

# Evaluating reading performance using eye-movement analysis: clinical cases of AMD and amblyopia

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**Purpose:** Visual acuity forms the preferred test among clinicians for assessing visual function. However, since many activities of daily living rely on reading, evaluation of reading performance is believed to form a more reliable outcome of functional vision. The purpose of this study was to evaluate functional vision of patients using of eye movement based measures of reading performance.

**Methods:** One case of patient with wet AMD and two cases of patients with strabismic and anisometric amblyopia are presented. All patients were native Greek speakers and had to read comprehensively IREST-like texts in Greek. The texts were 0.4 logMAR (newsprint) in size at 40 cm distance. Eye movements were recorded with an infrared eye tracker (EyeLink II, SR Research Ltd) with a sampling rate of 500 Hz. Reading analysis included computation of reading speed, fixation duration, number of fixations per word, regressions and frequency distributions of fixation duration.

**Results:** By comparing the worse with the better eye of each patient, we show a much more pronounced effect of AMD and amblyopia on reading performance compared to visual acuity. Eye-movement analysis showed that slower reading speed in the worse eye is due to an increase in (i) the number of fixations (ii) the mean fixation duration and (iii) the percentage of regressions.

**Discussion:** Visual acuity test seems to underestimate functional vision due to AMD and amblyopia. Reading performance based on eye movement analysis seems to better correlate with the decreased functional vision which is experienced by such patients and probably forms a better measure to evaluate the effectiveness of any therapeutic interventions.