./IOL)
- Pseudophakic corneal decompensation after refractive IOL implantation.
- Fuch's dystrophy +/- dense cataract
- ICE syndromes
- CHED
- Previous rejection of pkp
- TASS
- Extensive HABB's Striae ( in good optic nerve functions )



## Historical Revolution

- DLEK / DSEK
- With the introduction of MicroKeratome  
 → The use with endothelial Keratoplasty

DSAEK

UT/DSAEK



## Historical Revolution

- A True Breakthrough → Dua's Layer

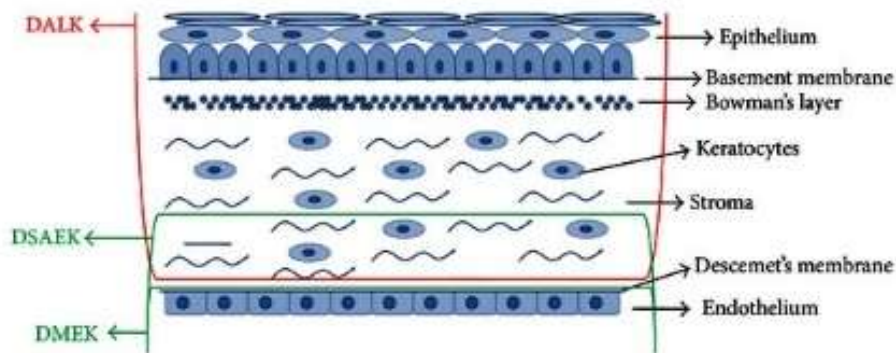
It explained a lot of things in both anterior lamellar & posterior lamellar surgeries

