Patient–Donor Cornea Matching

Matching the right donor to each patient can facilitate DMEK surgery and subsequently enhance the outcomes. Factors such as donor and patient age, graft characteristics, and the patient´s eye anatomy (e.g. anterior chamber depth) can influence surgical handling. Thus, minimal graft manipulation may then have an impact on visual recovery and long-term results. Thoughtful consideration of these parameters helps ensure optimal compatibility between donor tissue and recipient needs.

General allocation principles

- Match tissue to both patient needs **and** donor characteristics to use all donated corneas efficiently.
- Priority factors: **surgery type** (DMEK/DSEK/PK/advanced), **donor age, graft diameter, ECD, clear-area size, comorbidities**, and **logistical constraints**.
- For eye bankers: Be aware of the **surgeon's preferences**.
- For surgeons: Be aware of the challenges in **donor availability**.

Allocation challenges

- Matching opportunities depend heavily on released **corneas in stock** in the eye bank, combined with **surgeons´ preferences** and **surgical demand**.
- There may be a **large variety** in available/released corneas and surgical demand.
- Advice to surgeons:
    - Avoid planning **too far ahead.**
    - Avoid planning **multiple young PK recipients** in the same week.
    - Be **flexible** with your planning if requested tissue is not available.

Surgery type selection

- For **DALK** and **PK**: Clear area > 8.5 mm (pref. > 9.0 mm).
- For **DMEK**: Also, corneas with scars, small clear area, donor with connective tissue disease.

Donor age selection

- **Patient age** (preferably donor not >30y older than recipient).
- **Younger donors** → tighter rolls, ideal for **shallow chambers or phakic eyes**.
- **Older donors** → looser rolls, preferable for **deep or vitrectomized eyes, as well as eyes with a failed penetrating graft**.
- Usually a young donor (e.g. <65 years of age) results in tight rolls but **not always**! And vice versa. So, after preparation it may be necessary to switch the planning again when the eye´s anatomy surely requires the ordered graft characteristic! (Note: mainly each graft can be used in almost every eye, certain graft characteristics may simply facilitate the surgery in certain eye conditions. Certain surgical techniques may still allow graft unfolding in an undesired donor characteristic /patient anatomy ´mismatch´).

Donor endothelial cell density (ECD)

- Highly challenging cases may benefit from **higher ECD, however this is** not evidence proven.
- Reserve **high ECD** corneas for young patients. They will need the tissue longer.

Graft size customization

- **Large grafts** (8.5–9.5 mm): better for **deep chambers, vitrectomized eyes, post-PKP**,
- **Small grafts** (7.5–8.0 mm): better for **shallow chambers, anterior synechiae, glaucoma tubes, phakic eyes**.
- **Eyes with anterior synechiae may even require grafts <7.0 mm**
- If donor request is not met → **stay flexible** and adapt technique (e.g. use safety-net sutures).

Advanced customization

- Use OCT/Pentacam to evaluate whether scars or anatomy allow **selective endothelial procedures** instead of PKP.
- **Quarter-DMEK / Hemi-DMEK / small-diameter DMEK**: useful for **localized Fuchs** or selective areas of edema.
- Endothelial migration can support **partial clearance** in selective cases.

HLA matching

- Rarely needed for **low-risk corneas**.
- Currently **no convincing evidence of benefit** for DMEK or most PK cases.
- Avoid if it causes tissue delays or reduces availability.
- In NL all donors < 65y are HLA-genotyped.
- Participants stated that in their country HLA-typing for cornea transplantation is not performed.

Tips & Tricks

Marking

- Surgeon-dependent preference; can leave **long-lasting stromal marks**.
- Many surgeons successfully operate **without graft marking**.

Handling postoperative challenges

- **Edge scrolls** = peripheral non-attachment → often harmless; allow spontaneous healing.
- Peripheral edema after DSEK with good vision → usually **symptom management**, surgery only if severe.

Surgeon mindset

- Standard grafts work for most cases.
- Customization **improves handling and confidence** in complex anatomy.
- **Be innovative and adaptable** with the tissue that is available.