FLACS
Femtosecond Laser Assisted Cataract Surgery
Transition Of Surgical Procedure

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Commercially Available Laser Systems For FLACS

<table>
<thead>
<tr>
<th>Aspect</th>
<th>LenSx (Alcon)</th>
<th>Catalys (AMO)</th>
<th>Victus (B&amp;L)</th>
<th>LensAR (Topcon)</th>
<th>LDV Z8 (Ziemer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface Design</td>
<td>contact lens with rounded lens</td>
<td>Liquid Optics™ (fluid-filled)</td>
<td>Rounded lens</td>
<td>Robocone™ (Immersion-lens)</td>
<td>(PI 1: Appl.) PI 2:fluid-filled</td>
</tr>
<tr>
<td>Imaging</td>
<td>3D FD OCT</td>
<td>3D Spectral Domain OCT</td>
<td>Online OCT</td>
<td>3D-CSI (Scheimpflug)</td>
<td>3D SD-OCT</td>
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<tr>
<td>Surface detection</td>
<td>Manuel</td>
<td>Automatically Manuel</td>
<td>automatically</td>
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<td>Integrated table</td>
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<td>yes</td>
<td>yes</td>
<td>no</td>
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<tr>
<td>Dimension (no table)</td>
<td>48 x 62”</td>
<td>35” x 65”</td>
<td>41 x 81”</td>
<td>78 x 36”</td>
<td>101 x 70 cm</td>
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<td>System source</td>
<td>Femto-LASIK (Intralase)</td>
<td>Cataract surgery</td>
<td>Femto-LASIK</td>
<td>Presbyopia surgery</td>
<td>Femto-LASIK 24, 24, 26</td>
</tr>
</tbody>
</table>
You need an additional 15 m²
Limitations: FLACS

- Fail to fit PI
- Poor transparency of cornea
- Poor transparency of lens

Limitations: White Cataract
Laser Tissue Interaction

Photodisruption: Tissue dissection by mechanical force of expanding gas bubbles
Laser Tissue Interaction

Variable Numerical Aperture

Applications:
- Cornea
- Anterior lens capsule
- Lens fragmentation
- Posterior lens capsule
360° High-Definition OCT Scan

See what you cut…
…cut what you see!

Circular OCT scan
- Tilt detection
- Depiction depth up to 8.5 mm

Indications: FLACS
- Refractive Lens Exchange (RLE)
- Cataract (senile/juvenile)
- PEX
- Weak zonula/ysis
- Flat ACD
- Low ECC (FuchsED)
Laser Cutting

° CCI
° Sideports
° AK / ISAK
° Rhexis
° Nucleus division

Laser Rhexis
Pie Pattern: Phaco
Dice Pattern

Dice Pattern: Phaco
Small Pupil

Other Indications
Other Indications

Customized Refractive Alignment

- Digital Imaging System
- Standard in LVC
Customized Refractive Alignment

Intended Rhesis Offset  IOL centered on Visual Axis

Clinical Results: Capsulotomy

**Femtosecond laser capsulotomy**

<table>
<thead>
<tr>
<th>Manual Results (Mean ±SD)</th>
<th>Laser Results (Mean ±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation from intended diameter</td>
<td>337 μm ± 258μm</td>
</tr>
<tr>
<td>Circularity (1=perfect circle)</td>
<td>0.80 ± 0.15</td>
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</tbody>
</table>

**Manual Capsulorhexis**

**Laser Capsulotomy**
Effective Phacoemulsification Time

Impact of Crystalline Lens Opacification on Effective Phacoemulsification Time in Femtosecond Laser-Assisted Cataract Surgery


- **n = 150**
  - Group 1: 88 femtosecond laser-assisted surgery
  - Group 2: 62 phacoemulsification
- Effective phacoemulsification time (EPT) was significant lower in group 1
- Endothelial cell loss was significant lower in group 1

Endothelial Cell Loss @ 3 Months

Kohnen, unpublished research

Advantage FLACS
Macular Edema
Kohnen, unpublished research

No significant difference

Rise IOP @ 24 hours
Kohnen, unpublished research

No significant difference
Advantage FLACS

Anterior Capsular Rupture

Standard FLACS Rhelix Ø: 4.8mm
No adverse effects with Rhelix Ø: 5.5mm

Disadvantage FLACS
### Posterior Capsular Rupture

Kohnen, unpublished research

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>FLACS</th>
<th>CCS</th>
<th>Odds Ratio</th>
<th>95% CI</th>
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<td>Korf et al 2016</td>
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<td>Total events</td>
<td>204</td>
<td>204</td>
<td>1.00</td>
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</table>

No significant difference

### FLACS vs. Conventional Cataract Surgery

**Pro FLACS**
- Less US energy
- Less Endothelial Cell Damage
- Less Zonular Stress
- Better Refractive Alignment
- Superior Corneal Astigmatic Incisions
- Superior Circularity
- Superior Reproducability

**No Difference to CCS**
- Posterior capsular rupture
- Macular edema
- Intraocular pressure
- Other surgical complications

**Contra FLACS**
- Anterior capsular rupture
Increasing Demand For FLACS

n = 2768 eyes