OMICS Group Conferences
Accelerating Scientific Discovery
3rd International Conference on
Clinical & Experimental Ophthalmology
April 15-17, 2013 Hilton Chicago/Northbrook, USA

Dynamic assessment of binocular coordination and functional implications

Erik Viirre
University of California, USA

Abstract

Assessment of binocular alignment has classically been done statically. Eye positions are assessed in primary position and at eccentric angles to interpret the functional status of the oculomotor nerves and muscles. However, assessment of dynamic eye alignment, the coordination of the eyes during eye movements, has been less commonly carried out. Clinicians are aware of slow eye movement dynamic alignment changes, such as observed in Intranuclear Ophthalomoplegia, but assessment of eye alignment during rapid eye movements, such as saccades has not been part of neuro-ophthalmologic assessment. With the advent of inexpensive, high resolution recording systems, both eyes can be simultaneously recorded and dynamically compared. A critical issue with eye recording is calibration of recording systems, to ensure reliable velocity assessments and to determine eye-in-head angle and gaze angle. Our previous research with carefully calibrated implanted search coils demonstrated the operations of adaptation systems for binocular alignment (Viirre, 1987). The adaptation system appears to rapidly correct misalignment and velocity mismatches, but is limited in the magnitude of disparity that can be corrected. More recent research in humans (Viirre, 2005) has demonstrated increased variability of binocular coordination during divided attention. Variability is an interesting statistic that can be sensitively assessed without extensive recalibration procedures during recording over long intervals. Variability can be used as a robust eye movement parameter. It is proposed that population studies of binocular coordination be used to determine neurologic norms so that conditions such as brain injury, migraine and other neurologic conditions be assessed with a functional tool.

Biography

Viirre completed his Ph.D. in 1987 and his M.D. in 1988 at the University of Western Ontario. He did a fellowship in Neurology and Ophthalmology at UCLA in 1994-5. He was a senior scientist at the Human Interface Technology Laboratory at the University of Washington and at the Naval Health Research Center in San Diego. He is a professor in Neurosciences, Surgery and Cognitive Sciences at the University of California, San Diego where he practices Neurotology. Viirre has had research funding from NIH, NSF, DARPA, ONR, NASA and other sources. He has over 60 publications and 5 patents