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Presentation Abstract

Program#/Poster#:	4371
Abstract Title:	**Sign-Dependent Sensitivity to Defocus in Peripheral Vision for Myopes and Emmetropes**
Presentation Start/End Time:	Wednesday, May 04, 2011, 2:00 PM - 2:15 PM
Session Number:	441
Session Title:	Peripheral Refractive Errors /
Location:	Room 305
Reviewing Code:	333 peripheral vision - VI
Author Block:	*Robert Rosen*[1], *Linda Lundstrom*[1], *Ala Abdul-Rasool*[1], *Nova Ogmaia*[1], *Christina Schwarz*[2], *Pablo Artal*[2], *Peter Unsbo*[1]. [1]Biomedical & X-Ray Physics, Royal Institute of Technology (KTH), Stockholm, Sweden; [2]Laboratorio de Optica, Universidad de Murcia, Murcia, Spain.
Keywords:	750 visual acuity; 604 myopia; 673 refraction
Abstract Body:	**Purpose:** In an earlier study on the influence of optical defocus on peripheral vision (Rosén et al. acc. for IOVS sept 2010, doi: 10.1167/iovs.10-5623), the two myopes were less sensitive to negative (hyperopic) than to positive (myopic) defocus. This asymmetry was not present for the three emmetropes. Asymmetries in the impact of defocus of different signs are generally interesting for understanding the process of emmetropization. This study therefore investigates the phenomenon in more depth. **Methods:** Low contrast grating resolution thresholds were determined in the 20° nasal visual field for 14 myopes (<-1.75 D) and 12 emmetropes (<0.5 D) for different amounts of defocus induced by trial lenses (±4 D from best refraction, sampled at 1 D). Sensitivity to positive and negative defocus in logMAR/D was determined by linear least squares fits. In a subsequent experiment on two subjects, we used an adaptive optics instrument to correct for peripheral aberrations while performing the same type of low contrast resolution measurements for different defocus. **Results:** Asymmetry in the sensitivity to defocus was not found for all myopes and there were also some emmetropes with asymmetric trends. However, a Mann-Whitney test on the difference in sensitivity between positive and negative defocus revealed a

significantly (p=0.013) larger difference for myopes than for emmetropes. Furthermore, when comparing the reduction in visual acuity for negative and positive defocus the myopes showed a significant difference, whereas the emmetropes did not (Wilcoxon's paired-sample rank test one-tailed p-value 0.0015 for myopes and 0.48 for emmetropes). The median sensitivity for myopes to negative defocus was 0.141 (range 0.002 to 0.240) logMAR/D and for positive defocus 0.203 (0.148 to 0.422), the corresponding values for the emmetropes were 0.173 (0.085 to 0.273) and 0.184 (0.103 to 0.241). On one subject with a large asymmetry, the difference in sensitive was much smaller when the peripheral aberrations were corrected with adaptive optics.
Conclusions: For peripheral low contrast resolution tests, some subjects are less sensitive to negative defocus than to positive. This phenomenon is much more common for myopes than for emmetropes. Results of an adaptive optics experiment indicate that the asymmetry may be caused by optical aberrations.

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