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ABI Information for Healthcare Professionals

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
Floaters 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

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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

Brain Injury Association of America

nabis North American Brain Injury Society

NORA Neuro-Optometric Rehabilitation Association

Vestibular Disorders Association

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References for Vision problems and management of Visual Problems:

A. General

1. Proposed objective visual system biomarkers for mild traumatic brain injury. Ciuffreda KJ, Ludlam DP, Thiagarajan P, Yadav NK, Capo-Aponte J. Mil Med. 2014;179(11):1212-7.

2. Oculomotor diagnostic protocol for the mTBI population. Ciuffreda KJ, Ludlam D, Thiagarajan P. Optometry. 2011;82(2):61-3.

3. The scientific basis for and efficacy of optometric vision therapy in nonstrabismic accommodative and vergence disorders. Ciuffreda KJ. Optometry. 2002;73(12):735-62.

4. Pediatric acquired brain injury. Bodack MI. Optometry. 2010;81(10):516-27.

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

1. Photosensitivity in mild traumatic brain injury (mTBI): a retrospective analysis. Truong JQ, Ciuffreda KJ, Han ME, Suchoff IB. Brain Inj. 2014;28(10):1283-7.

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.

3. Static and dynamic aspects of accommodation in mild traumatic brain injury: a review. Green W, Ciuffreda KJ, Thiagarajan P, Szymanowicz D, Ludlam DP, Kapoor N. Optometry. 2010;81(3):129-36.
4. Occurrence of oculomotor dysfunctions in acquired brain injury: a retrospective analysis. Ciuffreda KJ, Kapoor N, Rutner D, Suchoff IB, Han ME, Craig S. Optometry. 2007;47(4):155-61.

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: concensus 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) Questionaire: 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.