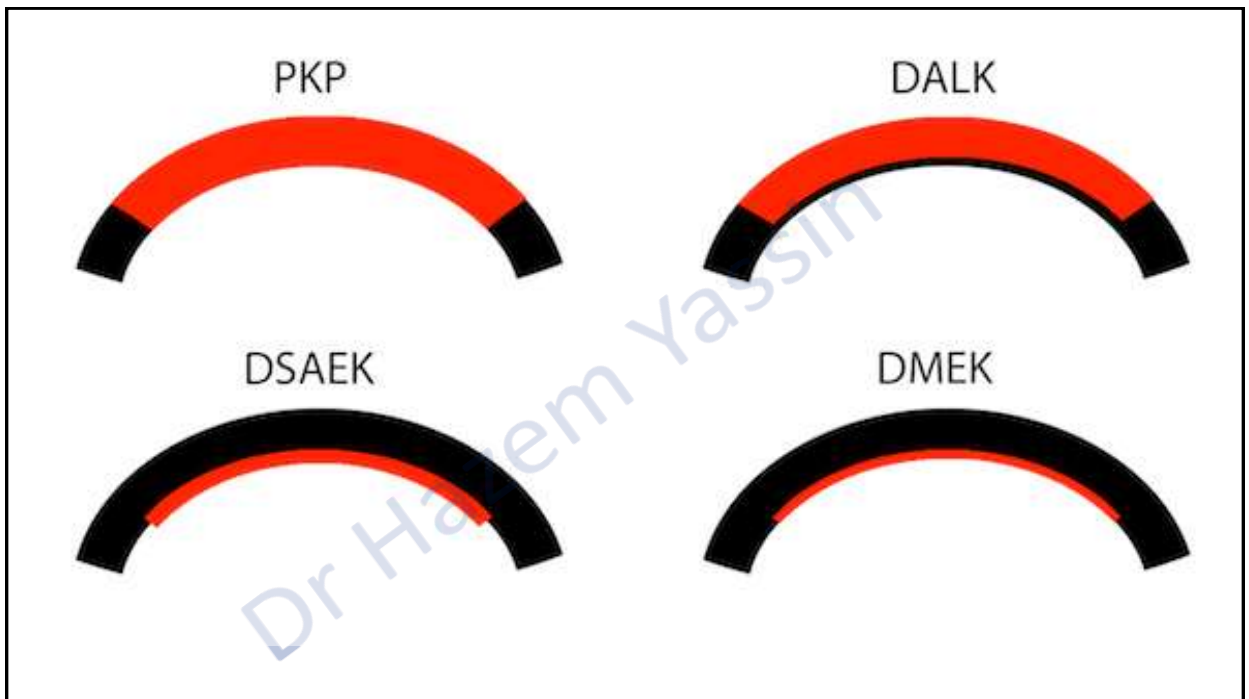
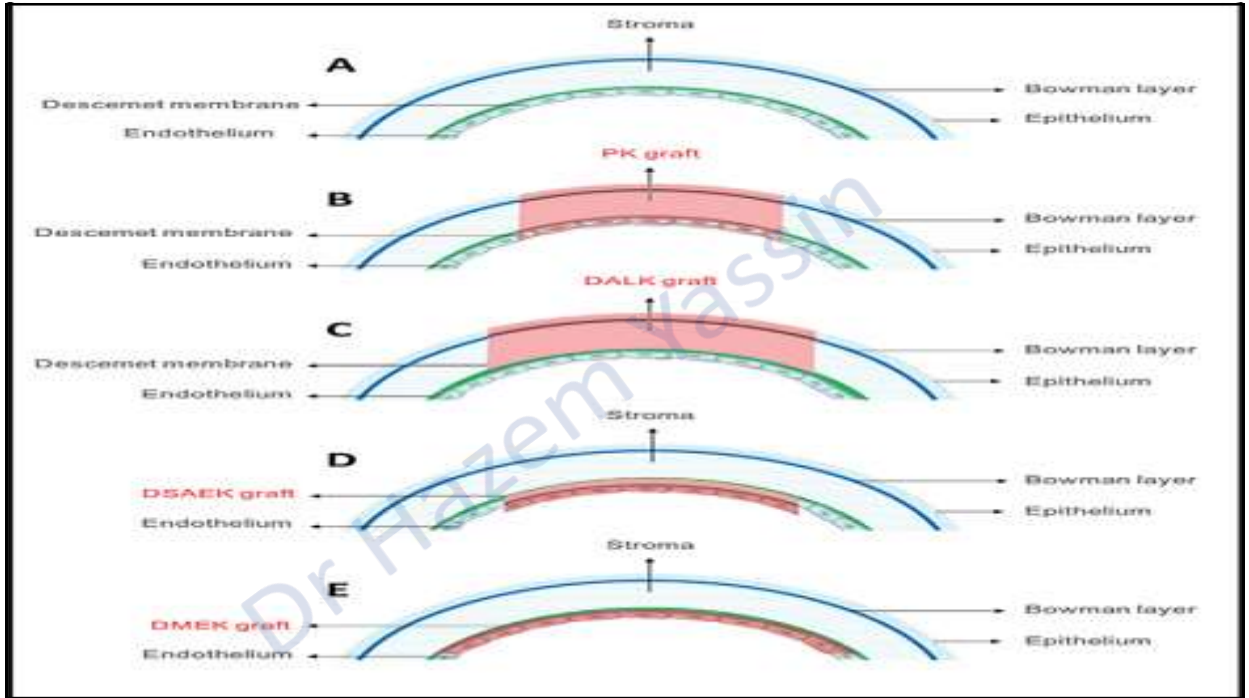
### In Anterior Lamellar Surgeries

