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# Measuring Scattered Light in Patients Implanted With Iols Using a High-Sensitivity Double-Pass Instrument

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## Abstract

**Purpose:**To quantify and compare light scatter in patients implanted with different types of IOLs using a new high-sensitivity instrument that employs a wide-angle double-pass technique.

**Methods:**Recording double-pass retinal images of a point source is a successful and widely used objective method for evaluating the optical quality of the eye (Santamaria, Artal & Bescos, JOSAA,1987). We have built a new system that uses this concept and is optimized to detect the low light levels in the outer part of retinal images. An important characteristic of the instrument is its wide angle detection compared to the 30 minutes of visual field that is typical of standard double-pass instruments. An adapted version of the instrument was built for recording images of pseudophakic eyes in a clinical environment using infrared light for illumination.

**Results:**We recorded wide-angle double-pass images in both pseudophackic eyes and an artificial eye with a dynamic range of 5 log units. By computing a scatter parameter as the quotient of the light reaching different retinal locations, we quantified the changes in the light scattered between different types of multifocal and monofocal IOLs. At the inner part of the retinal image, below 1 degree, the scatter parameter of diffractive multifocal IOL is around 70% higher than that for a monofocal IOL, whereas at outer parts, the difference is around 30%. Smaller, but still measurable,differences were found among different types of multifocal IOLs.

**Conclusions:**A new instrument that objectively measures the scattered light induced by multifocal IOLs

has been designed and built. We used the system to quantify light scattering of pseudophakic eyes with different IOLs. These objective data could be used in the design stage of the multifocal IOL to reduce induced scatter, which would improve quality of vision.

**Keywords:** intraocular lens • optical properties