

ABSTRACT TITLE

TITLE: Three-dimensional biometry and alignment in eyes implanted with Accommodative IOLs as a function of accommodative demand

PROGRAM # (Final ID)

ABSTRACT FINAL ID: 382

SESSION TYPE: Paper Session

POSTER BOARD # (DOI)

DIGITAL OBJECT IDENTIFIER (DOI):

PRESENTATION START/END

SESSION ABSTRACT START TIME: 10:45 AM

SESSION ABSTRACT END TIME: 11:00 AM

SESSION # (Abbreviation)

SESSION ABBREVIATION: 120

SESSION TITLE: Accommodation and Presbyopia

SESSION DAY & DATE: Sunday, May 5, 2013

SESSION START TIME: 10:30 AM

SESSION END TIME: 12:15 PM

SESSION LOCATION: TCC LL 4/5

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Study Group:

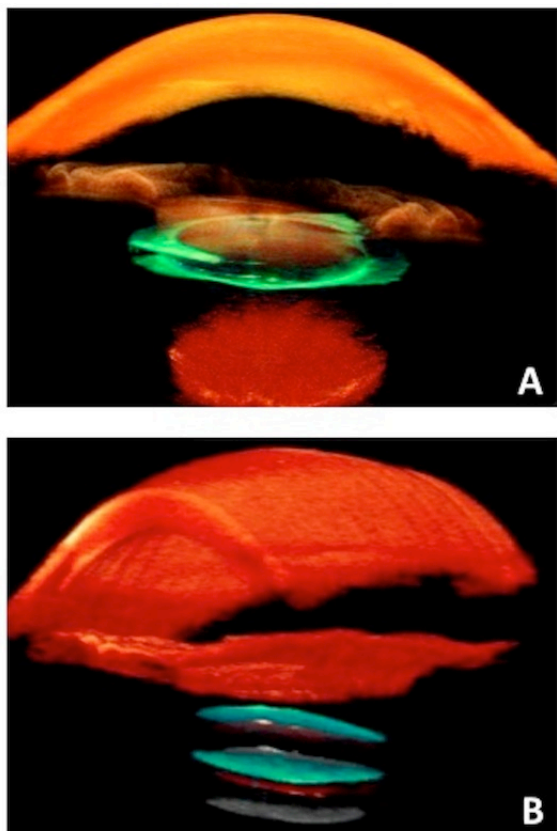
ABSTRACT BODY:

Purpose: Accommodative intraocular lenses (A-IOLs) appear as a promising solution for the correction of presbyopia. We used custom spectral Optical Coherence Tomography (sOCT) to fully image and quantify in 3D the anterior segment of the eye in patients implanted with A-IOLs designed to move axially inside the eye.

Methods: Custom sOCT provided with quantification tools (automatic image analysis and fan an optical distortion correction algorithms) was used to fully image in 3D the ocular anterior segment in 20 eyes from 10 patients (73-82 years old) implanted with single-optic A-IOLs (Crystalens AO, B&L). Measurements were performed pre-operatively, and post-operatively for 0, 1.25 and 2.5 D accommodative demands, under phenylephrine. The following parameters were extracted from the images: anterior and posterior corneal and lens (natural and A-IOL) surface 3D geometry, pre-and post- anterior chamber depth (ACD), and lens and A-IOL tilt. ACD and lens alignment were estimated from 3D data, from the distances between surface apices, and from the vectors normal to the pupil and lens planes, respectively.

Results: Data were obtained from fully registered pre/post-operative images, and from images corresponding to different accommodative demands (see Figure). The average ACD pre-op was 2.67 ± 0.25 mm, and post-op (relaxed accommodation) was 3.84 ± 0.39 mm, with high left/right eye symmetry. Most lenses moved axially backward upon an accommodative demand (up to 0.4 mm), opposite from the expected shift by design. Only five lenses moved forward (up to 0.11 mm). Natural lens tilt ranged from -2.14 to 1.84 (superior). The absolute tilt of the implanted A-IOLs was on average higher than the natural lens' tilt; in 5 eyes the A-IOL tilt exceeded by more than x2.5 the pre-op tilt, and changed orientation. A-IOLs tilts generally occurred in the superior/nasal orientation. Most lenses changed tilt with accommodative demand (from 0 to 9 deg/D, on average across eyes).

Conclusions: Quantitative sOCT imaging of the pre- and post-operative anterior segment of the eye appear essential to understand the mechanisms by which current A-IOLs operate and advance towards new developments. The tested A-IOL did not work as expected in most eyes, indicating that potential improvements in near vision are unlikely resulting from effective change in paraxial power, but may be associated to induced lens tilt.



Merged 3D Full anterior segment OCT images of **(A)** a pre-op (with cataract) and post-op (A-IOL) eye; **(B)** post-op eye with A-IOLs for three accommodative demands (green:0 D; red:1.25D; gray: 2.5 D)

Commercial Relationship(s) Disclosure: Susana Marcos: Commercial Relationship(s); Essilor: Code F (Financial Support); PCT/ES2012/070185: Code P (Patent) | Sergio Ortiz: Commercial Relationship(s); PCT/ES2012/070185 : Code P (Patent) | Pablo Perez-Merino: Commercial Relationship: Code N (No Commercial Relationship) | Miriam Velasco: Commercial Relationship: Code N (No Commercial Relationship) | Mengchan Sun: Commercial Relationship: Code N (No Commercial Relationship) | Judith Birkenfeld: Commercial Relationship: Code N (No Commercial Relationship) | Sonia Duran: Commercial Relationship: Code N (No Commercial Relationship) | Ignacio Jimenez-Alfaro: Commercial Relationship: Code N (No Commercial Relationship)

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Other Registry Site:

Registration Number:

