2nd Avedro CXL meeting,
ROME 2013

Crosslinking and Long-Term high myopic LASIK Stability Initial Clinical Findings in Contralateral Eye Study

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AJK is a consultant for Alcon, Wavelight and Avedro.

Next Saturday Athens!

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Clinical Ophthalmology

Long-term safety and efficacy follow-up of prophylactic higher fluence collagen cross-linking in high myopic laser-assisted in situ keratomileusis

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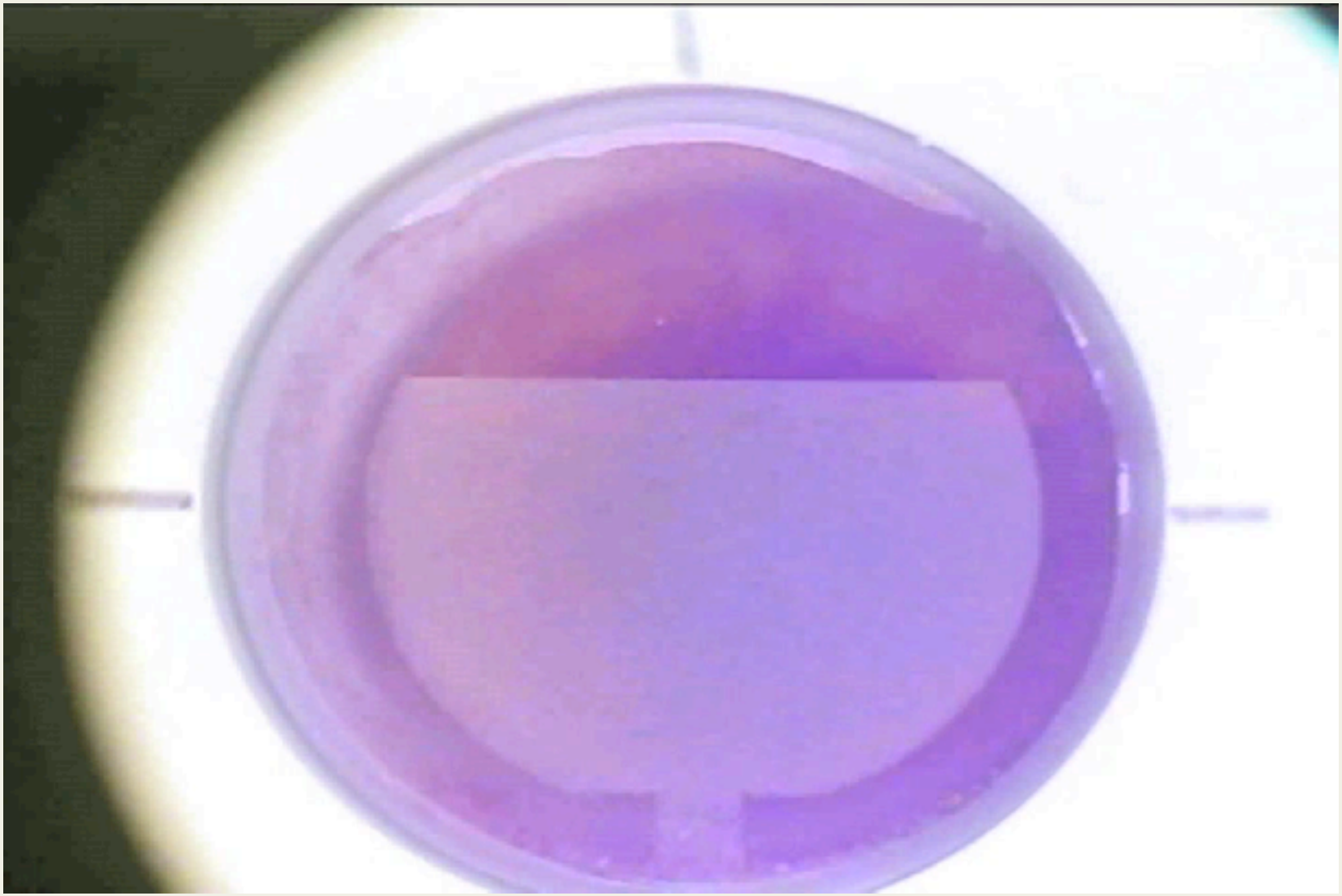
Methods

