



# Assessment and Management Of Oculomotor Dysfunctions Associated With Traumatic Brain Injury

*This fact sheet is intended to assist all who provide rehabilitative care to survivors of traumatic brain injury (TBI) affected by visual dysfunctions. The information below contains accepted practices for rehabilitation and treatment strategies for oculomotor dysfunctions.*

## Rehabilitation for Oculomotor Dysfunction

Oculomotor dysfunctions are common sequelae of traumatic brain injury (TBI).<sup>1,2,3</sup> These may occur due to TBI from blast exposure, concussion or penetrating head injury which can affect vision and or visual coordination pathways and may also be associated with direct injury to the eye(s). These co-occurring injuries can lead to visual disturbances that can have a significant functional impact on the quality of life for individuals with TBI.<sup>4,5</sup>

Rehabilitation for oculomotor dysfunction should include the following considerations:

- Individuals with TBI may also have sensory, motor, perceptual, cognitive and/or psychological problems that can complicate the management of the oculomotor dysfunction.
- Oculomotor dysfunctions associated with TBI may affect many areas of daily living including reading, visual learning and ability to concentrate.
- Vision Therapy is an accepted treatment of choice for the most common TBI-related visual dysfunctions: convergence insufficiency and accommodative dysfunction, with a success rate of 74-95%<sup>6</sup>.

### Common Oculomotor Dysfunctions

- Accommodative insufficiency
- Ill-sustained accommodation
- Accommodative excess
- Accommodative infacility
- Convergence insufficiency
- Convergence excess
- Fusional vergence dysfunction
- Divergence insufficiency
- Divergence excess
- Basic exophoria
- Basic esophoria
- Vertical phoria
- Saccadic dysfunction
- CN III, IV, VI palsies



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# Treatment Strategies for Oculomotor Dysfunction

The goal of rehabilitation for oculomotor dysfunctions is to improve the speed, accuracy and integration of oculomotor functions. Several treatment strategies for oculomotor dysfunction are listed below.

- Office-based and home-based oculomotor rehabilitation programs involve the use of simple therapy procedures to improve oculomotor dysfunction.
  - Office-based oculomotor rehabilitation supplemented with home-reinforcement is an effective treatment option for convergence insufficiency.
  - The individual's motivation, emotional state, and cognitive, attention and language ability may make it more difficult to implement active in-office oculomotor rehabilitation. In these situations, passive devices, such as lenses, prisms or home-based rehabilitation may be applied.
- Computer-based oculomotor rehabilitation utilizes software and computer programs to guide self-administered rehabilitation therapy procedures. Mobile applications have been developed for mobile electronic devices including smart phones and tablets.
- Prism therapy is a treatment option for convergence insufficiency, as it uses prisms in glasses to aid in the eyes achieving convergence.
- Lens therapy often uses plus lenses to improve accommodative and interactive vergence function.
- While rehabilitation, prisms and lenses have high success rates for oculomotor dysfunctions, surgical intervention may also be necessary.

Patients with oculomotor dysfunction following TBI should be treated early, aggressively and in concert with other rehabilitative specialties such as blind/low vision rehabilitation as well as occupational, physical and speech/language therapies. The specific provider(s) recommended will depend on the needs of the patient and may include those specialties listed below.

## Providers of care and rehabilitation for oculomotor dysfunction

- Audiology/Otolaryngology/  
Vestibular PT
- Blind/Low Vision Rehabilitation
- Occupational Therapy
- Physical Therapy
- Speech/Language Therapy
- Neurology/Neuro-Ophthalmic Care
- Psychology/Psychiatry/  
Neuro-Psychiatry

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## For additional details on the Oculomotor Dysfunctions Clinical Recommendation

- » See Care for Individuals with Oculomotor Dysfunctions Associated with TBI Clinical Recommendation available at [vce.health.mil](http://vce.health.mil)



### REFERENCES

1. Kapoor, N., & Ciuffreda K. J. (2011). Vision problems. In J. M. Silver, T. W. MacAllister, & S. C. Yudofsky (Eds.), Textbook of traumatic brain injury (pp. 363-373). (2nd ed.). Arlington, VA: American Psychiatric Publishing.
2. Brahm, K. D., Wilgenburg, H. M., Kirby, J., Ingalla, S., Chang, C. Y., & Goodrich, G. L. (2009). Visual impairment and dysfunction in combat-injured servicemembers with traumatic brain injury. *Optometry and Vision Science*, 86(7), 817-825.
3. Cockerham, G. C., Goodrich, G. L., Weichel, E. D., Orcutt, J. C., Rizzo, J. F., Bower, K. S., et al. (2009). Eye and visual function in traumatic brain injury. *Journal of Rehabilitation Research and Development*, 46(6), 811-818.
4. Dougherty, A. L., MacGregor, A. J., Han, P. P., Heltemes, K. J., & Galarneau, M. R. (2011). Visual dysfunction following blast-related traumatic brain injury from the battlefield. *Brain Injury*, 25(1), 8-13. doi:10.3109/02699052.2010.536195.
5. Stelmack, J. A., Frith, T., Van Koeveering, D., Rinne, S., & Stelmack, T. R. (2009). Visual function in patients followed at a Veterans Affairs Polytrauma Network site: An electronic medical record review. *Optometry*, 80(8), 419-424.
6. Scheiman, M., & Wick, B. (2014). Clinical management of binocular vision: Heterophoric, accommodative and eye movement disorders. (4th ed.) Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins.



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