ARTICLE

Objective Vision-Based Testing in Mild Traumatic Brain Injury: A Bibliography

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Ciuffreda KJ, Tannen B, Rutner D, Yadav NK, Suter PS. Objective vision-based testing in mild traumatic brain injury: a bibliography. Vision Dev & Rehab 2023; 9(2):127-32.

Keywords: bibliography, diagnosis, mild traumatic brain injury, objective testing, treatment, vision

ABSTRACT

The area of traumatic brain injury has received considerable attention in the medical and related health care communities over the past three decades. One major focus has been on the constellation of visual deficits and correlated symptoms frequently found in these patients. A subset of intense focus has involved the use of objectively-based vision testing for diagnostic, prognostic, and therapeutic purposes. The assembled bibliography provides a listing of the major published research papers and chapters over the past 30 years involving objective vision testing using an array of instrumentations and protocols. This should help both the clinician and researcher obtain a broad perspective in this important and rapidly evolving area.

INTRODUCTION: THE TWO WORLDS

The area of traumatic brain injury has exploded over the past two decades. This is primarily due to two factors: first, the many brain injuries related to the United States mideast military encounters, and second, concern over sports-related concussions.[1,2] This renewed interest has led to the development of new clinical and laboratory tests to assist in its diagnosis and treatment.[2]

This has been especially true with respect to the visual system. It is not surprising, as over 300 intracortical pathways linking more that 30 cortical areas are involved in vision.[3] This has resulted in a constellation of visual dysfunctions of a sensory (e.g., photosensitivity, impaired contrast sensitivity), motor (e.g., saccadic dysmetria, slowed vergence), and perceptual (e.g., abnormal egocentric localization, impaired distance perception) nature.[1,2,4,5,6,7]

One area of particular interest has been the use of objective testing to detect and quantify a visual deficit. There are several important benefits derived from objective testing. First, it serves to support the patient's symptom(s) and related problem(s). Second, it circumvents the problem of malingering, unreliable responses in young children, and potential difficulties with special populations. Third, with such tools, treatment can be more targeted for the affected neural site, and hence be more

efficacious. Fourth, and related to #3, it could help set a more targeted research agenda. And lastly, it could serve as critical information in the case of an expert witness: it is difficult to argue against one's claim of "brain injury" and related visual dysfunctions when the objective test findings (e.g., visual-evoked response, diffusion tensor imaging, eye movement recordings) clearly reveal a correlated abnormality.

Thus, the purpose of this paper is to furnish a bibliography of objective, vision-based tests, by category, in the patient with mild traumatic brain injury. It involved extensive searches of the literature via *PubMed, Google, Google Scholar, APA PsychNet,* and *Semantic Scholar,* as well as other related papers and books. This should assist the neuro-optometrist, and others, in the aforementioned five areas. Furthermore, this bibliography reflects the successful diagnostic and therapeutic approaches used in the field across a wide range of visual dysfunctions.

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