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**Eccentric Correction in Low Vision Subjects with Central Visual Field Loss**

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### Purpose

To evaluate if the correction of off-axis optical aberrations can improve the visual function in subjects with large central visual field loss (CFL) who use eccentric fixation. Only the lowest order off-axis aberrations, oblique astigmatism and defocus, are considered.

### Methods

The peripheral refraction in the preferred eccentric fixation angle was measured with photorefractometry using the PowerRefractor (PR) instrument. Of the 38 CFL subjects that were measured, seven (7) were selected for eccentric correction. The average values from several PR measurements were used to prescribe the eccentric correction. To analyse the impact on visual performance, random-sized ring-targets from High-pass Resolution Perimetry (HRP) were displayed on a computer screen in the same location as the PR head. The detected target size determines the resolution threshold in the eccentric fixation angles, with and without eccentric spectacle correction. Contrast sensitivity was also measured with the Pelli-Robson chart.

### Results

An improvement of visual performance was found in five of the seven subjects with large CFL and, correspondingly, large eccentric fixation angles. The HRP results demonstrated an improved visual acuity when the eccentric (oblique) astigmatism and eccentric spherical refractive errors were corrected. Five subjects also showed an improvement in contrast sensitivity function. The results corresponded well with the subjective improvements reported by the subjects after evaluating the new correction in practical use.

### Conclusions

There are substantial lower order optical aberrations with large individual variations in peripheral vision. The present study shows that individual measurements and improvements of the optical image quality at the preferred retinal location for well-adapted users of eccentric correction leads to both an improved resolving capacity and improved contrast sensitivity. This increases the possibility for the individual subjects to use their remaining visual function. It also shows that there are optical limitations in visual function in larger off-axis angles.

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### References


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