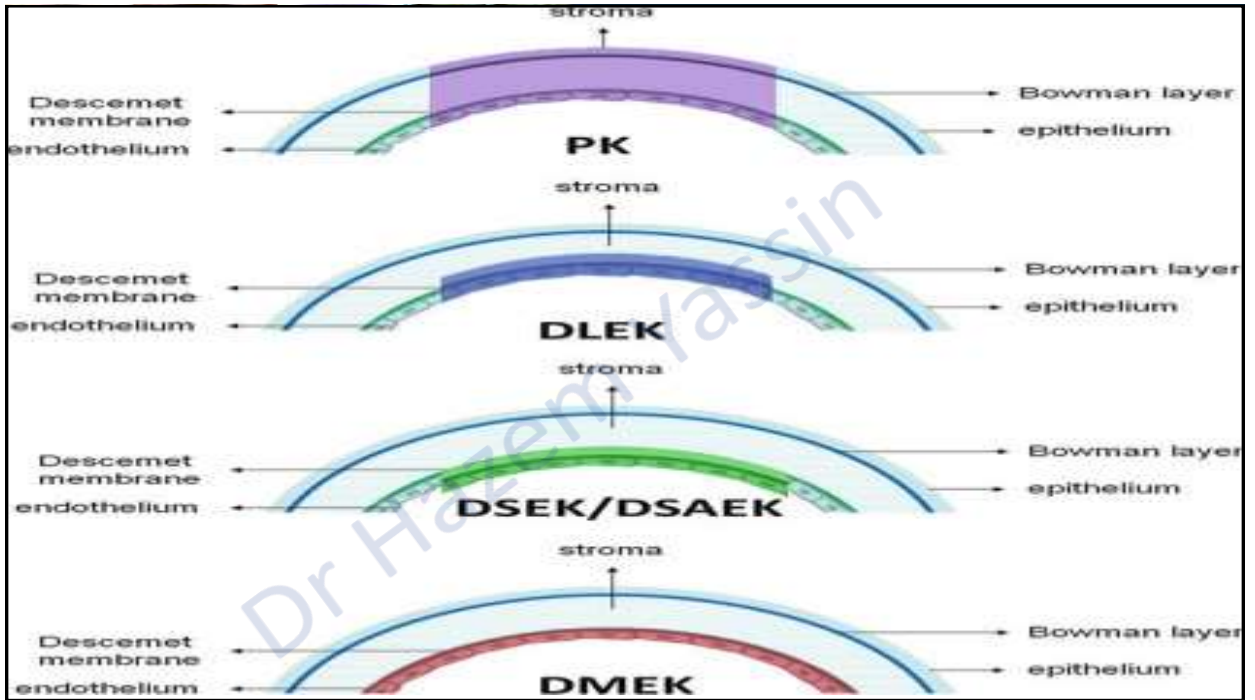
- Type I Bubble
- Type II Bubble
- Additional Cataract removal  
(Only in type I)

### In Posterior Lamellar Surgeries

- DSAEK / UT DSAEK
- PDEK
- DMEK
- Femtosecond assisted DLEK







Courtesy of Prof. Dr. Rania Sobhy



## Investigative Help

- OCT of cornea (pre / intra / postoperative)
- Scheimpflug imaging



## Femtosecond assisted Keratoplasty

### Did it add much ?

in DALK (cannot determine Dua's layer as bubble type I does)  
 shape of the anterior cut (mushrom head, top hat or zigzag)  
 didn't reduce astigmatism that much

in DLEK ( very difficult separation for donor & recipient )  
 → Improved in new zeimer Z8

Very good results in CHED

Courtesy of Prof. Dr. Rania Sobhy



Nowadays

### The state of Art of posterior lamellar keratoplasty

1. UT/DSAEK (thinnest stroma + Dua's + DM + endothelium)
2. PDEK (Dua's layer + DM + endothelium)
3. DMEK (DM + endothelium)
4. Hemi / Quadri DMEK



## Other Surgeries

- Circular Descmetectomy in Fuch's dystrophy without DMEK transplantation (DWEK) ??
- Endothelial cells transplantation



## Main focus

**We will focus on the 3 mainly done surgeries**

- DSAEK or UT/DSAEK
- PDEK
- DMEK

**In All the 3 maneuvers**

A)  
Removal of  
diseased  
recipient  
tissue

B)  
Preparation  
of donor  
tissue

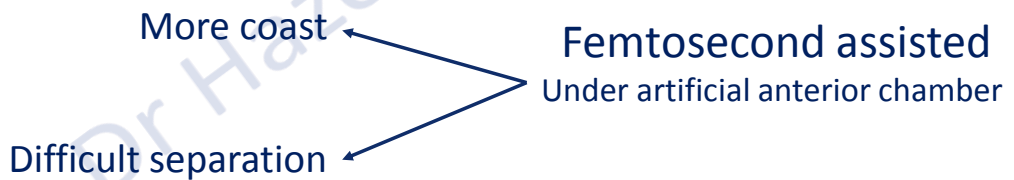
C)  
Transplantation  
of prepared  
donor tissue



A)

## Removal of diseased recipient tissue

Is the same in all procedures  
 (you remove only DM except in Femtosecond assisted EK)  
 under air → (easier) or stained



A)

