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DoD and VA Vision Center of Excellence DHA Practice
Recommendation:
Evaluation and Management of Dizziness
Associated with Traumatic Brain Injury
(TBI) for Eye Care Providers

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Evaluation and Management of Dizziness
Associated with Traumatic Brain Injury (TBI)
For Eye Care Providers
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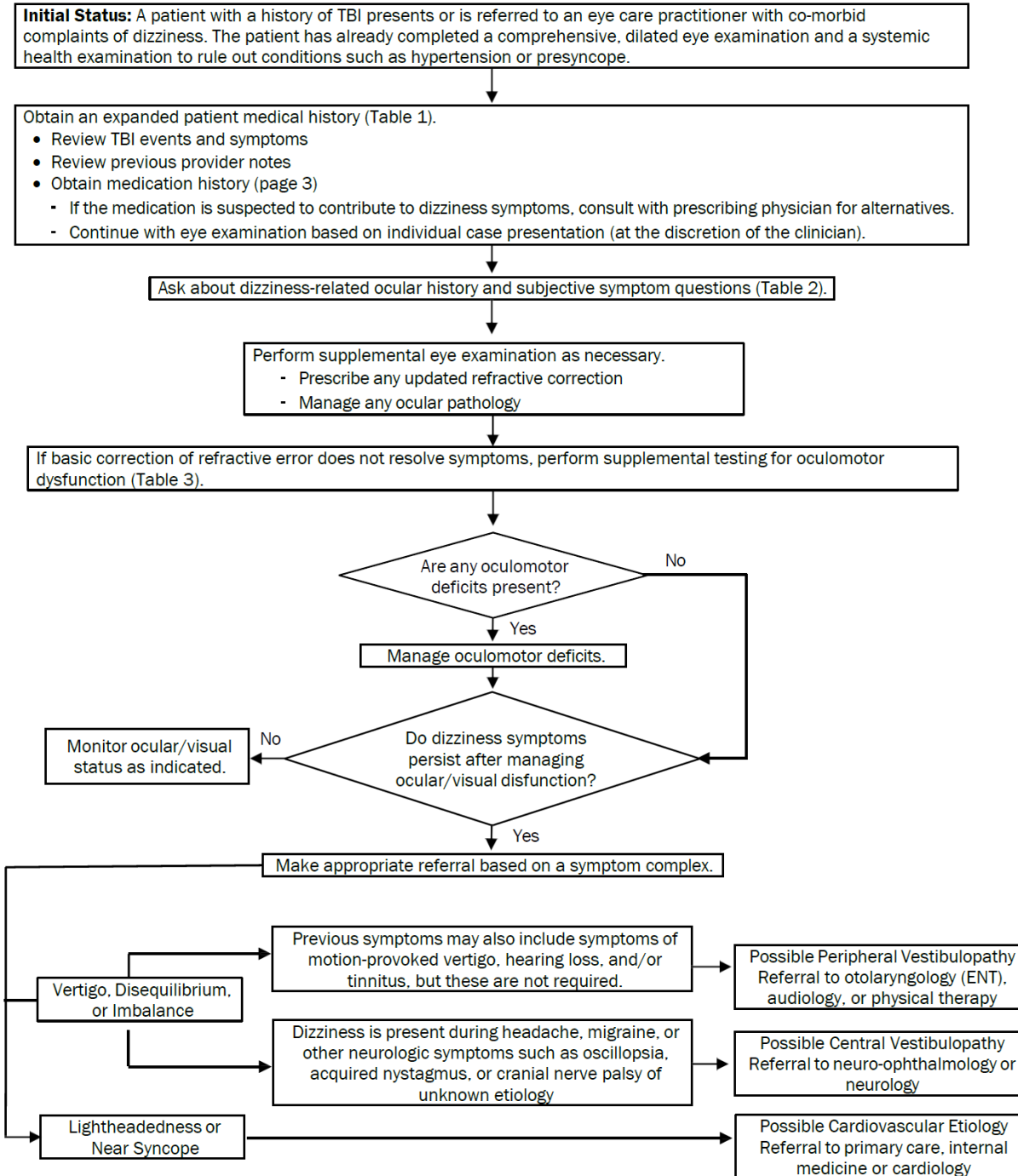
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Algorithm

The “Algorithm for the Evaluation and Management of Dizziness Associated with TBI” will assist eye care providers in evaluation, management, and interdisciplinary care referral of patients presenting with dizziness following a concussion or brain injury of any severity.



