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PROGRESSIVE RETURN TO ACTIVITY CASE STUDY

MANAGING CONCUSSION FROM POINT OF INJURY TO RETURN TO FULL DUTY

STUDENT WORKBOOK

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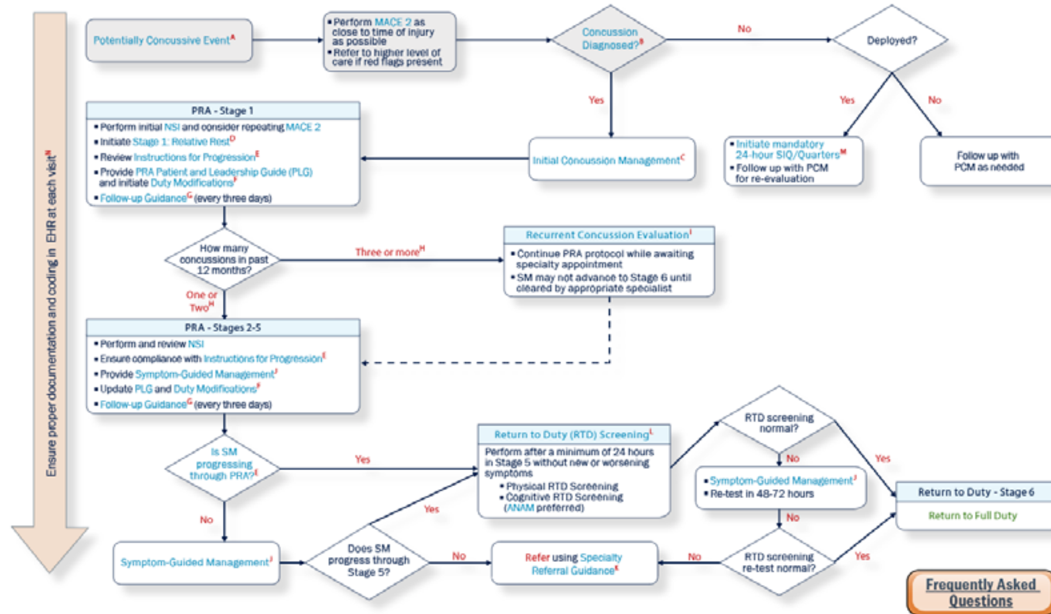
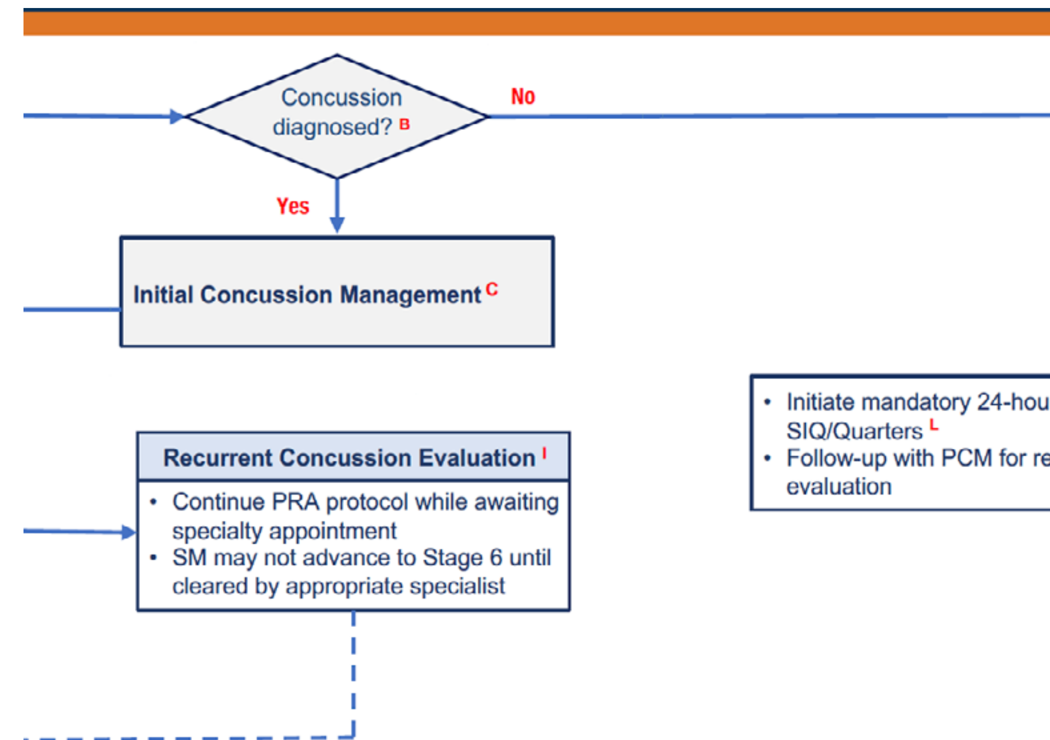
WELCOME TO PRA TRAINING CASE STUDY

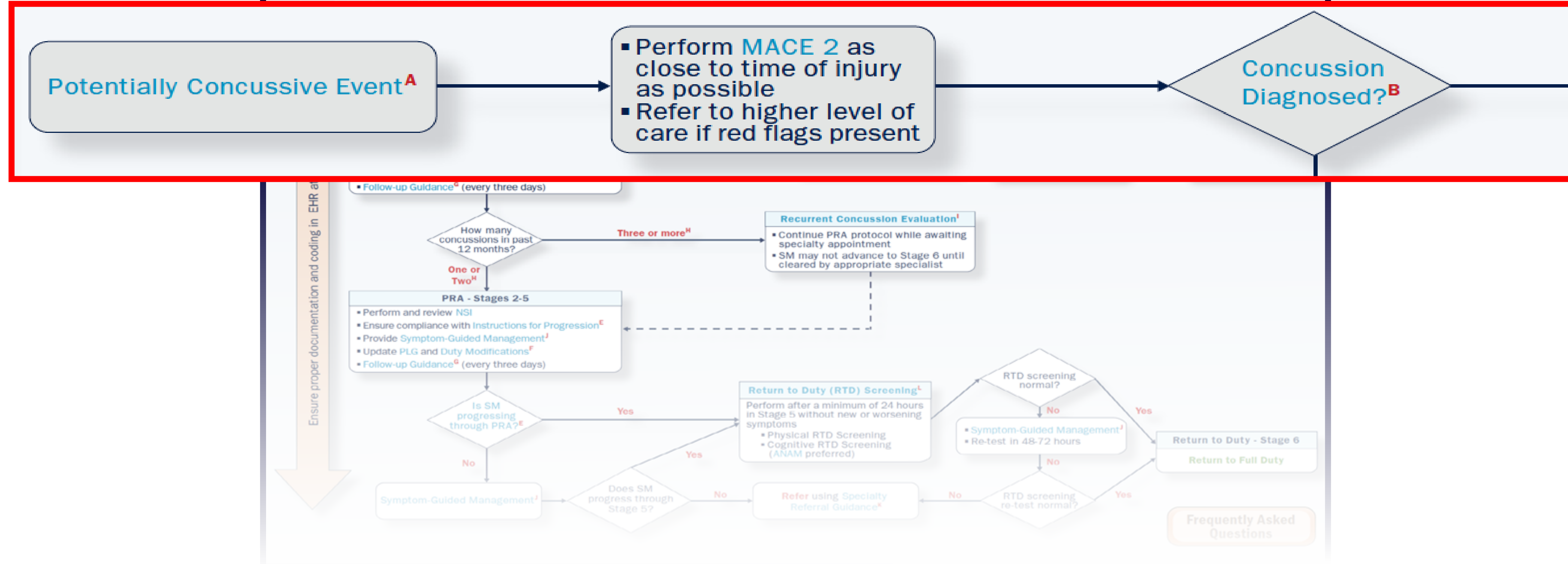
I'm Dr. Keith Stuessi, a member of the Clinical Practice/Clinical Recommendations team at the Traumatic Brain Injury Center of Excellence (TBICoE). As a Navy Primary Care Sports Medicine physician for 23 years, I had the honor of taking care of hundreds of active duty service members who sustained concussions, or mild traumatic brain injuries. I will be your guide for this training. We are hoping this will help you become more familiar with the Progressive Return to Activity process, when treating service members with concussions. We will start with a short introduction that sets up our first patient scenario. Throughout the remainder of this presentation, I'll be asking you to make decisions based on the situation. Several possible actions will be shown to you and we ask that you stop and think about the best choice. When you are ready to continue, we will review the best course of action together. We all learn from our mistakes, so please take the time to answer before reading on.



I recommend you have the **PROGRESSIVE RETURN TO ACTIVITY CLINICAL RECOMMENDATION** available to refer to as a reference guide as we go through the case study. You will see the full algorithm on the first page of the Clinical Recommendation.

The algorithm provides general guidance for the provider, but within each box, you will see blue links with red-lettered superscripts. These will link you to more detailed guidance within the clinical recommendation.





We'd like to point out the first three boxes at the beginning of the algorithm. Typically the **MACE 2** is performed prior to entering the PRA protocol. Often, providers who are outside the service member's usual medical facility such as an emergency department, or MTF branch clinic will implement the **MACE 2**. Thus, we want to emphasize this by shading the box a different color. .

