

# Comparison of Cumulative Dissipated Energy and Operative Time Between Femtosecond Laser-Assisted Cataract Surgery and Traditional Phacoemulsification Cataract Surgery

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The authors have no financial interests to disclose.

# Purpose



- To compare the efficiency of femtosecond laser-assisted cataract surgery and traditional phacoemulsification cataract surgery as a function of cumulative dissipated energy (CDE) and operative time

# Methods



- Retrospective review
- Single surgeon, ambulatory surgical center
- Femtosecond laser is situated in single large operating theater (20x20 feet) with single mobile reclining surgical bed. Patient is positioned under femtosecond laser while scrub team has all preparations made in same suite
- Once femtosecond laser completed by surgeon and laser technician, OR bed is retracted and rotated 90 degrees and positioned under operating microscope
- Nursing staff then preps and drapes while surgeon scrubs in, and phacoemulsification proceeds
- The surgeon did not adjust the phacoemulsification settings for the transition to femtosecond cataract surgery

# Methods cont.



- All femtosecond laser assisted cataract surgery cases
  - January to December 2013, inclusive
- Age- and sex-matched traditional phacoemulsification cataract surgery
  - January 2012 to December 2013, inclusive

# Methods cont.



## Group I: Control

- 155 eyes
- Traditional phacoemulsification cataract surgery

## Group II : Early femtosecond

- 65 eyes
- First 6 months of femtosecond laser assisted cataract surgery

## Group III: Late femtosecond

- 90 eyes
- Latter 6 months of femtosecond laser assisted cataract surgery

# Results: CDE



Group	Average CDE	CDE Range
I	6.15±4.07	0.27 – 33.9
II	7.51±5.46	0.32 – 27.73
III	6.43±3.96	0 – 18.3

- Group I versus II  
– P value = 0.08
- Group I versus III  
– P value = 0.61

# Results: Operating Time



Group	Average Operating Time (minutes)	Operating Time Range (minutes)
I	13±4.04	5 - 30
II	17.78±6.33	7 - 38
III	16.68±8.66	6 - 50

- Group I versus II  
– P value = 0.0000003
- Group I versus III  
– P value = 0.0003

# Results: Complications

Group	Complications	Percentage
I	3 out of 155	1.9%
II	2 out of 65	3.1%
III	2 out of 90	2.2%

- Group I versus II  
– P value = 0.63
- Group I versus III  
– P value = 1.00

*Types of complications:*

- *Posterior capsule rupture*
- *Retinal detachment*
- *Retained lens fragment*



# Discussion



- No difference in CDE between femtosecond laser assisted and traditional phacoemulsification cataract surgery
- Increased operative time with femtosecond laser assisted cataract surgery
  - Trend to decreasing operative time with increased number of cases
- No difference in rate of complications

# Conclusion



- Femtosecond laser assisted cataract surgery is an emerging technology as an alternative to traditional phacoemulsification
- Our single surgeon and site evaluation shows the technology is equivalent to traditional phacoemulsification cataract surgery for CDE and complications
- Positioning the femtosecond laser within the same OR suite as the operating microscope and phaco machine allows for efficient use of space and minimal changes in operating time

# Conclusions cont.



- Longer operating times for femtosecond cataract surgery were statistically significant but not clinically significant as the magnitude of the difference was only 3-4 minutes and did not affect the total numbers of cases performed per day
- Optimizing phacoemulsification settings may allow for further reductions in CDE