

## **EXAMINATION OF ACCOMMODATION IN PSEUDOPHAKIC EYES**

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The essential function of human eye is to ensure sharp sight for far and for near objects. The process when the refractive status of the eye is changing called accommodation. The crystalline lens changes with age and loses its capacity for focusing to near objects. In the course of cataract surgery the intraocular lens implanted to the place of the cataractous lens is monofocal lens without any accommodation capacity. Despite this fact certain patients with monofocal intraocular lenses can achieve good visual acuity for distance and for near objects with distance correction. There are two mechanisms in the background of this phenomenon: pseudophakic pseudoaccommodation and pseudophakic accommodation.

In our scientific works in the Department of Ophthalmology we had measured pseudophakic accommodation and pseudoaccommodation in pseudophakic eyes with three different methods. With defocusing technique we had proved approximately 0.8-0.9 D total amplitude of accommodation. With partial coherence interferometry method, the mean shift of the intraocular lens was minimal under physiological accommodation condition. After pharmacological blocking of the ciliary muscle the shift of the intraocular lens was a mean of 0.2 mm, with no difference between two types of monofocal intraocular lenses.

We had proved that there is a difference in anterior chamber depth values in phakic and pseudophakic eyes measured by a newly developed diagnostic tool using Scheimpflug imaging and a standard ultrasonic device (Pentacam<sup>®</sup> vs Tomey AL-2000). In phakic eyes the results are the same, but in the case of pseudophakic eyes the Pentacam<sup>®</sup> measures significantly smaller anterior chamber depth.

The anterior chamber depth was larger measured with newly developed anterior segment optical coherence tomograph (Visante<sup>®</sup> OCT) than ultrasonic device using immersion technique in phakic eyes. The repeatability, reproducibility and reliability of measurements of anterior chamber depth was much better with optical device.

In conclusion, measuring amplitude of accommodation is a difficult task and not able to differentiate accommodation and pseudoaccommodation from each other. Only parts of this complex process can be measured. Besides, there are a lot of poorly measured factors to help accommodating with pseudophakic eyes. ACD measurements dependent on the observer. The ACD values are significantly different with non-contact optical devices than standard ultrasonic devices.