

SUBJECTIVE VISUAL VERTICAL IN NEUROLOGICAL PATIENTS WITH MULTIPLE SCLEROSIS

Ulozienė I., Totilienė M., Balnytė R., Kuzminienė A.

Lithuanian University of Health Sciences, Kaunas, Lithuania

Introduction. Although abnormal visual dependence has been documented in other neurological disorders, it is not known whether multiple sclerosis leads to visual dependence, and whether such dependence is related to disease progression, clinical disability, or neuro-inflammatory burden in the central nervous system.

Research objectives. We aimed to evaluate subjective visual vertical and visual dependence using a novel mobile virtual reality-based system for subjective visual vertical assessment (VIRVEST), which was created by the authors of the presentation and evaluate its relationship with the Expanded Disability Scale Score (EDSS), multiple sclerosis (MS) course and clinical findings.

Materials and methods. The study included 59 patients with MS and 59 controls. Four tests were integrated in VIRVEST system and performed by each patient: a static subjective visual vertical (SVV), dynamic SVV with clockwise and counter-clockwise background stimulus rotation, and SVV in a virtual reality background – a boat floating in the wavy water – to be adjusted vertically. Visual dependence was evaluated as a function of dynamic SVV.

Results. Patients with MS manifest larger biases in both static and dynamic SVV than healthy controls ($p < 0.001$), in addition to higher visual dependence scores ($p < 0.05$). MS patients with an EDSS score > 4.5 had larger values of dynamic SVV and when compared to MS patients with lower EDSS scores ($p < 0.01$), and visual dependence was related to disease severity. Patients with progressive MS disease course demonstrated statistically significantly larger dynamic SVV and visual dependence scores when compared to MS patients with relapsing-remitting disease ($p < 0.01$).

Conclusion. We suggest that this real-world paradigm, which is used in our system, is effective at identifying visual dependence in neurological patients, and may have application in clinical settings, given high system usability scores.