## Removal of diseased recipient tissue

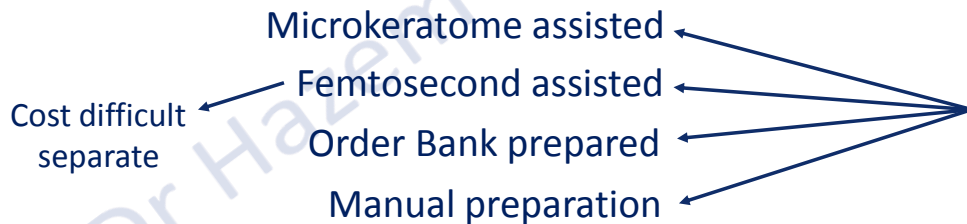
If under saline → Against red reflex (dilated pupil)  
 → Methylene blue staining

The most important issue → Don't leave tags

B)

## Preparation of donor tissue totally different

In DSAEK & UT/DSAEK



B)

## Preparation of donor tissue

- Microkeratome assisted : Double circular pass/single straight forward pass
- N.B. you must have high frequency ultrasonic pachymetry not the regular 20 Htz but the 50 to know pre & post cut thickness
- Single straight pass (Moria, Gebauar, medlogics)

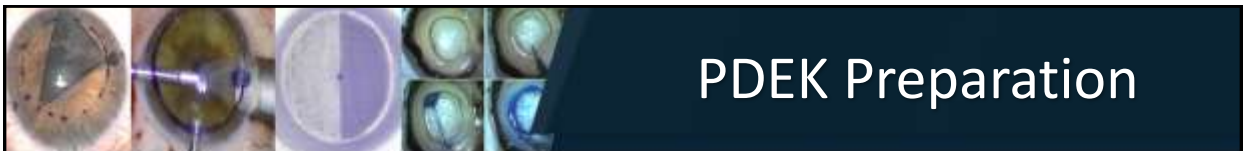
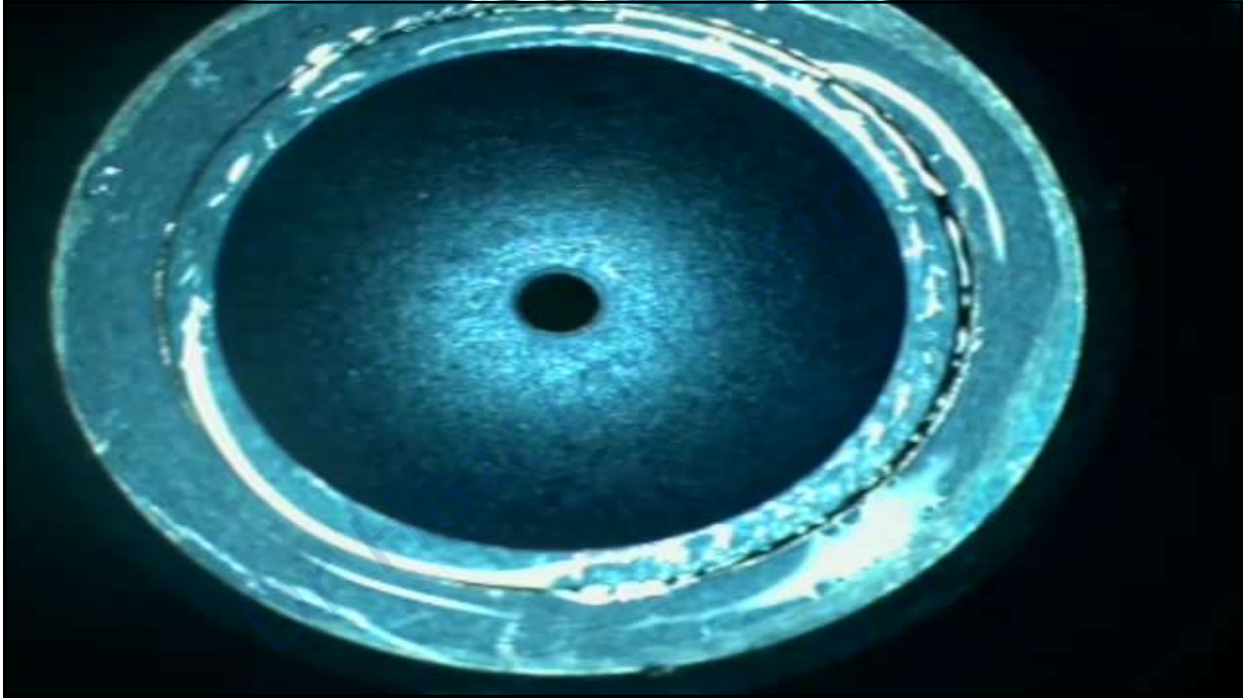


