Optometric Vision Therapy: Evidence Based Treatment for Head Injury

The new standards of care have recognized the importance of identifying and treating vision disorders after head injury.

In his position statement on Vision Therapy and Traumatic Brain Injury, Dr. Eric Singman MD, PHD, Milton and Muriel Shurr Director of Johns Hopkins Hospital says:

‘Among the critical members of this (rehab) team, there should be vision specialists dedicated to working with patients who demonstrate deficiencies in eye teaming, loss of visual acuity and/or visual field as well as uncoupling of ‘visuospatial awareness’. For the most part, optometric and neuropsychological communities have embraced visual rehabilitation efforts; notably, these providers have documented successes in helping brain injury patients improve their quality of life’.

Evidence Review

Vision Therapy for Binocular Dysfunction Post Brain Injury

Conclusion:
‘In this case series, post-concussion vision problems were prevalent and CI and AI were the most common diagnoses. Vision therapy had a successful or improved outcome in the vast majority of cases that completed treatment. Evaluation of patients with a history of concussion should include testing of vergence, accommodative, and eye movement function.’

Vision Therapy for Post-Concussion Vision Disorders
Gallaway, Michael; Scheiman, Mitchell; Mitchell, G. Lynn. Optometry and Vision Science: January 2017 - Volume 94 - Issue 1 - p 68–73

Conclusion:
‘The majority of participants who completed the study experienced meaningful improvements in signs and symptoms.’
Vision Diagnoses Are Common After Concussion in Adolescents
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Conclusion:
‘Vision diagnoses are prevalent in adolescents with concussion and include convergence insufficiency, accommodative disorders and saccadic dysfunction. Symptoms of these problems may include double vision, blurry vision, headache, difficulty with reading or other visual work, such as the use of a tablet, smartphone, or computer monitor in the school setting. This likely represents a significant morbidity for adolescents whose primary work is school, which is heavily visually oriented. Recognition of these deficits is essential for clinicians who care for patients with concussion and the CISS may prove to be a useful screening tool for use in the future. Identification of these vision diagnoses will help physicians design necessary academic accommodations for patients who have visual deficits and are attempting to reintegrate into school and learning while recovering from concussion.’


Conclusion:
‘There are promising interventions for vision deficits following mild traumatic brain injury. However, there are multiple gaps in the literature that should be addressed by future research. Implications for Rehabilitation Mild traumatic brain injury may result in visual deficits that can contribute to poor concentration, headaches, fatigue, problems reading, difficulties engaging in meaningful daily activities, and overall reduced quality of life. Promising interventions for vision rehabilitation following mild traumatic brain injury include the use of optical devices (e.g., prism glasses), vision or oculomotor therapy (e.g., targeted exercises to train eye movements), and a combination of optical devices and vision therapy. Rehabilitation Professionals (e.g., optometrists, occupational therapists, physiotherapists) have an important role in screening for vision impairments, recommending referrals appropriately to vision specialists, and/or assessing and treating functional vision deficits in individuals with mild traumatic brain injury.’
Visual dysfunction is underestimated in patients with acquired brain injury.

Conclusion:
‘Visual impairments are common after acquired brain injury, but some patients do not define their problems as vision-related. A structured questionnaire, covering the most common visual symptoms, is helpful for the rehabilitation team to facilitate assessment of visual changes.’

Consequences of traumatic brain injury for human vergence dynamics.

Conclusion:
‘The results support the hypothesis that occult injury to the oculomotor control system is a common residual outcome of mTBI.’

Effect of oculomotor rehabilitation on vergence responsivity in mild traumatic brain injury.

Conclusion:
‘Vergence-based OR was effective in individuals with mTBI who reported nearwork-related symptoms. Overall improvement in nearly all of the critical, abnormal measures of vergence was observed both objectively and clinically. Improved vergence motor control was attributed to residual neural visual system plasticity and oculomotor learning effects in these individuals. Concurrently, nearwork-related symptoms reduced, and visual attention improved.’

Impaired eye movements in post-concussion syndrome indicate suboptimal brain function beyond the influence of depression, malingering or intellectual ability

Conclusion:
‘Our results indicate that eye movement function is impaired in PCS, the deficits being unrelated to the influence of depression or estimated intellectual ability, which affected some of the neuropsychological tests. The majority of eye movement deficits in the PCS group were found on measures relating to motor functions executed under both conscious and semi-conscious control (directional errors; poorer visuospatial accuracy; more saccades and
marginally poorer timing and rhythm keeping in memory-guided sequences; smaller number of self-paced saccades; deficits in OSP). Importantly, the PCS group also had poorer performance on several eye movement functions that are beyond conscious control and indicative of subcortical brain function (slowed velocity of self-paced saccades and indications of longer saccade durations of self-paced saccades, anti-saccades and larger amplitude memory-guided saccades). Cognitive functions likely affected in the PCS group based on the eye movement deficits include decision making, response inhibition, short-term spatial memory, motor-sequence programming and execution, visuospatial information processing and integration and visual attention (Pierrot-Deseilligny et al., 2004; Leigh and Zee, 2006). These results indicate that brain function in the PCS group had not returned to normal and contrasted that seen in patients with good recovery.’

Vision therapy for oculomotor dysfunctions in acquired brain injury: a retrospective analysis

Conclusion:
‘Nearly all patients in the current clinic sample exhibited either complete or marked reduction in their oculomotor-based symptoms and improvement in related clinical signs, with maintenance of the symptom reduction and sign improvements at the 2- to 3-month follow-up. These findings show the efficacy of optometric vision therapy for a range of oculomotor abnormalities in the primarily adult, mild brain-injured population. Furthermore, it shows considerable residual neural plasticity despite the presence of documented brain injury.’