Let’s look at our case scenario.

You are covering a unit football game on a Thursday morning as part of weekly PT. As you’re watching the game, you see Service Member Jones lunge to tackle another service member and he appears to hit his head on the ground. As he lays on the ground, someone yells out “Corpsman up.” You and your corpsman rush onto the field to assess him.

By the time you get there, Service Member Jones is sitting up and is alert. He tells you he’s fine and wants to continue playing, despite the fact that he’s holding his head in what appears to be obvious pain. He's moving his head, neck and extremities and seems to be conversing normally.

QUESTION 1

WHICH IS THE BEST CHOICE?

A. CALL 911 AND WAIT FOR THE EMTs TO DO THEIR EVALUATION.

B. ADMINISTER THE MILITARY ACUTE CONCUSSION EVALUATION 2 (MACE 2).

C. DO NOTHING. BECAUSE HE SAYS HE'S FINE, YOU CAN LET HIM RETURN TO THE GAME.

SELECT THE BEST ANSWER AND REVIEW ON THE NEXT PAGE

ANSWER 1

WHICH IS THE BEST CHOICE?

B IS THE CORRECT ANSWER. THE PROVIDER, MEDIC OR CORPSMAN SHOULD ADMINISTER THE MILITARY ACUTE CONCUSSION EVALUATION, OR MACE 2, RULING OUT ANY RED FLAGS.

BECAUSE HE IS SITTING UP AND APPEARS TO BE LUCID, THERE IS NO URGENCY TO CALL 911.

SENDING HIM BACK TO THE GAME IS NOT CORRECT BECAUSE IF A CONCUSSION IS SUSPECTED, HE NEEDS A MORE THROUGH EVALUATION.

Which did you choose? Send him back to the field? He's their best player and he can help his team win. Call 911?

Unfortunately, neither of those are the best choice. Because he had a potential concussive event, you initially perform the **MACE 2**. While calling 911 is technically not wrong, because he is sitting up and appears to be lucid, there is no urgency for calling 911. The **MACE 2** can also help you rule out red flags and determine if a higher level of care is necessary.

Knowing football is a high-risk sport for concussion, your corpsman brought a copy of the **MACE 2** and has it in her uniform pocket. After you clear his cervical spine, you walk him to the sideline to administer the **MACE 2**.

Service Member Jones admits to feeling "dazed and confused" for approximately 30 seconds after he hit his head. He denies any loss of consciousness and states he remembers the entire event. There are no red flags. He currently complains of a mild headache, dizziness and nausea.

You perform the **MACE 2** screening and complete the cognitive and neurological examination. His overall cognitive score was 25 out of 30. During the neurological exam he had an abnormal tandem gait and single leg stance.

QUESTION 2

DID SERVICE MEMBER JONES SUSTAIN A TRAUMATIC BRAIN INJURY?

A. NO

B. YES

SELECT THE BEST ANSWER AND REVIEW ON THE NEXT PAGE

ANSWER 2

DID SERVICE MEMBER JONES SUSTAIN A TRAUMATIC BRAIN INJURY?

B IS THE CORRECT ANSWER. THE SERVICE MEMBER HAD A CONCUSSION BASED ON THE DOD DEFINITION OF TRAUMATIC BRAIN INJURY. HE HIT HIS HEAD AND HAD ALTERATION OF CONSCIOUSNESS FOR 30 SECONDS.

DOD DEFINITION OF TRAUMATIC BRAIN INJURY

A TRAUMATICALLY INDUCED STRUCTURAL INJURY OR PHYSIOLOGICAL DISRUPTION OF BRAIN FUNCTION, AS A RESULT OF AN EXTERNAL FORCE, THAT IS INDICATED BY NEW ONSET OR WORSENING OF AT LEAST ONE OF THE FOLLOWING CLINICAL SIGNS IMMEDIATELY FOLLOWING THE EVENT:

ALTERATION OF CONSCIOUSNESS (AOC)

Any alteration in mental status (e.g., confusion, disorientation, slowed thinking, etc.)

LOSS OF CONSCIOUSNESS (LOC)

Any period of loss of or decreased level of consciousness, observed or self-reported

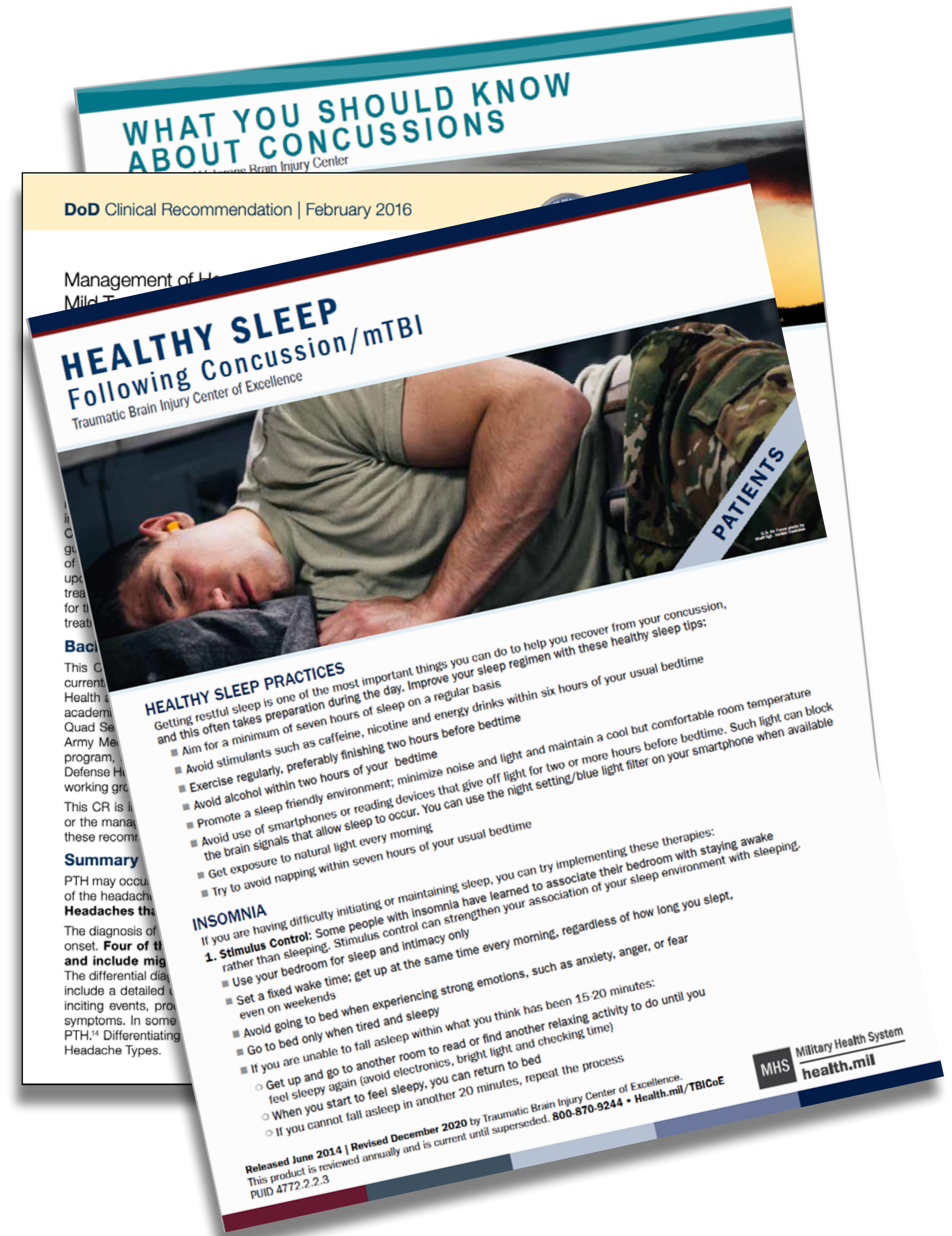
POST TRAUMATIC AMNESIA (PTA)

Any loss of memory for events immediately before or after the injury

Did you answer yes? I hope so. Service Member Jones clearly had a concussion based on the DOD definition of traumatic brain injury. The definition is stated above. Note, the external force can either be a direct blow to the head or the result of a pressure wave that we see in blast injuries. In the case of Service Member Jones, he stated he was “dazed and confused” for approximately 30 seconds (AOC). In addition, he was witnessed to hit his head (mechanism of injury). Therefore, he meets the criteria for diagnosis of traumatic brain injury.

Per the PRA algorithm, the initial concussion management includes:

Providing concussion education including these two fact sheets: **What You Should Know About Concussions** and **Healthy Sleep Following Concussion/mTBI,** both of which can be found on the TBICoE website. In addition, you should manage the acute headache with acetaminophen for the first 48 hours followed by use of an NSAID. If necessary, more information can be obtained with the **Headache Following Concussion/mTBI Clinical Recommendation** which can also be found on the TBICoE website. Lastly, review current medications and supplements, initiate 24 hours SIQ/Quarters and schedule a follow-up visit with their PCM in 24 hours.



Service Member Jones follows up with you the next day and you repeat the **MACE 2**. He continues to have a mild headache, but his nausea and dizziness are nearly resolved. His score on the cognitive portion of the **MACE 2** is 27/30, and his neurological exam is normal except for an abnormal tandem gait. Therefore, the result of the **MACE 2** is still positive.

MACE 2 - Military Acute Concussion Evaluation

EXAM SUMMARY

Record the data for correct MACE 2 documentation.

Cognitive Summary

	Score
Orientation Total Score - Q5	4 /5
Immediate Memory Total Score (all 3 trials) -	15/15
Concentration Total Score (Sections A and B) - **Q15**	4 /5
Delayed Recall Total Score - Q16	4 /5
COGNITIVE RESULTS ≤ 25 is abnormal	27/30

NEUROLOGICAL RESULTS (Q 7-14)		X Abnormal (+)	Normal (-)
SYMPTOM RESULTS (Q 3)		X 1 or more symptoms (+)	No symptoms (-)
HISTORY RESULTS (Q 4A-4C)		Positive (+)	X Negative (-)
VOMS RESULTS (Q 17)	Abnormal (+)	X Normal (-)	Deferred
MACE 2 RESULTS		X Positive (+)	Negative (-)

AFTER COMPLETING MACE 2:

- Document MACE 2 results in the EHR with coding instructions.
- Initiate the Progressive Return to Activity (PRA) Clinical Recommendation beginning with Initial Concussion Management to include 24-hours rest.

Refer to Progressive Return to Activity Clinical Recommendation at Health.mil/TBIProviders

Revised 03/2021 Health.mil/TBICoE Page 13 of 14

QUESTION 3

WHAT WOULD YOU DO NEXT?

A. FILL OUT THE NSI AND INITIATE STAGE 1, RELATIVE REST AND PROVIDE FURTHER EDUCATION.

B. THE MACE 2 IS IMPROVED SO HE CAN RETURN TO FULL DUTY.

SELECT THE BEST ANSWER AND REVIEW ON THE NEXT PAGE

ANSWER 3

WHAT WOULD YOU DO NEXT?

A IS THE CORRECT ANSWER. FILL OUT THE NSI, AND INITIATE STAGE 1, RELATIVE REST. REVIEW INSTRUCTIONS FOR PROGRESSION, FILL OUT AND REVIEW THE PLG, AND SCHEDULE FOLLOW-UP VISITS EVERY THREE DAYS. SENDING HIM BACK TO FULL DUTY JUST BECAUSE HIS MACE 2 HAS IMPROVED DOES NOT MEAN HE IS READY TO RETURN TO FULL DUTY.

The complete answer is seen in the PRA Algorithm. You should have the patient fill out the **NSI**, which is a patient questionnaire that assesses symptoms associated with concussion. You should then discuss Stage 1, Relative Rest with the patient and review instructions for progression, which are in the clinical recommendation. You then fill out and review the new **Patient and Leadership Guide** (PLG) with the service member and make sure he understands he must submit it to his chain of command, so they are aware of his diagnosis of concussion. Lastly, you schedule the patient follow-up visits every 3 days, to ensure close observation during the PRA process.

As you can see, simply because the **MACE 2** is improved does not mean the patient can return to full duty. All patients successfully complete all the PRA Stages in a step-wise fashion before they can return to full duty. Service Member Jones appears to understand the PRA process, so you discharge him with appropriate duty modifications.

Appendix A: Neurobehavioral Symptom Inventory (NSI)

Neurobehavioral Symptom Inventory (NSI)*

Instructions: Please rate the following symptoms with regard to how much they have disturbed you in the last 24 hours. (Consider only your symptoms **as they relate to your most recent concussion**):

0 = **None**-Rarely or never present.

1 = **Mild**-Occasionally present but doesn't disrupt my activities.

2 = **Moderate**-Often present and occasionally disrupt...

Appendix B: Patient and Leadership Guide (PLG)

Stages of Progressive Return to Activity	Things Service Member *Should* Do		Things Service Member *Should Not* Do	
Stage				
Stage 1 – Relative Rest	▪ Light physical activities that don't make symptoms worse (e.g. walking at easy pace) ▪ Light leisure activities that don't make symptoms worse (e.g. TV, reading)	▪ Communicate with friends and family members for support ▪ Eat a healthy diet and drink plenty of water ▪ Get plenty of sleep, and take naps as needed in the early stages ▪ Maintain or reduce use of caffeine, energy drinks, and nicotine ▪ Take breaks if needed	▪ Do not go to work (SIQ/ Quarters) ▪ No physical training or exercise	▪ Do not go outside the wire in a combat zone ▪ No alcohol ▪ No combatives or contact sports ▪ No driving until dizziness or visual symptoms have resolved ▪ No weapons fire or blast exposure
Stage 2 – Symptom-Limited Activity	▪ Increase your physical activity (e.g. take a walk, ride a stationary bike without resistance, do light household activities) ▪ Light reading/computer work as tolerated		▪ Avoid crowded areas ▪ Avoid extreme temperatures ▪ No group physical training ▪ No resistance/weight training	
Stage 3 – Light Activity ▪ SM may be able to return to work at this stage with limitations based on symptoms	▪ Increase physical activities (e.g. elliptical or stationary bike without resistance, walk further, lift or carry light loads of less than 20 pounds) ▪ More technical reading and computer work, go out in more crowded areas (e.g. grocery shopping) ▪ Start military specific tasks (e.g. clean equipment, perform maintenance checks, clean weapons)		▪ No operating heavy machinery ▪ No resistance/weight training ▪ No riding in tactical vehicles ▪ No alternating shift work or shifts > 8 hours	
Stage 4 – Moderate Activity	▪ Increase physical activities (e.g. non-contact sports, hiking or running, resistance training as tolerated (e.g. push ups, sit ups), carry weight across uneven terrain) ▪ Increase complexity of military specific tasks (e.g. orienteering/land navigation, following complex instructions, begin wearing personal protective equipment as tolerated)			
Stage 5 – Intensive Activity ▪ SM to follow up with PCM for Return to Duty Screening	▪ Gradually increase exposure to high risk activities (e.g. combatives, weapons fire or blast exposure, contact sports) in a supervised training environment based on mission requirements ▪ Resume usual exercise routine and military tasks/training (e.g. use night vision goggles, take part in simulations, navigate uneven terrain/busy environment with flak jacket/Kevlar helmet/pack)		▪ No operating heavy machinery ▪ No riding in tactical vehicles ▪ No alternating shift work or shifts > 8 hours	
Stage 6 – Return to Full Duty	▪ Unrestricted activity		▪ No alternating shift work or shifts > 8 hours	

10 of 14

Return to Algorithm

QUESTION 4

SERVICE MEMBER JONES HAS HAD ONE CONCUSSION IN THE LAST 12 MONTHS. IS IT MANDATORY TO REFER TO A SPECIALIST ?

A. YES

B. NO

K. Specialty Referral Guidance:

- Patients who do not respond to initial management and have symptoms persisting >15 days may benefit from if available, or specialties listed below.

Symptom Cluster	Specialty Referral
Anxiety/Mood	**Behavioral Health** ▪ Consider early referral in cases of acute stress reaction that do not rapidly resolve with simple measures ▪ Evaluation of new or premorbid behavioral health conditions
Cervical	**Physical Medicine and Rehabilitation (PM&R)** ▪ Assessment of persistent neck pain with comorbid chronic pain or persistent headache secondary to mu **Physical Therapy** ▪ Assessment and treatment of persistent neck pain following mTBI
Cognitive	**Neuropsychology** ▪ Formal evaluation to determine a need for work/home/school accommodations **Occupational Therapy** ▪ Strategies for daily living, functional cognition interventions, adaptive equipment/technology, driving eva **Speech Language Pathology** ▪ Cognitive rehabilitation strategies, speech disfluencies, organizational strategies
Headache	**Neurology** ▪ Assessment of persistent headaches when: (a) the diagnosis is not clear, (b) headaches do not respond to unresolved disability due to headache, (d) prolonged or persistent aura, or (e) headaches with accompanie **Neuro-Optometry** ▪ Evaluation of headaches secondary to visual changes or eye strain **Physical Medicine and Rehabilitation (PM&R)** ▪ Assessment of persistent headaches with comorbid chronic pain or persistent headache secondary to m

SELECT THE BEST ANSWER AND REVIEW ON THE NEXT PAGE

ANSWER 4

SERVICE MEMBER JONES HAS HAD ONE CONCUSSION IN THE LAST 12 MONTHS. IS IT MANDATORY TO REFER TO A SPECIALIST ?

B IS THE CORRECT ANSWER. AN IMMEDIATE REFERRAL TO A HIGHER LEVEL OF CARE IS NOT NECESSARY, THE PCM CAN TREAT THE SERVICE MEMBER BASED ON GUIDANCE FROM THE PRA.

K. Specialty Referral Guidance:

- Patients who do not respond to initial management and have symptoms persisting >15 days may benefit from if available, or specialties listed below.

