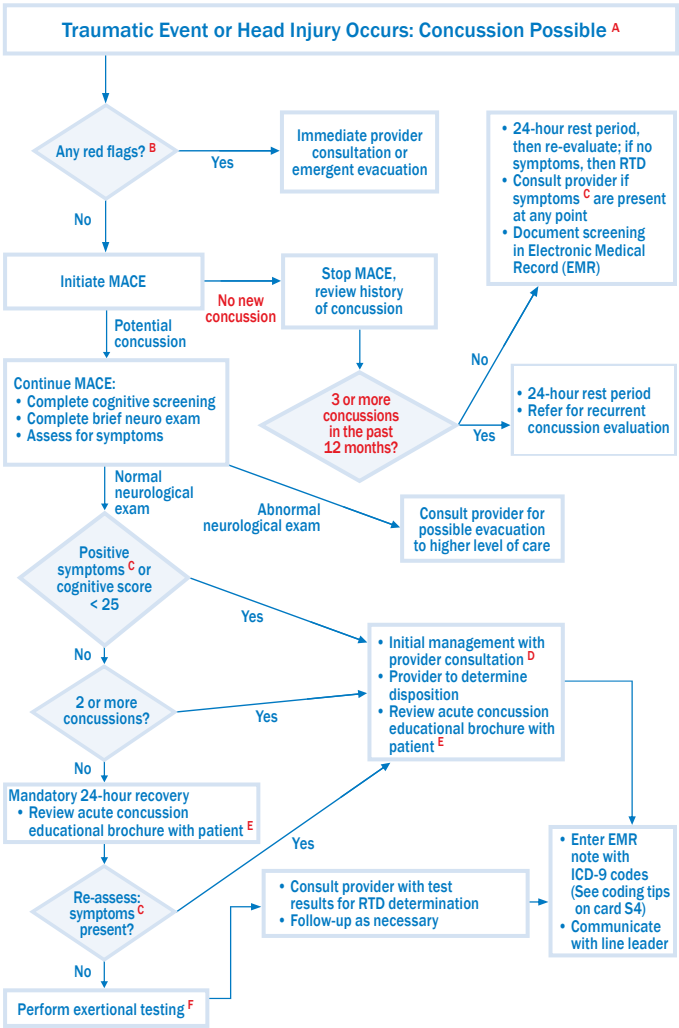
DVBIC
Defense and Veterans Brain Injury Center

Concussion Management in Deployed Settings

DEFENSE CENTERS OF EXCELLENCE
For Psychological Health & Traumatic Brain Injury

Combat Medic/Corpsman Algorithm

(Pre-hospital/no medical officer in the immediate area)



Priority: Quickly assess for red flags

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Initial Provider Algorithm

(Management of Concussion in Deployed Setting)

Traumatic Event or Head Injury Occurs: Concussion Possible [A]

Any red flags? [G]

Yes → Refer to higher level
- Specialty Services
- Neuroimaging
- Laboratory Capabilities

No →
- Confirm history of events, including any previous concussions in past 12 months
- Complete MACE if not already done
- Ensure documented 3-part MACE results in EMR

No new concussion →
- Mandatory 24-hour recovery period before RTD
- Assess for and treat any other injuries or symptoms
- If 3 or more concussions in past 12 months, refer for recurrent concussion evaluation*
- Document screening in EMR

New concussion →

Symptoms [H] **or MACE cognitive score < 25?**

Yes →
- Mandatory 24-hour recovery period
- Review acute concussion educational brochure [E] with service member if not done previously
- PCM Management [I]
- Re-evaluate daily up to 7 days
- When symptoms resolve, perform exertional testing [F]
- Consider NeuroCognitive Assessment Tool (NCAT) per DCoE clinical recommendation [J]

No →
- Review acute concussion educational brochure with service member [E]
- Mandatory 24-hour recovery period

Re-assess: symptoms [H] **present?**

Yes → (to Mandatory 24-hour recovery period)

No →

Perform exertional testing. [F] **Symptoms** [H] **present?**

Yes → (to Mandatory 24-hour recovery period)

No →

Consider NCAT per DCoE clinical recommendation [J]

Abnormal →
- Consult with higher level of care
- Screen for acute stress [E] and consult with combat stress team
- Continue concussion and combat stress management for up to 21 days if improving, otherwise evacuate to higher level of care
- If symptoms resolve, proceed with exertional testing [F]

Normal or not performed →
- If 1st concussion in past 12 months, 24-hour recovery
- If 2nd concussion in the past 12 months, mandatory 7-day recovery period following symptom resolution before RTD
- If 3rd concussion in the past 12 months, refer for recurrent concussion evaluation*

Symptoms persist after 7 days or after exertional testing?

