

# Bivariate contour ellipse area (BCEA) variability: comparison of two methods for recording.

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## Abstract

**Purpose:** : To compare bivariate contour ellipse area (BCEA) values obtained using two different methods to calculate fixation stability.

**Methods:** 57 healthy subjects (57 eyes) and 54 age related macular degeneration (AMD) patients (54 eyes) were enrolled to perform two consecutive examinations, fixation test before and during microperimetry, using MP-1 microperimeter (Nidek Technologies, NAVIS software version 1.7.6). Fixation stability was quantified by calculating the BCEA obtained during a 30 second fixation test. A 2° red cross was used as fixation target. Microperimetric examination was performed using the same target of fixation test, Humphrey 10 to 2 grid of 68-loci grid, stimuli Goldmann III with a projection time of 200 ms, white background illumination of 4 asb (1.27 cd/m<sup>2</sup>), and a 4-2 staircase strategy. BCEA (deg<sup>2</sup>) was normalized by logarithmic transformation (Shapiro-Wilk test,  $p < 0.05$ ). Statistical analysis was performed using paired t-test and a Bland-Altman analysis to assess the reliability of measurements. Statistical significance was set at  $P < 0.05$ .

**Results:** In healthy subjects, mean log BCEA recorded during fixation test was significantly smaller than microperimetry examination ( $P < 0.001$ , in all three standard deviations). Also in AMD group there was a highly significant differences between the two methods of recording BCEA ( $P < 0.001$ , in the 3 standard deviations). The Bland Altman plot analysis that demonstrates there were not agreement between two methods of quantifying BCEA.

**Conclusions:** BCEA calculated with fixation test is significantly smaller respect to microperimetric examination. This is probably due to short duration and the ease of performance of the fixation test, whereas microperimetric BCEA may be influenced by the duration of examination and by the projection of the stimuli at different locations. In AMD patients to detect changes in fixation stability is important to use the same method during follow-up. Finally, fixation test seems to have less variability than microperimetric examination.

**Keywords:** 524 eye movements: recording techniques • 412 age-related macular degeneration • 641 perception

