Femto Cataract and anterior segment surgery

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Laser Cataract Surgery 1999-2 mm barrier

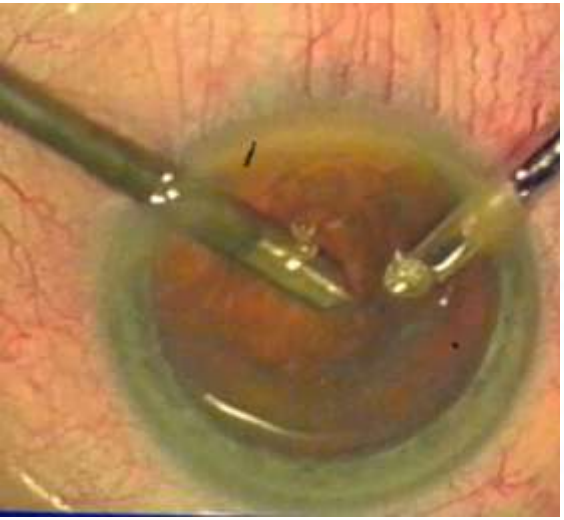
In pursuit of endocapsular CE

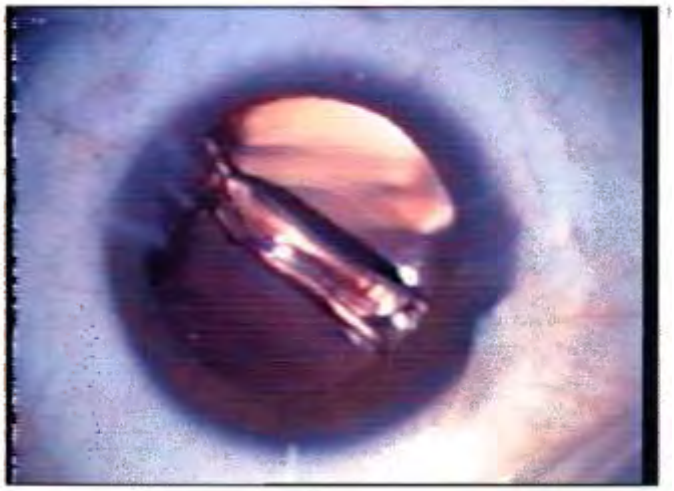
True accommodative IOL


Ophthalmology Times

2-mm incision barrier is broken in Greece

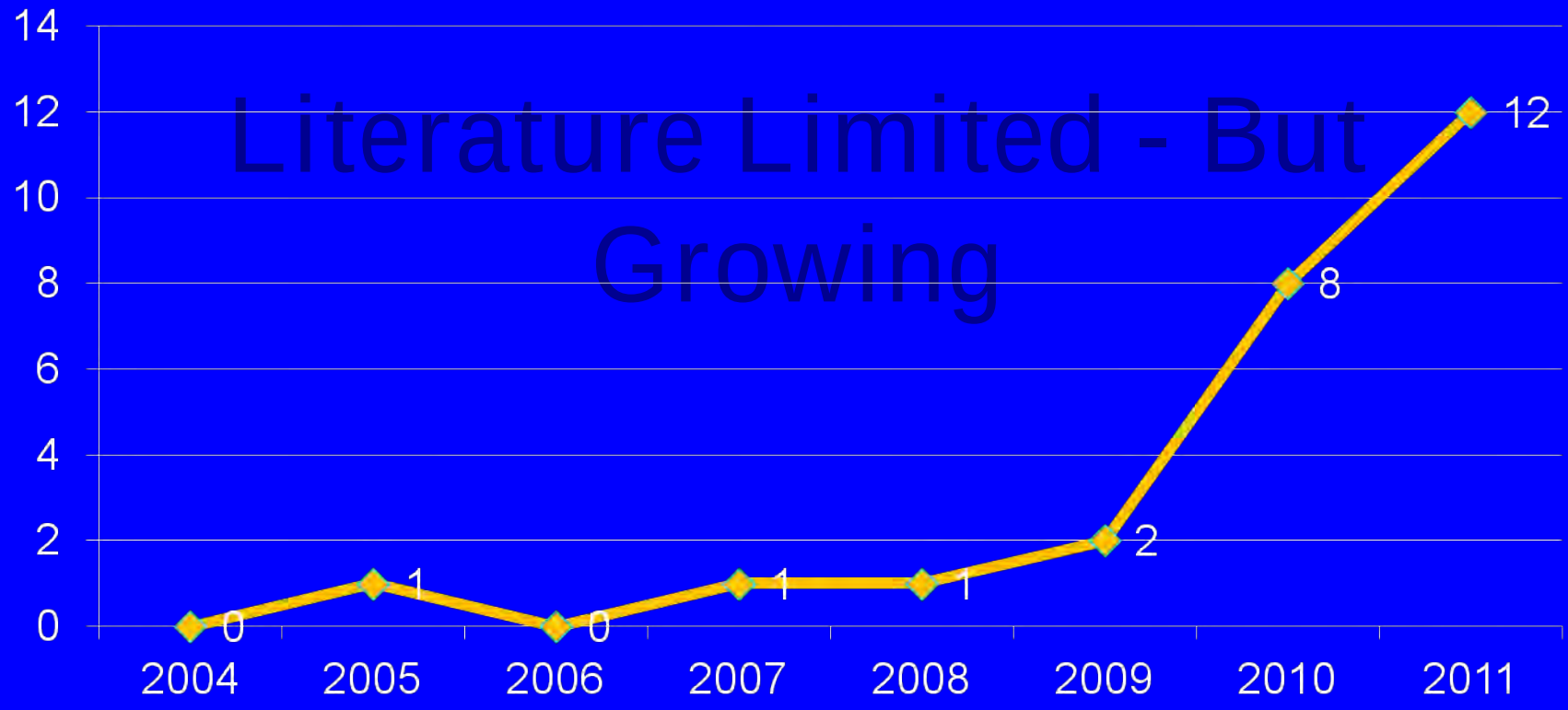
Laser cataract removal was done through two clear cornea para-centeses of about 1.5 mm in width.





Femto-Cataract work:
2 Years in Athens, Greece

Published Papers on Lenticular or Cataract Surgery Applications for Femtosecond Lasers



Review of Published Literature Cataract/Lenticular Applications

First report of all 4 components of FS laser-assisted cataract surgery: Palanker 2010

OptiMedica Catalys Laser with integrated OCT

Capsulorhexis 2x stronger and 5x more precise than manual

Perceived cataract hardness decreased by 2 grades

Describes multi-planar self-sealing incisions and exact placement of LRIs

Palanker DV, Blumenkranz MS, Andersen D, et al. Femtosecond laser-assisted cataract surgery with integrated optical coherence tomography. *Sci Transl Med* 2010;17(2):58ra85.

What is the goal of laser-assisted cataract surgery?

To improve

- Refractive outcomes
- Safety profile
- Patient comfort and satisfaction

How can this be accomplished?

- More precise and accurate *capsulotomy*
- More precise and accurate cataract incision
- More efficient lens disruption and removal
- More precise and accurate relaxing incisions

Surgical Systems

LenSx®

LensAR™

Surgical Systems

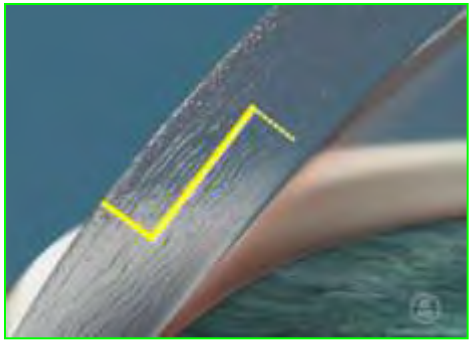
Optimedica Catalys™

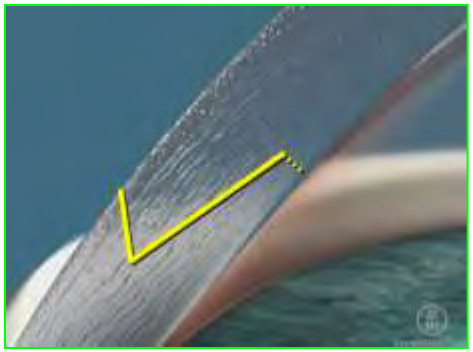
Technolas Victus™

Improved Cataract Incision

Improved cataract incisions could
lead to the following:

- A tighter self-sealing sealing wound
- More consistent incision
- Unique incision architecture