## Manual Preparation of DSEK

### Indian school

- Artificial anterior chamber
- Guarded 450 micron keratome
- Blunt crescent shaped dissectors
- OCT proof postoperatively


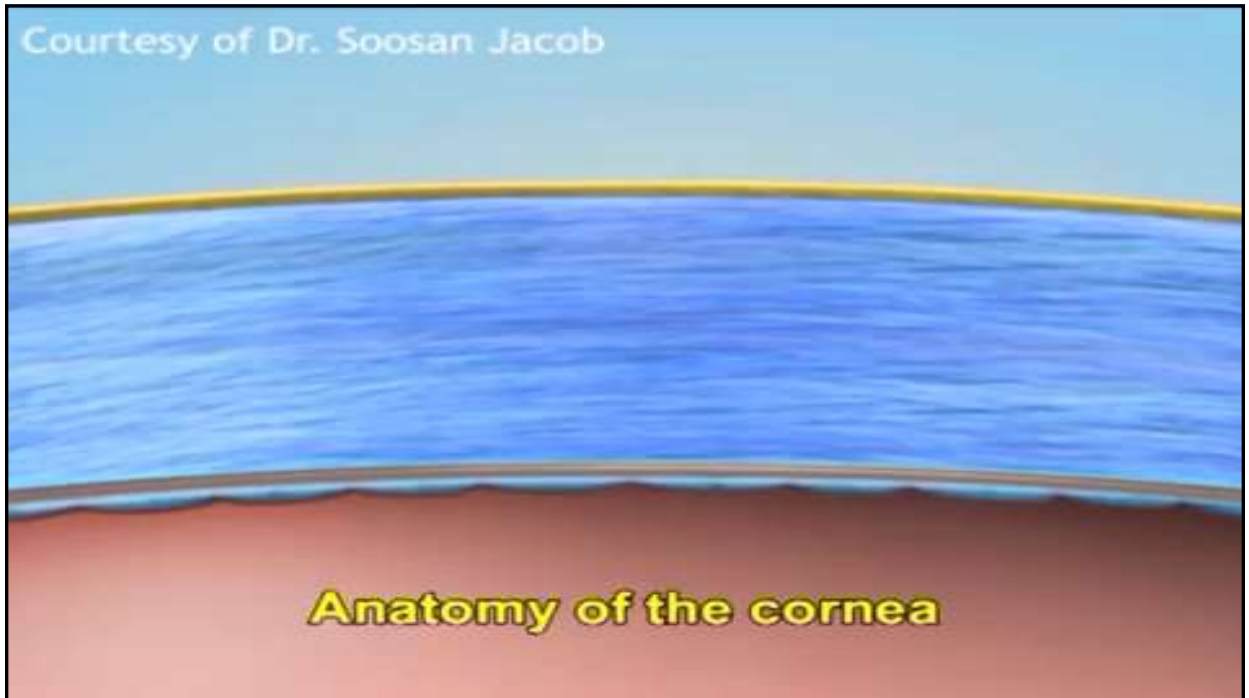
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## PDEK Preparation

### Agarawal school

- initiation of type I Bubble from endothelial slide
- Puncture bubble → Stain the stromal side
- Scissors circular fashioning
- Advantages : youngest donor age & tougher then DMEK



A collage of six small images showing various stages and techniques of DMEK preparation, including the use of a microkeratome, manual dissection, and the final preparation of the endothelial layer.

## DMEK Preparation

- Melles school
- Price school (scuba technique)
- Gorovoy school
- Donald Tan school
- Bank prepared (Quadriple pre.)



