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

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• I have no financial interest in any of the subject matter presented.

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
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**DSAEK vs DMEK**

- **2014 EBAA:**
  - 28,961 EKs done (38% of all transplants)
  - 76.2% of transplants for endothelial disease were EK
  - In the US:
    - 89% DSAEK
    - 11% DMEK

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**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

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**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-stripped 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?

Why Should I Still Care About 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)
- 2.4 mm self-sealing keratome incision
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**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)

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**Recipient Preparation**

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**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 in one piece (if possible)
- Add Healon throughout to keep chamber deep
**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

- 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
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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

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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

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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
### Insertion Devices

- 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, Endosertor, NCI

### Insertion Devices—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
Insertion Devices—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
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**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

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**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

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**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

- **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
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