Comparative evaluation of laser correction results in induced post-keratoplastastic ametropia by FemtoLASIK and LASIK

Alexander Doga

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Author: Doga, Alexander
Session: Free Paper Session: Corneal Femtosecond
Presented at: Amsterdam 2013
Date: October 07, 2013 16:08
Room: Elicium 1
Laser ametropia correction provides in patients after Penetrating Keratoplasty (PKP)

- Efficiency
- Predictability
- Stability of refraction effect

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Post-PKP cornea characteristics:
- The complicated topography of cornea
- The uneven thickness of the graft
- The incomplete scarring

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Complications of microkeratome using after PKP

- risk of Post-LASIK corneal ectasia
- corneal perforations
- local thinning
- defects of tissue near scar after flap creation using mechanical microkeratome
- epithelial defects
- high frequency of flap disadaptation and displacement, striae, "Button hole"

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Femtosecond Laser VS mechanical microkeratome

Low risk of:
- corneal perforations
- local thinning
- defects of tissue near scar after flap creation
- epithelial defects
- flap disadaptation and displacement

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To compare the results of FemtoLASIK and LASIK methods in an induced refractive error correction after penetrating keratoplasty

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Patients

We observed 29 eyes in patients with induced ametropia after the PKP, patient age ranged from 18 to 36 years (mean age was 27 ± 3).

Criteria for inclusion:
- ≥ 1 year after removal of sutures
- stability of refraction effect ≥ 6 months
- ametropia ≥ 2 D
- regular astigmatism

Exclusion criteria:
- disease of graft
- corneal thickness ≤ 500 μm or local thinning
- ectasia of cornea
- ophthalmic or somatic pathology

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Methods

I group: 11 eyes
Femto LDV
(Ziemer, Switzerland)

II group: 18 eyes
Zyoptix XP
(Perfect Vision, Germany)

Diameter and thickness of the corneal flap:
- the diameter was calculated taking into account optometric parameters depending on the ablation zone and was independent of the graft diameter
- the thickness was selected based on data of the central graft pachymetry and the degree of refractive error

Algorithm of ablation:
- standard
- excimer laser “MicroScan-Visum” (Russia)
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Methods

Optical Coherent Tomography of anterior segment
- investigation of central cornea zone in the High Resolution Cornea mode

Confocal Microscopy
- in vivo evaluation of corneal histomorphology

Visante OCT, Carl Zeiss Meditec Inc.

ConfoScan 4, Nidek
## Results

<table>
<thead>
<tr>
<th></th>
<th>Pre-op. Mean ± SD (range)</th>
<th>12 months post-op. Mean ± SD (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FemtoLASIK</td>
<td>-2.64±2.83</td>
<td>-0.25±0.61</td>
</tr>
<tr>
<td>LASIK</td>
<td>-2.67±3.06</td>
<td>-0.29±0.6</td>
</tr>
<tr>
<td><strong>Cyl</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FemtoLASIK</td>
<td>4.53±2.7</td>
<td>1.23±1.64</td>
</tr>
<tr>
<td>LASIK</td>
<td>4.48±2.72</td>
<td>1.34±1.62</td>
</tr>
<tr>
<td><strong>UDVA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FemtoLASIK</td>
<td>0.12±0.1 (0.01 to 0.6)</td>
<td>0.51±0.23 (0.08 to 1.0)</td>
</tr>
<tr>
<td>LASIK</td>
<td>0.11±0.1 (0.01 to 0.6)</td>
<td>0.5±0.24 (0.1 to 0.6)</td>
</tr>
<tr>
<td><strong>CDVA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FemtoLASIK</td>
<td>0.58±0.25 (0.1 to 1.0)</td>
<td>0.69±0.18 (0.4 to 1.0)</td>
</tr>
<tr>
<td>LASIK</td>
<td>0.55±0.26 (0.1 to 1.0)</td>
<td>0.64±0.25 (0.3 to 1.0)</td>
</tr>
</tbody>
</table>

\[ p < 0.05 \]
Dynamics of the Uncorrected Vision Acuity

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Results of flap creation using Femtosecond Laser & microkeratome

Mean deviation in flap thickness

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Results of flap creation using Femtosecond Laser & microkeratome

Meniscus-form flap

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Acellular intrastromal corneal zone after LASIK and FemtoLASIK

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### Density of endothelial cells

<table>
<thead>
<tr>
<th></th>
<th>Pre-op.</th>
<th>Post-op.</th>
<th>% of loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>FemtoLASIK</td>
<td>1760 ± 247 cell/mm² (from 1019 to 2501)</td>
<td>1708 ± 236 cell/mm² (from 1000 to 2417)</td>
<td>1.6</td>
</tr>
<tr>
<td>LASIK</td>
<td>1750 ± 242 cell/mm² (from 1024 to 2476)</td>
<td>1710 ± 237.2 cell/mm² (from 998 to 2421)</td>
<td>1.8</td>
</tr>
</tbody>
</table>

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Comparative analysis of intraoperative complications

**FemtoLASIK**
- 2 eyes — was not a cutting of flap edge about 3 mm long

**LASIK**
- 6 eyes — epithelium defects

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Conclusion

- Corneal flap formed by a femtosecond laser, is more uniformity and has less deviation in thickness than a flap formed with microkeratome.

- The FemtoLASIK and the LASIK are effective and safe technologies to achieve high functional results in the correction of induced ametropia in patients after the PKP.
Thank you for your attention!

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