



# MACE

## Military Acute Concussion Evaluation



Patient Name: \_\_\_\_\_

Service Member ID#: \_\_\_\_\_ Unit: \_\_\_\_\_

Date of Injury: \_\_\_\_\_ Time of Injury: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date of Evaluation: \_\_\_\_\_ Time of Evaluation: \_\_\_\_\_

### CONCUSSION SCREENING

Complete this section to determine if there was both an injury event AND an alteration of consciousness.

#### 1. Description of Incident

##### A. Record the event as described by the service member or witness.

Use open-ended questions to get as much detail as possible.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

##### Key questions:

- Can you tell me what you remember?
- What happened?

##### B. Record the type of event.

Check all that apply:

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Explosion/Blast | <input type="checkbox"/> Fragment      | <input type="checkbox"/> Motor Vehicle Crash |
| <input type="checkbox"/> Blunt Object    | <input type="checkbox"/> Sports Injury | <input type="checkbox"/> Gunshot Wound       |
| <input type="checkbox"/> Fall            | <input type="checkbox"/> Other _____   |  |

##### C. Was there a head injury event?

- YES       NO

##### Key questions:

- Did your head hit any objects?
- Did any objects strike your head?
- Did you feel a blast wave?  
(A blast wave that is felt striking the body/head is considered a blow to the head.)

**CONCUSSION SCREENING – continued****2. Alteration of Consciousness or Memory (AOC/LOC/PTA)****A. Was there Alteration of Consciousness (AOC)?**

AOC is temporary confusion or “having your bell rung.”

YES       NO

If yes, for how long? \_\_\_\_\_ minutes

**Key question:**

- Were you dazed, confused, or did you “see stars” immediately after the injury?

**B. Was there Loss of Consciousness (LOC)?**

LOC is temporarily passing out or blacking out.

YES       NO

If yes, for how long? \_\_\_\_\_ minutes

**Key question:**

- Did you pass out or black out?

**C. Was there any Post Traumatic Amnesia (PTA)?**

PTA is a problem remembering part or all of the injury events.

YES       NO

If yes, for how long? \_\_\_\_\_ minutes

**Key questions:**

- What is the last thing you remember before the event?
- What is the first thing you remember after the event?

**D. Was there a witness?**

YES       NO

If yes, name of witness:  
\_\_\_\_\_

**Tips for assessment:**

- Ask witness to verify AOC/LOC/PTA and estimate duration.

**CONCUSSION SCREENING RESULTS (Possible Concussion?)**

**YES to 1C**

**AND**

**YES to 2A, 2B or 2C**



**CONTINUE** the MACE:

- Complete the Cognitive, Neurological and Symptoms portions of the MACE

**NO to 1C**

**OR**

**NO to 2A, 2B and 2C**



**STOP** the MACE:

- Evaluate and treat any other injuries or symptoms
- Enter negative screening result into electronic medical record (V80.01)
- Communicate results with provider and line commanders
- Check for history of previous concussions and refer to Concussion Management Algorithm for appropriate rest period

## COGNITIVE EXAM<sup>a</sup>

### 3. Orientation

Score 1 point for each correct response.

Ask This Question	Incorrect	Correct
"What month is this?"	0	1
"What is the date or day of the month?"	0	1
"What day of the week is it?"	0	1
"What year is it?"	0	1
"What time do you think it is?"	0	1

*Correct response must be within 1 hour of actual time.*

**ORIENTATION TOTAL SCORE**

5
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### 4. Immediate Memory

Choose one list (A-F below) and use that list for the remainder of the MACE.

Read the script for each trial and then read all 5 words. Circle the response for each word for each trial. Repeat the trial 3 times, even if the service member scores perfectly on any of the trials.

#### Trial 1 Script:

- "I am going to test your memory. I will read you a list of words and when I am done, repeat back to me as many words as you can remember, in any order."

#### Trials 2 and 3 Script:

- "I am going to repeat that list again. Repeat back to me as many words as you can remember, in any order, even if you said them before."

