Comparison of Fixation Target Stability for RareBit and Humphrey Visual Field Tests
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Background

Maintaining stable fixation during visual field testing is essential for reliable results. In this study, we compared fixation stability and fatigue for HVF (static fixation target) to an alternative computer-based visual field test, RareBit perimetry (RBP) (kinetic fixation target).

Prior studies have demonstrated that RBP is as sensitive and specific as HVF with regard to detecting visual field abnormalities across a broad range of ophthalmic conditions. RBP does not, however, provide fixation monitoring, relying instead on a kinetic fixation target to encourage fixation. We measured how well subjects fixate on the RBP kinetic target in comparison to the static HVF fixation target.

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Methods

1. Fourteen healthy subjects were tested using an ASL Mobile Eye Tracker as they completed HVF 10-2 and RBP Central Field tests. Testing time was standardized for both tests, and the starting test for subjects was randomized.

2. Fixation stability was calculated as the average distance in degree minutes from the fixation target to the subject’s actual gaze. In order to determine fixation fatigue for each test, the amount of unfixated time (eyes closed or >20º from target) was measured for each subject.

Results / Conclusion

1. The kinetic RBP test resulted, on average, in 18% better fixation stability relative to the HVF test (p=0.02). Nine subjects demonstrated better fixation stability with the kinetic RBP target, 3 showed approximately equivalent fixation stability with both tests, and 2 had better fixation stability with the static HVF target.

2. Subjects spent a significantly longer amount of time unfixated (eyes closed or >20º from target) during the HVF test (10.0 seconds) relative to the RBP test (0.9 seconds) (p=0.002). (Figure 2)

Table 1: Comparison of fixation stability between the kinetic RBP target and the static HVF target during a central visual field test.

*Subjects were randomized to begin with either RBP or HVF but the analyzed portion of the HVF was normalized to the equivalent length of the RBP exam in order to eliminate the impact of test fatigue in causing differences between the two study groups.

Figure 1: The eye tracker is a monocular system which tracks subject gaze at a rate of 30 Hz. The device captures gaze data via a camera facing the eye. The device simultaneously captures scene data by a forward-facing camera which records what the subject is viewing. Gaze data and scene data are combined into a video showing where the subject is looking at any given time.

Figure 2: Fixation behavior of right eye of 2 subjects during HVF and RBP exams. The location of the fixation target during the entire length of each exam is represented with the red dot and/or lines; with the blue data points indicating the location of the subjects’ gaze. (a) Plot of gaze and fixation data for subject C, who had 48% better tracking with the kinetic RBP target.

Figure 3: Number of seconds spent unfixated (eyes closed or >20º from target) during the RBP and HVF tests are represented in table (a) and graph (b).