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CME Session

Presentation Abstract

Program#/Poster#:	5275
Abstract Title:	**A Wavelength Tunable Optical Instrument For Measuring Ocular Scatter**
Presentation Start/End Time:	Thursday, May 05, 2011, 8:45 AM - 9:00 AM
Session Number:	502
Session Title:	In Vivo Scatter and Polarization /
Location:	Palm A
Reviewing Code:	340 physiological optics, optical design and optical models - VI
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Keywords:	550 imaging/image analysis: non-clinical; 627 optical properties; 548 image processing

Abstract Body:

Purpose: Some of the most common ocular pathologies incur with the increase of the light scattering into the eye. The wavelength dependence of the light scattering is related with the characteristics of the inhomogeneities in the ocular media, and this could be used to identify underlying pathologies. We developed a new optical instrument for measuring the light scattered in the human eye at different wavelengths.

Methods: White light from a Halogen lamp is spectrally filtered by using a liquid crystal tunable filter. Series of disks of different wavelengths and uniform radiance with an increasing angular dimension up to 9.1 degrees in radius are sequentially projected on to the retina. The disk's retinal images are recorded by a cooled electron-multiplied CCD camera. The derivative of intensity at the center of each disk's retinal image with respect to its radius provides the eye's wide-angle double-pass point-spread function (PSF). This function, the wide-angle PSF, was determined for three different wavelengths: 550, 600 and 650 nm (FWHM = ± 50 nm). The method was applied in an artificial eye and in a group of four normal young subjects.

Results: For all wavelengths, wide-angle PSF was measurable up to the complete range of the angular dimensions of the projected disks

(9.1 degrees). The dynamic range for the PSF intensity from the center to the edges exceeded six orders of magnitude. The estimated wide-angle PSFs differ from the lower to the larger wavelengths. The PSF at 550 nm is characterized by more intense light scatter in the angular range between 5 and 10 degrees, while the PSF at the 650nm showed a relatively increased scattered light between 0 and 2 degrees. This is presumably as a result of more diffuse light from the inner retina and choroid for longer wavelengths.
Conclusions: An optical objective method is sensitive enough to detect consistently differences in light scatter for different wavelengths in normal healthy eyes. The technique can differentiate the main sources of scattering in the human eye and could be used for early detection of ocular pathologies.

CommercialRelationships: **Guillermo M. Perez**, Universidad de Murcia (P); **Harilaos S. Ginis**, Universidad de Murcia (P); **Juan M. Bueno**, Universidad de Murcia (P); **Carlos Herrero**, None; **Pablo Artal**, Universidad de Murcia (P)

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