List F	Trial 1		Trial 2		Trial 3	
	Incorrect	Correct	Incorrect	Correct	Incorrect	Correct
Dollar	0	1	0	1	0	1
Honey	0	1	0	1	0	1
Mirror	0	1	0	1	0	1
Saddle	0	1	0	1	0	1
Anchor	0	1	0	1	0	1

**IMMEDIATE MEMORY TOTAL SCORE**

15
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#### Immediate Memory Alternate Word Lists

List E	List D	List C	List B	List A
Jacket	Finger	Baby	Candle	Elbow
Arrow	Penny	Monkey	Paper	Apple
Pepper	Blanket	Perfume	Sugar	Carpet
Cotton	Lemon	Sunset	Sandwich	Saddle
Movie	Insect	Iron	Wagon	Bubble

**NEUROLOGICAL EXAM****5. Eyes**

Test pupil response  
to light, tracking

- Normal  
 Abnormal

**Tips for assessment:**

- Pupils should be round, equal in size and briskly constrict to a direct, bright light.
- Both eyes should smoothly track your finger side-to-side and up and down.

**6. Speech**

Test speech fluency  
and word finding

- Normal  
 Abnormal

**Tips for assessment:**

- Speech should be fluid and effortless – no pauses or unnatural breaks.
- Assess difficulties with word finding:
  - Does service member have trouble coming up with the name of a common object?

**7. Motor**

Test grip strength  
and pronator drift

- Normal  
 Abnormal

**Tips for assessment:**

- Assess grip strength.
- Assess for pronator drift for 5-10 seconds by directing patient to close eyes and extend arms forward, parallel to the ground with palms up:
  - Does either palm turn inward?
  - Does either arm drift down?

**8. Balance**

Tandem Romberg Test

- Normal  
 Abnormal

**Tips for assessment:**

- Have patient stand with eyes closed, one foot in front of the other heel-to-toe, arms extended forward, palms up. Observe for 5-10 seconds:
  - Does the service member stumble or shift feet?

**NEUROLOGICAL  
EXAM RESULTS**

All Normal  
Green



Any Abnormal  
Red

**COGNITIVE EXAM<sup>a</sup> - Continued**

**9. Concentration**

**A. Reverse Digits**

Read the script and begin the trial by reading the first string of numbers in Trial 1.

Script:

- “I am going to read you a string of numbers. When I am finished, repeat them back to me backward. That is, in reverse order of how I read them to you. For example, if I said 7 - 1 - 9, then you would say 9 - 1 - 7.”

**Circle the response for each string.**

- If correct on string length of Trial 1, proceed to the next longer string length in the same column.
- If incorrect on string length of Trial 1, move to the same string length of Trial 2.
- If incorrect on both string lengths in Trials 1 and 2, **STOP** and record score as zero for that string length. Record total score as sum of previous correct trials.

List F			
Trial 1	Trial 2 (if Trial 1 is incorrect)	Incorrect	Correct
2-7-1	4-7-9	0	1
1-6-8-3	3-9-2-4	0	1
2-4-7-5-8	8-3-9-6-4	0	1
5-8-6-2-4-9	3-1-7-8-2-6	0	1

**REVERSE DIGITS SCORE (9A)**

4
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**Concentration Alternate Number Lists**

*Note: Use the same list (A-F) that was used in Question 4.*

List E	
Trial 1	Trial 2
3-8-2	5-1-8
2-7-9-3	2-1-6-9
4-1-8-6-9	9-4-1-7-5
6-9-7-3-8-2	4-2-7-9-3-8

List D	
Trial 1	Trial 2
7-8-2	9-2-6
4-1-8-3	9-7-2-3
1-7-9-2-6	4-1-7-5-2
2-6-4-8-1-7	8-4-1-9-3-5

List C	
Trial 1	Trial 2
1-4-2	6-5-8
6-8-3-1	3-4-8-1
4-9-1-5-3	6-8-2-5-1
3-7-6-5-1-9	9-2-6-5-1-4

List B	
Trial 1	Trial 2
5-2-6	4-1-5
1-7-9-5	4-9-6-8
4-8-5-2-7	6-1-8-4-3
8-3-1-9-6-4	7-2-7-8-5-6

List A	
Trial 1	Trial 2
4-9-3	6-2-9
3-8-1-4	3-2-7-9
6-2-9-7-1	1-5-2-8-5
7-1-8-4-6-3	5-3-9-1-4-8

## COGNITIVE EXAM<sup>a</sup> - Continued

### 9. Concentration - Continued

#### B. Months in Reverse Order

**Script:**

- “Now tell me the months of the year in reverse order. Start with the last month and go backward. So you’ll say: December, November...Go ahead.”

