

# JOINT TRAUMA SYSTEM CLINICAL PRACTICE GUIDELINE (JTS CPG)



## MRI in Management of Mild TBI/Concussion in the Deployed Setting (CPG ID: 44)

This CPG provides updated guidance for the use of magnetic resonance imaging (MRI) capability in the continuum of care in the diagnosis, evaluation, treatment, follow-up and return to duty of mTBI patients.

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## BACKGROUND

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1. In December 2006, the first mTBI acute management algorithms in military operational settings were released as part of a Clinical Practice Guideline (CPG) document. Since then, several memoranda were released, algorithms have undergone several revisions, and more research has been done. The last updated version was March 2017.<sup>1</sup> The terms mild Traumatic Brain Injury (mTBI) and concussion are used interchangeably in the literature, and for the purpose of consistency, concussion is used throughout these recommendations.
2. In September 2012, Department of Defense Department (DoDI) 6490.11 entitled [\*Management of Mild Traumatic Brain Injury/Concussion in the Deployed Setting\*](#) was signed by the Under Secretary of Defense and established several mandatory events requiring concussion evaluations and reporting with aims to improve early detection, appropriate treatment, and avoidance of second concussion before recovery.<sup>2</sup> Algorithms were also established for combat medic/corpsman, initial provider, and multi-disciplinary teams including algorithms for comprehensive evaluations of concussion and recurrent concussion.
3. Concussion per DoDI 6490.11 criteria occurs when two conditions are met: an injury event AND one of the following:
  - a. an alteration of consciousness lasting < 24 hours
  - b. a loss of consciousness lasting for < 30 minutes
  - c. post traumatic amnesia or memory loss that lasts for < 24 hours due to the injury event
4. Computerized Tomography (CT) scan is considered standard of care for imaging patients with head injury and suspected intracranial pathology. CT is a highly sensitive test for the rapid diagnosis of intracranial injury requiring urgent neurosurgical intervention. In the civilian literature, up to 15% of trauma patients undergoing head CT scan who are alert and have grossly normal neurological function including a Glasgow Coma Scale score of 15 will have an acute brain lesion on CT, while less than 1% will have a lesion that requires neurosurgical intervention.<sup>3</sup>
5. MRI has specific limitations in theater and has unique requirements for its safe use with patients which require additional technician training and strict adherence to MRI-specific safety protocols. Clinically irrelevant artifacts are more common with MRI as well. These limitations, as well as a recent thorough review of the MRI/TBI literature,<sup>4</sup> support the current recommendation that MRI not be used in the evaluation of mTBI/concussion in the deployed setting.

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## OPERATIONAL TENETS

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As stated in DoDI 6490.11, mission requirements may supersede individual member welfare in certain operational environments as determined by combatant commanders' consideration of operational objectives, risks, and costs. The small risk of deterioration in patients who present with concussion must be considered and weighed against the mission requirements.

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## METHODOLOGY

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The Defense and Veterans Brain Injury Center (DVBIC) Working Group in 2008 included a diverse, multi-disciplinary membership from Veterans Affairs, DoD, civilian subject matter experts, special operations staff, and deployed providers. This working group recommended revision of CPGs incorporating current literature, knowledge of operational conditions, consensus expert clinical experience and best practice reports.

The working group met several times in 2010-2011 to develop this CPG regarding the safest and most appropriate way to use MRI in the evaluation of concussion in the deployed setting.

In July of 2013 a separate working group of imaging specialists completed a clinical recommendation entitled [Neuroimaging following Mild Traumatic Brain Injury in the Non-Deployed Setting](#), and this provided specific guidance for the use of MRI in some patients with chronic post-concussion symptoms.<sup>4</sup>

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## MRI FOR ACUTE MANAGEMENT OF CONCUSSION IN DEPLOYED SETTING

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At present there is no indication for the clinical use of MRI in the management of acute concussion in the deployed setting.<sup>4</sup> Current CPGs for management of concussion in the deployed setting include careful examination for clinical “red flags” at the unit, Role 1 and Role 2 settings that may indicate more severe injury. Neuroimaging is important in the evaluation of patients with these red flags and can be completed with CT.<sup>1</sup> CT remains a rapid, readily available diagnostic tool that is very sensitive for acute intra-cerebral hemorrhage and a standard imaging study in acute trauma protocols. CT also avoids the risk of MRI with ferromagnetic materials which may be present in fragments from improvised explosive device blast injuries.

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## MRI FOR EVALUATION OF PROLONGED POST-CONCUSSION SYMPTOMS.

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MRI may play a role in the post-acute or chronic phases after concussion (>8 days) where the goal is to enhance understanding of persistent symptoms and identify the need for specialist referral. Therefore, MRI is recommended as the imaging modality of choice in the post-acute and chronic stages for service members who have persistent or worsening post-concussion symptoms.<sup>4</sup>

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## PERFORMANCE IMPROVEMENT (PI) MONITORING

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### INTENT (EXPECTED OUTCOMES)

MRI should not be used for the acute management of concussion in the deployed setting.

### PERFORMANCE/ADHERENCE MEASURES

Any patient who has an MRI in the deployed setting as part of the acute evaluation for mTBI/concussion should be considered a PI/Quality Assurance deviation, and the reasons for that evaluation discussed.

### DATA SOURCE

- Patient Record
- DoD Trauma Registry

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## SYSTEM REPORTING & FREQUENCY

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The above constitutes the minimum criteria for PI monitoring of this CPG. System reporting will be performed annually; additional PI monitoring and system reporting may be performed as needed.

The system review and data analysis will be performed by the JTS Director, JTS PI Director, and the JTS PI Branch.

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**RESPONSIBILITIES**

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It is the trauma team leader's responsibility to ensure familiarity, appropriate compliance and PI monitoring at the local level with this CPG.

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**REFERENCES**

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