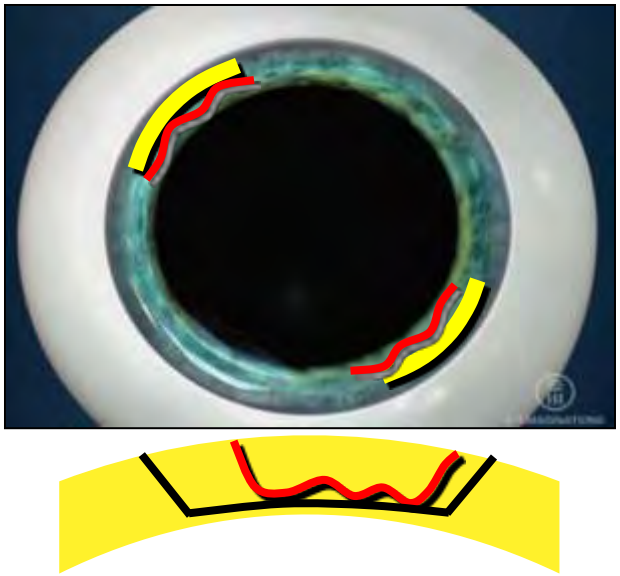


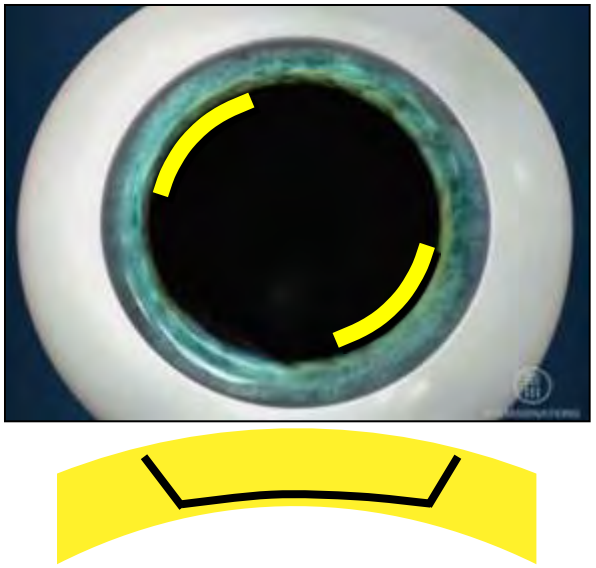


Refractive Results:
A more precise relaxing incision

LRIs with Femtosecond Lasers:

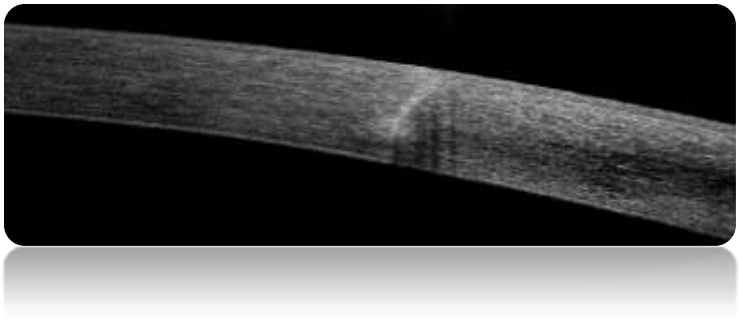
Potentially more consistent and predictable astigmatic management compared to manual LRIs[1,2]





[1]Slade S. Donnenfeld Femtosecond Lasers in Refractive cataract Surgery. *AAO*, October 2010.
[2]Slade S MD, Culbertson W MD, & Krueger R MD. Femtosecond Lasers for Refractive Cataract Surgery. *CRST*, August 2010

Laser Refractive Cataract Surgery - Arc Incisions



Fully Customizable and adjustable

Refractive incisions are no long an art form. They are a science.

Place Desired Incisions:

EXACT Size

EXACT Place

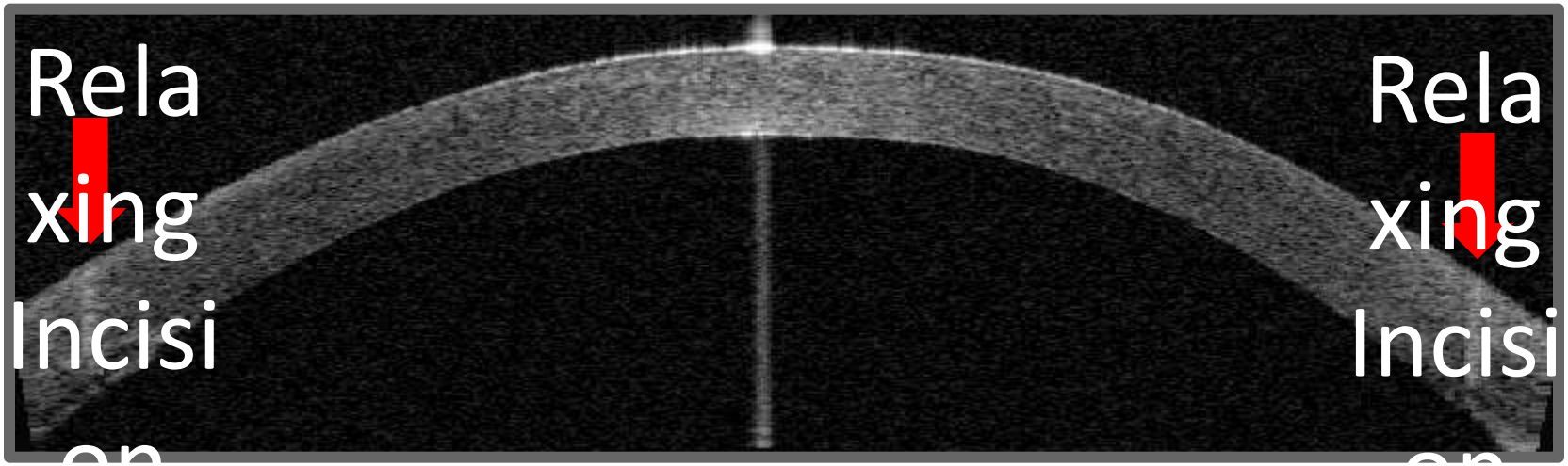
EXACT Depth

Every Time

New York University School of Medicine

LaserVision.gr
Institute for laser

Refractive Results: A more precise relaxing incision



Corneal OCT (Visante)