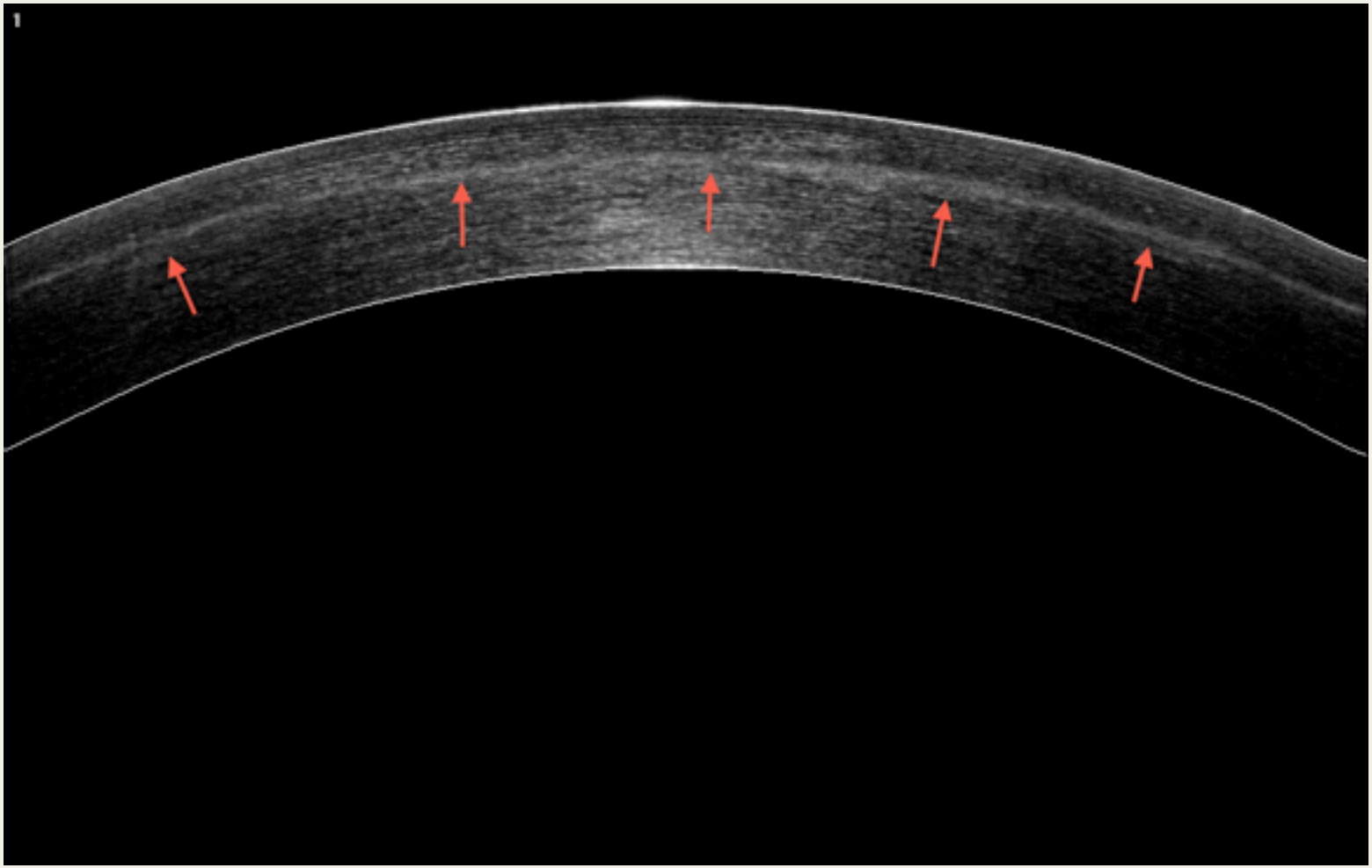
248 bilateral LASIK cases were evaluated peri-operatively for UCVA, BSCVA, refraction, keratometry (K), topography(T), total and flap pachymetry (tP & fP), endothelium(ECC). In all cases and in both eyes at the completion LASIK, a single instillation of 0.1% riboflavin sodium phosphate, was instilled in the flap interface, prior to flap reposition. In one randomized eye of each case (group A) higher fluence CXL was applied (30mW/cm^2 for 80 seconds). No CXL was applied in the contralateral eye (group B). Mean follow up was 2.5 years (1 to 3.5).

