

EVALUATION OF VERTICAL AND HORIZONTAL SACCADES USING THE DEVELOPMENTAL EYE MOVEMENT TEST COMPARED TO THE KING-DEVICK TEST

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ABSTRACT

Background: Oculomotor function is impaired when an individual has a concussion and as such, it is important to identify tests that are able to assess oculomotor impairment. The King-Devick (K-D) test assesses horizontal saccadic eye movement and attention. The Developmental Eye Movement (DEM) test is designed to identify oculomotor dysfunction in children. It measures both horizontal and vertical saccades. The K-D test shows promise as a concussion-screening tool and part of a multifactorial assessment. The DEM has not been tested as a concussion assessment tool, but the neuroanatomical control of horizontal and vertical saccades originates from different areas of the brain, so one might expect to see differences in performance on the K-D and DEM tests when administered to concussed patients. First, it is important to determine if performance on the DEM and K-D tests, particularly with respect to the measurement of vertical and horizontal saccades, is similar in a healthy population.

Hypothesis/Purpose: The primary purpose was to evaluate the relationship between horizontal and vertical saccade tests over repeated trials in normal, healthy subjects. A secondary purpose of this study was to determine the number of trials needed to reach a performance plateau for both the DEM and K-D tests.

Study Design: This study used a prospective cohort research design

Methods: Forty-two healthy non-concussed participants (22 males, 20 females; mean age, 24.2 ± 2.92 years) completed six repeated trials of both the DEM, and then six trials of the K-D test in a single testing session. Trials within each test were performed in random order and participants were offered short rest breaks as needed between test administrations.

Results: Results indicated strong correlations, $r = .67$, or greater, between measurements of horizontal and vertical saccades. Performance plateaued on the K-D at trial three and on the DEM at trial two for both horizontal and vertical saccades.

Conclusion: It appears that the DEM and K-D tests measure similar constructs in healthy individuals and that no additional information is provided by assessment of vertical saccades. Additional studies are required to investigate the usefulness of the DEM in concussed individuals.

Level of Evidence: 3: Laboratory study with repeated measures.

Key words: Concussion baseline testing, ocular motor dysfunction, saccades

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