Symptom Cluster	Specialty Referral
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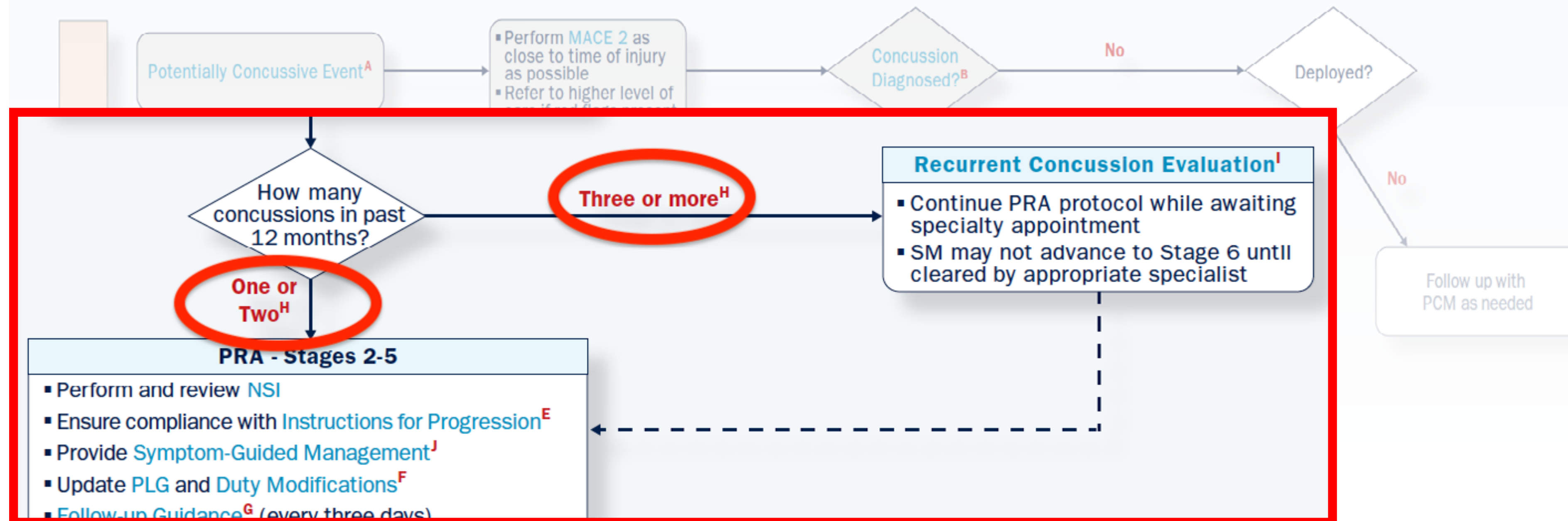
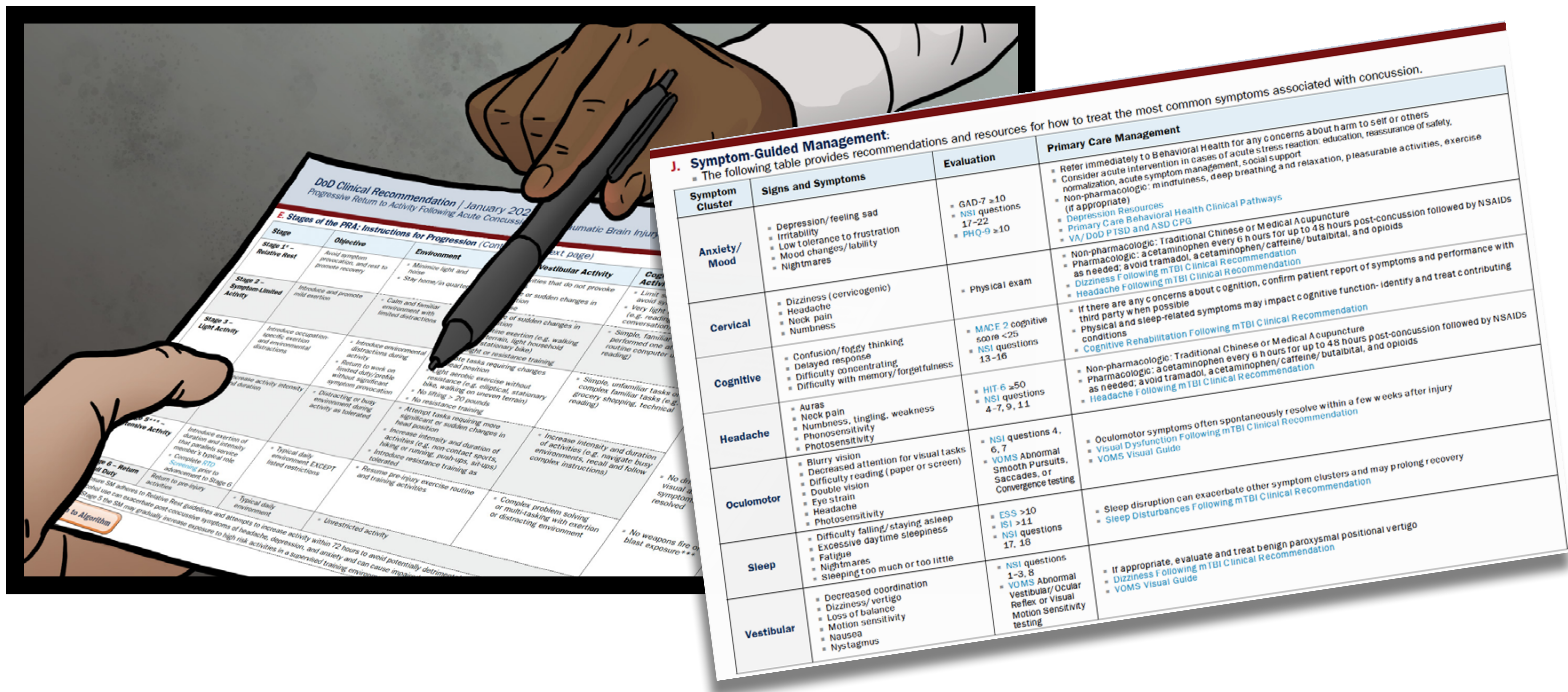


Since this is Service Member Jones' first concussion in the past 12 months, he does not need a referral to a higher level of care. In most cases, service members will completely recover and be able to return to full duty in approximately two weeks. Thus, the PCM should feel comfortable treating based on guidance in the PRA Clinical Recommendations and immediate referral is not necessary.

If this had been the third concussion in the past 12 months, you would refer to a neurologist or other qualified provider for a comprehensive neurological exam while also initiating the PRA protocol.



J. Symptom-Guided Management:

- The following table provides recommendations and resources for how to treat the most common symptoms associated with concussion.

Symptom Cluster	Signs and Symptoms	Evaluation	Primary Care Management
Anxiety/ Mood	▪ Depression/feeling sad ▪ Irritability ▪ Low tolerance to frustration ▪ Mood changes/lability ▪ Nightmares	▪ GAD-7 ≥10 ▪ NSI questions 17–22 ▪ PHQ-9 ≥10	▪ Refer immediately to Behavioral Health for any concerns about harm to self or others ▪ Consider acute intervention in cases of acute stress reaction: education, reassurance of safety, normalization, acute symptom management, social support ▪ Non-pharmacologic: mindfulness, deep breathing and relaxation, pleasurable activities, exercise (if appropriate) ▪ Depression Resources ▪ Primary Care Behavioral Health Clinical Pathways ▪ VA/DoD PTSD and ASD CPG
Cervical	▪ Dizziness (cervicogenic) ▪ Headache ▪ Neck pain ▪ Numbness	▪ Physical exam	▪ Non-pharmacologic: Traditional Chinese or Medical Acupuncture ▪ Pharmacologic: acetaminophen every 6 hours for up to 48 hours post-concussion followed by NSAIDs as needed; avoid tramadol, acetaminophen/caffeine/butalbital, and opioids ▪ Dizziness Following mTBI Clinical Recommendation ▪ Headache Following mTBI Clinical Recommendation
Cognitive	▪ Confusion/foggy thinking ▪ Delayed response ▪ Difficulty concentrating ▪ Difficulty with memory/forgetfulness	▪ MACE 2 cognitive score <25 ▪ NSI questions 13–16	▪ If there are any concerns about cognition, confirm patient report of symptoms and performance with third party when possible ▪ Physical and sleep-related symptoms may impact cognitive function- identify and treat contributing conditions ▪ Cognitive Rehabilitation Following mTBI Clinical Recommendation
Headache	▪ Auras ▪ Neck pain ▪ Numbness, tingling, weakness ▪ Phonosensitivity ▪ Photosensitivity	▪ HIT-6 ≥50 ▪ NSI questions 4–7, 9, 11	▪ Non-pharmacologic: Traditional Chinese or Medical Acupuncture ▪ Pharmacologic: acetaminophen every 6 hours for up to 48 hours post-concussion followed by NSAIDs as needed; avoid tramadol, acetaminophen/caffeine/butalbital, and opioids ▪ Headache Following mTBI Clinical Recommendation
Oculomotor	▪ Blurry vision ▪ Decreased attention for visual tasks ▪ Difficulty reading (paper or screen) ▪ Double vision ▪ Eye strain ▪ Headache ▪ Photosensitivity	▪ NSI questions 4, 6, 7 ▪ VOMS Abnormal Smooth Pursuits, Saccades, or Convergence testing	▪ Oculomotor symptoms often spontaneously resolve within a few weeks after injury ▪ Visual Dysfunction Following mTBI Clinical Recommendation ▪ VOMS Visual Guide
Sleep	▪ Difficulty falling/staying asleep ▪ Excessive daytime sleepiness ▪ Fatigue ▪ Nightmares ▪ Sleeping too much or too little	▪ ESS >10 ▪ ISI >11 ▪ NSI questions 17, 18	▪ Sleep disruption can exacerbate other symptom clusters and may prolong recovery ▪ Sleep Disturbances Following mTBI Clinical Recommendation
Vestibular	▪ Decreased coordination ▪ Dizziness/vertigo ▪ Loss of balance ▪ Motion sensitivity ▪ Nausea ▪ Nystagmus	▪ NSI questions 1–3, 8 ▪ VOMS Abnormal Vestibular/Ocular Reflex or Visual Motion Sensitivity testing	▪ If appropriate, evaluate and treat benign paroxysmal positional vertigo ▪ Dizziness Following mTBI Clinical Recommendation ▪ VOMS Visual Guide

During advancement through Stages 2–5 of the PRA, be sure to have the patient complete the **NSI** and discuss **Instructions for Progression** at every visit. You can also use the **Symptom-Guided Management** table to assist you in treating the patient's specific symptom clusters. Follow-up is recommended every three days until the service member is either ready to return to full duty or specialty referral is necessary.