Yes → (to Consult with higher level of care)

No → (to Consider NCAT per DCoE clinical recommendation [J])

- Enter note in EMR
- Ensure communication with line leadership

*See Recurrent Concussion Algorithm (Page 4)

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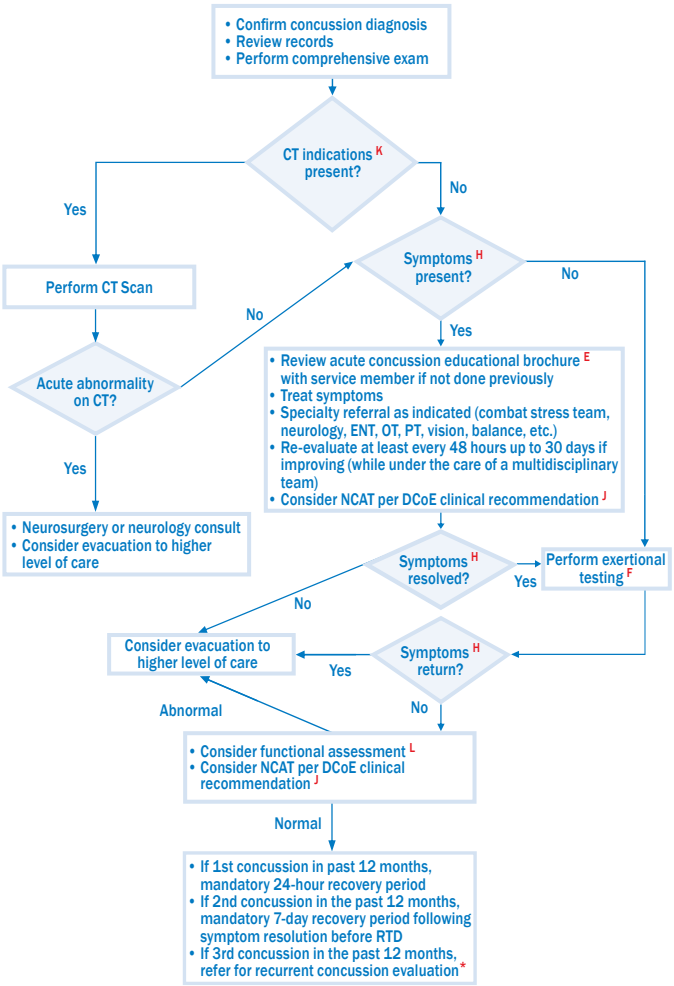
Comprehensive Concussion Algorithm

(Referral to military treatment facility with neuroimaging capabilities)



*See Recurrent Concussion Algorithm (Page 4)

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Recurrent Concussion Evaluation

(three or more documented in 12-month span)

1. Comprehensive neurological evaluation by neurologist or otherwise qualified provider
   - Review of prior concussion history with focus on timeline or resolution of symptoms
   - Assessment of symptoms (face-to-face interview by provider)
     Consider:
     - ▶ Neurobehavioral Symptom Inventory [E]
     - ▶ Acute Stress Reaction questionnaire [E]
   - Balance assessment [M]

2. Neuroimaging per provider judgement

3. Neuropsychological assessment by psychologist
   - Evaluate: attention, memory, processing speed and executive function
   - Perform a psychosocial and behavioral assessment
   - Include measure of effort
   - Consider NCAT per DCoE clinical recommendation[J]

4. Functional assessment [L] completed by occupational therapy/ physical therapy

5. Neurologist (or qualified provider) determines RTD status

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Traumatic Event or Head Injury Occurs: Concussion Possible

A Mandatory Events Requiring Concussion Evaluation:

1. Any service member in a vehicle associated with a blast event, collision or rollover
2. Any service member within 50 meters of a blast (inside or outside)
3. Anyone who sustains a direct blow to the head
4. Command directed—such as, but not limited to, repeated exposures

B Medic/Corpsman Algorithm Red Flags:

1. Witnessed loss of consciousness (LOC)
2. Two or more blast exposures within 72 hrs
3. Unusual behavior/combative
4. Unequal pupils
5. Seizures
6. Repeated vomiting
7. Double vision/loss of vision
8. Worsening headache
9. Weakness on one side of the body
10. Cannot recognize people or disoriented to place
11. Abnormal speech

C Medic/Corpsman Algorithm Symptoms:

(Persisting beyond initial traumatic event)

1. Headache
2. Dizziness
3. Memory problems
4. Balance problems
5. Nausea/vomiting
6. Difficulty concentrating
7. Irritability
8. Visual disturbances
9. Ringing in the ears
10. Other_____

D Medic/Corpsman Initial Management of Concussion:

1. Give acute concussion educational brochure to all concussion patients, available at: www.DVBIC.org
2. Reduce environmental stimuli
3. Mandatory 24-hour recovery period
4. Aggressive headache management
   – Use acetaminophen q 6 hrs x 48 hrs
   After 48 hours may use naproxen prn
5. Avoid tramadol, Fioricet, excessive triptans and narcotics

E Available Resources (www.DVBIC.org):

- Acute Stress Reaction Questionnaire
- Acute Concussion Educational Brochure
- Neurobehavioral Symptom Inventory
- Line Leader Fact Sheet
- Coding Guidance
- DCoE NeuroCognitive Assessment Tool (NCAT) Recommendation

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S2

F Exertional Testing:

1. Exert to 65-85% of target heart rate (THR=220-age) using push-ups, sit-ups, running in place, step aerobic, stationary bike, treadmill and/or hand crank
2. Maintain this level of exertion for approximately 2 minutes
3. Assess for symptoms (headache, vertigo, photophobia, balance, dizziness, nausea, visual changes, etc.)
4. If symptoms/red flags exist with exertional testing, stop testing, and consult with provider

G Provider Algorithm Red Flags:

1. Progressively declining level of consciousness
2. Progressively declining neurological exam
3. Pupillary asymmetry
4. Seizures
5. Repeated vomiting
6. Clinically verified GCS < 15
7. Neurological deficit: motor or sensory
8. LOC > 5 minutes
9. Double vision
10. Worsening headache
11. Cannot recognize people or disoriented to place
12. Slurred speech
13. Unusual behavior

H Provider Algorithm Symptoms:

1. Confusion (24 hours)
2. Irritability
3. Unsteady on feet
4. Vertigo/dizziness
5. Headache
6. Photophobia
7. Phonophobia
8. Sleep issues

I Primary Care Management (PCM):

1. Give acute concussion educational brochure to all concussion patients, available at: www.DVBIC.org
2. Reduce environmental stimuli
3. Mandatory 24-hour recovery period
4. Aggressive headache management
   – Use acetaminophen q 6 hrs x 48 hrs
   After 48 hours may use naproxen prn
5. Avoid tramadol, Fioricet, excessive triptans and narcotics
6. Consider nortriptyline q HS or amitriptyline q HS for persistent headache (> 7 days). Prescribe no more than 10 pills.
7. Implement duty restrictions
8. Address any sleep issues. Ambien 10mg po QHS may be considered for short-term (2 weeks) sleep regulation
9. Pain management if applicable
10. Send consult to TBI.consult@us.army.mil for further guidance if needed
11. Consider evacuation to higher level of care if clinically indicated
12. Document concussion diagnosis in EMR

TBI.consult@us.army.mil is a Department of Defense email consultation service provided by DVBIC to assist deployed clinicians with the treatment of TBI and RTD decisions.

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[J] DCoE NeuroCognitive Assessment Tool (NCAT) Recommendation:

Current DoD policy is that all service members must be tested with a neurocognitive assessment tool (NCAT) prior to deployment. Among several tests that are available, the DoD has selected the Automated Neuropsychological Assessment Metrics (ANAM) as the NCAT to use for both pre-deployment baseline testing and for post-concussion assessment in theater. Detailed instructions for administering a post-injury ANAM are provided at www.DVBIC.org.