Results

- Mean values for Group a and Group B respectively: First postop day UDVA: 20/25 and 20/20, 6 months UDVA: 20/22 and 20/25, 6 months BSCVA 20/12 and 20/12, spherical equivalent -7.5D to -0.2D and -7.4D to -0.4D, K: 44.5D to 38D and 44.6 to 38.5D. 1 eye from group A and 5 eyes from group B regressed by over 0.5D and required re-treatment.



CXL evidence viewed in corneal OCT



Epithelial remodeling and CXL

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Figure 2

Average change in epithelial thickness at the center (d Center, green columns), on the mean over the 6 mm diameter (d Mean, blue), and on the 5 mm peripheral zone (d Peripheral, yellow), in comparison to the preoperative baseline levels at one day, one week, one month, and one year (12 months) postoperatively. Error bars indicate the standard deviation. All units in μm.

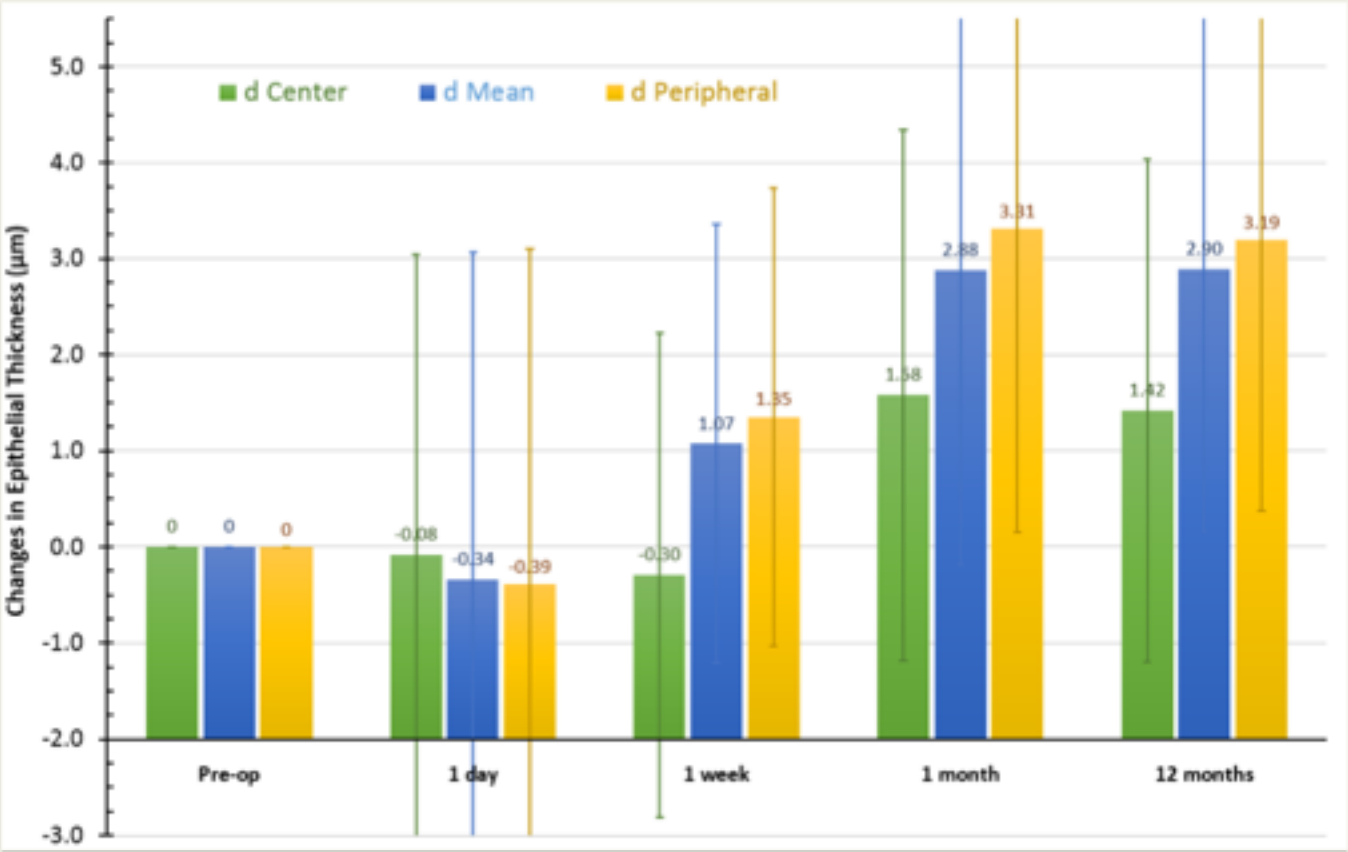
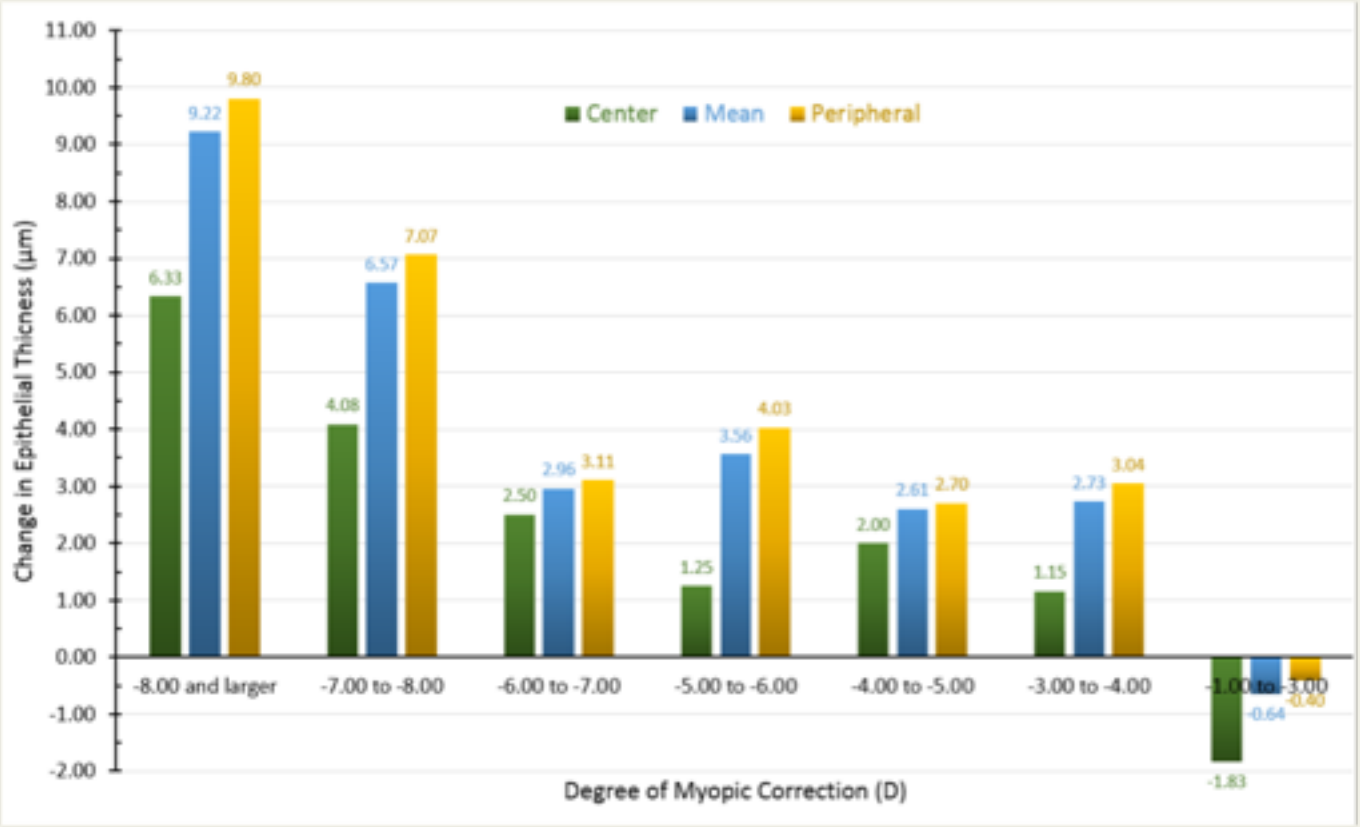


