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# Anterior Segment OCT Changes after Phacoemulsification

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- Phacoemulsification is one of the most frequent surgical techniques used for cataract removal .
- In addition to restore vision, phacoemulsification has been shown to decrease intraocular pressure (IOP) in patients with and without glaucoma .
- Because elevated IOP is the main risk factor in the development and progression of glaucoma, phacoemulsification with foldable intraocular lens implantation (IOL) has been implicated to treat both Cataract and Glaucoma.



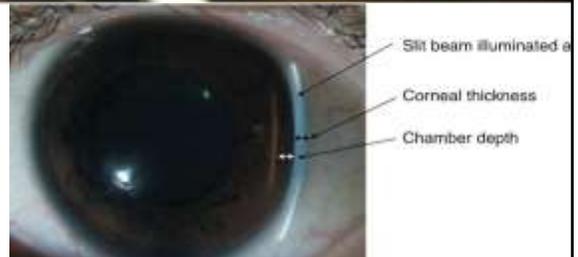
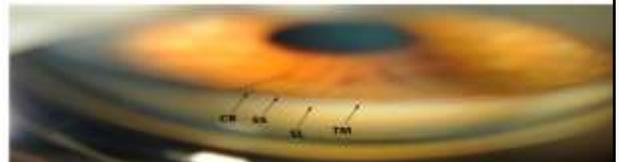
## Assessment of Anterior Chamber Angle(ACA)

- Essential part of the ophthalmological examination.
- It is intrinsically related to the diagnosis and treatment of glaucoma .
- Has a role in its prevention In patients with glaucoma or glaucoma suspicion.
- A careful assessment of the ACA should always be performed.



## Assessment of Anterior Chamber Angle(ACA)

- Slit-lamp gonioscopy
- limbal anterior chamber depth measurement (LACDM)Van Herick test
- Ultrasound bio microscopy



## Assessment of Anterior Chamber Angle(ACA)

- Anterior segment optical coherence tomography
- Rotational Scheimpflug camera
- New gonio-photographic systems



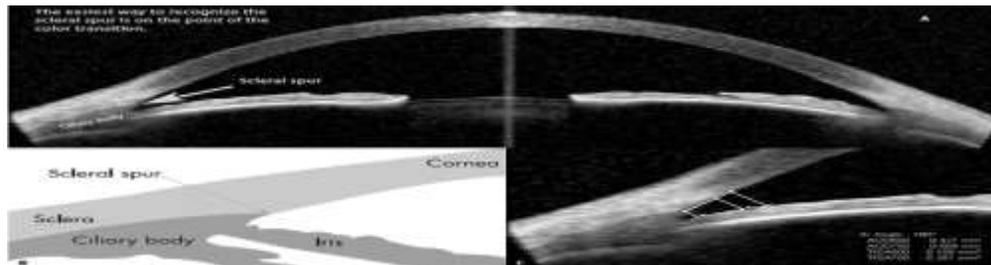
## Comparison of anterior segment imaging modalities for assessing ACA

Imaging system	Correlation with gonioscopy	Advantages	Limitations
Slit scan topography	N/A	Noncontact	No visualization of angle, ciliary body or sulcus
Rotational Scheimpflug camera	++	Noncontact	No visualization of angle, ciliary body or sulcus
ASOCT	+++	Noncontact Direct angle visualization Some visualization of ciliary body and sulcus	Requires identification of scleral spur
UBM	+++	Excellent visualization of angle, ciliary body and sulcus	Requires contact, Require identification of scleral spur