Correct Response:

*Dec – Nov – Oct – Sep – Aug – Jul –  
Jun – May – Apr – Mar – Feb – Jan*

	Incorrect	Correct
ALL months in reverse order	0	1

**MONTHS IN REVERSE ORDER (9B)**

**CONCENTRATION TOTAL SCORE**

Sum of scores:  
9A (0-4 points) and 9B (0 or 1 point)

### 10. Delayed Recall

Read the script and circle the response for each word.  
Do NOT repeat the word list.

**Note:** Use the same list (A-F) that was used in Question 4.

**Script:**

- “Do you remember that list of words I read a few minutes earlier? I want you to tell me as many words from that list as you can remember. You can say them in any order.”

List F	Incorrect	Correct
Dollar	0	1
Honey	0	1
Mirror	0	1
Saddle	0	1
Anchor	0	1

**DELAYED RECALL TOTAL SCORE**

**Delayed Recall Alternate Word Lists**

**List E**

Jacket  
Arrow  
Pepper  
Cotton  
Movie

**List D**

Finger  
Penny  
Blanket  
Lemon  
Insect

**List C**

Baby  
Monkey  
Perfume  
Sunset  
Iron

**List B**

Candle  
Paper  
Sugar  
Sandwich  
Wagon

**List A**

Elbow  
Apple  
Carpet  
Saddle  
Bubble

**SYMPTOM SCREENING****11. Symptoms — Check all that apply:**

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Headache        | <input type="checkbox"/> Balance Problems         | <input type="checkbox"/> Irritability        |
| <input type="checkbox"/> Dizziness       | <input type="checkbox"/> Nausea/Vomiting          | <input type="checkbox"/> Visual Disturbances |
| <input type="checkbox"/> Memory Problems | <input type="checkbox"/> Difficulty Concentrating | <input type="checkbox"/> Ringing in the Ears |
|  |   | <input type="checkbox"/> Other _____         |

**SUMMARY**

Record the data for correct MACE documentation.

**Cognitive Summary**

Orientation Total Score - Q3

Immediate Memory Total Score (all 3 trials) - Q4

Concentration Total Score (Sections A and B) - Q9

Delayed Recall Total Score - Q10

**COGNITIVE RESULTS****NEUROLOGICAL RESULTS**

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Normal  
(Green)Abnormal  
(Red)**SYMPTOM RESULTS**No symptoms  
(A)1 or more  
symptoms (B)**MACE RESULTS (Report all 3 parts.)** Example: 24/Red/B

Abnormality in any area should be discussed with provider.

**C** \_\_\_\_\_ / **N** \_\_\_\_\_ / **S** \_\_\_\_\_  
 Cognitive / Neurological / Symptoms
**CONCUSSION HISTORY IN PAST 12 MONTHS****12. During the past 12 months have you been diagnosed with a concussion, not counting this event?**

- 
- YES
- 
- NO

If yes, how many? \_\_\_\_\_

Refer to Concussion Management Algorithm for clinical care guidance.

## ADDITIONAL INFORMATION ABOUT MACE COGNITIVE SCORES

Although cognitive is listed first in the summary of MACE results, this should not suggest that any one of the three screening categories is more or less important than the others. Each area (Cognitive, Neurological, Symptoms) must be evaluated carefully. The results of all three evaluations must be included in any MACE report for it to be considered complete.

Regarding cognitive scores, in studies of non-concussed subjects, the mean total cognitive score was 28. Therefore, a score of < 30 does not imply that a concussion has occurred. Definitive normative data for a cut-off score are not available. The Concussion Management Algorithm stipulates that a cognitive score of < 25 or the presence of symptoms requires consultation with a provider.

Repeating the MACE 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.

### Coding Tips for Concussion:

1. Primary code (corpsmen/medics require co-sign)
  - 850.0 – Concussion without LOC
  - 850.11 – Concussion with LOC  $\leq$  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
  - V80.01 – Special screening for TBI code
6. E-code (external cause of injury)
  - E979.2 (if applicable) – Terrorism involving explosions and fragments

### References

- a. McCrea, M. Standardized Mental Status Testing on the Sideline After Sport-Related Concussion. *J Athl Train.* 2001 Sep;36(3):274-279.

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