

Validation of a behavioral approach for measuring saccades in Parkinson's disease.

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Methodological Issue:

Research has shown that the speed, accuracy, and control of saccades is related to cognitive functioning in Parkinson's disease and other neurologic disorders, and may be more sensitive to subtle changes with progression or intervention than neuropsychological tests. However, expense and technical complications encumber application for individual evaluations and clinical trials.

Introduction:

A battery of standalone computerized tests was developed to measure reflexive prosaccade latency, volitional saccade initiation, and saccade inhibition (antisaccade). Briefly, the tasks require saccadic eye movement to make a fine perceptual discrimination of a Landolt C optotype target that is presented off-center. Presentation time decreases until the examinee is no longer able to accurately discriminate the direction of the target. In a prior study validating the tasks in healthy adults, minimum presentation time was shown to reflect latency to initiate saccade. The purpose of the present study was to evaluate psychometric properties of the tasks, including test-retest reliability, concurrent validity with traditional digital video eye-tracking, and sensitivity to cognitive dysfunction, in a heterogeneous sample of patients with Parkinson's disease (PD).

Methods:

A sample of 65 patients with idiopathic PD were recruited from a university hospital movement disorders clinic and provided informed consent. Participants completed the computerized behavioral battery of saccade tasks as well as traditional digital video eye-tracking using the EyeLink-II system. Comprehensive neuropsychological evaluation was performed to establish cognitive diagnosis consistent with Movement Disorder Society Task Force Level II criteria. Participants returned approximately 30 days later and repeated both the behavioral and traditional eye-tracking batteries.

Results:

Demographics had minimal impact on task performance. Thirty-day test-retest reliability estimates for behavioral tasks were acceptable and similar to traditional eye-tracking. Behavioral tasks demonstrated concurrent validity with traditional eye-tracking measures; discriminant validity was less clear. Saccade initiation and inhibition discriminated PD patients with cognitive impairment.

Conclusions:

The present findings support further development and use of the behavioral tasks for assessing latency and control of saccades in PD. The tasks are currently used in several clinical trials of interventions to enhance cognitive functioning in PD. A follow-up study is underway to collect normative data from healthy older adults to enable application in clinical evaluations of individuals.

Disclosure:

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