

# Comparative evaluation of laser correction results in induced post-keratoplastic ametropia by FemtoLASIK and LASIK (5 views)



## Alexander Doga

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

## COMPARATIVE EVALUATION OF LASER CORRECTION RESULTS IN INDUCED POST-KERATOPLASTIC AMETROPIA BY FEMTOLASIK AND LASIK

Doga A.V., Kachalina G.F., Mushkova I.A., Karimova A.N.

Authors have no financial or proprietary interest in any material or method mentioned

XXXI Congress of the ESCRS  
Amsterdam 2013



The S. Fyodorov Eye Microsurgery Federal State Institution, Russia

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Presented at:	Amsterdam 2013
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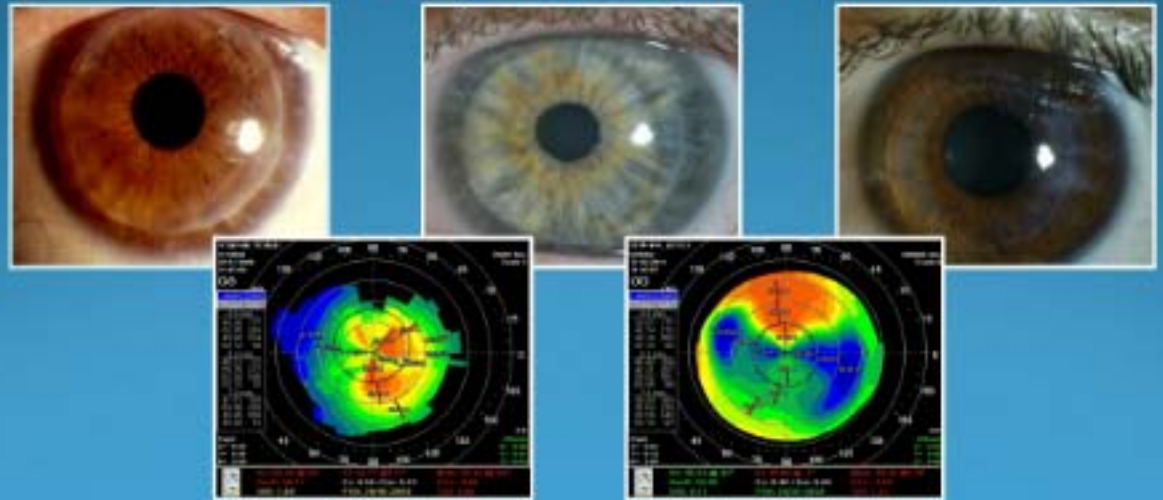
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## Laser ametropia correction provides in patients after Penetrating Keratoplasty (PKP)

- Efficiency
- Predictability
- Stability of refraction effect



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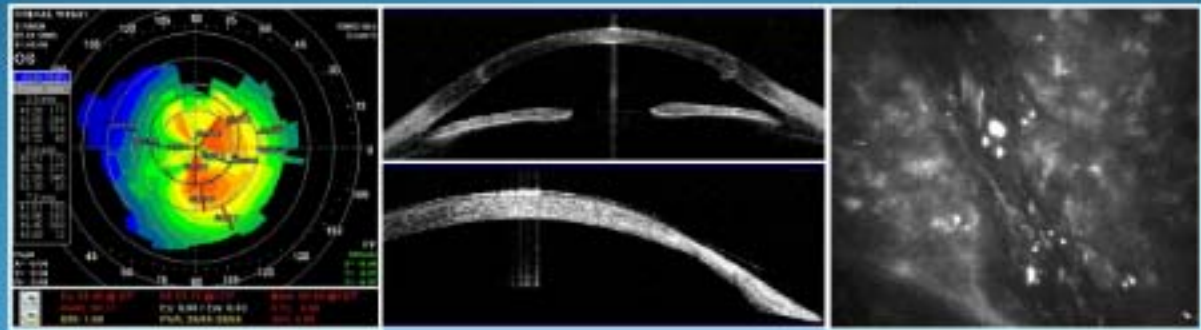
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### Post-PKP cornea characteristics

- The complicated topography of cornea
- The uneven thickness of the graft
- The incomplete scarring