## Melles school

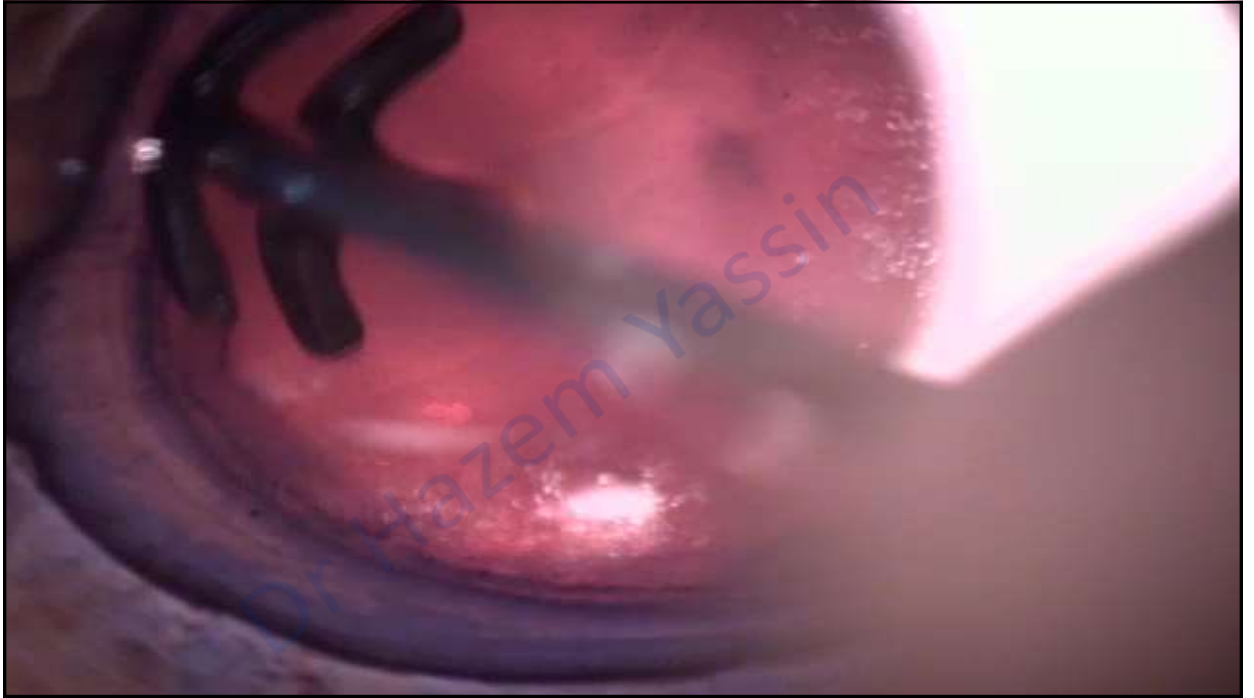
- Blunt dissection from outside the trabecular meshwork from tightly adherent zone till you reach the loosely adherent zone then peeling from 4 quadrants
- Advantages : they claim trabecular meshwork is the skeleton of D.M so it won't roll
- They can use contact lens instead of stroma
- They can do hemi DMEK



## Price school (Scuba technique)

- Cut inside TM & peeling in viewer chamber against red ocusol solution

→ Makes it less tough



## Gorovoy school

- Injection of saline under D.M to hydro separate it from Dua's layer then trephine



## Donald Tan school

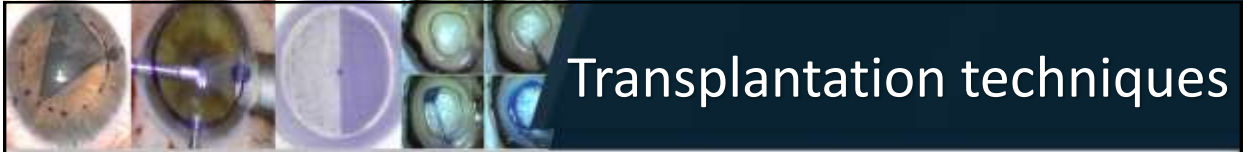
- Manual dissection in the potential space between Dua's layer & back of D.M



## Bank prepared (Quadriple pre.)

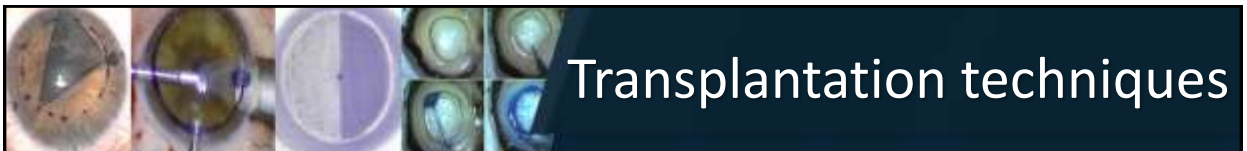
- Prestripped
- Prestained
- Premarked (S mark , F mark)
- Preloaded in modified Johns Straiko tube





