

# Comparison Between Femtosecond Laser Capsulotomy and Manual Continuous Curvilinear Digital Image Guided Capsulorrhexis

Wilson Takashi Hida, MD PhD

**Brasilia Ophthalmology Hospital HOB, Brazil & São Paulo University HC-FMUSP, Brazil**

Celso T Nakano – Antonio F. P. Motta – Patrick Tzelikis - Fernando Nogueira - Mario Chaves Monike Vieira - Daniel Scarabotolo – Aline Guimaraes – Mayumi Nakano - Milton Ruiz Alves

Financial Disclosure – Authors have no financial interest in the subject matter of this e-poster. Research fees Alcon Abbot Bausch&Lomb Zeiss

**April - 2014**

# ASCRS 2014 POSTER



COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL  
CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS

## Purpose

To measure and compare size, shape and positioning parameters of femtosecond laser capsulotomy with manually continuous curvilinear digital guided capsulorrhexis

# ASCRS 2014 POSTER



COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL  
CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS

## Patients and Methods

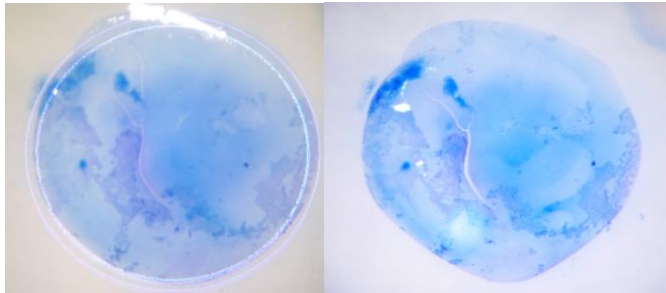
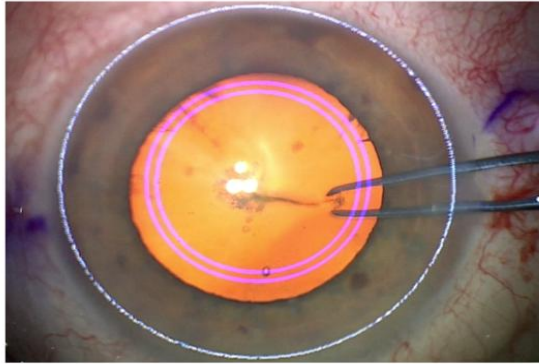
- ▶ **Prospective, comparative, controlled and randomized** study model.
- ▶ Evaluate **80 eyes of 80 patients** referred for cataract surgery
- ▶ Routine cataract surgery cases were prospectively assigned to 1 of 2 groups

**GRUPO 1** (n=40 eyes)  
**LenSx Femtosecond**

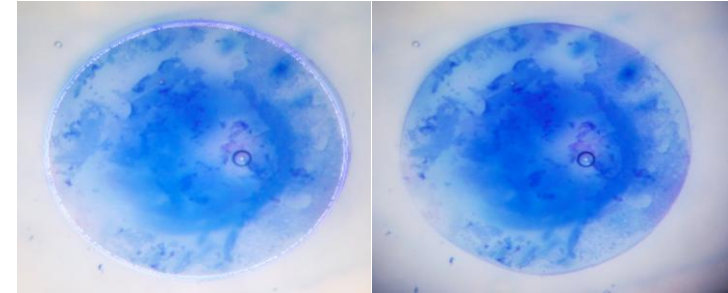
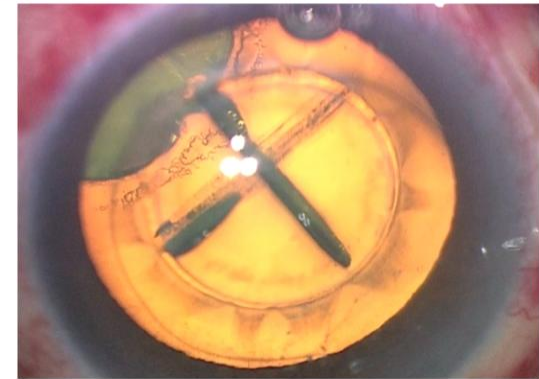
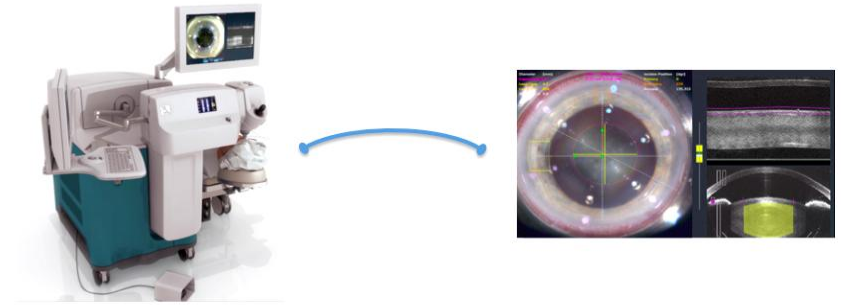
**GRUPO 2** (n=40 eyes)  
**Callisto Eye digital  
Image**

