Statistical Analysis Plan

Produced during publication of data

Shrinivas Pundlik, Matteo Tomasi, Rui Liu, Kevin Houston, Gang Luo; Development and Preliminary Evaluation of a Smartphone App for Measuring Eye Alignment. *Trans. Vis. Sci. Tech.* 2019;8(1):19.

August 1, 2019

Aim 1: Simulated Strabismus

The Hirschberg ratio (HR) for each subject was determined using data from all 13 fixation points by plotting the app measurement against the known angular deviation for each fixation point, and determining best fit of this scatter plot using linear regression. The slope of this function represents the individual's HR and the *y*-intercept is the individual's angle κ (the angle between the visual and optical axes, represented as κ).[18,19] We measured the within-subject test–retest repeatability of the app in estimating the HR and κ using a Bland-Altman[20] plot to compute 95% confidence interval (CI) of the difference between two trials. Furthermore, we tested the accuracy of using a population average value of the HR by comparing the absolute gaze angles estimated by the app measurements and the true deviation of the fixation targets (via regression analysis using MATLAB; Mathworks, Natick, MA). The HR used for a subject was the average HR of the rest of the subjects.

Aim 2: Strabismus

Linear regression analysis was used to compare the app measurements of strabismus angle with cover test with prism neutralization CTPN measurements. Since the CTPN measurements were done at near fixation to facilitate direct comparison with the app measurements, corrections were made to the recorded CTPN values during data processing to account for the finite distance between the prism and center of rotation of the eye.[22] We arrived at a value of the distance between prism and center of rotation of eye by assuming a population average value of 24 mm for axial length[23] and a back vertex distance of 10 mm.