Refractive Results:
A more precise capsulotomy

Precise capsulotomy

↓

More accurate & repeatable IOL positioning

↓

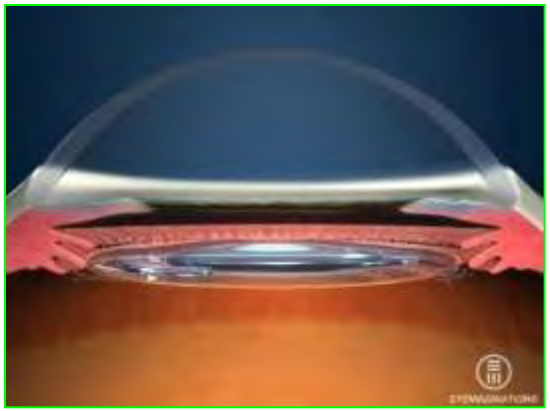
Better IOL performance

↓

Better visual outcomes

The size, shape, and positioning of the capsulorhexis is a key determinant for effective lens position[1]

A 0.5 mm axial plane deviation from intended ELP results in 1D of refractive error[2]



[1]Yanoff M, Duker J: Ophthalmology: Expert Consult 3rd edition, Mosby, 2008.

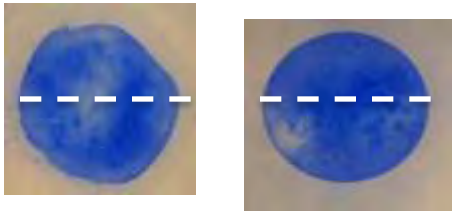
[2]Cekic O, Batman C: The relationship between capsulorhexis size and anterior chamber depth relation. *Ophthalmic Surg Lasers* 1999, 30(3):185-90.

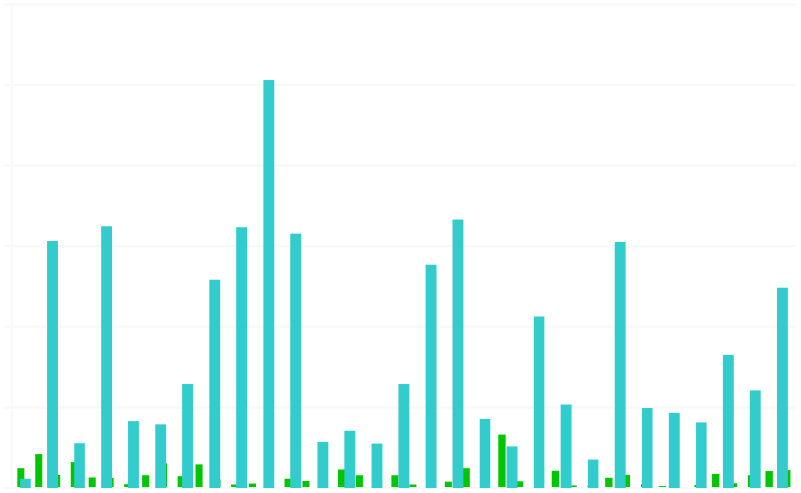
Capsulotomy size is more precise

Capsulotomy/capsulorhexis disc excised during surgery

Disc diameter measured and recorded

Deviation between intended and observed diameter calculated





Blue = Manual; Green = Laser

Graph from: Lane, S MD et al. Accuracy and Predictability of OptiMedica Femtosecond Laser Capsulotomy. *AAO* 2010

Company	Manual	Laser
OptiMedica[1] (μ± SD)	0.339 ± 0.250mm	0.027 ± 0.025mm (p <0.001)
LensAR[2] (μ± SD)	0.42 ± 0.54mm	0.16 ± 0.17mm (p=0.03)
LenSx[3]	10% < 0.25mm	All < 0.25 mm

[1]Lane, Stephen MD. Accuracy and Predictability of the OptiMedica Femtosecond Laser Capsulotomy. *AAO* 2010

[2]Data courtesy of LensAR

[3]Nagy, Z .Comparative analysis of femtolaser-assisted and manual capsulorhexis during phaco. *ESCRS* 2010

Laser assisted lens fragmentation

Increased ease of nucleus disassembly & phaco can lead to the following benefits:

- Reduction in phaco energy and time[1]
- Reduce corneal trauma and endothelial cell loss[1]
- Reduce risk of capsular tears
- Increase ability to use I/A alone[2]
- Faster visual recovery[2]

