An EK For All Reasons: When and How to Perform DSAEK and DMEK

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EK Is Now the Gold Standard for Endothelial Disease

- Advantages over PKP:
  - Quicker recovery
  - Minimal astigmatism
  - Smaller wound (safer)
  - Less glaucoma risk
  - Less rejection risk
  - Easier to repeat
  - Easier to do with standard cataract surgery

- 2013 EBAA:
  - 27,298 EKs done (41% of all transplants)
  - 77.9% of transplants for endothelial disease were EK

DSAEK vs DMEK

- DSAEK
  - Pros
    - Easier technique
    - Less tissue wastage
    - Less need for rebubbling
    - Easier access to pre-cut tissue
    - Can be performed in more complicated situations
  - Cons
    - Includes stroma and is additive
    - Can cause refractive shift
    - Interface may limit visual acuity

Financial Disclosure

- I have no financial interest in any of the subject matter presented.
DSAEK vs DMEK

- **DMEK**
  - **Pros**
    - More anatomically correct—just Descemet’s/Endothelium
    - No refractive shift
    - Quicker visual recovery
    - Higher likelihood of 20/20 vision
  - **Cons**
    - Technically challenging
    - High tissue wastage
    - High bubbling rate
    - More difficult to obtain pre-cut tissue, may add time/cost
    - Not advised in complicated situations

Why Should I Still Care About DSAEK?

- If DMEK is so great, why even bother learning/practicing DSAEK?

DSAEK is better for:

- Surgeons first learning to do EK
- Surgeons with a lower-volume corneal practice
- Surgeons without access to pre-stripped DMEK tissue
- Surgeons concerned with OR time and cost
- Surgeons without the ability or desire to rebubble in the office
- Eyes with:
  - ACIOL
  - Aphakia or Dislocated IOL
  - Post-vitrectomy or buckle
  - Post-trab or shunt
  - Iris abnormalities

DSAEK Technique—Recipient Preparation

- Place circle on cornea as a guide
- Two 1-mm paracentesis incisions at right angles to main wound
- Intracameral lidocaine if using topical anesthesia
- Miostat/miochol
- Healon in AC (no dispersive visco)
- 2.75 mm self-sealing keratome incision
### DSAEK Technique—Recipient Preparation

- Score and strip Descemet’s using reverse Sinskey hook
- Scrape peripheral 1 mm of bed using Terry scraper
- Widen wound to 5 mm
- Place inferior PI using Vanass scissors
- Remove Healon with IA (can be done after punching donor)

### Recipient Preparation—Technique Pearls

- Keep paracentesis wounds relatively parallel to iris for better wound stability and better air control
- Don’t score Descemet’s too deeply to avoid involving stroma
- Try to keep Descemet’s in one piece (if possible)
- Add Healon throughout to keep chamber deep

### DSAEK Technique—Donor Preparation

- Pre-cut Tissue Criteria:
  - Age: young as possible
  - Date of Death: < 1 week
  - Cause of Death: nothing weird
  - Death-to-Preservation: <20 hours, <12 if possible
  - Endothelial cell count: >2400
  - Optical zone: >8 mm
  - No pseudophakia or prior ocular surgery
  - Serologies: Negative
  - Graft thickness: <150 microns, ideally 100-120
### DSAEK Technique—Donor Preparation

- Soak donor in BSS plus for about 10 minutes
- Punch same size as stromal bed – Sharpoint punch
- Small amount of viscoelastic on endothelium
- Fold into 60/40 taco
- Load into Charlie forceps

### Donor Preparation—Technique Pearls

- Use stable surface under operating scope
- Do not use too much Healon to coat endothelium
- Try to grab stromal edge of graft when folding (easier with thicker grafts)
- Use tips of Charlie forceps to capture graft once loaded

### DSAEK Technique—Donor Insertion/Deployment

- Irrigate interface (outside of taco) with BSS
- Deepen AC with BSS
- Insert graft gently—AC will be flat
- Close wound with 10-0 nylon interrupted sutures
- Deepen AC with BSS from side of fold until flap drops down
- Inject air into taco from other side to deploy
- Recenter with reverse Sinskey
- Fill AC with air, allow to rest 10 mins
- Squeegee with cannula
- Inject BSS to remove air and normalize IOP
- Dilating drops, collagen shield with Antibiotic/steroid
**Donor Insertion—Technique Pearls**

- Irrigate graft well prior to insertion to remove excess Healon.
- Try to insert in one smooth motion.
- Pronate forceps once graft is inserted to get them to release the graft.
- Once graft is deployed, use either paracentesis to fill AC with air, depending on which is more air-tight.
- Use this same paracentesis to add BSS later to prevent air egress.
- Decompression during air removal is a very common cause of dislocation, so start over if necessary.