On day 7, Service Member Jones has advanced to Stage 4 and is at the gym weightlifting. While attempting to increase his weight on the bench to 135 lbs, his headache gets significantly worse to the point he has to stop lifting. He has a scheduled follow-up with you shortly after the incident and states he is unclear as to what to do next.

QUESTION 5

WHAT ADVICE DO YOU GIVE THE SERVICE MEMBER?

A. IT'S OK TO HAVE MILD SYMPTOMS AND YOU SHOULD RECOMMEND HE ADVANCE TO STAGE 5.

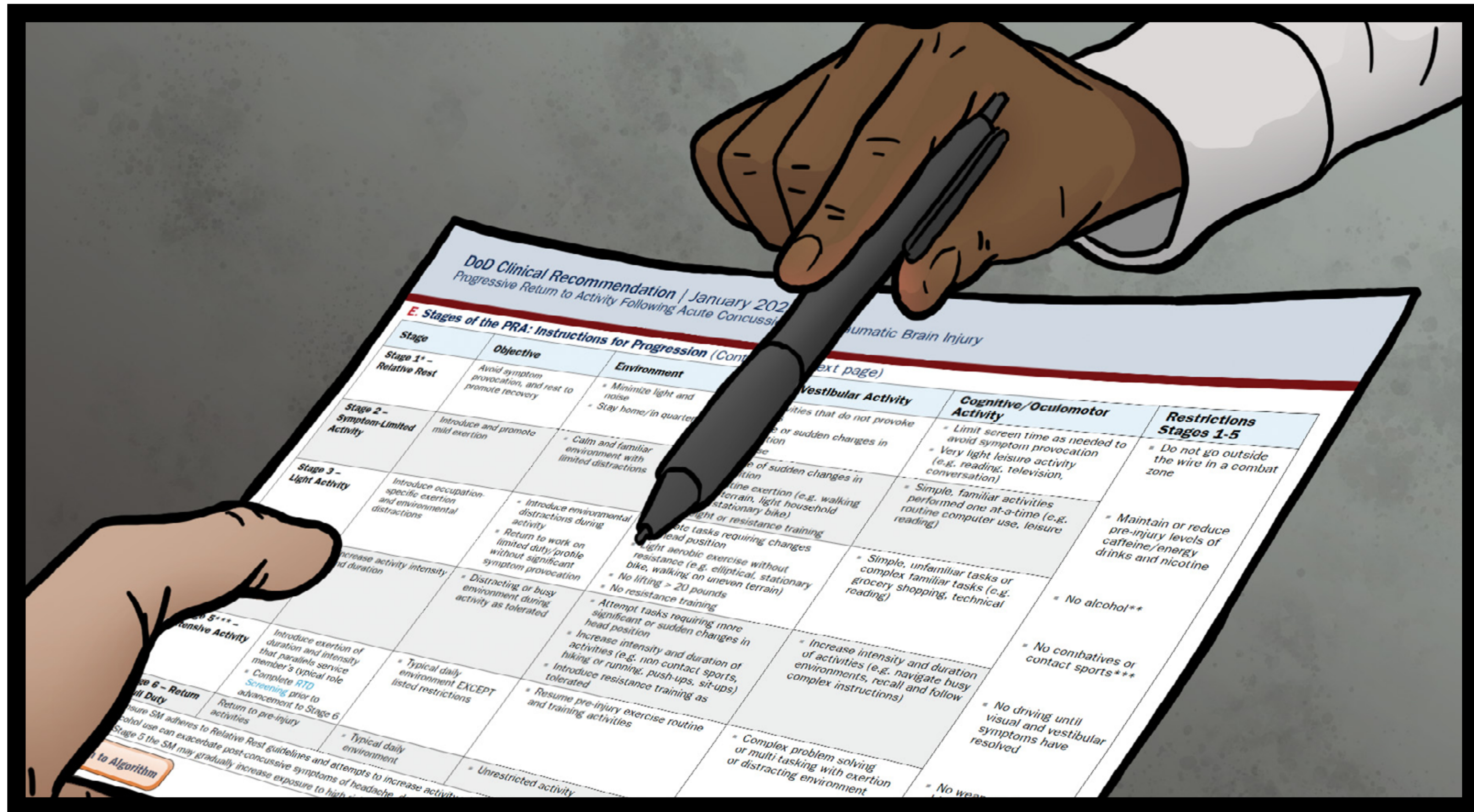
B. SINCE HE FEELS WORSE, HE SHOULD FOLLOW GUIDELINES FOR RELATIVE REST AND RETURN TO STAGE 3, WHERE HE LAST FELT WELL.

SELECT THE BEST ANSWER AND REVIEW ON THE NEXT PAGE

ANSWER 5

WHAT ADVICE DO YOU GIVE THE SERVICE MEMBER?

B IS THE CORRECT ANSWER. IF SYMPTOMS WORSEN DURING AN ACTIVITY, HE SHOULD NOT ADVANCE. HE NEEDS TO FOLLOW THE GUIDELINES FOR RELATIVE REST UNTIL THE EXACERBATION RESOLVES. THEN RETURN TO THE PREVIOUS TOLERATED STAGE FOR THE REMAINDER OF THE DAY.



If symptoms worsen during an activity, the service member should follow the guidelines for relative rest until their symptoms resolve, and then return to the previously tolerated stage for the remainder of the day. Since Service Member Jones was last asymptomatic in Stage 3 and he felt “worse” today attempting to advance to Stage 4, he should go back to Stage 3 and continue progression as instructed. It is important to go over the stages and instructions for progression at each follow-up visit.

Service Member Jones follows up three days later and states he got to Stage 4 again, but feels like his headache is not improving. In addition, you sense he is becoming very anxious about the fact that he has not fully recovered. You review his medications, and he admits that he never picked up his prescription for naproxen and only took acetaminophen for a few days after he hit his head. Regarding the anxiety, he notes having similar anxiety several years ago when he had a concussion in theater.

QUESTION 6

AT THIS POINT, WHAT WOULD BE YOUR RECOMMENDATIONS FOR THE SERVICE MEMBER?

A. RESTART NAPROXEN AND DISCUSS RELAXATION METHODS FOR ANXIETY.

B. PUT IN A REFERRAL ASAP TO BEHAVIORAL HEALTH BECAUSE HE HAS NOT ADVANCED TO STAGE 6 IN SEVEN DAYS.

SELECT THE BEST ANSWER AND REVIEW ON THE NEXT PAGE

ANSWER 6

AT THIS POINT, WHAT WOULD BE YOUR RECOMMENDATIONS FOR THE SERVICE MEMBER?

A IS THE CORRECT ANSWER. PUTTING IN A REFERRAL TO BEHAVIORAL HEALTH BECAUSE HE HAS NOT ADVANCED TO STAGE 6 IN SEVEN DAYS, IS NOT CORRECT. THE PRA GIVES THE PCM STRATEGIES TO CONSIDER BEFORE REFERRAL TO SPECIALISTS. IN THIS CASE, CONSIDER RE-STARTING NAPROXEN AND DISCUSSING RELAXATION TECHNIQUES FOR HIS ANXIETY.