# STUDY DESIGN

## Callisto Eye digital image (Zeiss, Germany)



## LenSx femtosecond capsulotomies (Alcon US)





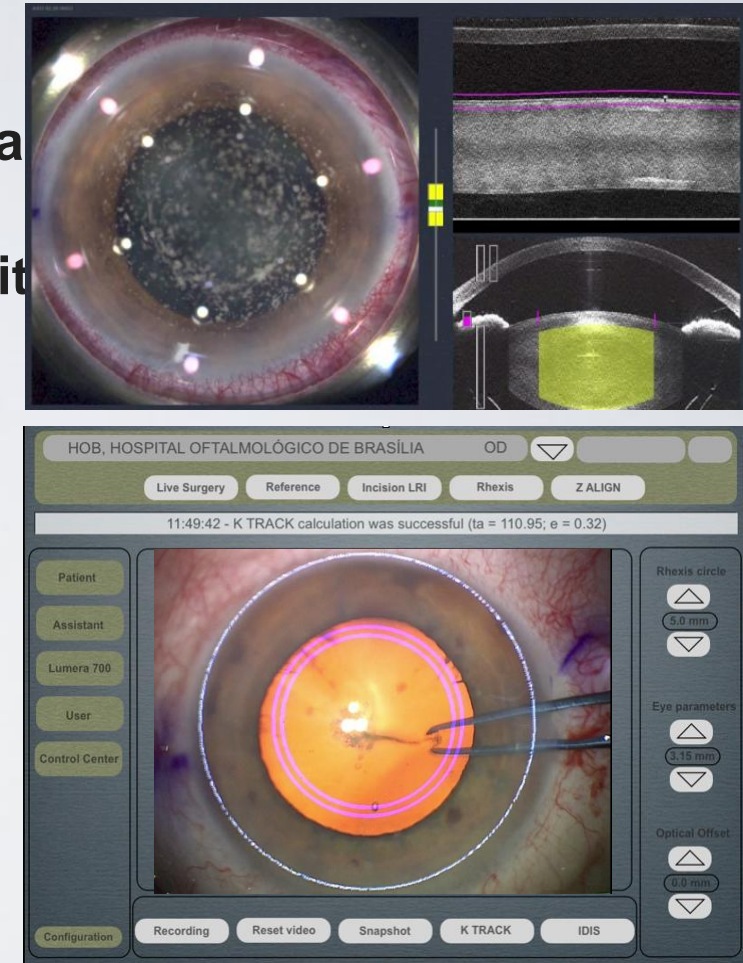
# ASCRS 2014 POSTER



## COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS

### Patients and Methods

- ▶ The study was approved by the IRB of HFA
- ▶ This study was conducted between October 2013 and January 2014
- ▶ All surgeries were performed at - **Brasilia Ophthalmology Hospital in Brazil**
- ▶ **Single Senior Surgeon (W.T.H)**
- ▶ Same Capsulorhexis Software settings were used for all surgeries
- ▶ Capsulorhexis 4.9mm, Incision 2,4mm
- ▶ Dispersive cohesive technique
- ▶ Statistical analysis of the results was performed by SPSS



