

## ABI Information for Healthcare Professionals

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### Definition of Neuro-Optometric Rehabilitation (NOR):

Neuro-Optometric Rehabilitation (NOR) represents a specialized area of optometry, which addresses the oculomotor, accommodative, visuomotor, binocular, vestibular, perceptual/, visual information processing, and specific ocular/neurological sequelae of the acquired brain injury population. This includes the sequelae of concussion, traumatic brain injury, cerebrovascular accident/stroke, post-surgical brain complications, encephalopathy, vestibular dysfunction, and neurological conditions adversely affecting the visual system. NOR includes standard optometric modalities such as corrective lenses, prisms, tints and coatings, selective occlusion and Optometric visual therapy.

Neuro-Optometric Rehabilitation Therapy (NORT) is an active therapeutic approach incorporating both in-office and out of office procedures for the remediation and management of the associated visual problems listed above with the goal to improve activities of daily visual living and performance. NORT is based on sound principles of neuroscience involving visual motor and perceptual learning reflective of the underlying visual/neural system plasticity. It frequently is provided in conjunction with other rehabilitation and health care professionals.

### List of Treatment Modalities: Symptom Survey for Referral to Optometrists

- Flashes of light
- Floater in field of view
- Restricted field of vision
- "Curtains" appearing into field of view
  
- Inability to completely close eyes
- Difficulty moving or turning eyes
- Pain with movement of the eyes
- Pain in or around eyes
- Wandering eye
- Double vision
  
- Blurred vision for distance viewing
- Blurred vision for near viewing
- Slow shift of focus from near to far to near
- Difficulty copying or taking notes
- Pulling or tugging sensation around eyes
  
- Discomfort while reading
- Unable to sustain near work or reading for periods of time
- General fatigue while work/reading
- Loss of place while reading
- Eyes get tired while reading



Headaches while reading

Covering, closing one eye

Easily distracted when reading

Decreased attention span

Reduced concentration ability

Difficulty remembering what has been read

Disorientation

Loss of balance

Abnormal posture

Face, head turn or head tilt

Bothered by movement in environment

Bothered by crowded environments

Light sensitivity

A sensation of the floor, ceiling or

walls tilting

Dizziness

A sensation of the room spinning

A sensation of not feeling grounded

Postural shifts/ veering off when walking

Resources on Neuroscience of Vision and Head Injury:



AMERICAN OPTOMETRIC ASSOCIATION



## References for Vision problems and management of Visual Problems:

### A. General

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5. Conceptual model of optometric vision care in mild traumatic brain injury. Ciuffreda KJ, Ludlam DP. *J Beh Optom.* 2011;22(1):10-12.
6. Top-down visual framework for optometric vision therapy for those with traumatic brain injury. Chang A, Cohen AH, Kapoor N. *Optom Vis Perf.* 2013;1(2):48-53.
7. Visual symptomology and referral patterns for Operation Iraqi Freedom and Operation Enduring Freedom veterans with traumatic brain injury. Bulson R, Jun W, Hayes J. *J Rehabil Res Dev.* 2012;49(7):1075-82.
8. Traumatic Brain Injury: Visual consequences, diagnosis and treatment. In: *Advances in Ophthalmology and Optometry* (ed: Yanoff, M.), Elsevier, New York, in press

### B. Diagnosis

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2. Vergence dysfunction in mild traumatic brain injury (mTBI): a review. Thiagarajan P, Ciuffreda KJ, Ludlam DP. *Ophthalmic Physiol Opt.* 2011;31(5):456-68.
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5. Occurrence of ocular disease in traumatic brain injury in a selected sample: a retrospective analysis. Rutner D, Kapoor N, Ciuffreda KJ, Craig S, Han ME, Suchoff IB. *Brain Inj.* 2006;20(10):1079-86.

6. Vision disturbances following traumatic brain injury. Kapoor N, Ciuffreda KJ. *Curr Treat Options Neurol.* 2002;4(4):271-280.
7. Visual impairments in the first year after traumatic brain injury. Greenwald BD, Kapoor N, Singh AD. *Brain Inj.* 2012;26(11):1338-59.
8. Diagnostic tests for concussion: is vision part of the puzzle? Ventura RE, Jancuska JM, Balcer L J, Galetta SL. *J Neuroophthalmol.* 2015;35(1):73-81.
9. Composition of a vision screen for service members with traumatic brain injury: consensus using a modified nominal group technique. Radomski MV, Finkelstein M, Llano I, Scheiman M, Wagener SG. *Am J Occup Ther.* 2014;68(4):422-9.
10. Brain Injury Vision Symptom Survey (BIVSS) Questionnaire: Laukkanen Hanna, Scheiman Mitcheel, Hays John R: *Optometry and Vision Science*

### C. Therapy

1. Vision therapy for oculomotor dysfunctions in acquired brain injury: a retrospective analysis. Ciuffreda KJ, Rutner D, Kapoor N, Suchoff IB, Craig S, Han ME. *Optometry.* 2008;79(1):18-22.
2. Vision rehabilitation for visual-vestibular dysfunction: the role of the neuro-optometrist. Cohen AH. *NeuroRehabilitation.* 2013;32(3):483-92.
3. Oculomotor rehabilitation in traumatic brain-injured patients. Ciuffreda KJ, Suchoff IB, Marrone MA, Ahmann E. *J Beh Optom.* 1996;7(2):31-38.