SYMPTOM-GUIDED MANAGEMENT TABLE

Symptom Cluster	Signs and Symptoms	Evaluation	Primary Care Management
Anxiety/ Mood	▪ Depression/feeling sad ▪ Irritability ▪ Low tolerance to frustration ▪ Mood changes/lability ▪ Nightmares	▪ GAD-7 ≥10 ▪ NSI questions 17–22 ▪ PHQ-9 ≥10	▪ Refer immediately to Behavioral Health for any concerns about harm to self or others ▪ Consider acute intervention in cases of acute stress reaction: education, reassurance of safety, normalization, acute symptom management, social support ▪ Non-pharmacologic: mindfulness, deep breathing and relaxation, pleasurable activities, exercise (if appropriate) ▪ Depression Resources ▪ Primary Care Behavioral Health Clinical Pathways ▪ VA/DoD PTSD and ASD CPG
Headache	▪ Auras ▪ Neck pain ▪ Numbness, tingling, weakness ▪ Phonosensitivity ▪ Photosensitivity	▪ HIT-6 ≥50 ▪ NSI questions 4–7, 9, 11	▪ Non-pharmacologic: Traditional Chinese or Medical Acupuncture ▪ Pharmacologic: acetaminophen every 6 hours for up to 48 hours post-concussion followed by NSAIDs as needed; avoid tramadol, acetaminophen/caffeine/butalbital, and opioids ▪ Headache Following mTBI Clinical Recommendation

While it's never wrong to refer to a higher level of care, we encourage PCMs to attempt managing symptoms in the first 15 days, and if they do not resolve then consider referral to a specialist. In this case, he needs to restart his NSAID and this will hopefully resolve his headache. In addition, there are several things the PCM can do for Service Member Jones' anxiety. Per the **Symptom-Guided Management** table, you can see recommendations for treatment of anxiety and mood. Those include mindfulness, deep breathing, relaxation, and exercise as tolerated.

Service Member Jones follows up in three more days (now 13 days post injury) and says the naproxen resolved his headache completely. With the help of simple relaxation techniques, his anxiety is significantly dissipated. He spent the past 24 hours at Stage 5 and feels “great" today.

QUESTION 7

AT THIS POINT, WHAT SHOULD YOU DO AT THIS VISIT?

A. PERFORM THE RETURN TO DUTY SCREENING TODAY TO ADVANCE TO STAGE 6.

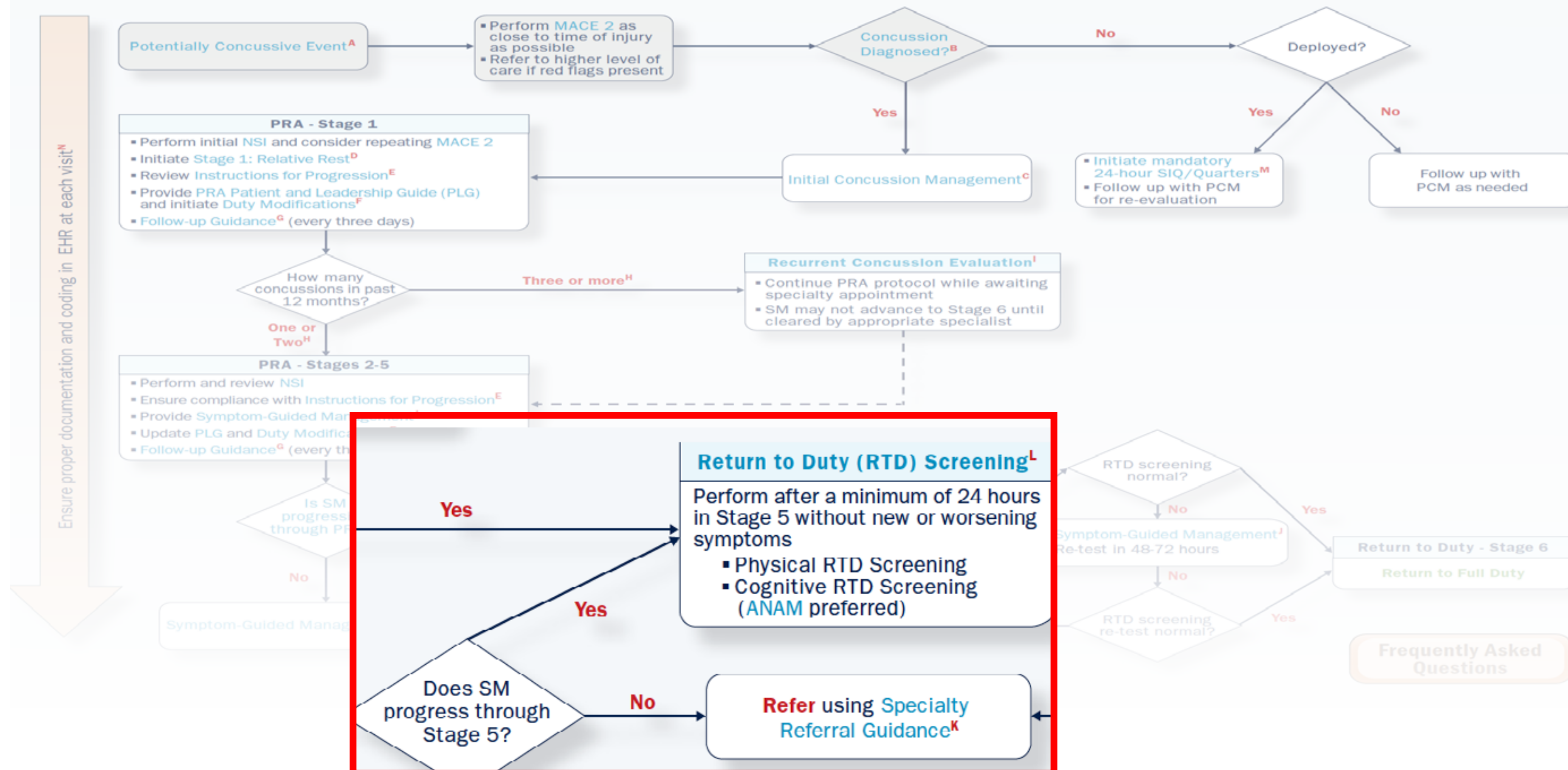
B. ALLOW HIM TO STAY AT STAGE 5 FOR THREE MORE DAYS AND THEN PERFORM THE RETURN TO DUTY SCREENING.

SELECT THE BEST ANSWER AND REVIEW ON THE NEXT PAGE

ANSWER 7

AT THIS POINT, WHAT SHOULD YOU DO AT THIS VISIT?

A IS THE CORRECT ANSWER. HE DOES NOT NEED TO WAIT AN ADDITIONAL THREE DAYS BEFORE PERFORMING THE RETURN TO DUTY SCREENING. AFTER THE SERVICE MEMBER HAS SPENT AT LEAST 24 HOURS IN STAGE 5, WITHOUT ANY NEW OR WORSENING SYMPTOMS, THE PROVIDER CAN SAFELY PERFORM THE RETURN TO DUTY SCREENING.



Per the PRA algorithm, once a service member has completed Stage 5 for 24 hours without worsening or new symptoms, you can safely perform the **Return to Duty** screening. It is not necessary to wait any additional days to perform the screening. In the updated PRA algorithm, the **Return to Duty** screening is now comprised of physical and cognitive portions, and the service member must pass both in order to return to full duty. The purpose of the RTD screening is to give the provider a way to objectively measure readiness for return to duty.

Appendix C: Borg Rate of Perceived Exertion (RPE) Scale

Instructions: The Borg Rate of Perceived Exertion (RPE) is a way of measuring physical activity intensity level. When conducting the Physical RTD Screening, have the service member begin the activity and ask them to rate their level of exertion using the Borg RPE. When they reach a 14-16, begin the two minute timer.

6	**No exertion at all**
7-8	**Extremely light**
9	**Very light** exercise. For a healthy person, it is like walking slowly at his or her own pace for some minutes
10-12	**Light**
13	**Somewhat hard** exercise, but it still feels OK to continue.
14-16	**Hard** (heavy)
17-18	**Very Hard**. A healthy person can still go on, but he or she really has to push him- or herself. It feels very heavy, and the person is very tired.
19	**Extremely strenuous** exercise level. For most people this is the most strenuous exercise they have ever experienced
20	**Maximal exertion**

Borg, G. (1982). Psychophysical bases of perceived exertion. ***Medicine and Science in Sports and Exercise***, 14 (5), 377 – 81.

BORG RPE SCALE

The physical **Return to Duty** screening may be done in office, gym, or PT area. Have the service member perform two minutes of supervised aerobic activities at an exertion rate of 16 or greater on the Borg Rate of Perceived Exertion (or RPE) scale. The Borg RPE scale helps estimate how hard someone is working and one can multiply the RPE on the Borg scale by ten to get a fairly good estimate of the individual's actual heart rate. Therefore at a Borg RPE of 16, the service member's heart rate should be approximately 160 bpm. Preferred activities include modified burpees, sit-ups, or jumping jacks, as these activities will stress the vestibular system. Other activities may include high-knees, step-ups, push-ups, running, elliptical machine, or exercise bike.

QUESTION 8

LET'S ASSUME YOU PERFORM THE PHYSICAL RTD SCREENING ON SERVICE MEMBER JONES AND HE HAS WORSENING SYMPTOMS. WHAT SHOULD YOU DO?

A. STOP THE TEST IMMEDIATELY AND RE-TEST IN 48-72 HOURS.

B. NOTHING. CONTINUE UNTIL TWO MINUTES ARE UP AND MOVE ONTO THE COGNITIVE PORTION OF THE SCREENING.

SELECT THE BEST ANSWER AND REVIEW ON THE NEXT PAGE

ANSWER 8

LET'S ASSUME YOU PERFORM THE PHYSICAL RTD SCREENING ON SERVICE MEMBER JONES AND HE HAS WORSENING SYMPTOMS. WHAT SHOULD YOU DO?