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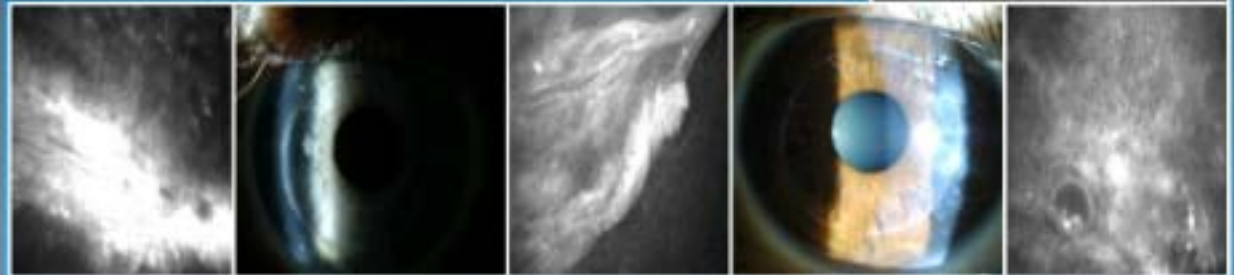
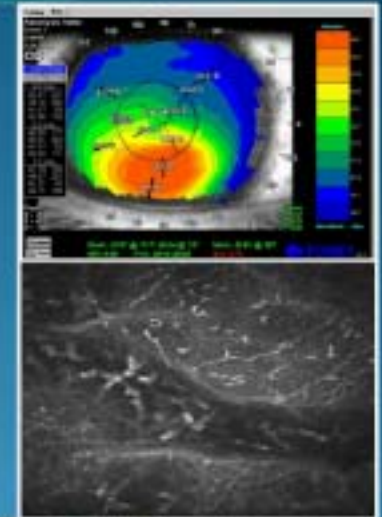


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### Complications of microkeratome using after PKP

- 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, strias, "Button hole"



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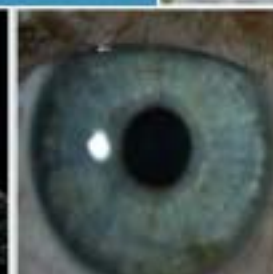
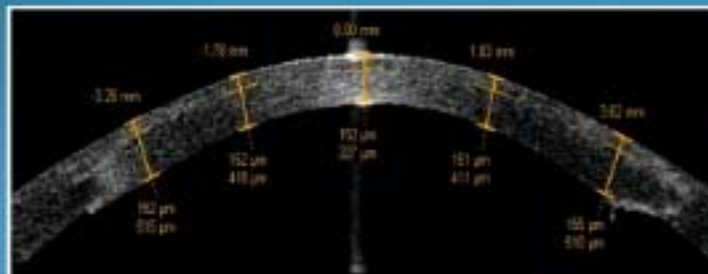
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### Femtosecond Laser VS mechanical microkeratome

#### 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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**Purpose**

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  $27 \pm 3$ )

### Criteria for inclusion:

- $\geq 1$  year after removal of sutures
- stability of refraction effect  $\geq 6$  months
- ametropia  $\geq 2$  D
- regular astigmatism



### Exclusion criteria:

- disease of graft
- corneal thickness  $\leq 500 \mu\text{m}$  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



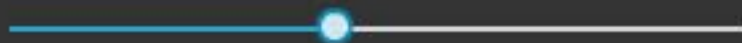
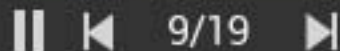
Visante OCT, Carl Zeiss Meditec Inc.

### Confocal Microscopy

- in vivo evaluation of corneal histomorphology



ConfoScan 4, Nidek



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## Results

		Pre-op. Mean $\pm$ SD (range)	12 months post-op. Mean $\pm$ SD (range)
SE	FemtoLASIK	-2.64 $\pm$ 2.83	-0.25 $\pm$ 0.61
	LASIK	-2.67 $\pm$ 3.06	-0.29 $\pm$ 0.6
Cyl	FemtoLASIK	4.53 $\pm$ 2.7	1.23 $\pm$ 1.64
	LASIK	4.48 $\pm$ 2.72	1.34 $\pm$ 1.62
UDVA	FemtoLASIK	0.12 $\pm$ 0.1 (0.01 to 0.6)	0.51 $\pm$ 0.23 (0.08 to 1.0)
	LASIK	0.11 $\pm$ 0.1 (0.01 to 0.6)	0.5 $\pm$ 0.24 (0.1 to 0.6)
CDVA	FemtoLASIK	0.58 $\pm$ 0.25 (0.1 to 1.0)	0.69 $\pm$ 0.18 (0.4 to 1.0)
	LASIK	0.55 $\pm$ 0.26 (0.1 to 1.0)	0.64 $\pm$ 0.25 (0.3 to 1.0)

$p < 0.05$

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### Dynamics of the Uncorrected Vision Acuity



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### Predictability ( $\pm 1,0 D$ )



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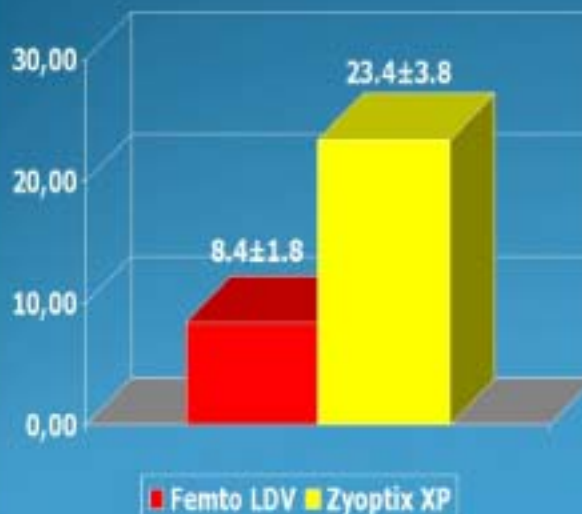
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## Results of flap creation using Femtosecond Laser & microkeratome