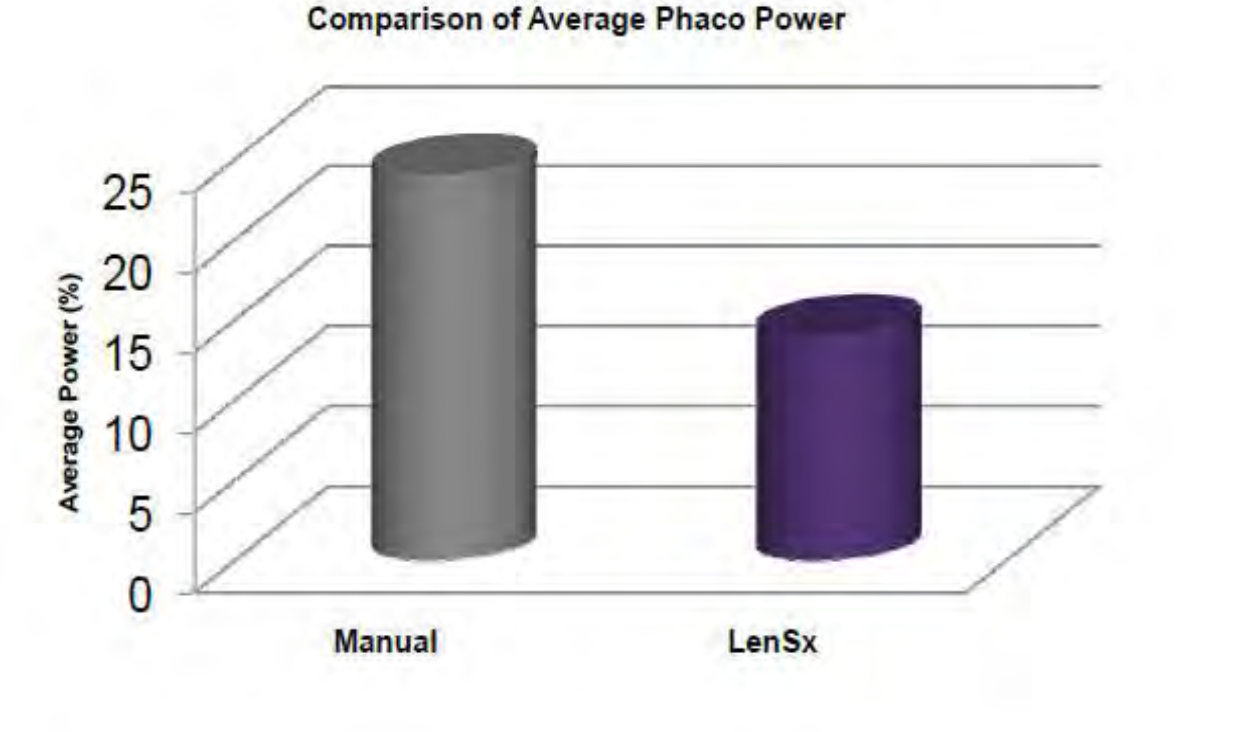
[1]Palanker D, Blumenkranz M, Andersen D, et al. Femtosecond laser-assisted cataract surgery with integrated optical coherence tomography. *Sci Transl Med*. 2010;2(58):58ra85.

[2]Edwards KH, Frey RW,Naranjo-Tackman R, et al.Clinical outcomes following laser cataract surgery. *Invest Ophthalmol Vis Sci*. 2010;51:5394.

Reduced phaco energy and endothelial loss

46% reduction in phaco power

28% decrease in endothelial loss following laser cataract surgery vs. manual



Source: Knorz. Royal Hawaiian Eye Meeting Presentation, January 2011.

New Hybrid Fragmentation Pattern

- Combination of Cylinder and Chop Patterns
- Efficient for All Cataract Grades
- Rapid Lens Removal with Minimal Phaco Required
- Preferred Pattern for Surgeons going Forward