Figure 3

Correlation of increase in epithelial thickness at the center (green dots), on the mean over the 6 mm diameter (blue), and on the 5 mm peripheral zone (yellow), at the one-month following myopic LASIK correction.

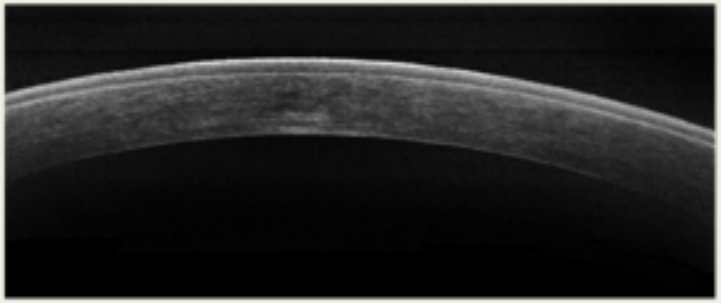


Epi in LASIK Xtra

Figure legends

Figure 1

Top, AS-OCT high-resolution cross-sectional meridional image of and bottom, detail from of the analysis and report software main report, showing corneal and epithelial three-dimensional pachymetry maps over the 6 mm corneal diameter. The symbol * indicates thickness minimum (both corneal and epithelial maps), and the symbol + thickness maximum (epithelial map only). The specific patient (right eye) received LASIK Xtra treatment for -8.00 D of sphere and -0.25 D of astigmatism, and was imaged one month postoperatively.



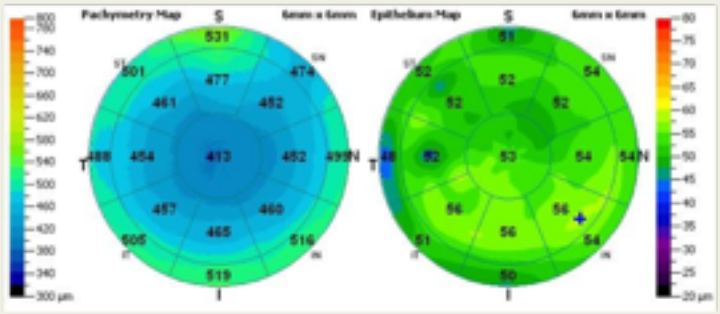


Figure 2

One-month postoperative increase in epithelial thickness at the center (d Center, green bars), on the mean over the 6 mm diameter (d Mean, blue), and on the 5 mm peripheral zone (d Peripheral, yellow), in comparison to the preoperative baseline levels for the two groups. Error bars indicate the standard deviation. All units in µm.