Purpose

Dizziness is a commonly reported symptom following head injury, including all severity levels of traumatic brain injury (TBI). Dizziness is a broad term, often encompassing more specific symptoms of vertigo, disequilibrium, presyncope, and vague lightheadedness. Vertigo is often described as a sensation or illusion of movement (such as spinning, rotating, tilting, or rocking), and typically denotes peripheral or central vestibular dysfunction.¹

Estimates of 30-81% of individuals after TBI of all severities, and as high as 98% of those seen acutely following blast-related concussion, may experience dizziness and balance dysfunction.^{2,3,4} Such patients can present to an eye care provider because visual dysfunctions can co-present with vestibular abnormalities post-TBI. The frequency of oculomotor dysfunction in patients with vestibular symptoms after concussion is higher compared with concussed patients without vestibular problems, thus requiring that such patients be assessed more vigorously.⁵ It is important to recognize that treatable causes for dizziness and vertigo such as BPPV (Benign Paroxysmal Positional Vertigo) and migraine are very common and should be considered. More serious cases, which require prompt evaluation and care, can also be present in this population. Clinical presentations of dizziness following head trauma are often further complicated by polytrauma, medications, and other common co-morbid conditions, making diagnosis difficult. Referrals to members of a multidisciplinary TBI team or individual specialty providers are often required.

Multidisciplinary referral partners can include but are not limited to neurology, neuro-ophthalmology, physical medicine and rehabilitation, otolaryngology, audiology, physical therapy, primary care, internal medicine, cardiology, mental health specialties, ophthalmology, and optometry.

Diagnosis

This PR will assist eye care providers in evaluating patients presenting with dizziness or vertigo and confirmed history of concussion or TBI of any severity. In some cases of severe TBI, this PR may be applied at a later stage when the patient sufficiently recovers. Use of this PR should follow a comprehensive dilated-eye examination and general medical evaluation to exclude systemic conditions such as hypotension or presyncope.⁶ It provides guidance on obtaining an expanded patient medical history followed by supplemental testing recommendations and specialty referrals for further evaluation and management of dizziness. This PR should not replace sound clinical judgment or standard practice when caring for a patient.

Expanded Patient Medical History

A comprehensive assessment of injury history can assist in evaluating and managing the patient's health. Review all relevant available multidisciplinary prior examinations and testing to determine if the patient's dizziness symptoms have already been evaluated to avoid duplicate referrals, including:

- Prior eye examinations
- Neurology evaluation
- Audiology evaluation
- Otolaryngology evaluation
- Vestibular evaluation

Refer to Tables 1 and 2 for guidance on dizziness-related injury history evaluation. When questioning patients, always use patient-friendly terminology and be mindful that a brain injury may slow the processing of the question and the response.

Table 1. Detailed Dizziness-related Injury History by an Eye Care Provider			
Review TBI Events⁷	Associated Symptoms	Characteristics of Symptoms	Relevant Past Medical History
<ul style="list-style-type: none"> • Date of injury • Location of injury • Loss of consciousness • Type of injury (blunt, blast, penetrating, motor vehicle accident, stroke, combined mechanism) 	<ul style="list-style-type: none"> • Aural pressure or pain • Hearing loss • Tinnitus • Diplopia • Oscillopsia • Headache • Confusion/disorientation • Other neurological symptoms 	<ul style="list-style-type: none"> • Duration • Frequency • Onset (continuous vs. episodic) • Precipitating factors (positional or postural effects) • Relieving factors 	<ul style="list-style-type: none"> • Cardiovascular disease • Ear disease or surgery • Headaches/migraines (pre- and post-TBI) • Orthostatic hypotension • Prior vertigo • Psychological health disorders • Sleep disorders • Stressors/anxiety • Substance abuse disorders (e.g., drugs or alcohol)

Medication History

Many prescribed medications can contribute to dizziness and need to be evaluated.^{8,9} (The list below is not exhaustive.)