LenSx® Laser Hybrid Pattern

- Used for all Cataract Grades
- # Cuts/Cylinders Customizable

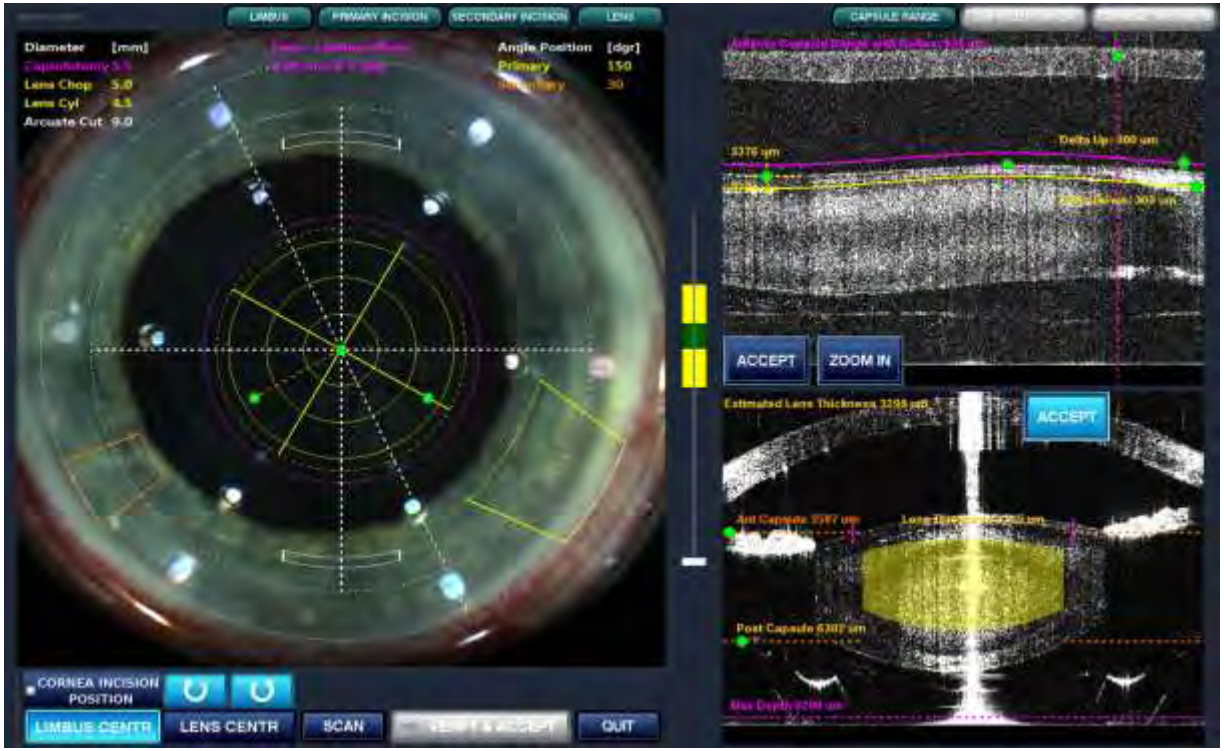
*510(k) Premarket Notification to the FDA, LenSx Laser System, K101626, 2010.

LSX12001SK

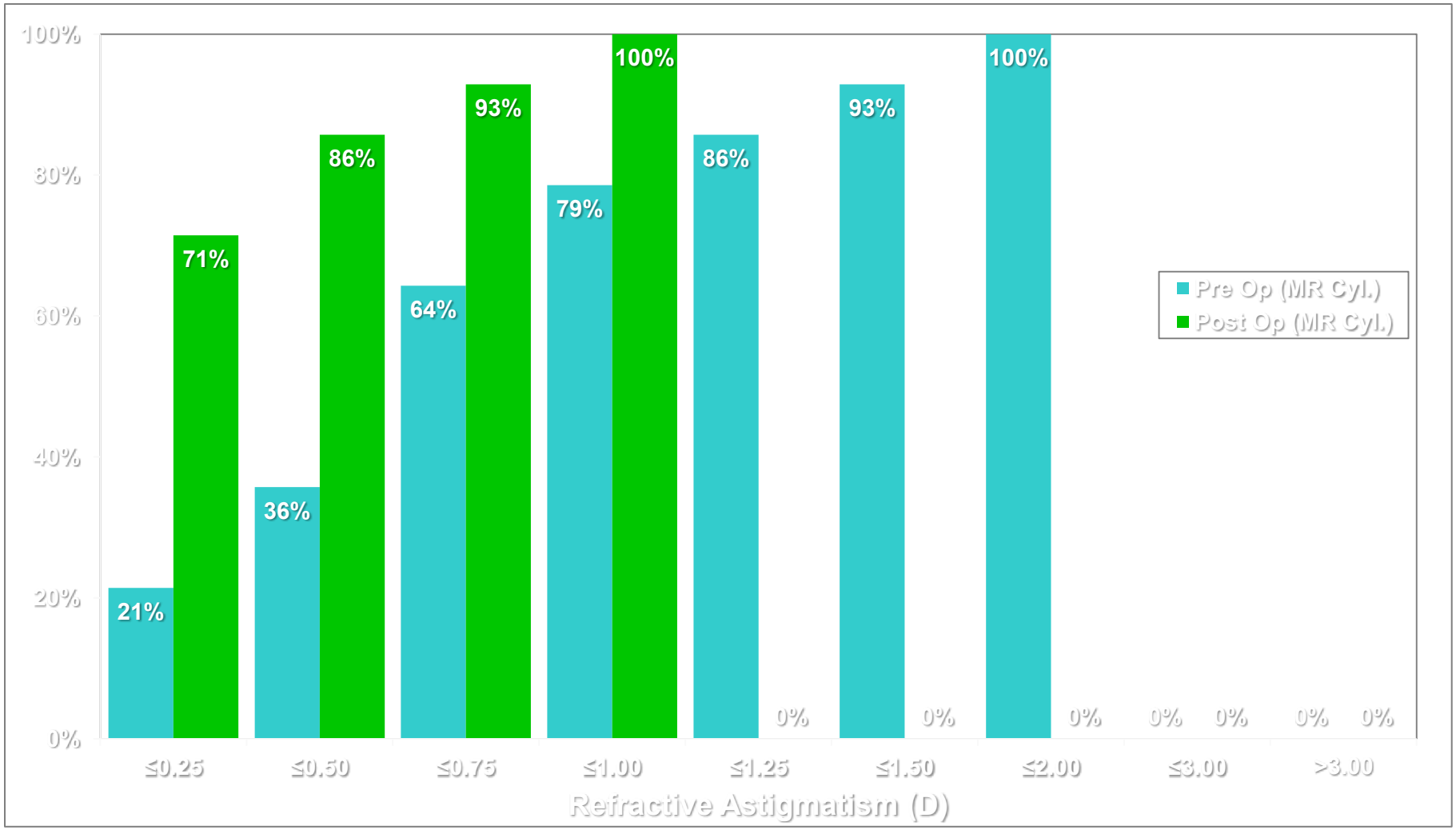

Prof. Kanellopoulos, MD

Arcuate Incisions with the LenSx® Laser

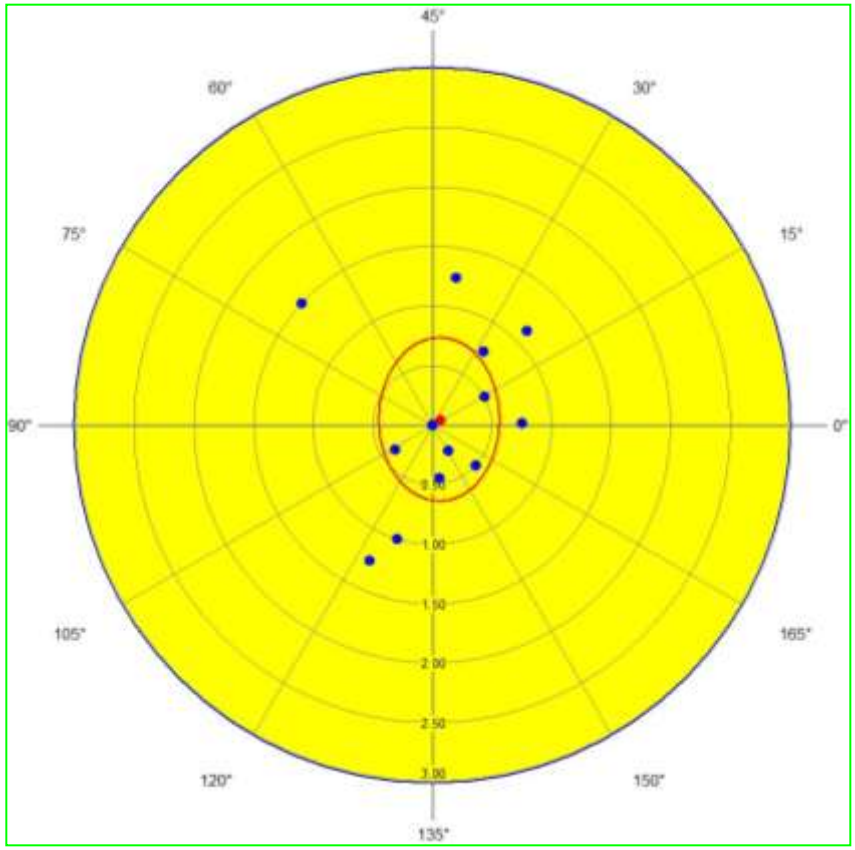
Development of a nomogram for laser created arcuate incisions based previous experience with manual LRI nomogram

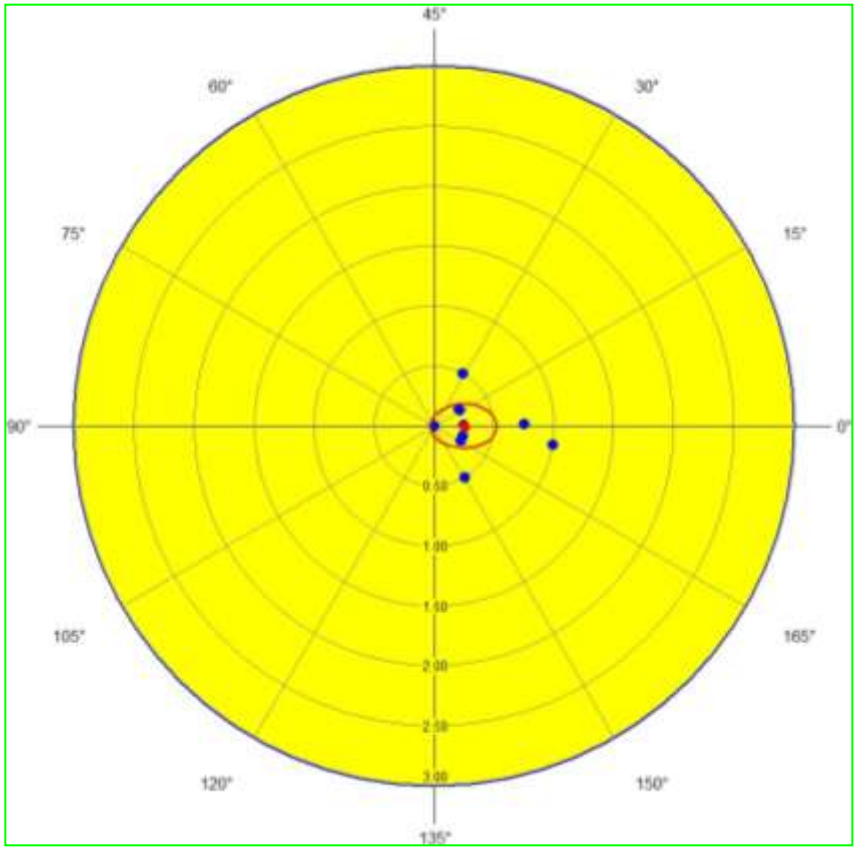


Refractive Astigmatism



Double-Angle Plot





Pre-Op (n=14)