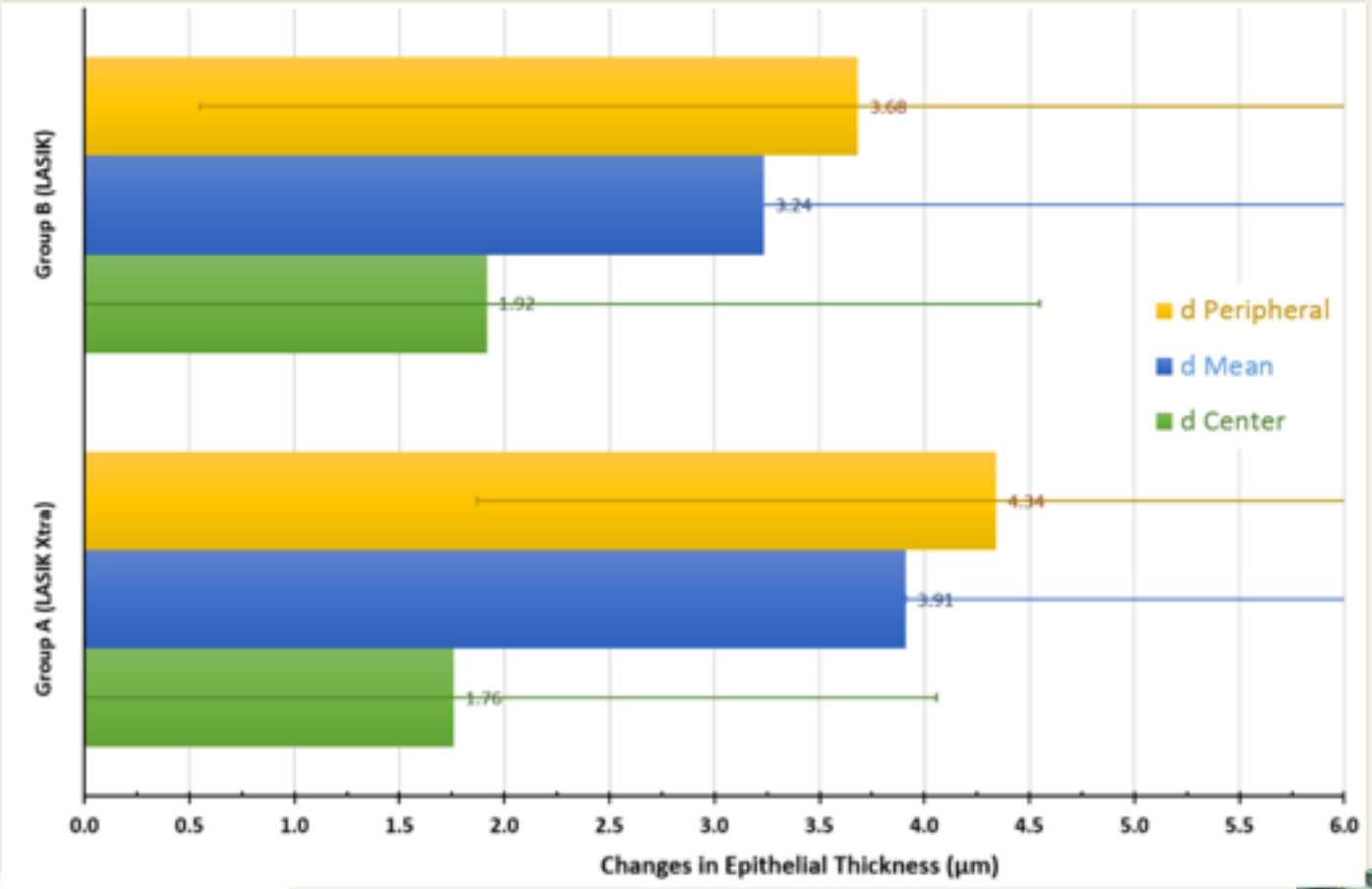