Mean deviation in flap thickness



Femto LDV  
 $8.4 \pm 1.8 \mu\text{m}$



Zyoptix XP  
 $23.4 \pm 3.8 \mu\text{m}$

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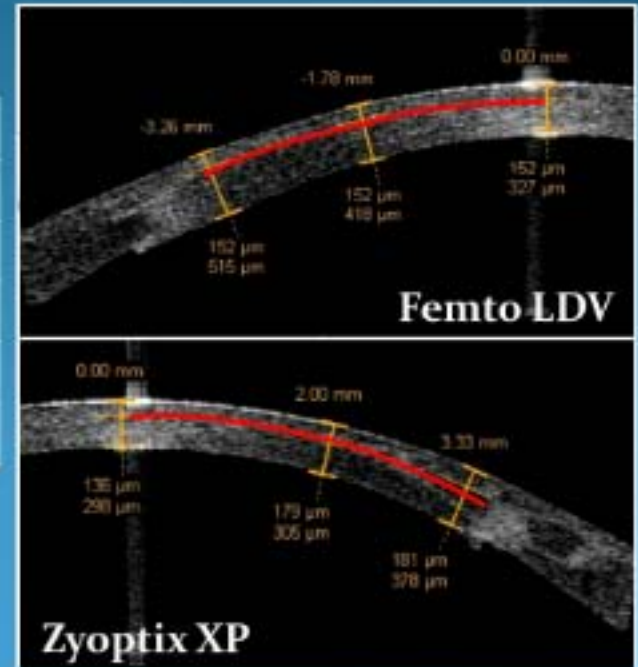
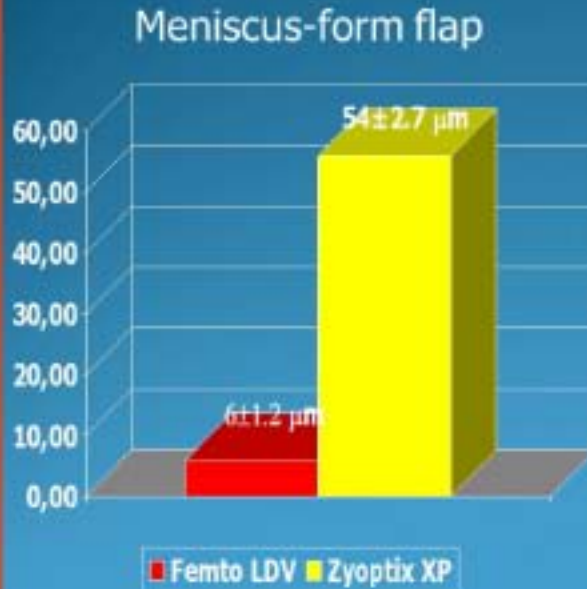


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## Results of flap creation using Femtosecond Laser & microkeratome



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### *Acellular intrastromal corneal zone after LASIK and FemtoLASIK*



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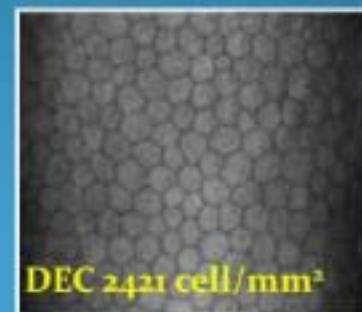
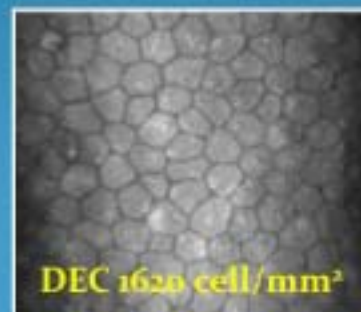
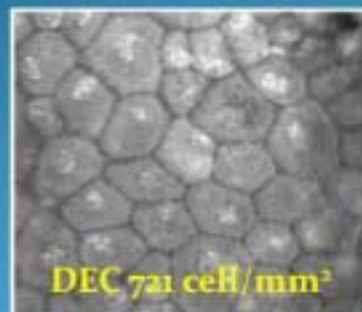


## Density of endothelial cells

	Pre-op.	Post-op.	% of loss
<b>FemtoLASIK</b>	1760 ± 247 cell/mm <sup>2</sup> (from 1019 to 2501)	1708 ± 236 cell/mm <sup>2</sup> (from 1000 to 2417)	1.6
<b>LASIK</b>	1750 ± 242 cell/mm <sup>2</sup> (from 1024 to 2476)	1710 ± 237.2 cell/mm <sup>2</sup> (from 998 to 2421)	1.8

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## Comparative analyse of intraoperative complications

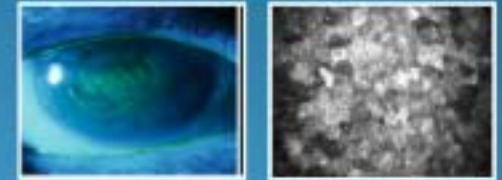
### FemtoLASIK

**3 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

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*Thank you for your attention!*

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