# ASCRS 2014 POSTER



## COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS

### Patients and Methods

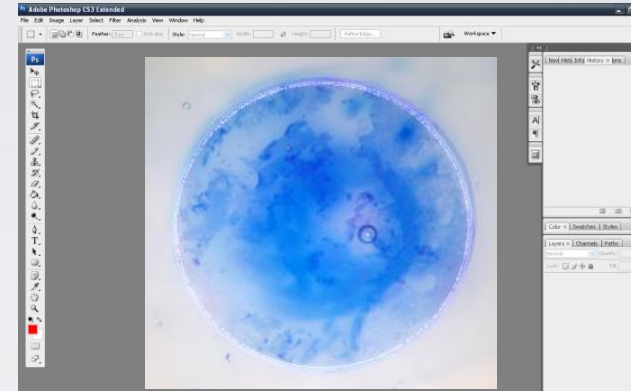
#### Patients Measurements

- ▶ Predicted Spherical Equivalent
- ▶ Actual Spherical Equivalent
- ▶ PNS Pentacam

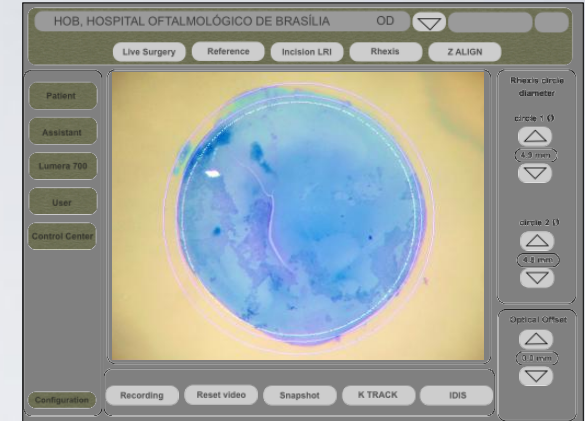
#### Capsulorhexis Measurements (VIDEO RECORD DURING SURGERY OUTER)

- ▶ Circularity ( $\epsilon = \varnothing_{\min} / \varnothing_{\max}$ )
- ▶ Shape (area) capsule overlap
- ▶ Positioning ( $\epsilon = \varnothing_{\text{optical}} - \varnothing_{\text{geometric}}$ )
- ▶ measured Adobe Photoshop & Callisto Eye digital image

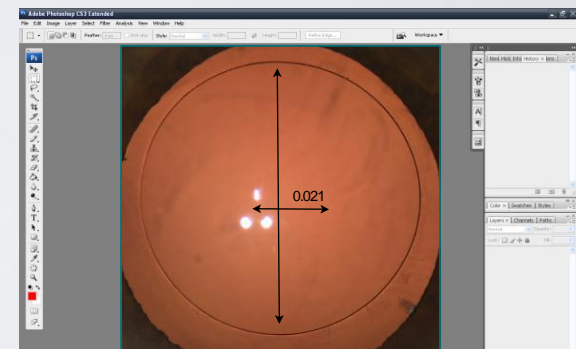
Adobe Photoshop (Adobe Systems Inc)



Callisto Eye digital image (Zeiss, Germany)



Adobe Photoshop (Adobe Systems Inc)



# ASCRS 2014 POSTER



## COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS

### Results

We used the LOCS III system and PENTACAM PNS to grade the cataracts. There was no statistically difference of age nuclear density between the groups.