## Angle parameters by AS OCT

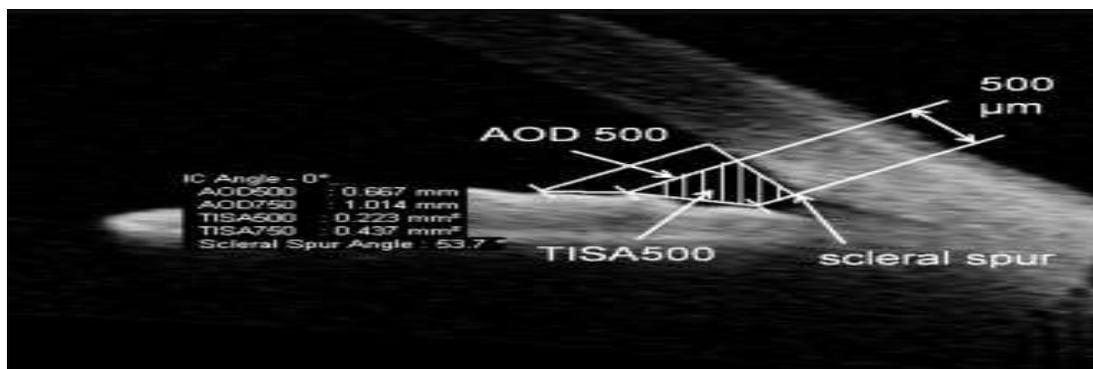
The scleral spur (SS) insertion landmark is located where the less reflective ciliary muscle contacts the more reflective sclera and angle parameters were automatically measured on the temporal and nasal side.



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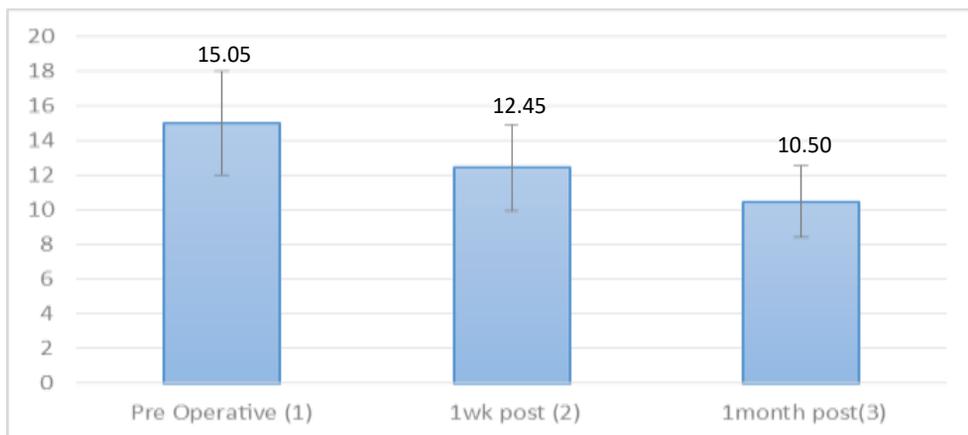
1. ACA (anterior chamber angle)
2. AOD (angle opening distance) 500, 750 [ $\mu\text{m}^2$ ]
3. TISA (trabecular iris space area) 500, 750 [ $\mu\text{m}^2$ ]



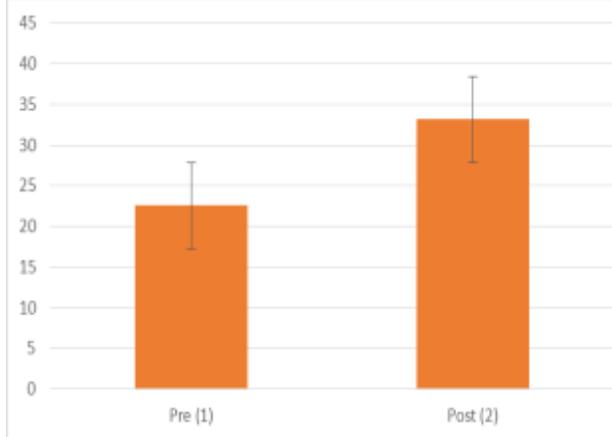
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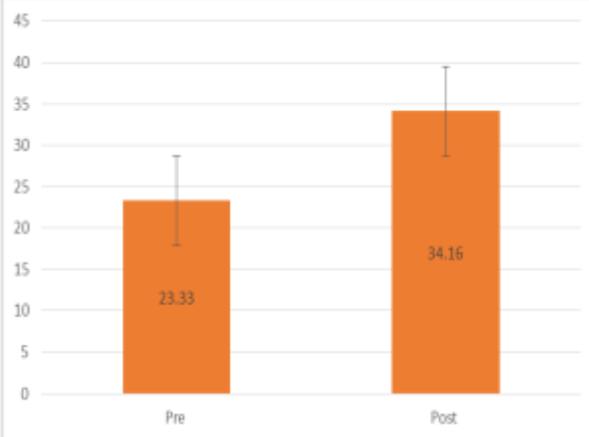
## Changes in intraocular pressures before, a week after, and a month after surgery