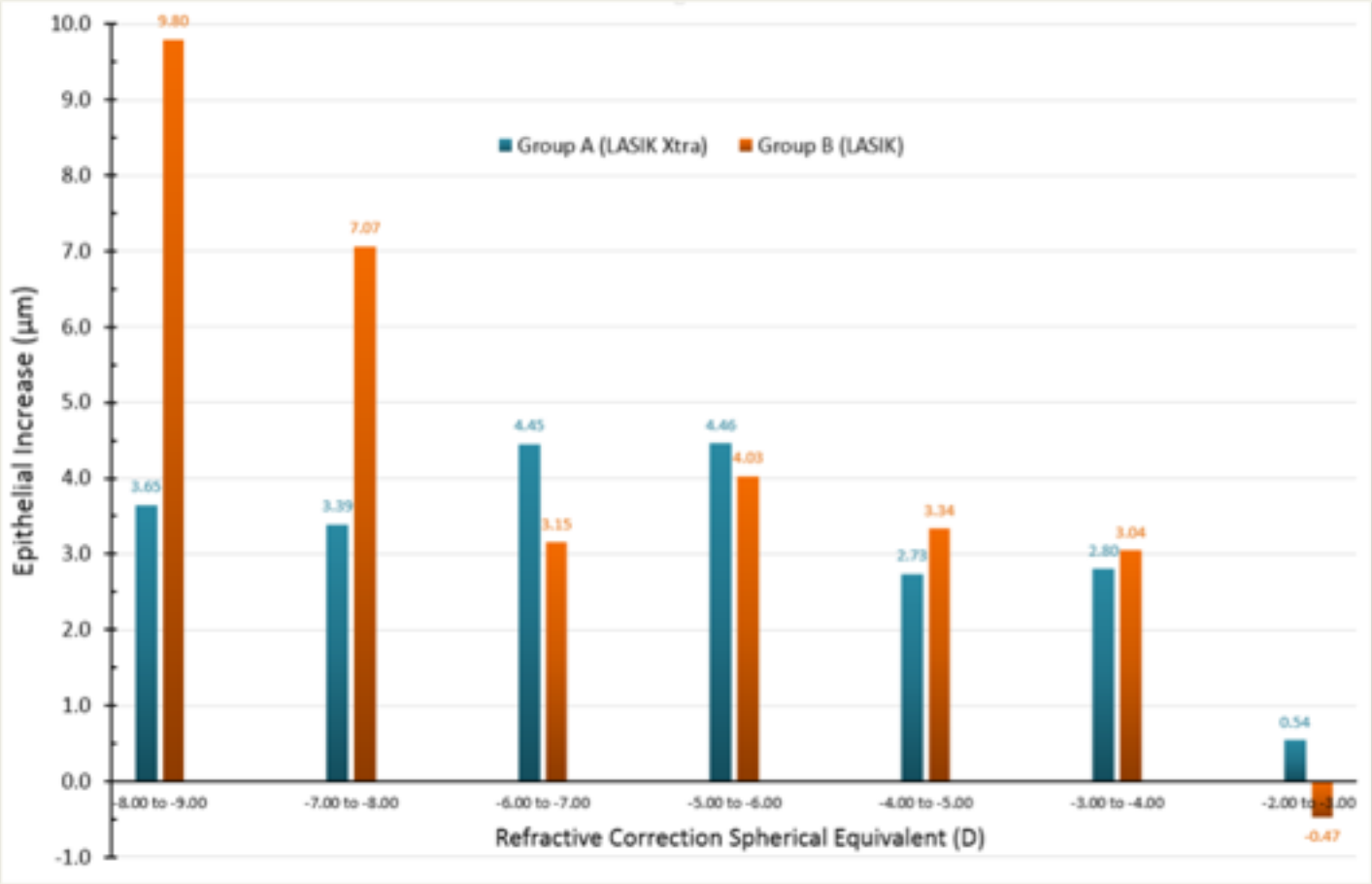