- Abortive agents for migraine or migraine-like headaches
- Analgesics
- Antidepressants
- Anti-epileptic medications
- Anti-fatigue stimulant medications
- Anti-hypertensive medications
- Anxiolytic medications
- Non-steroidal, anti-inflammatory medications
- Prophylactic headache medications
- Psychotropic medications
- Sleep disorder medications (sedative/hypnotic)

Ocular History and Subjective Symptoms

Numerous visual/ocular deficits can contribute to a patient's perception of dizziness after TBI. Examples of such contributory factors include: heightened sensitivity to blur from uncorrected refractive error; refractive correction adaptation, especially with astigmatic lenses, bifocals, progressives or wrap-style lenses; binocular, accommodative or oculomotor dysfunctions; motion perceived from flashes or floaters, especially involving more central vision; loss of peripheral vision altering visual-spatial awareness; photophobia/glare sensitivity; difficulty with vision at night contributing to blur or worsening of binocular status due to reduction in cues to peripheral fusion. Given the variety of visual/ocular deficits that may contribute to symptoms of dizziness, the following history questions should be used holistically and not individually in guiding the course of the eye exam.

Table 2. Dizziness-related TBI Ocular History Questions⁷
Dizziness-related Ocular History and Subjective Symptom Questions
Do you have balance problems or dizziness?
Do you bump into objects or walls while walking?
Do you have restricted or missing part(s) of your visual field?
Does turning or tilting your head improve your vision or help your dizziness?
Is your vision blurry at distance or near since your injury?
Does covering one eye improve your overall vision?
Have you experienced any double vision since your injury?

Do you get headaches or brow aches during or after reading? Does this occur more frequently now than before your injury?
How often do you get headaches? If yes, do they occur with an episode of dizziness?
Is your vision blurry after reading?
Have you noticed a change in your ability to read since your injury?
What and how many materials do you read daily?
How long can you read continuously before you need to stop? Is this less than before your injury?
Do you experience sensitivity to light?
Do you see flashing lights or floating spots?
Is your vision at night worse since your injury?
Have you ever been diagnosed with benign paroxysmal positional vertigo (BPPV)?
Is there anything that you currently use that improves your vision since your injury?

Supplemental Ocular Testing

Supplemental ocular testing is indicated if the initial comprehensive eye examination, correction of refractive error, and other updated testing do not resolve complaints and dizziness symptoms. This testing should be performed with the patient's habitual spectacle prescription first and repeated as needed after refraction if different from the habitual (see Table 3).

Table 3: Supplemental Testing Guidance for Refractive and Oculomotor Dysfunction Post-Initial Comprehensive Eye Examination^{7,8}	
Considerations While Testing for Oculomotor Dysfunction	
Signs/Symptoms	Diplopia Dizziness Headache Lack of clarity of thought/slowed thinking Lightheadedness Nausea Nystagmus (clinical sign) Oscillopsia Pain/discomfort Visual blur
Tests for Oculomotor Dysfunction	
Extraocular Muscles (EOMs)	Ductions/Versions Presence of Nystagmus (Central/Peripheral)
Ocular Alignment in Free Space	Cover Test at distance and near considerations: <ul style="list-style-type: none"> – Patient positioned correctly (head/neck straight, no abnormal head posture) – Careful evaluation of vertical misalignment (ask about subjective movement of target) – Comitancy Testing (at every new visit and as needed thereafter, especially if patient is symptomatic and/or reports symptoms in a specific gaze other than primary)
Near Point of Convergence (NPC)*	Repeat 3-5 times looking for regression (i.e., NPC recedes with repeated testing)
Vergence Ranges in Free Space	Distance and near Horizontal and vertical
Accommodative Testing*	Accuracy of target fixation Amplitude Facility
Saccades and Pursuits*	Inaccurate, hypometric saccades, and/or saccadic pursuits <ul style="list-style-type: none"> – Horizontal – Vertical

*Detailed instructions on how to properly perform testing for near point of convergence, accommodative testing, and saccades/pursuits can be found in the DHA VCE Clinical Recommendation for the Eye Care Provider: Screening for Oculomotor Dysfunctions Following Traumatic Brain Injury (TBI). [Click here](#) for access to download **Clinical Screening Tool**.