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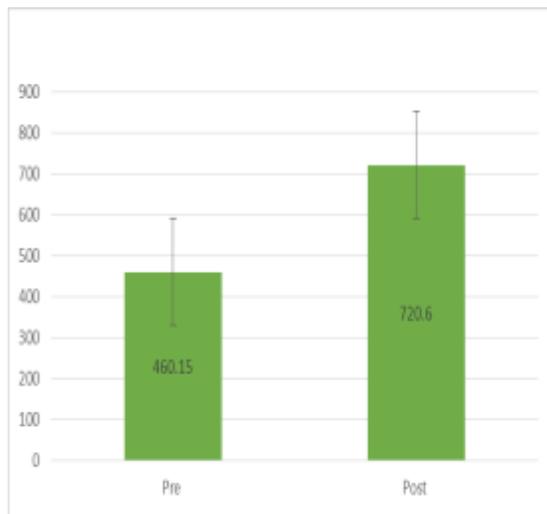
Changes in anterior chamber angle (ACA) at temporal side before and a month after surgery.



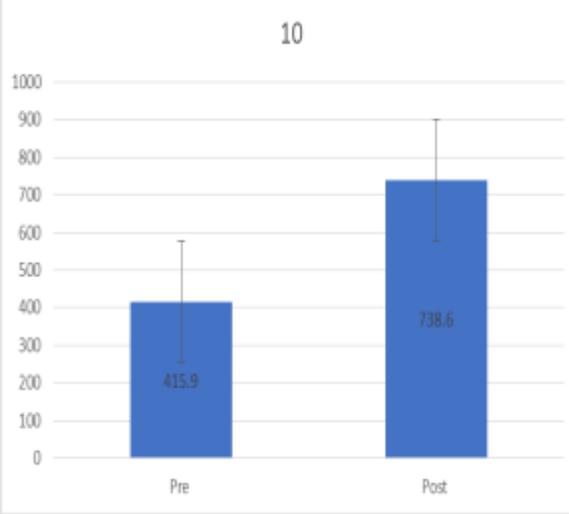
Changes in anterior chamber angle (ACA) at nasal side before and a month after surgery.

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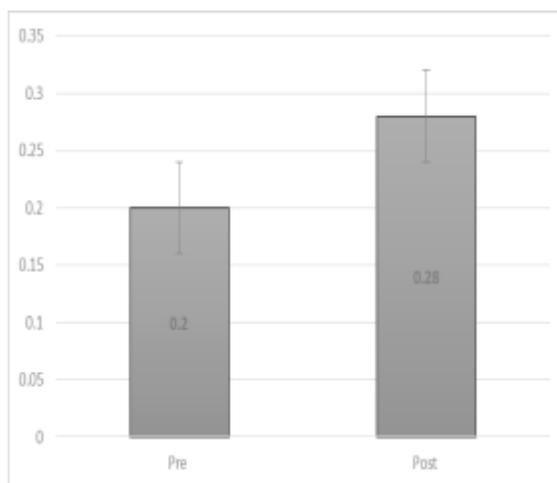


Changes in Angle opening distance (AOD) at temporal side 500  $\mu\text{m}$  from scleral spur before and 1 month after surgery

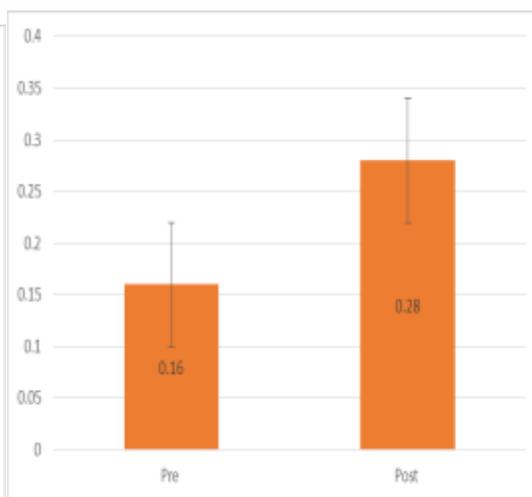


Changes in Angle opening distance (AOD) at nasal side 500  $\mu\text{m}$  from scleral spur before and 1 month after surgery