	Femto	Manual	P VALUE
	Average $\pm$ SD	Average $\pm$ SD	
AGE	66.8 $\pm$ 8.7	65.2 $\pm$ 8.8	0.365 - NS
LOCS III	2.2 $\pm$ 0.7	2.1 $\pm$ 0.8	0.160 - NS
PNS PENTACAM	1.9 $\pm$ 0.9	1.9 $\pm$ 0.8	0.912 - NS

In the *FEMTO Group*, there were no suction breaks, no intra-operative complications (capsule tears), but there were 12.5% (5) of pupillary constriction and 7.5% (3) anterior capsule tags (less than 5 degrees) 2.5% absence of treatment (less than 10 degrees)

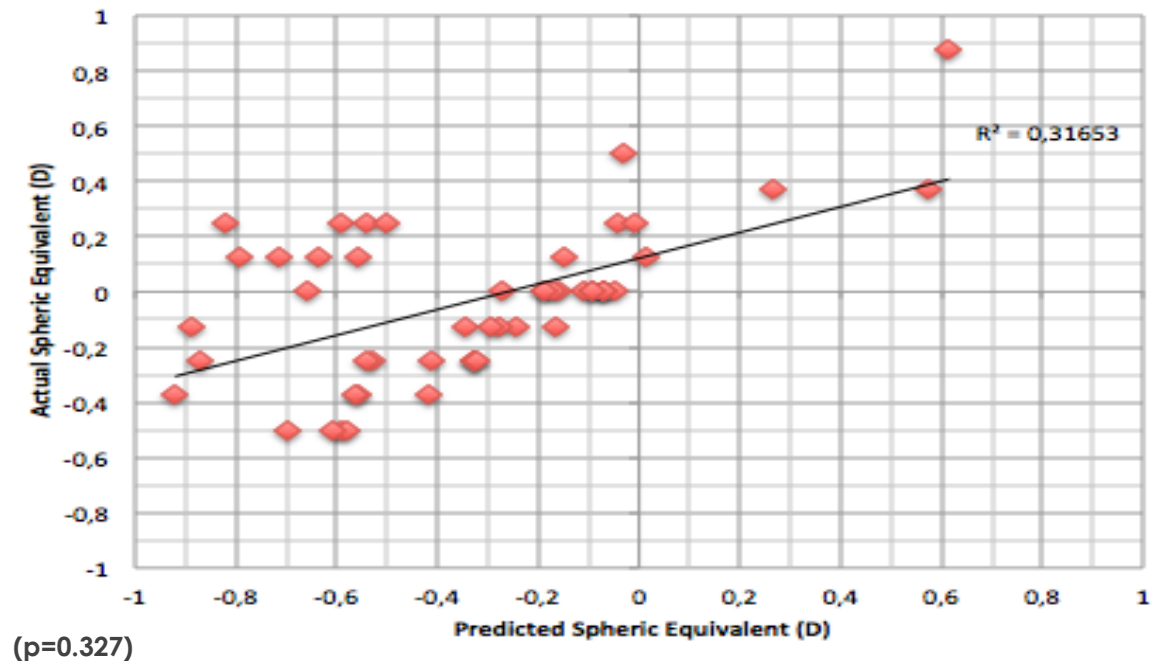
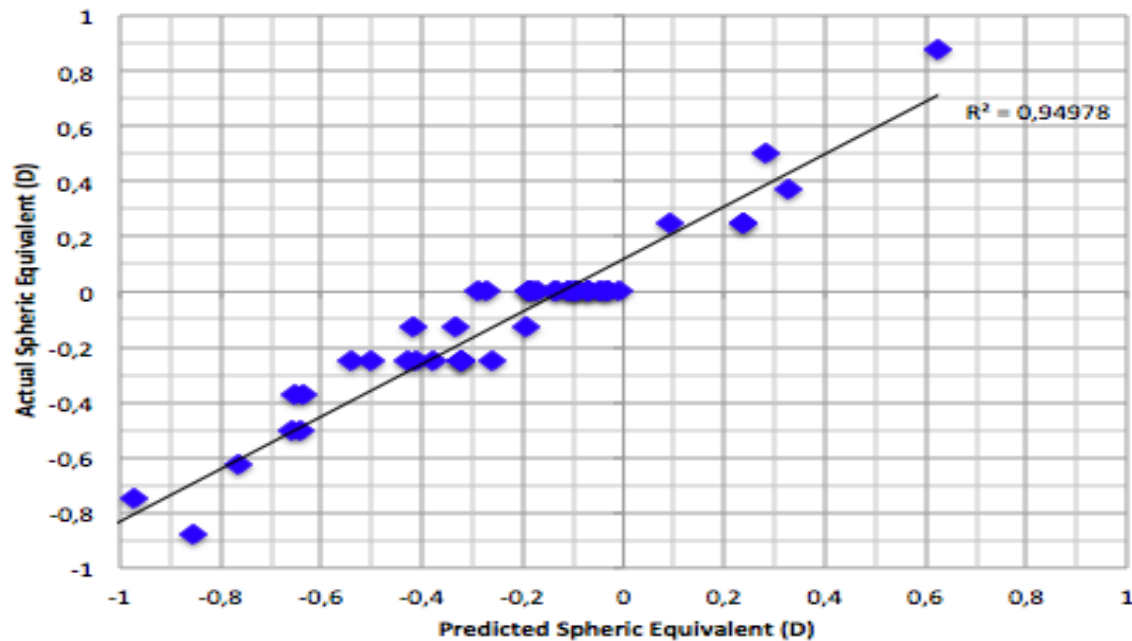
# ASCRS 2014 POSTER



## COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHESIS

### Results

There was no statistically difference of predicted and actual Spheric equivalent between the groups.



(p=0.327)

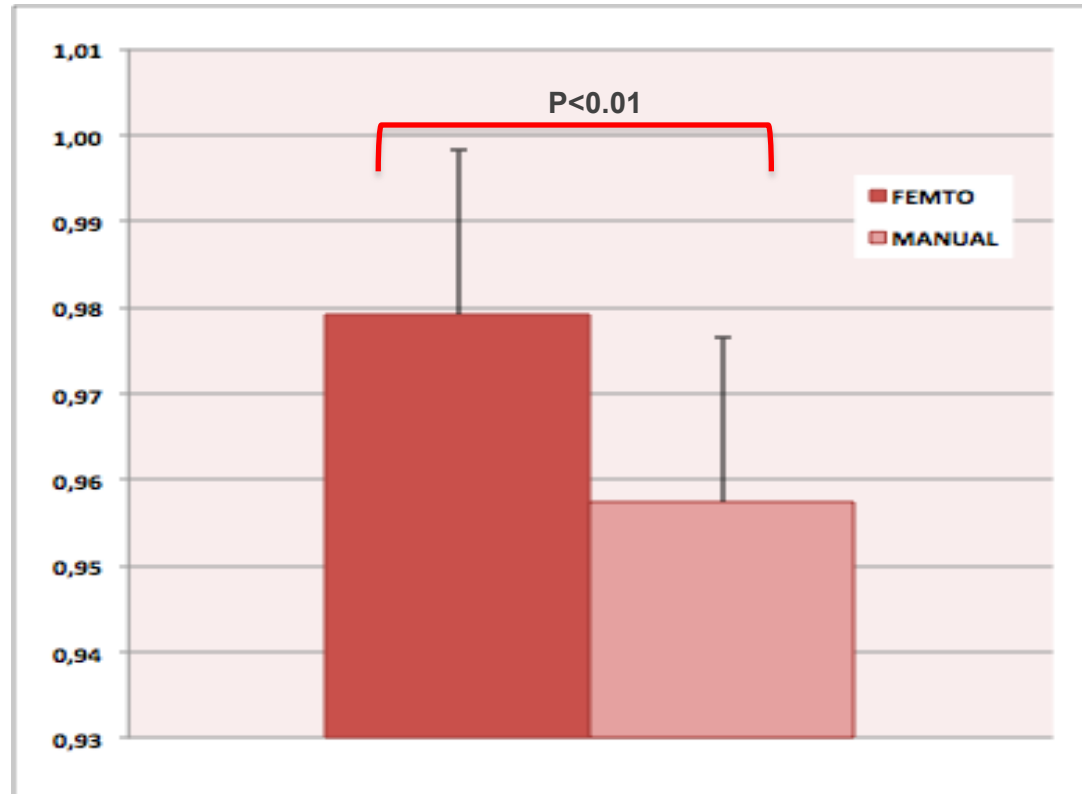


# ASCRS 2014 POSTER

## COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS

### Results

#### Comparison Capsulorhexis Circularity between Femtosecond Laser Capsulotomy and Manual Continuous Curvilinear Digital Image Guided Capsulorrhexis



The circularity ( $\epsilon = \text{Ømin} / \text{Ømax}$ ) following the femtosecond laser-assisted and manual capsulorhexis procedure.

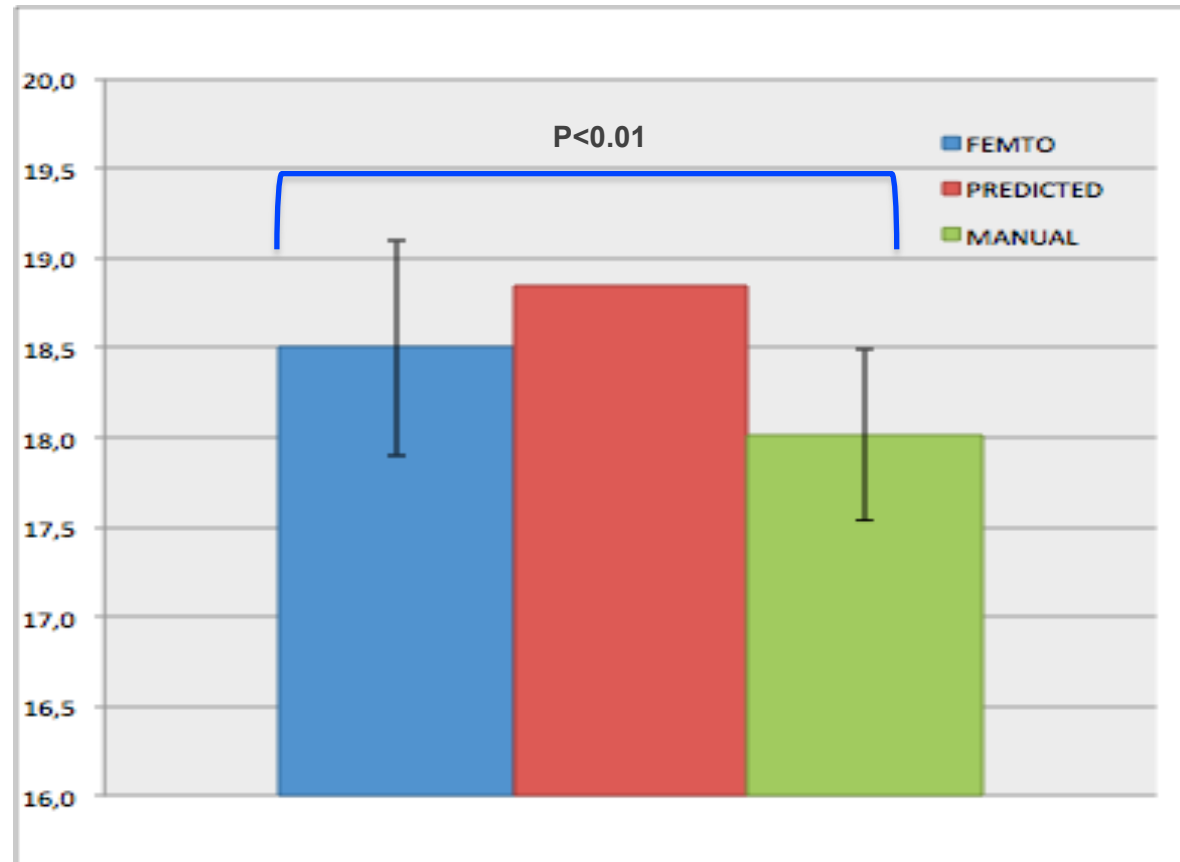
There was statistically difference of capsulorhexis circularity between groups.