A IS THE CORRECT ANSWER. CONTINUING UNTIL TWO MINTUES ARE UP AND MOVING TO THE COGNITIVE PORTION OF THE SCREENING, IS NOT CORRECT.

YOU SHOULD STOP THE TEST FOR ANY WORSENING SYMPTOMS, DISCHARGE THE SM IN STAGE 5, AND RE-TEST IN 48-72 HOURS. REFER TO THE PRIMARY CARE MANAGEMENT STRATEGIES IN THE SYMPTOM GUIDED MANAGEMENT TABLE TO ADDRESS ANY SYMPTOMS.

J. Symptom-Guided Management:

- The following table provides recommendations and resources for how to treat the most common symptoms associated with concussion.

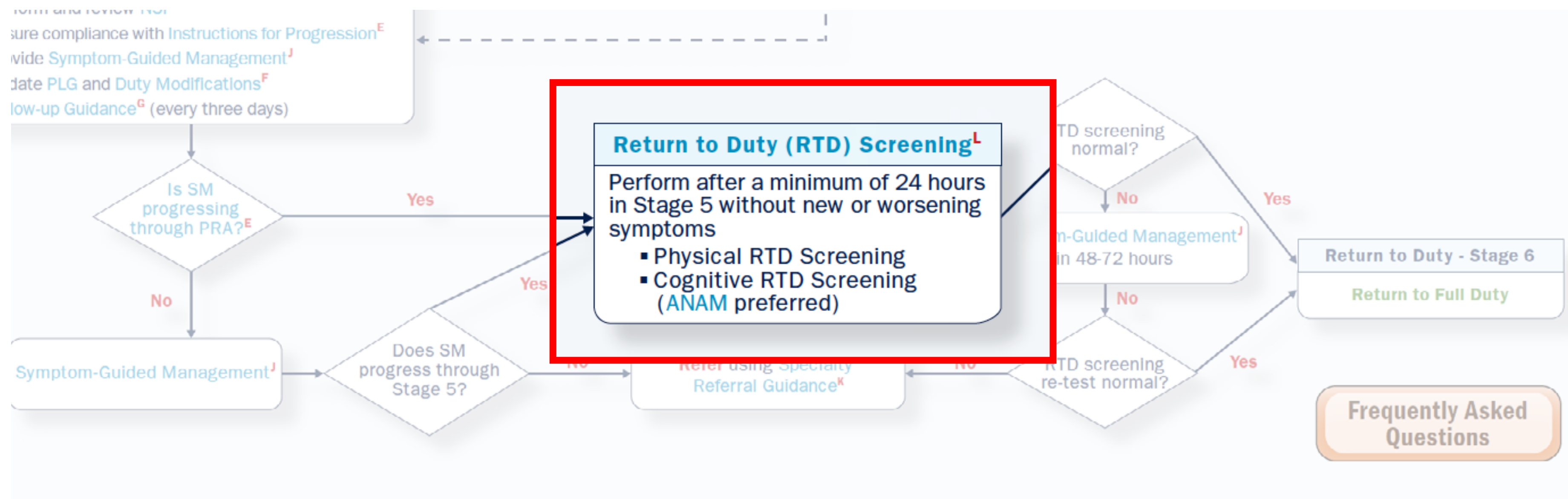
Symptom Cluster	Signs and Symptoms	Evaluation	Primary Care Management
Anxiety/ Mood	▪ Depression/feeling sad ▪ Irritability ▪ Low tolerance to frustration ▪ Mood changes/lability ▪ Nightmares	▪ GAD-7 ≥10 ▪ NSI questions 17–22 ▪ PHQ-9 ≥10	▪ Refer immediately to Behavioral Health for any concerns about harm to self or others ▪ Consider acute intervention in cases of acute stress reaction: education, reassurance of safety, normalization, acute symptom management, social support ▪ Non-pharmacologic: mindfulness, deep breathing and relaxation, pleasurable activities, exercise (if appropriate) ▪ Depression Resources ▪ Primary Care Behavioral Health Clinical Pathways ▪ VA/DoD PTSD and ASD CPG
Cervical	▪ Dizziness (cervicogenic) ▪ Headache ▪ Neck pain ▪ Numbness	▪ Physical exam	▪ Non-pharmacologic: Traditional Chinese or Medical Acupuncture ▪ Pharmacologic: acetaminophen every 6 hours for up to 48 hours post-concussion followed by NSAIDs as needed; avoid tramadol, acetaminophen/caffeine/butalbital, and opioids ▪ Dizziness Following mTBI Clinical Recommendation ▪ Headache Following mTBI Clinical Recommendation
Cognitive	▪ Confusion/foggy thinking ▪ Delayed response ▪ Difficulty concentrating ▪ Difficulty with memory/forgetfulness	▪ MACE 2 cognitive score <25 ▪ NSI questions 13–16	▪ If there are any concerns about cognition, confirm patient report of symptoms and performance with third party when possible ▪ Physical and sleep-related symptoms may impact cognitive function- identify and treat contributing conditions ▪ Cognitive Rehabilitation Following mTBI Clinical Recommendation
Headache	▪ Auras ▪ Neck pain ▪ Numbness, tingling, weakness ▪ Phonosensitivity ▪ Photosensitivity	▪ HIT-6 ≥50 ▪ NSI questions 4–7, 9, 11	▪ Non-pharmacologic: Traditional Chinese or Medical Acupuncture ▪ Pharmacologic: acetaminophen every 6 hours for up to 48 hours post-concussion followed by NSAIDs as needed; avoid tramadol, acetaminophen/caffeine/butalbital, and opioids ▪ Headache Following mTBI Clinical Recommendation
Oculomotor	▪ Blurry vision ▪ Decreased attention for visual tasks ▪ Difficulty reading (paper or screen) ▪ Double vision ▪ Eye strain ▪ Headache ▪ Photosensitivity	▪ NSI questions 4, 6, 7 ▪ VOMS Abnormal Smooth Pursuits, Saccades, or Convergence testing	▪ Oculomotor symptoms often spontaneously resolve within a few weeks after injury ▪ Visual Dysfunction Following mTBI Clinical Recommendation ▪ VOMS Visual Guide
Sleep	▪ Difficulty falling/staying asleep ▪ Excessive daytime sleepiness ▪ Fatigue ▪ Nightmares ▪ Sleeping too much or too little	▪ ESS >10 ▪ ISI >11 ▪ NSI questions 17, 18	▪ Sleep disruption can exacerbate other symptom clusters and may prolong recovery ▪ Sleep Disturbances Following mTBI Clinical Recommendation
Vestibular	▪ Decreased coordination ▪ Dizziness/vertigo ▪ Loss of balance ▪ Motion sensitivity ▪ Nausea	▪ NSI questions 1–3, 8 ▪ VOMS Abnormal Vestibular/Ocular Reflex or Visual Motion Sensitivity	▪ If appropriate, evaluate and treat benign paroxysmal positional vertigo ▪ Dizziness Following mTBI Clinical Recommendation ▪ VOMS Visual Guide

K. Specialty Referral Guidance:

- Patients who do not respond to initial management and have symptoms persisting >15 days may benefit from referral to TBI specialty clinic, if available, or specialties listed below.

If Service Member Jones has worsening symptoms while performing the exertion test, you should stop the test immediately, discharge him in Stage 5, and re-test in 48–72 hours. You can refer to **Primary Care Management** strategies in the **Symptom-Guided Management** table while awaiting re-test. In addition, you should hold off on performing the cognitive testing until he passes the physical portion of the RTD screening. If the re-test is abnormal, refer to a higher level of care based on the **Specialty Referral Guidance** table within the PRA.

Service Member Jones comes back in 72 hours for another Return to Duty screening. You have him perform jumping jacks in your office and he has no worsening symptoms after two minutes with a Borg RPE of 16.



Per the PRA Algorithm, once a service member has successfully completed the physical portion of the **Return To Duty** screening, he or she must complete the cognitive screening.

This is something new that has been added to the 2021 **PRA Clinical Recommendation** and should only be performed after the service member has successfully completed the physical portion of the **Return To Duty** screening.

The preferred neurocognitive assessment is the **Automated Neuropsychological Assessment Metrics** test, also known as the **ANAM**.

Ordering the ANAM is simple, and ANAM is available at most MTFs. Appendix D in the PRA tells you how to request an ANAM. As you can see, you can either call the Help Desk at 855-630-7849 or you can email the Request Inbox at usarmy.jbsa.medcom.mbx.otsg--anam-baselines@mail.mil. There is someone at the Help Desk 24 hours a day, 365 days a year.

Once you have ordered the ANAM, have the service member go to the nearest ANAM office to complete the test. Once completed, the ANAM results will come back to your email that you provided (this is typically 24–48 hours later).

The interpretation will look like the ANAM Interpretation graphic to the right.

As the graphic describes, if the service member has a baseline ANAM for comparison, refer to the Reliable Change and if any single domain is less than -1.64 or any two domain are less than -1.28, the service member must wait an additional 48–72 hours and re-test.

If there is no baseline for comparison, then refer to the Composite Score and if that is less than -1.64, then the service member must also re-test in 48–72 hours.

