

## **Random changes of accommodative stimulus: an extension of the accommodative facility test**

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### **Purpose:**

To study the accommodative dynamics when the accommodative demand (AD) is randomly changed during the accommodative facility test.

### **Methods:**

Nine young emmetropes and 9 young myopes (mean age  $\pm$  standard deviation (SD) of  $22 \pm 2$ ) were measured monocularly 2 consecutive times with three different tests: 1) the near distance accommodative facility test (AD: 0.17 D/2.17 D); 2) the far distance accommodative facility test (AD: 0.50 D/4.50 D) and 3) the integrated randomized accommodative facility test (AD: 0.17 D/2.17 D/0.50 D/4.50 D). The accommodative response was measured with the PowerRef II, which was synchronized with an electro-optical Badal optometer that dynamically changed the accommodative stimulus. Each subject was instructed to clear the accommodative stimulus (black Maltese cross) and press a button once he/she cleared the stimulus. All of the subjects had normal accommodative amplitudes and accommodative facilities.

### **Results:**

Each half cycle was fitted with an exponential function to compute the amplitude, time response and velocity. A mixed ANOVA with the following independent variables (each with 2 levels) was used: refraction (myopes, emmetropes), test (conventional, integrated) and direction (accommodation, disaccommodation) and demand (2 D, 4 D). There is a main effect of demand ( $p < 0.01$ ) in all three variables. For amplitude, there is also a main effect of direction ( $p < 0.01$ ) and for time response there is an interaction of direction\*demand ( $p < 0.01$ ) and test\*demand ( $p < 0.01$ ). There is not a systematic pattern between any of the measured variables and time.

### **Conclusions:**

Despite there are significant differences in the accommodative dynamics between accommodation and disaccommodation and between 2 D and 4 D of accommodative demand, our results suggest that young subjects with good accommodative capabilities are not affected by the unpredictability of the accommodative stimulus during an accommodative facility task.

**Keywords:** accommodative facility; unpredicted stimulus; refractive error.

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