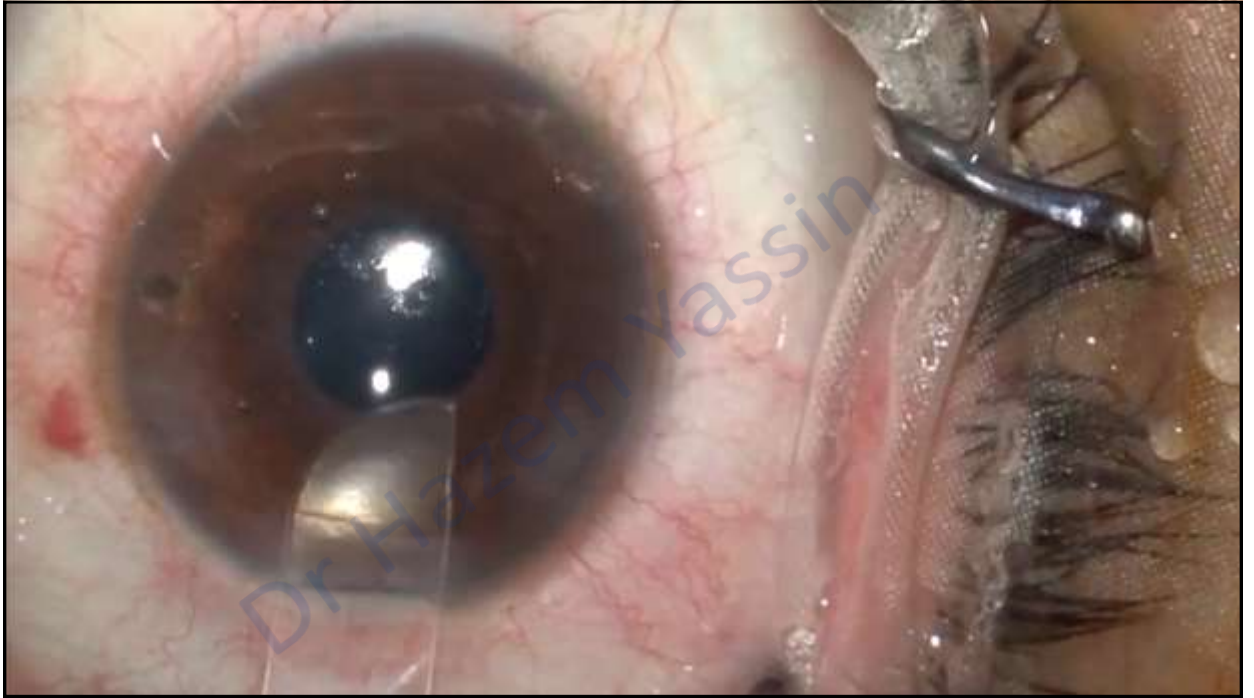
## Transplantation techniques

- It is all about anterior chamber depth + thickness of transplanted tissue



## Transplantation techniques

- For DSAEK tissues to unfold it needs deep AC & AC maintainer.
- Either pulling technique (Busin glide, Macaluso inserter)
- Or pushing technique by a needle (indian school)
- Injectors (Tan injector, endoserters)
- N.B the presence of stroma makes unfolding easy





## PDEK Indian School

- Remember : Dua's + DM + endo. (in between DSAEK & DMEK)
- The whole debate endothelium internal or external
- Agarawal school endo. Inside (injector + pulling)
- A.C maintainer



## DMEK

- 90% of the world is using injector with endo out as D.M tends to roll endo out
- Donald Tan & M. Busin (endo in & pull technique )
- A.C maintainer is a must

Courtesy of Prof. Dr. Donald Tan





## Unfolding of DM Tissues

- V.shallow A.C
- Tapping / press & release / Burb side ports
- To move hockey strokes at the limbus
- To unfold shallow & press or tap