Figure 3

Correlation of increase in epithelial thickness at the 5 mm peripheral zone, one-month postoperatively, in comparison for the two groups, with refractive correction spherical equivalent.



Conclusions

LASIK Xtra for high risk LASIK cases appears to be a safe and effective adjunct treatment against potential ectasia. It appears to delay UDVA by 1-2 days, but has a higher stability record than standard LASIK and may prevent ectasia.

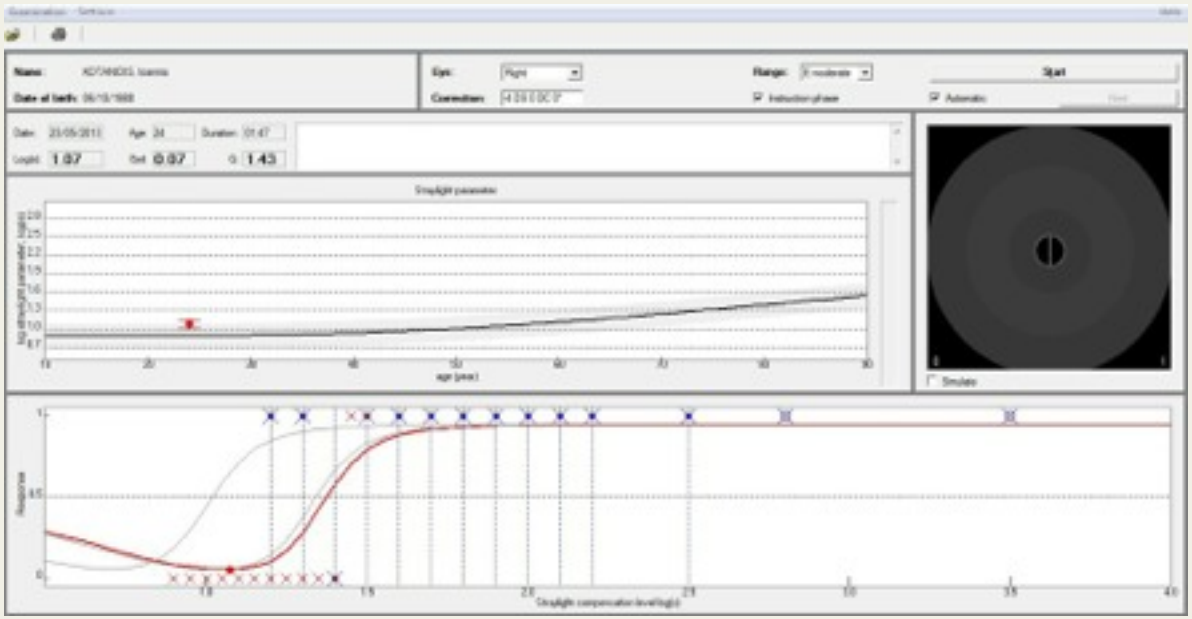
Clinical relevance:
1-Reactive epithelial hyperplasia after LASIK may represent
a biological marker of biomechanical instability

2-LASIK regression may be due to the epithelial hyperplasia

3-LASIK regression may be a “controlled” symmetric ectasia

Ongoing studies:

- Long term epithelium response
- Light scatter: C-quant and OQAS HD analyzer HD from Visiometrics-preliminary data show no difference in liht scatter aftr first week with LASIK Xtra



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