For ANAM baseline results send requests to ANAM.baselines@amedd.army.mil

[K] CT Indications:*

1. Physical evidence of trauma above the clavicles
2. Seizures
3. Vomiting
4. Headache
5. Age > 60
6. Drug or alcohol intoxication
7. Coagulopathy
8. Focal neurologic deficits

* Haydel MJ, Preston CA, Mills TJ, Luber S, Blaudeau E, DeBlieux PM. Indications for computed tomography in patients with minor head injury. N Engl J Med. 2000 Jul 13;343(2):100-5.

[L] Functional Assessment:

Assess the service member's performance of military-relevant activities that simulate the multi-system demands of duty in a functional context. Selected assessment activities should concurrently challenge specific vulnerabilities associated with mTBI including cognitive (such as executive function), sensorimotor (such as balance and gaze stability), and physical endurance. Rehabilitation providers should not only evaluate the service member's performance but also monitor symptoms before, during and after functional assessment.

[M] The Balance Error Scoring System (BESS - Modified):**

Stand on flat surface, eyes closed, hands on hips in 3 positions:

1. On both feet (20 seconds)
2. On one foot (20 seconds)
3. Heel-to-toe stance (20 seconds)

For each position, score 1 point for any of the following errors:

1. Stepping, stumbling or falling
2. Opening eyes
3. Hands lifted above the iliac crests
4. Forefoot or heel lifted
5. Hip moved > 30 degrees flexion or abduction
6. Out of test position > 5 seconds

Score 10 points if unable to complete

Total Balance Score_____

** Guskiewicz KM, Ross SE, Marshall SW. Postural Stability and Neuropsychological Deficits After Concussion in Collegiate Athletes. J Athl Train. 2001 Sep;36(3):263-273.

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S4

Definition of Concussion:

Anyone who has had a direct blow to the head, blast exposure or other head injury followed by at least one of the following (even momentarily):

- Alteration of Consciousness (AOC)
  - Having their "bell rung," being dazed/confused or "seeing stars"
- Loss of Consciousness (LOC)
  - Temporarily blacked out
- Post-Traumatic Amnesia (PTA)
  - Memory loss

Coding Tips:

1. Primary code (corpsman/medics require co-sign)
   - 850.0 - Concussion without LOC
   - 850.11 - Concussion with LOC ≤ 30 min.
2. Personal history of TBI in Global War on Terror (GWOT)
   - V15.52_2 - Injury related to GWOT, mild TBI
3. Symptom codes
   - As appropriate
4. Deployment status code
   - V70.5_5 - During deployment encounter
5. Screening code for TBI
   - V80.01
6. External cause of injury code (E-code)
   - E979.2 (if applicable) - Terrorism involving explosions and fragments

Key Algorithm Directives:

- Personnel are required to use the algorithms to treat concussion in the deployed setting
- Mandatory event-driven protocols for exposure to potentially concussive events
  - Requires a medical evaluation and minimum 24-hour rest period
- All sports and activities with risk of concussion are prohibited until after a 24-hour rest period
- Military Acute Concussion Evaluation (MACE) documentation will address all 3 MACE parts
- Service members diagnosed with concussion will be given the acute concussion educational brochure available at: www.DVBIC.org
- Specific protocols for anyone sustaining ≥ 2 concussions within 12 months

MACE Documentation

Document using the mnemonic "CNS"

(1) C – Cognitive score
(2) N – Neurological exam reported as normal or abnormal
(3) S – Symptoms reported as present or absent

If a head injury event or AOC/LOC/PTA is not reported, then a concussion has not occurred. The MACE is stopped because the cognitive portion is not valid in non-concussed patients. Evaluate and treat any other symptoms or injuries, and document the event in the EMR. The MACE score should be reported as N/A.

Repeat MACE Tips:

Repeating the MACE's Cognitive Exam with a different version (A-F) may be used to evaluate acute concussion recovery; however, a physical exam and symptom assessment must accompany any repeated cognitive exam. Providers should be mindful of other factors affecting the MACE cognitive score such as sleep deprivation, medications or pain.

For additional copies or information call 1.866.966.1020 or email info@DVBIC.org