Femtosecond assisted corneal cross linking in early keratoconus
2 years follow up

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Ideal procedure

• Safe (fewer complications)
• Effective
  – UVA Transmission
  – Riboflavin Stromal saturation
• Painless
• Easy to perform
• Corneal UVA absorbance is highest in the stroma. Its thickness is more than 10 times larger than that of the other structures.

• Epithelium will reduce transmission by less than 10%.

Kolozsvári et al. UV Absorbance of the Human Cornea in the 240- to 400-nm Range, IOVS, July 2005, Vol. 43, No. 7
- Epithelium blocks transfer of large molecules MB > 100
- Riboflavin: MB > 300
- Tetracaine can dissolve protein intercellular bonds
  - T. Seiler 2007

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Corneal dense white spots after Collagen Cross Linking  Papadopoulos N, Balidis M et al J Refr Surg JRS-2008-270 Accepted for publication

Salzmann like white lesions – ‘overcrosslinking’

White scarring after peripheral melting
intrastromal
CCL in Pellucid Marginal Degeneration

• Yellow arrow.
  • Optical reflection Descemet’s folds (lower right)
  • CXL effect on deep stroma (left)

• Red arrow (upper right)
  • Riboflavin saturation
Surgical parameters

- Femtosecond assisted 3 mm wide circular intrastromal pocket, leaving a central 3 mm area clear.
- Depth 200 μm with two 1.5 mm incisions
- 0.1% Riboflavin–5-phosphate dextran intrastromal infusion
- UVA 30´ with Riboflavin–5-phosphate film every 10´.
Femto-CXL

- 9 patients – 12 eyes with early keratoconus
- Mean age 31 years (stdev 10 years)
- 5 male – 4 female
- Pre op CVA >0.7 Snellen decimal
<table>
<thead>
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<th></th>
<th>CVA</th>
<th>SPH</th>
<th>CYL</th>
<th>PACHY</th>
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<tr>
<td>Mean</td>
<td>0.92</td>
<td>-4.13</td>
<td>-3.23</td>
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Anterior segment OCT

YELLOW ARROWS FEMTO POCKET
RED ARROWS Demarcation line. Border area denuded from keratocytes
Results

Mean ± SD Spherical Equivalent Refraction (D)

Time After Surgery (months)
Results

![Graph showing various data points and lines labeled DKmax, DKmin, DHmax, and DHmin. The graph plots Case Number on the x-axis and Value on the y-axis.]
Femto-ISCXL

- Utmost accuracy of cross linking depth. In almost all cases 80-90%
- Preoperative planning for riboflavin depth
- Safe effective and painless procedure
- Utilize of anterior stroma for future refractive procedures
Further questions

• Do we need 80-90% of CXL in all keratoconus cases?
• Do we need a more selective treatment?
• Can we selectively treat the cone by creating a pocket at the base or around the cone?
Σας ευχαριστώ

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