PROGRESSIVE RETURN TO ACTIVITY
Case Study

Managing Concussion from Point of Injury to Return to Full Duty

Student Workbook
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.
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.

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.
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
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.
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
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.
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
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.
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.
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.
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.

<table>
<thead>
<tr>
<th>Symptom Cluster</th>
<th>Signs and Symptoms</th>
<th>Evaluation</th>
<th>Primary Care Management</th>
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| 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, Phanosensitivity, 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 in TBI Clinical Recommendation. |
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.
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 minutes 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.
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 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.
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](https://health.mil/TBICoE).

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

All illustrations created by Kori Zick (TBICoE).


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