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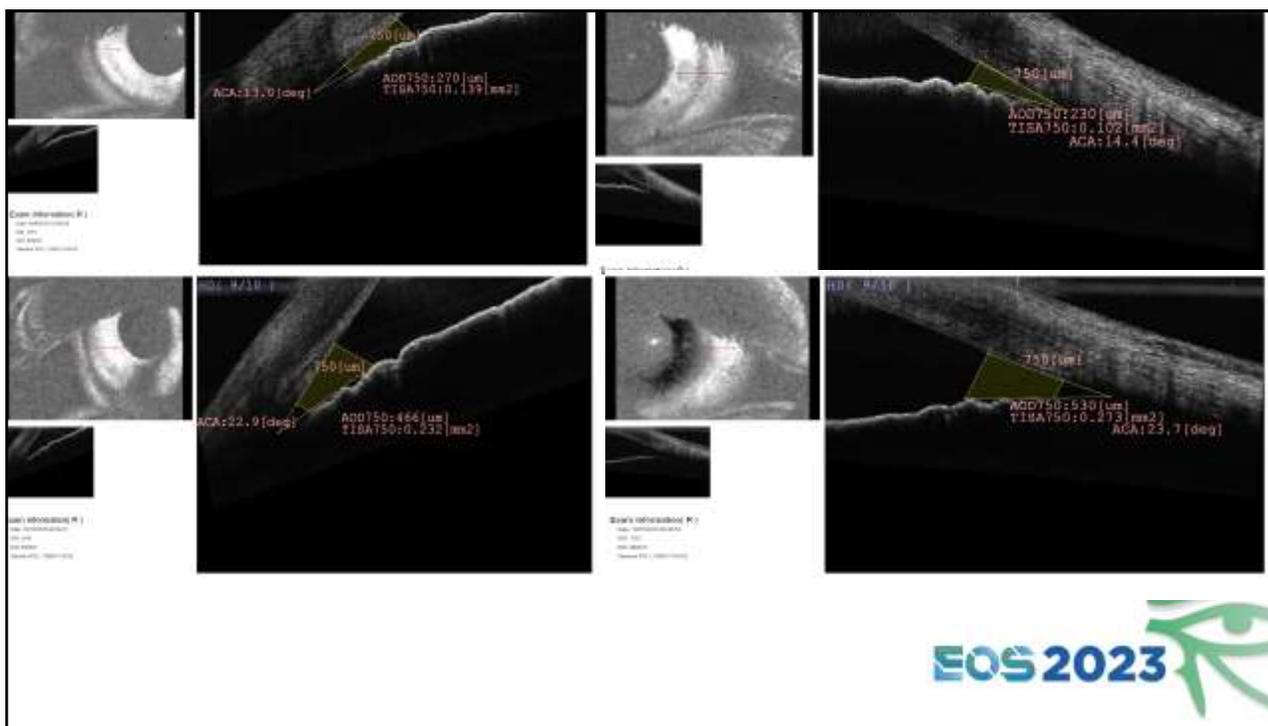
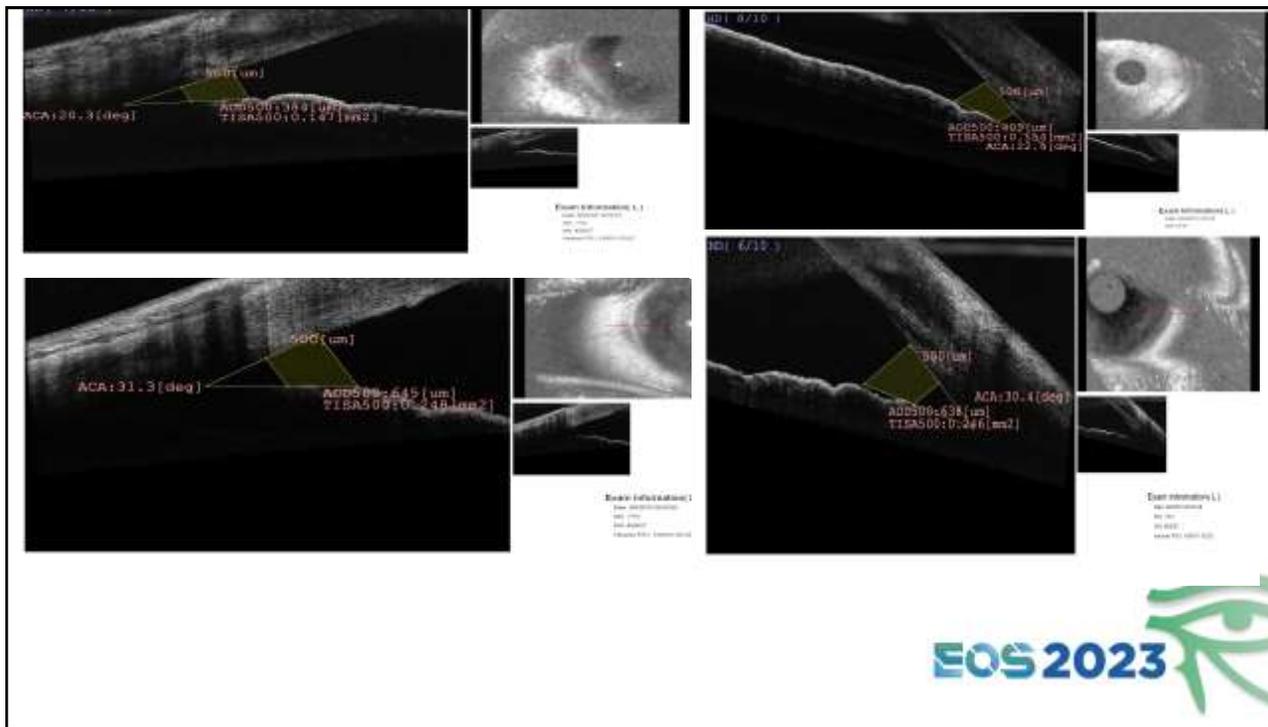
Changes in Trabecular iris spur area (TISA) at temporal side 500  $\mu\text{m}$  from scleral spur before and 1 month after surgery

