Known and Potential Complications of SMILE

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- Failure to obtain an adequate suction
  - Correct treatment pack size (S in myopic cases)
  - Use speculum with suction
  - VisuMax internal settings o.k.? (Hotline)

Decentration (mm) from pupil centre

- Watch the 1st Purkinje projection (observation mode)
- Apply suction after ≅ 85-90% applanation
- Do not apply suction > 3 times

Decentration (mm) from corneal apex

- ReLEx
  - Mean Decentration: 0.326mm
  - Nasalisation of the fixation in relation to the pupil centre = positive angle κ
- fs-LASIK
  - Mean Decentration: 0.452mm
  - Centration is randomly distributed

Pre-operative

Centration: minor nasalisation is normal (angle κ)
**During laser cut**

- **Suction loss**
- Intermittent laser stop (fluid in interface)
  - Poor dissection
- Incomplete cut (e.g. incomplete sidecut)

**Dissection**

- Epithelial slugh off (basement membrane dystrophy): Contact lens, steroids (DLK!)
- Cap perforation & tear: I usually use >120µm cap, adapt and leave: usually heals well
- Tear at the incision site for SMILE: usually not a big problem
- Incomplete side cut: always keep a micro-blade in the OR
- Wrong plane:
  - use „hook movement“ from anterior lip or invert the edge (incisions >3.5mm)
  - separate from distal end with Mehta reversed dissector

**Microstriae after SMILE?**

- ReLEx SMILE does not induce any microstriae in the cap when examined by slit-lamp, unless stained with fluorescein (D. Reinstein)
  - Manual stretching + ironing toward the periphery at the conclusion of procedure helps

**VisuMax® software assists you in decision making:**

1. Convert to ReLEx FLEx or continue with SMILE with a larger cap, if the bottom plane has been accomplished
2. Abort procedure, if „suction loss“ occurred during the first cut: perform microkeratome Lasik or PRK with MMC or phakic IOL later
3. A vertical opening cut is possible at any time
4. Software „flap making tool“ can be used later in time

**Bowman's Layer Microdistorsions (BLMD)**

- can be detected by OCT after SMILE
- correlate with the extent of correction*
- BLMD do not produce visual symptoms in the mid-term

*Wong CW et al., JCRS 2014
*Liu Y-C, Pujara T, Mehta JS, PLOS One 2014
*Messerschmidt-Roth & Sekundo 2013

*Courtesy of R. Shah
**Post-op**

1. Epithelial plug
2. Lenticule "left-overs" and debris in the interface
3. DLK
4. "Haze" in the interface
5. Ectasia
6. Infection
7. Unusual cases

**Epithelial ingrowth**

- Always only a plug (so far)
- Observe
- Intervene only if progressive
- Put a stich

**Lenticule remains**

- Very serious complication, if
  - Within optical zone (more prone in hyperopic treatments)
  - Usually at the edge in myopic treatment
    - Irregular astigmatism
    - "Central island" in hyperopia treatment (experimental)
  - Dissect from the middle toward the periphery, respect counter-action
  - Use curved dissector
  - Use forceps only after complete dissection

**Debris**

- Usually at the edge
- Do not affect vision
- Consider a longer course of steroids to prevent local inflammation
Haze/DLK

- DLK
  - Incidence 1.6%*
    - erosion at the opening incision
    - thin lenticules \( \approx 100\mu m \)
  - Use steroids vigorously

- Haze
  - After DLK
  - As „primary scarring“
  - Usually does not affect vision
  - Consider a longer course of steroids (e.g. FML) after difficult dissection

*Zhao J et al, JCRS 2015

Decentration

- Decentration (has been discussed above): never saw clinical significance.
  Otherwise topography guided excimer ablation (Ivarsen et al.)

My worst case

Ectasia

True ectasia: only one case reported after FLEx (Blum M. et al). Misdiagnosed form fruste Keratoconus: CXL done

Ectasia secondary to forceful dissection („via falsa“): RGP, DALK, if CL intolerance

Infection/unusual cases

- Infection: no reports in the literature, but probably not very different from fs-Lasik
- *Simultaneous uneventful SMILE for -6D
- Post-op UDVA
  - OD=0.8
  - OS=1.4

- Deterioration of vision OD
- Unchanged OS

* Courtesy of K. Shimizu, Kitasato University/Japan
**Conclusion**

- Despite its novelty, complications after SMILE are rare, even with new users.
- In the vast majority they are similar to fs-Lasik and can be addressed accordingly.
- However, SMILE requires more manual work and has a steep learning curve.
- Surgeons novel to this technique should stick to the suggested training protocol.