Keratometric Centroid: +0.08D @ 17° ± 0.59D, ρ = 1.82

Post-Op (n=14)

Refractive Centroid: +0.26D x 178° ± 0.23D, ρ = 0.45

Femtosecond Laser Astigmatic Keratotomies Now Adjustable

- Refractive incisions may now be made at the time of cataract surgery and opened partially in the OR
- Intraoperative aberrometry (Wavetec ORange) may be used to titrate results in the OR
- Patients can then be examined with topography and refraction performed the following day
- If needed the remainder of the incision can be opened easily in the office to increase the effect of the incision and adjust the refraction.

Conclusion
Femtosecond Cataract Surgery

- Novel technology provides in-vivo image-guided laser cataract surgery.
- Computer-controlled and femto precision arc incisions.
- System will provide faster, safer, easier, customizable, adjustable, and fully repeatable arcuate incisions.
- Removing inconsistencies in procedure will improve understanding and accuracy of all corneal incisions.

Summary
Refractive Cataract Surgery

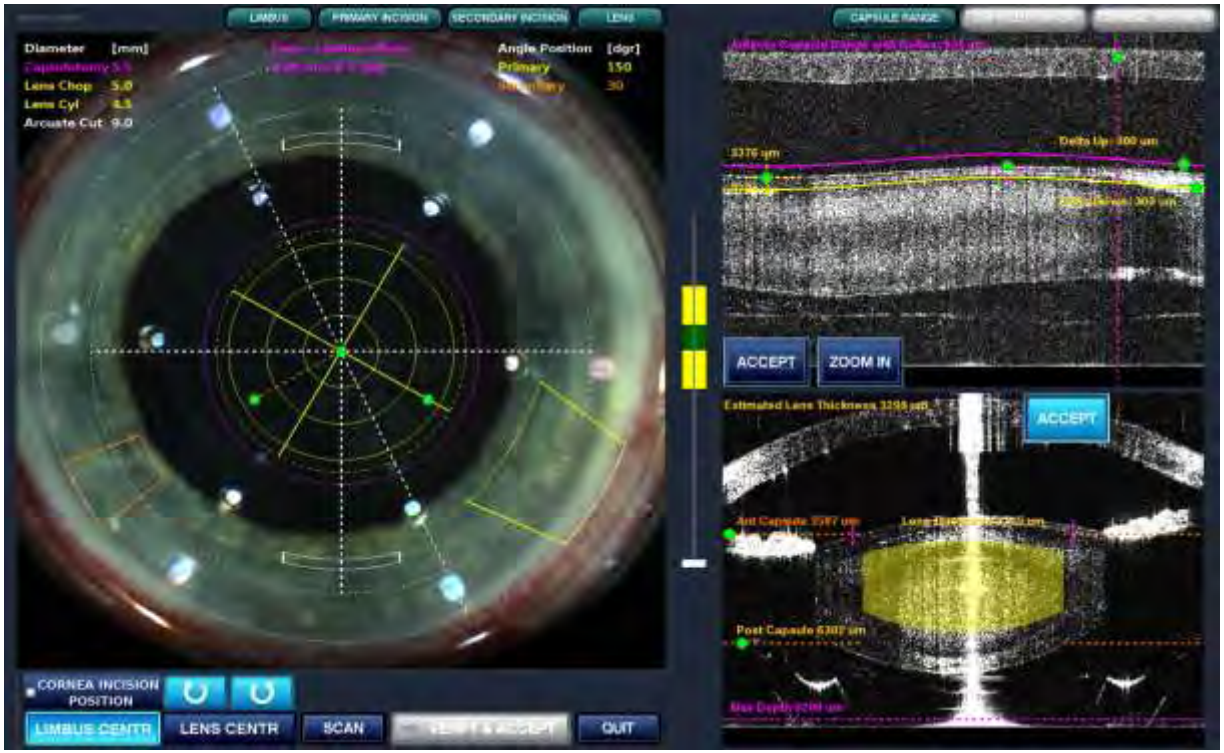
Cataract and refractive surgery are one and the same.

Quality of vision is of increasing importance.

New techniques, technologies, and pharmaceuticals help improve outcomes to give patients the vision and experience they desire.

Surgery is performed by surgeons!

A promising view of an anterior segment surgeon!



Available to all Greek Ophthalmologists!


Thank you