**Taking DSAEK to the Next Level...**

- Using insertion devices
- Performing DSAEK in complicated eyes
- Combining DSAEK with other procedures

**Issues with Standard Insertion Techniques**

- Issues with standard insertion:
  - Greater trauma to the graft
  - Less controlled insertion
  - Greater endothelial cell loss
  - Greater difficulty with deployment
  - Higher risk of graft inversion
  - More manipulation of graft
Numerous glides and insertion devices have been developed for DSAEK. Attempt to preserve endothelium and make insertion and deployment easier and safer. Allows controlled insertion of graft in a particular configuration. Minimizes handling of graft. Minimizes compression/trauma during insertion. Particularly helpful for difficult cases: post-Trab, ACIOL. Cost can be an issue in ASC’s. Examples: Mini-Busin glide, Endoglide, Endoserter, NCI.

Mini-Busin:
- Multiple-use glide to coil graft for insertion
- Can be used with Ultrathin grafts
- Allows for smaller wound
- Preserves orientation for easier deployment
- Requires graft to be pulled in from across AC
- Requires use of AC maintainer
- Does not prevent endothelium from touching itself while coiled

Endoglide:
- Single-use insertion device for DSAEK
- Developed by Donald Tan
- Loads graft into a “double-coil
- Endothelium does not touch itself
- Seals wound for more stable chamber
- Requires graft to be pulled in from across AC
- Endoglide-Ultrathin allows for sub-100 micron grafts
- Other insertion devices may be as or more effective
**Insertion Devices—Endoglide**

**DSAEK in Post-trab/shunt Eyes**
- Use clear corneal incision to avoid poor conjunctiva
- Consider insertion device to aid deployment
- May need to inflate with more air as air may egress through shunt
- Leave larger air bubble at the end of case
- Be aware of hypotony from air loss during the case

**Combining DSAEK with Phaco**
- Standard Phaco is simple to combine with DSAEK
- Do not use cyclogyl or homatropine
- May need to debride epithelium for better view
- Do not use dispersive viscoelastics
- Slightly smaller capsulorhexis is preferable to prevent air from entering capsular bag
- DSAEK typically causes +1.00 to +1.50 shift due to meniscus graft, so target IOL accordingly
- Phaco closer to endothelium
  - Better view through hazy cornea
  - Less chance of posterior capsule rupture
DSAEK in Eyes with ACIOL
- **ACIOL**
  - IOL needs to be stable, and non-mobile
  - AC needs to be deep
  - Consider use of an insertion device, as AC depth and air bubble are difficult to manage in one-chamber eye
  - Leave more air in the eye as air may egress posteriorly
  - Consider IOL exchange to a posterior chamber IOL if not enough room in AC

Combining DSAEK with IOL Issues
- **Aphakia or Dislocated IOL**
  - Must do a secondary IOL or IOL exchange prior to DSAEK
  - Procedures can be done staged or combined
    - **Staged**
      - Gives more time for lens to heal and become stable
      - No wasting of corneal tissue if IOL procedure has a complication
      - Delays visual recovery
    - **Combined**
      - IOL may not be as stable depending upon technique
      - Only risk of one trip to the OR
      - Quicker visual recovery

Combining DSAEK with IOL Issues
- Refrain from placing an ACIOL—can cause difficulty with DSAEK and endothelial damage
- Options for IOL:
  - Iris-fixated PCIOL
  - Scleral-sutured PCIOL
  - Glued IOL
- Each technique has pros and cons
- Choose technique that is most familiar and best-suited
- I typically choose glued IOL as it does not rely on intact iris, and no sutures to degrade

IOL Exchange (Glued IOL) with DSAEK
Summary

- EK is the gold standard for endothelial disease
- DSAEK remains the most common EK procedure
- DMEK shows promise, but surgeons still need to be excellent at DSAEK
- DSAEK is still the preferred technique for beginning and lower-volume EK surgeons
- DSAEK will continue to play a role in many situations where DMEK is not possible

Reverse Sinskey: STORZ E3119

Terry Descemet Scraper
Storz: E3124

Charlie Forceps: STORZ ET3121
Sharpoint UltraFit Coronet Donor Punch Set

Mini Busin Spatula: Moria 20007

Tan EndoGlide – Ultrathin: Angiotech 11823

MST Duet Forceps 23g
Microsurgical Technology