

DEFICIENT CONTRAST VISUAL ACUITY IN PATIENTS WITH MULTIPLE SCLEROSIS DEGRADES GAIT PERFORMANCE UNDER CONDITIONS OF LOW ILLUMINATION

Rachel Tripoli, Kelly Schwirian, Megan J. Walley, Barbara Giourgas, Harold Bland, Leonard LaPointe, Gerry Maitland

Department of Clinical Sciences, Florida State University College of Medicine, Tallahassee, FL

BACKGROUND: Contrast visual acuity is deficient in patients with multiple sclerosis (MS) and is associated with thinning of optic nerve fibers demonstrated by optical coherence tomography. Studies on the functional implication of this visual defect for motor performance, particularly under conditions of low illumination, are limited.

OBJECTIVES: To determine the effect of deficient contrast visual acuity on gait performance in patients with MS under conditions of bright and dim illumination.

METHODS:

The study compared 22 subjects with MS versus age-matched controls. Tests included Expanded Disability Status Scale (EDSS); contrast sensitivity visual acuity (SLOAN) at 100%, 2.5%, and 1.25% efficiency; Cirrus spectral optical coherence tomography; and randomized quantitative gait analysis (GAITRite) in conditions of simple and maze walking under high/low illumination (>80 and <4 candela). All trials were repeated utilizing blueblocking lenses. A functional ambulation profile (FAP) was calculated from multiple gait parameters. Exclusion criteria were visual acuity <20/50, comorbid ophthalmologic disorders, and EDSS score >6.

RESULTS:

Compared with controls, significantly worse contrast visual acuity was found in the MS group at 100%, 2.5%, and 1.25% visual efficiency. MS patients had thinner optic nerves than age-matched controls, a finding that correlated negatively with performance on the SLOAN chart (Correl >50%). Further, such visual deficiency significantly degraded motor performance under lowcontrast (paired t-test P values .02 simple and .001 complex) but not highcontrast conditions. In MS patients, a correlation existed between disease status (EDSS) and FAP scores; those with an EDSS score of 4 or greater performed significantly worse than those with a score of less than 4. In an effort to improve ambulatory function, blue-blocking lenses, reported to improve contrast sensitivity, seemed to produce some improvement in dim illumination in MS patients compared with controls, especially for complex walking tasks (paired t-test P value .002). Neither group improved in high illumination.

CONCLUSION:

Reduced contrast sensitivity acuity degrades motor performance in MS in dim illumination. Low FAP scores have a high correlation with increased fall risk. Blue-blocking lenses may provide some benefit in dim illumination.

Disclosure: Nothing to disclose.

Note: This abstract is under the Whitaker Research Track category.