

RETROSPECTIVE STUDY OF THE RELATIONSHIP BETWEEN THE CHARACTERISTICS OF POSTURAL STABILITY AND OCULOMOTOR ACTIVITIES

Victor M. Pedro[1,2], **Nicole C. Lim**[1] **and Elena Oggero**[3,4]
[1] iBrain - International Institute for the Brain, New York, NY
[2] Director of Rhode Island Integrated Medicine, Cranston, RI
[3] Electrical and Computer Engineering Department, University of Wyoming, Laramie, WY
[4] Vestibular Technologies, LLC, Cheyenne, WY

Corresponding Author: Victor M. Pedro
International Institute for the Brain - iBRAINnyc.org - 311 East 94th St. New York, NY 10128, USA
Tel: +1 646-315-1548
Email: vpedro@ibrainnyc.org
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ABSTRACT

Oculomotor measures are utilized for various purposes, including the diagnoses of health conditions. However, less is known about eye movements and their relationship to postural stability, and no consensus is found in the literature on this subject. This retrospective chart review of refractory neurological cases focused on the relationship between postural control as measured by posturography and the characteristics of saccade and pursuit movements. Results included: the Head Neutral average stability score being higher than Head Left or Right; smooth pursuit gain being lower at 0.1 Hz than at 0.4 Hz; in the saccadic tests, the considered subjects tended to undershoot, and the latency tended to be lower than the normative 200 ms; there was a statistically significant difference of the smooth pursuit results with the head neutral and turned right, with very poor performance of the postural control system associated with very poor oculomotor ability to follow a target; only five out of 144 correlation pairs were found statistically significant, pointing toward no correlation between oculomotor activities and postural stability. Although results were conflicting, this study highlighted the need for better testing protocol: what is feasible with healthy subjects in a laboratory setting is not always applicable in clinical settings with subjects affected by different pathologies and in the presence of multiple comorbidities. Furthermore, since the oculomotor system is one component of the postural control system, a greater neurophysiological understanding of how it integrates the inputs received from its subsystems may be needed to lead to more effective interventions.

Keywords: Oculomotor activities, Smooth pursuit, Saccades, Postural stability, Clinical based research, Retrospective study

INTRODUCTION

Researchers have long utilized oculomotor measures for various purposes, including diagnosing health conditions [1-2]. E ye-tracking technologies, being either video or electrode based, capture different eye movements such as saccades, smooth pursuits, and optokinetic nystagmus, and these metrics provide means for assessing the condition of the patients' health, since trauma, vascular disease, genetic and developmental disorders are all associated with aberrant eye movement [1-2].

Saccades are swift and jerky eye movements that take place reflexively and voluntarily to bring an object of interest onto the fovea [3-4]. Quickly scanning a visual scene, the eye fixates on a position momentarily and then moves to another position. Saccades can be assessed based on velocity (measured in degrees per second), accuracy (how well the eye matches the target position), and latency (the time between the presentation of the stimulus and the start of eye movement) [4]. Smooth pursuits are eye movements that follow the movement of a target. Accurate, smooth pursuit entails that the eye movement matches the speed of the moving target [5-6]. In addition, smooth pursuits assessment