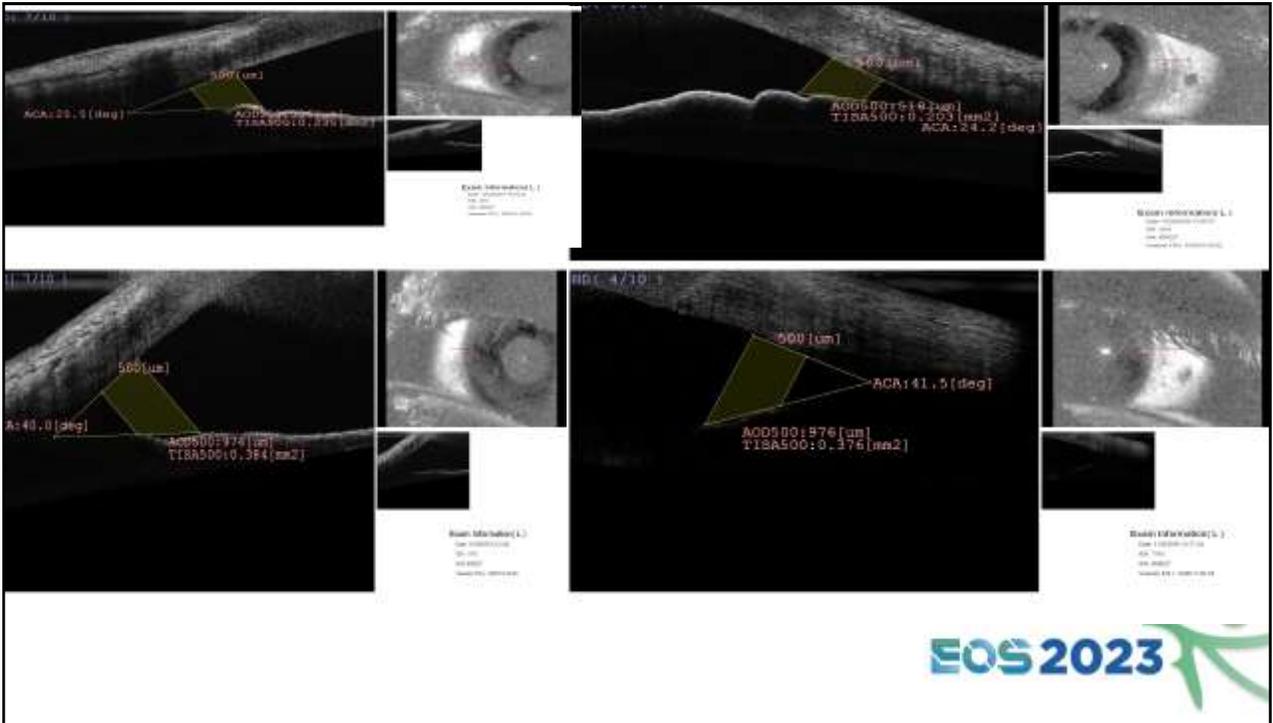


Changes in Trabecular iris spur area (TISA) at nasal side 500  $\mu\text{m}$  from scleral spur before and 1 month after surgery

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## Phacoemulsification with IOL implantation results in

- Widening of the ACA based on quantitative assessment of ASOCT imaging.
- Significant lowering of IOP in patients with glaucoma and in patients without glaucoma.
- Greater IOP lowering with more ACA widening although it did not reach statistical significance in our study.

## Explanation

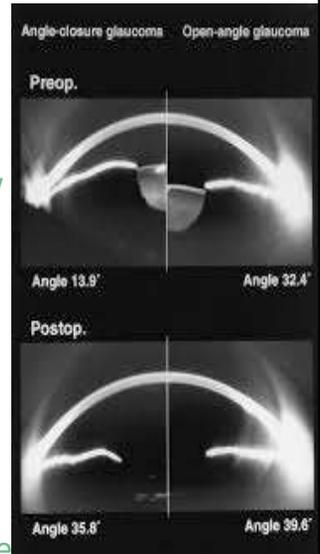
- Cataract surgery removes the anatomical cause of narrow angle



Deepening of the AC and widening of the ACA



Improve the access of aqueous to the filtering portion of the trabecular meshwork



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## Explanation

Postoperative shrinkage of the lens capsule



increasing posterior traction on the scleral spur expanding the trabecular meshwork and lumen of the Schlemm's canal

Ultrasound activation of cytokines, endogenous prostaglandin F2



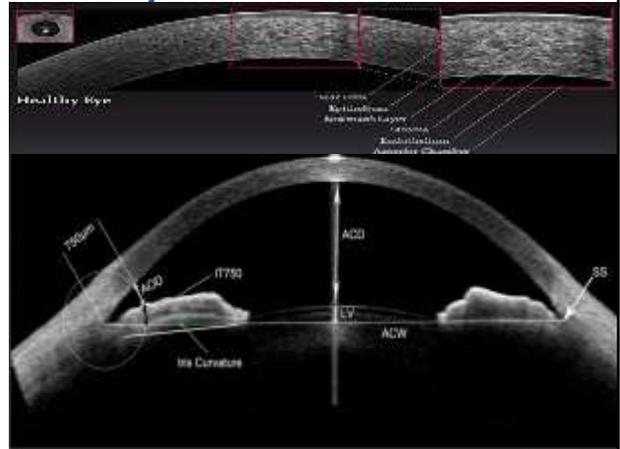
increase in aqueous outflow by expansion of the trabecular meshwork and lumen of the Schlemm canal

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## Other important parameters by AS OCT

- Central corneal thickness (CCT)
- Anterior chamber depth (ACD)
- anterior chamber width (ACW)
- anterior chamber volume (ACV)
- iris curvature (ICURVE)
- lens vault (LV ( $\mu\text{m}$ ))



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### Anterior Segment Optical Coherence Tomography Changes after Phacoemulsification

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#### ABSTRACT

**Background:** Phacoemulsification can cause changes in the anterior segment parameters that could be detected by

**Conclusion:** Phacoemulsification with IOL implantation results in significant widening of the ACA proved by quantitative assessment of ASOCT imaging. At the same time it caused small but significant reduction in IOP.

**Keywords:** Phacoemulsification, anterior chamber angle, anterior segment optical coherence tomography.

34.16° ± 6.99° respectively (P< 0.001).

**Conclusion:** Phacoemulsification with IOL implantation results in significant widening of the ACA proved by quantitative assessment of ASOCT imaging. At the same time it caused small but significant reduction in IOP.

**Keywords:** Phacoemulsification, anterior chamber angle, anterior segment optical coherence tomography.

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*Thank you*