# ASCRS 2014 POSTER

COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL  
CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS

## Results

Comparison of Capsulorhexis Area (shape) between Femtosecond Laser Capsulotomy and Manual  
Continuous Curvilinear Digital Image Guided Capsulorrhexis



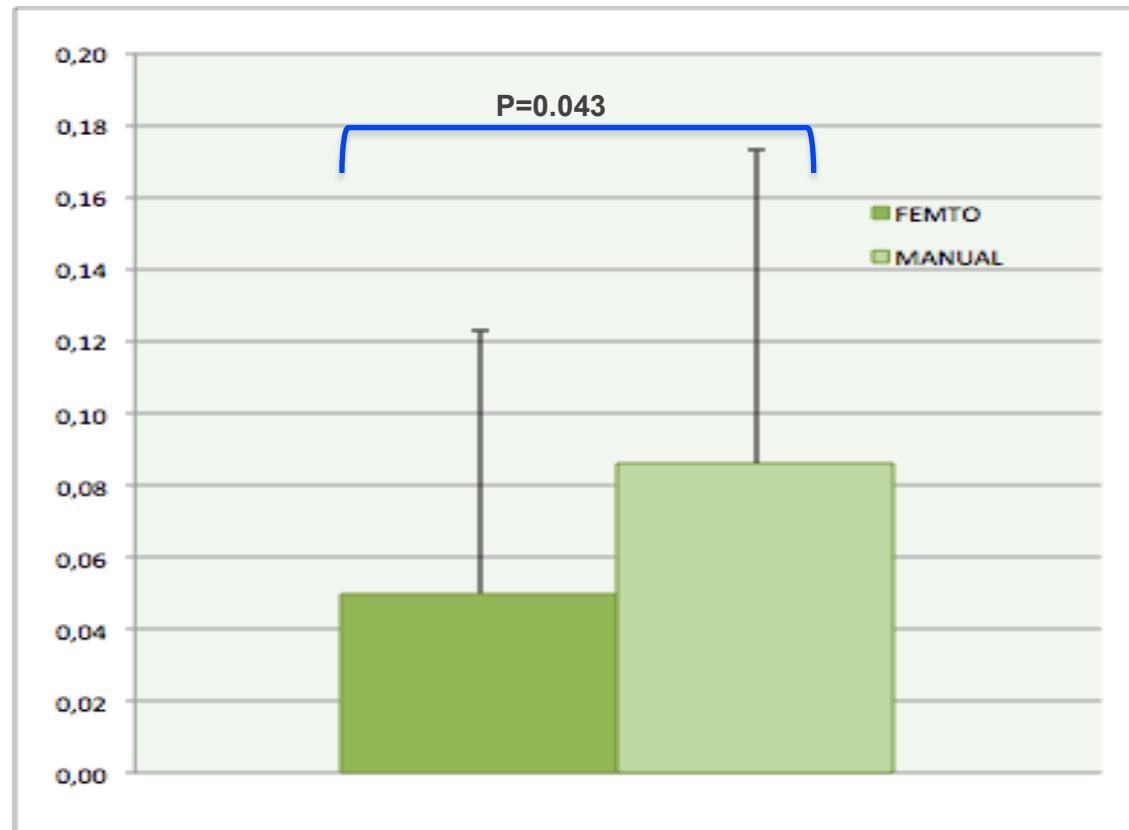
There was statistically difference of capsulorhexis area between groups.

# ASCRS 2014 POSTER

## COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS

### Results

#### Comparison Capsulorhexis Positioning between Femtosecond Laser Capsulotomy and Manual Continuous Curvilinear Digital Image Guided Capsulorhexis



There was no statistically difference of capsulorhexis centration between groups.

# ASCRS 2014 POSTER

COMPARISON BETWEEN FEMTOSECOND LASER CAPSULOTOMY AND MANUAL  
CONTINUOUS CURVILINEAR DIGITAL IMAGE GUIDED CAPSULORRHEXIS



## Conclusions

In summary, this study found that using different technologies increased surgical efficiency to a different degree.

The DATA shows that capsulorexis performed by an experienced surgeon, with good parameters and appropriate settings provide similar results.

But more precise capsulotomy shape and circularity can be achieved with femtosecond laser. Our results suggest that different techniques are equally effective.

New research should benefit in improving the efficiency of various surgical approaches. Further studies are needed to evaluate these technologies.