Appendix D: ANAM Guidance

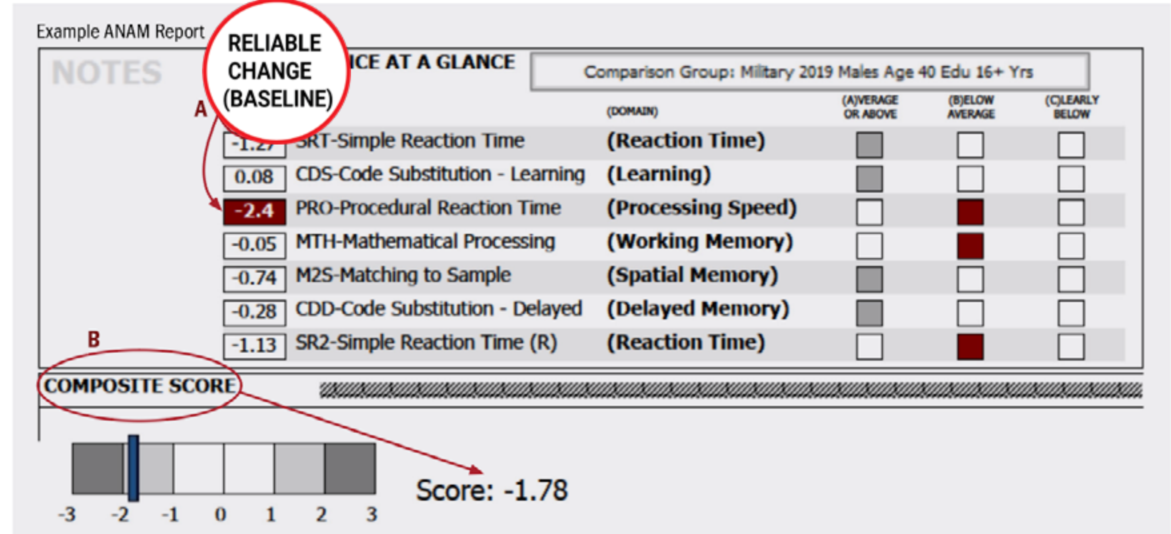
How to Request ANAM

1. Call ANAM Help Desk
   - Phone number: 1-855-630-7849 (toll free)
   - Hours of Operation: 24 hours, 365 days
2. Send a request to ANAM Results Request Inbox (*cannot be encrypted*): usarmy.jbsa.medcom.mbx.otsg--anam-baselines@mail.mil

Interpretation of the ANAM Clinical Report

A. If service member **has a baseline ANAM,** refer to the Reliable Change scores for each subtest. If the Reliable Change is less than -1.64 on any one subtest (appearing in a red box), or less than -1.28 on 2 or more subtests, remain in Stage 5 and repeat ANAM in 48-72 hours.

B. If service member **does not have a baseline ANAM**, refer to the overall Composite Score. If the Composite Score is less than -1.64, remain in Stage 5 and repeat ANAM in 48-72 hours.



- If service member does not meet criteria for return to duty after second attempt, refer to Neuropsychologist/Speech Language Pathologist (SLP) for further evaluation.
- The ANAM Help Desk can answer general questions. For questions regarding ANAM interpretation, please consult a Neuropsychologist or specialist.

If ANAM is unavailable, repeat the Cognitive Exam portion of the MACE 2 (Questions 5-16)

- SM should score ≥ 25 to be considered ready to return to full duty.
- If SM scores < 25, remain in Stage 5 and repeat in 48-72 hours.
- If the score continues to be < 25, refer for ANAM (see above) or to Neuropsychologist/Speech Language Pathologist (SLP) for further evaluation.

MACE 2 (QUESTIONS 5-16)

MACE 2 - Military Acute Concussion Evaluation

COGNITIVE EXAM

5. Orientation

Score one 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 one hour of actual time.

ORIENTATION TOTAL SCORE /5

6. Immediate Memory

Choose one list (A-F below) and use that list for the remainder of the MACE 2.

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

Trial 1 script: Read the script exactly as written.

- *"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: Read the script exactly as written.

- *"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."*

	Trial 1		Trial 2		Trial 3	
List A	Incorrect	Correct	Incorrect	Correct	Incorrect	Correct
Jacket	0	1	0	1	0	1
Arrow	0	1	0	1	0	1
Pepper	0	1	0	1	0	1
Cotton	0	1	0	1	0	1
Movie	0	1	0	1	0	1

IMMEDIATE MEMORY TOTAL SCORE /15

Immediate Memory Alternate Word Lists

List B	List C	List D	List E	List F
Dollar	Finger	Baby	Candle	Elbow
Honey	Penny	Monkey	Paper	Apple
Mirror	Blanket	Perfume	Sugar	Carpet
Saddle	Lemon	Sunset	Sandwich	Saddle
Anchor	Insect	Iron	Wagon	Bubble

Revised 03/2021 Health.mil/TBICoE Page 5 of 14

MACE 2 - Military Acute Concussion Evaluation

NEUROLOGICAL EXAM

7. Speech Fluency

☐ Normal
☐ Abnormal

- Speech should be fluid and effortless – no pauses or unnatural breaks.
  – Stuttering or struggling to speak is abnormal.

8. Word Finding

☐ Normal
☐ Abnormal

- Assess difficulties with word finding:
  – Difficulty in coming up with the name of an object or grasping to find words is abnormal.

9. Grip Strength

☐ Normal
☐ Abnormal

- Assess grip strength. Grip strength should be strong and equal bilaterally.
  – Unequal or weak grip strength is abnormal.

10. Pronator Drift

☐ Normal
☐ Abnormal

- Direct service member to stand with eyes closed and arms extended forward, parallel to the ground with palms up. Assess for five to 10 seconds:
  – Any arm or palm drift is abnormal.

11. Single Leg Stance

☐ Normal
☐ Abnormal

- Remove shoes if possible. Have service member stand on one leg, arms across chest, hands touching shoulders, eyes open initially. Once service member is balanced, have them close their eyes and time for 15 seconds how long they can maintain their balance. Repeat test with opposite leg.
  – Loss of balance on either leg before eight seconds is abnormal.

Revised 03/2021 Health.mil/TBICoE Page 6 of 14

MACE 2 - Military Acute Concussion Evaluation

NEUROLOGICAL EXAM - Continued

12. Tandem Gait

☐ Normal
☐ Abnormal

- Remove shoes if possible. Have service member take six steps one foot in front of the other, heel-to-toe, with arms at side
  - Stumbling or shifting feet is

13. Pupil Response

☐ Normal
☐ Abnormal

- Pupils should be round, equal in size and briskly constrict to a direct, bright light.
  - Unequal pupil size, dilation or constriction delay is abnormal.

14. Eye Tracking

☐ Normal
☐ Abnormal

- Both eyes should smoothly track your finger side-to-side and up and down.
  - Unequal, irregular or delayed eye tracking is abnormal.

NEUROLOGICAL EXAM RESULTS (Questions 7-14)

☐ All Normal ☐ Any Abnormal

COGNITIVE EXAM

15. Concentration

A. Reverse Digits

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

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.

Revised 03/2021 Health.mil/TBICoE Page 7 of 14

MACE 2 - Military Acute Concussion Evaluation

COGNITIVE EXAM - Continued

15. Concentration - Continued

A. Reverse Digits

Script: Read the script exactly as written.

- *"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."*

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

REVERSE DIGITS SCORE (15A) /4

Concentration Alternate Number Lists

Note: Use the same list (A-F) that was used in Question 6.

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

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

Revised 03/2021 Health.mil/TBICoE Page 8 of 14

If the **ANAM** is not available due to deployment, or if you are in an austere environment, repeat the Cognitive Exam portion of the **MACE 2**, questions 5–16. The service member should score a 26 or better in order to "pass" the Cognitive Exam on the **MACE 2**. If they fail the first attempt, as with the **ANAM**, they should re-test in 48–72 hours.

If the service member fails the Cognitive Exam on the second attempt, you should refer to either Neuropsychology or Speech Language Therapy for further evaluation (depending on what services are offered at your MTF).

Of course, the service member should remain at Stage 5 until they have either passed their Cognitive Exam or have been cleared by a specialist.

Let’s get back to Service Member Jones. You call the Help Desk and arrange for Service Member Jones to take the ANAM. Since the ANAM office is close to the Aid Station, you instruct him to go today to take the test.

He successfully completes the ANAM and the next day, you receive his results in your email. He fortunately had a baseline from 2018, prior to deployment, and therefore you are able to review the Reliable Change. No single value is less than –1.64 and there are no two values that are less than –1.28. Therefore, he has successfully passed the ANAM and the cognitive portion of the RTD screening.

He is now ready to advance to Stage 6 or Return to Full Duty.

Dr Keith Stuessi

Traumatic Brain Injury Center of Excellence

Congratulations! You've successfully guided Service Member Jones through the PRA process.

I hope this helps you treat service members with concussion in the future. For more information on the **PRA Clinical Recommendation**, please visit the TBICoE website at: https://health.mil/TBICoE.

The full PRA CR is available at this link https://health.mil/TBICoE.

All illustrations created by Kori Zick (TBICoE).

Page 2 photo of Concussion Restoration Care Center extracted from DVIDS video by Lance Cpl. Jerrick J. Griffin, 1st Marine Logistics Group.

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