1507 - 11:15AM
Fixation Stability Measurement Using the MP1 Microp erimeter: A Method to Improve the Quantification of Results
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\textbf{Purpose:} The Nidek microp erimeter (MPI, Nidek Instruments, Italy) is a recently available clinical perim etry device which also assesses fixation stability. The MPI expresses fixation stability in three ways: (i) as a fixation score (stable, relatively unstable, or unstable); (ii) as the proportion of fixations falling within the central 2° of retina; and (iii) as the proportion of fixation points falling within the central 4° of retina. In most published research, fixation stability is quantified by calculating a bivariate contour ellipse area (BCEA) which encompasses 68% of fixation points.

Here we compare these four methods of fixation assessment (Fixation Score, Central 2°, Central 4°, BCEA) by correlating them to various parameters of reading known to be related to fixation stability.

\textbf{Methods:} Twenty-three people with age-related macular disease were assessed. Eye position was recorded at 25 Hz using the MPI whilst patients performed a perimeter task. Fixation score, central 2° and central 4° values were obtained from the MPI’s inbuilt software. BCEA values were calculated from raw fixation data extracted from the MPI. Reading speed was assessed using MNREAD, Rapid Serial Visual Presentation (RSVP) and EUREAD tests.

\textbf{Results:} No relationship was revealed between any reading parameters and the fixation scores from the Central 2° value or the Central 4° value (p>0.1 for all comparisons). In contrast, there was a significant relationship between fixation stability assessed using the BCEA technique and RSVP reading speed (r=0.59, p<0.01), EUREAD reading error rate (r=0.66, p<0.01) and MNREAD reading speed (r=0.55, p<0.05).

\textbf{Conclusions:} Using the software supplied with the MPI does not adequately quantify fixation stability in people with age-related macular disease. However, a straightforward post-hoc analysis of the raw fixation data from the MPI can be applied to detect subtle yet important differences in fixation stability between subjects. We suggest that this technique is useful in studies where change in fixation stability is of importance, such as in clinical trials.

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1509 - 11:45AM
The Two-Dimensional Shape of Spatial Interaction Zones at the PRLs of Observers With Central Vision Loss
S.T.L. Chung, Y. Lin. College of Optometry, University of Houston, Houston, TX.

\textbf{Purpose:} Patients with long-standing central vision loss often adopt a peripheral retinal location for their preferred retinal locus (PRL) as the locus for occludometer and other visual tasks. Our previous work hinted that the PRL might exhibit properties resembling those of the normal fovea instead of the normal peripheral retina. Here, we tested whether or not the properties of the spatial interaction zone around the PRL resemble those of the normal fovea or the periphery.

\textbf{Methods:} Spatial interaction zones were determined for five observers (age: 48 - 83, logMAR acuity: 0.46 - 0.98) with long-standing central vision loss by measuring the extent of spatial interaction along four meridians (0, 45, 90 and 135° from horizontal) with respect to each observer’s PRL. Stimuli were random sequences of three upright- or inverted-letter stimuli that were randomly presented on a computer monitor (about 5 degrees) in one of four marked quadrants. The touch screen provides a measure of response time as a function of target contrast. These measurements are made with and without a dense neutral gray filter. This widely available fit-over sunglasses filter has a 1.8 ND. Thus we determine the magnitude of the increase or decrease in VA and CS in response to a standard reduction (1.5%) in retinal over-protection.

\textbf{Results:} Normally sighted subjects show, on average, a 0.22 log unit reduction (11 letters) in visual acuity and a 0.13 log unit reduction (25%) in contrast sensitivity. Within low vision patients having the same diagnosis, there can be considerable diversity, and some patients show a large amount of loss. Compared to normals, glaucoma patients show about the same reduction in VA (0.23 log units) but twice the reduction in CS (0.27). RP patients show more pronounced reductions in both visual functions, particularly for CS. On the other hand, patients with albinism generally do not show much change in VA and CS, although they may show a trend in other visual functions. We suggest that the PRLs in low vision patients show less change than normals and this is most pronounced for visual acuity. Some patients show a virtual improvement with the filter.

\textbf{Conclusions:} Low vision patient responses to reductions in illumination can be characterized by changes in both VA and CS. In some cases, the PRLs in low vision patients show less change than normals and this is most pronounced for visual acuity. Some patients show a virtual improvement with the filter.

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1510 - 12:00PM
Quantifying the Effect of Illumination on Visual Acuity and Contrast Sensitivity in Low Vision Patients
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\textbf{Purpose:} Low vision patients frequently have extraordinary responses to changes in task luminance. Clinicians typically rely on history taking and the patients’ reports of their visual experience when changes are made to the quality or quantity of lighting. We propose a method to quantitatively measure these effects on visual acuity and contrast sensitivity with and without a standard neutral gray filter.

\textbf{Methods:} Subjects are recruited from the Low Vision Clinic of the School of Optometry at UC Berkeley. Visual acuity measurements are made with a retro illuminated Bailey-Lovie Chart at a test distance of 3 or 4 meters. Contrast sensitivity is measured using a computer-based test in which the subject is required to locate a large blinking square (about 5 degrees) that appears in one of four marked quadrants. The touch screen provides a measure of response time as a function of target contrast. These measurements are made with and without a NOIR U23 neutral-gray filter. This widely available fit-over sunglasses filter has a 1.8 ND. Thus we determine the magnitude of the increase or decrease in VA and CS in response to a standard reduction (1.5%) in retinal illumination.

\textbf{Results:} Normally sighted subjects show, on average, a 0.22 log unit reduction (11 letters) in visual acuity and a 0.13 log unit reduction (25%) in contrast sensitivity. Within low vision patients having the same diagnosis, there can be considerable diversity, and some patients show a large amount of loss. Compared to normals, glaucoma patients show about the same reduction in VA (0.23 log units) but twice the reduction in CS (0.27). RP patients show more pronounced reductions in both visual functions, particularly for CS. On the other hand, patients with albinism generally do not show much change in VA and CS, although they may show a trend in other visual functions. We suggest that the PRLs in low vision patients show less change than normals and this is most pronounced for visual acuity. Some patients show a virtual improvement with the filter.

\textbf{Conclusions:} Low vision patient responses to reductions in illumination can be characterized by changes in both VA and CS. In some cases, the PRLs in low vision patients show less change than normals and this is most pronounced for visual acuity. Some patients show a virtual improvement with the filter.
Purpose: To determine the thresholds for speed discrimination in three groups of subjects, young normals, older normals, and patients with central visual field loss due to age-related macular degeneration (AMD).

Methods: Three groups of observers made speed discrimination judgments. The groups were younger normals aged 21-50 years, older normals aged >50 years and low vision patients with AMD aged >60 years. Observers were seated 50 cm from a display that subtended 44.6 arc deg in the horizontal dimension. Pressing a mouse began a trial. During the 833 ms trial, a pattern of 100 white dots on a black background appeared. The observer saw four regions on the screen. Alternating regions of the screen moved in opposite directions, 25 dots in each region, at random locations and moved either left to right or right to left. Dots had a lifetime of 467 ms or were replaced as they moved off of the screen. The observer’s task was to determine the direction of motion which had faster moving dots.

Results: AMD patients discriminate speed differences less well than younger normals (p < 0.01) and tended to discriminate speed differences less well than older normals (p = 0.06), although the difference was not statistically significant. There was also a trend for the older normals to discriminate speed differences less well than younger normals.

Conclusions: The results are consistent with Brown et al. (1986) who reported that discrimination of speed differences was related to mobility performance in low vision patients. The untested implication from our results is that AMD patients would have impaired mobility performance.

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