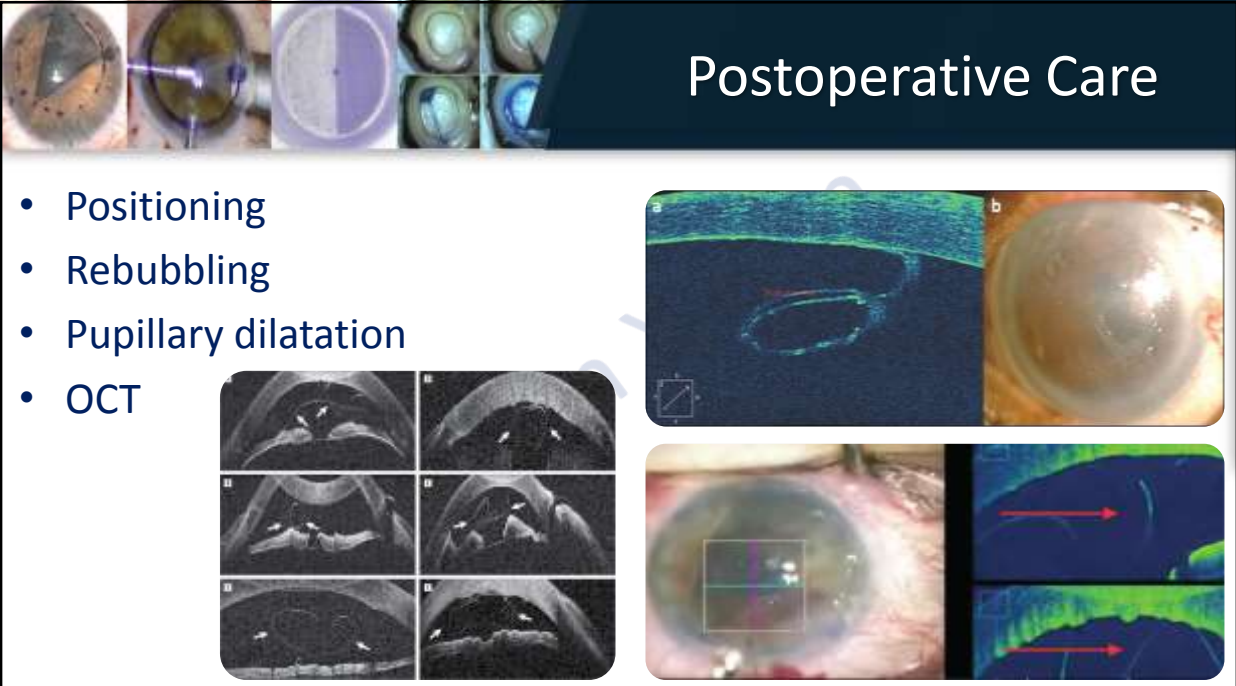


## P.I.

- It is a must in all procedures (to avoid pupillary block since air bubble is the only way to adhere the transplanted tissue to the recipient cornea)
- Timing as early as possible (bleeding & exudates is the worst enemy to the surgeon as it prevents unfolding)


## Postoperative Care

- Positioning
- Rebubbling
- Pupillary dilatation
- OCT



## Conclusion


	Donor Graft		
	DSEK	DMEK	PDEK
DONOR BUBBLE SIZE	-	LARGE	SMALL
BUBBLE RESILIENCE / COUNTER	-	ROUND DELICATE	DOME SHAPED TOUGH LOOKING
GRAFT TEAR RESISTANCE		TEARS EASILY	TOUGH TO TEAR
GRAFT PREPARATION	EASY	TOUGH	TOUGH
DONOR AGE DEPENDENCY	INDEPENDENT	DEPENDENT (>40 Yrs)	INDEPENDENT (as low as 1 Yr)



## Conclusion

**The Surgery**

	DSEK	DMEK	PDEK
SURGICAL LAYERS	STROMA + PRE DESECMETS MEMBRANE + DM + ENDOTHELUM	DM + ENDOTHELUM	PRE DESECMETS MEMBRANE + DM + ENDOTHELUM
SPECIAL INSTRUMENTS	REQUIRED	NOT REQUIRED	NOT REQUIRED
INDUCED HYPEROPIA	YES	NO	NO
GRAFT UNROLLING	EASY	SKILL REQUIRED	SKILL REQUIRED
TISSUE HANDLING	GOOD	MODERATE	MODERATE
VISUAL RECOVERY	SLOW	FAST	FAST



## Conclusion

- Lamellar corneal surgery (Anterior & Posterior) was a breakthrough in the field of keratoplasty
- IS IT A MUST TO SHIFT ?

**THE ANSWER IS YOURS**

**THANKS A LOT FOR  
YOUR ATTENTION**