

Cyclorotation during Femtosecond Laser-Assisted Cataract Surgery Measured using Iris Registration

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PURPOSE

To quantify ocular cyclorotation occurring between the preoperative upright position and the intraoperative supine position in patients undergoing femtosecond laser-assisted cataract surgery, using an iris registration system integrating Cassini topography with a Lensar laser platform.

METHOD

Retrospective case series of 241 patients (337 eyes) undergoing femtosecond laser-assisted cataract surgery between November 2015 – March 2016. The mean age of the 107 men and 134 women was 68.0 years G 9.0 (SD) (range 37 – 90 years).

Preoperative iris images and steep-axis data were acquired in the upright position with the Cassini topographer. Intraoperative iris registration was obtained with the Lensar femtosecond laser system immediately prior to laser treatment in the supine position. Cyclorotation calculated is the difference in axis between the preoperative and intraoperative registrations. Frequency, magnitude, and direction of cyclorotation (incyclorotation vs excyclorotation) were analyzed, incl. in bilaterally treated patients.

RESULTS

The mean absolute value of cyclorotation was 5.81G4.20 degrees (range 0 – 17 degrees), which was statistically significant compared to the preoperative axis with the intraoperative axis deviation (P < .0001). Overall, incyclorotation (67.4%) was more common than excyclorotation (30.9%). For patients having bilateral femtosecond laser-assisted cataract surgery, bilateral incyclorotation (47.37%) was most common.

Parameter	Right Eyes (N=177)	Left Eyes (N=177)
Mean correction (degrees)	7,13	4,55
Mean incyclorotation (degrees)	-7,88	4,74
Mean excyclorotation (degrees)	3,46	-4,75
Requiring incyclorotation (n)	137	90
Requiring excyclorotation (n)	27	77
No rotation required (n)	1	7
Could not be measured (n)*	11	3
Iris registration failed (n)	2	1

*Cyclorotation was greater than 17 degrees

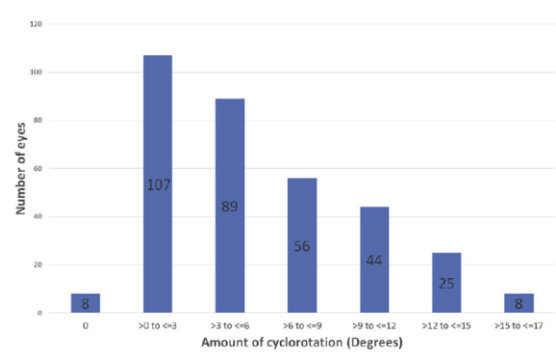


Figure 3. Frequency of cyclorotation.

CONCLUSION

Clinically significant cyclorotation is common during femtosecond laser-assisted cataract surgery and, if unaccounted for, can compromise astigmatic correction outcomes. Iris registration coupling Cassini preoperative data with the femtosecond laser platform provides a practical solution to detect and compensate for cyclotorsion, improving the accuracy of corneal and lens-based astigmatism correction.