Management Considerations

Manage oculomotor dysfunction with refractive correction, near addition, prism, or vision rehabilitation. In conjunction with ocular management, proceed with appropriate specialty referrals based upon presentation, findings, and specialty availability at the local facility. If vertigo and signs of vestibular dysfunction are present, refer to neurology, otolaryngology, audiology, or vestibular physical therapy for further testing. If oscillopsia, acquired nystagmus, cranial nerve palsy, or unexplained strabismus are present, refer to ophthalmology, neurology, or neuro-ophthalmology. If headaches are prominent, refer to neurology or primary care for further evaluation for migraine. If symptoms suggest lightheadedness or near syncope, primary care follow-up is indicated (for more guidance see [Eye and Vision Care Following Blast Exposure and/or Possible Traumatic Brain Injury](#)). Consider limited duty status options until reduction in symptoms or resolution of condition.

Medical Terminology Used to Describe Patient Symptoms of Dizziness^{9,10}

- **Disequilibrium:** The patient describes a sensation that they are not quite where they think they should be or that their orientation to the world is “off.”
- **Imbalance:** The patient reports difficulty and unsteadiness when standing or walking.
- **Lightheadedness:** The patient reports a vague feeling in the head as if becoming weightless or feeling disconnected from the environment.
- **Near syncope:** The patient reports a feeling of almost fainting.
- **Oscillopsia:** The patient describes an illusion that the world is jiggling.
- **Vertigo:** The patient reports a sensation of motion when no motion is present or reports an altered sensation of motion when motion occurs. It is usually described as spinning (typically rotary) but can also be translational, tilting, swaying, rocking, or a linear motion.

ICD-10 Coding Guidance for Dizziness following TBI

According to the DOD Clinical Recommendation Assessment and Management of Dizziness and Visual Disturbances Following Concussion/Mild Traumatic Brain Injury: Guidance for the Primary Care Manager, any patient who has sustained any severity level of a TBI and has persistent vision symptoms beyond 15 days should be referred to an eye care provider for a comprehensive vision and sensorimotor examination. The following are dizziness-related ICD-10 diagnostic codes following TBI that can be used.

Eye Care Provider Dizziness-Related Diagnostic Codes

- **H81.9:** Unspecified disorder of vestibular function
- **R42:** Dizziness and giddiness, which includes disequilibrium

Primary Care manager (PCM) or Subspecialty Dizziness-Related Diagnostic Codes

- **H53.19:** Other subjective visual disturbance
- **H81.39:** Other peripheral vertigo
- **H81.4:** Vertigo of central origin (used for suspected diagnosis)
- **H81.49:** Vertigo of central origin, unspecified ear (add location code as 5th character)
- **169.998:** Cervical vertigo (used for confirmed diagnosis)

This recommendation is not a substitute for existing guidance or clinical judgment. As with all clinical

decisions, field and operational circumstances may require deviation from these recommendations.

Additional Resources

Assessment and Management of Oculomotor Dysfunctions Associated with Traumatic Brain injury. Department of Defense Vision Center of Excellence website. Updated December 13, 2016.

vce.health.mil/Providers/ClinicalPracticeRecommendations

Clinical Recommendation for the Eye Care Provider: Screening for Oculomotor Dysfunctions Following Traumatic Brain Injury (TBI). Defense Health Agency Vision Center of Excellence. 2021.

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Rehabilitation of patients with Visual Field Loss Associated with Traumatic or Acquired Brain Injury. Department of Defense Vision Center of Excellence website. Updated April 27, 2016.

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[TBI Center of Excellence Provider Resources](http://tbi-center-of-excellence.org/Providers/ProviderResources)
10. Coding Guidance for Diagnosing Vestibular Disorders in the MHS. Department of Defense Hearing Center of Excellence. June 2020.
hearing.health.mil/For-Providers/Diagnostic-and-Coding-Guidance

Statement of Authorship

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