



**DEFENSE CENTERS  
OF EXCELLENCE**

For Psychological Health  
& Traumatic Brain Injury

# **Progressive Return to Activity Following Acute Concussion/Mild Traumatic Brain Injury**

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**Guidance for the Primary Care Manager  
in Deployed and Non-deployed Settings**



| Report Documentation Page                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    |                                     |                                                           | Form Approved<br>OMB No. 0704-0188                  |                                 |
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# Learning Objectives



Describe the role of this clinical recommendation and overall goal for recovery following concussion/mTBI

Understand the activity goal for each stage and identify minimum rest requirements

Recognize the criteria for progression through each activity stage

Identify the criteria for referral to a rehabilitation provider for the daily monitored progressive return to activity process

Demonstrate understanding of guidance for activity following concussion/mTBI through knowledge check

# Learning Objectives

- With more than 287,000 traumatic brain injuries (TBIs) in DoD from 2000 through the third quarter of 2013, TBI is a major concern that can negatively impact service members' (SM) health, unit readiness and mission accomplishment
- TBIs are classified as mild, moderate, severe or penetrating
- Majority of the documented brain injuries (83 percent) in the DoD are mild TBIs (mTBI), also known as concussions



# Closed TBI Classification

| Severity                          | Mild (Concussion)       | Moderate                  | Severe             |
|-----------------------------------|-------------------------|---------------------------|--------------------|
| Structural imaging                | Normal                  | Normal or abnormal        | Normal or abnormal |
| Loss of consciousness (LOC)       | 0 to 30 minutes         | 30 minutes and < 24 hours | > 24 hours         |
| Alteration of consciousness (AOC) | a moment up to 24 hours | > 24 hours                |                    |
| Post traumatic amnesia (PTA)      | 0 to 1 day              | > 1 day < 7 days          | > 7 days           |

Source: Assistant Secretary of Defense for Health Affairs. Health Affairs Memorandum (October 1, 2007).  
Traumatic Brain Injury: Definition and Reporting

This classification refers to severity at the time of injury,  
not symptoms experienced

# Purpose of Clinical Recommendation

- Provide guidance for primary care managers (PCM) in deployed and non-deployed settings for progressive return to activity following a concussion/mTBI
- Offer a standardized approach for SMs who remain symptomatic after sustaining a concussion/mTBI
- Identify recommended criteria for referral to the rehabilitation provider for the daily monitored return to activity process



*DoD photo by Tech. Sgt. Prentice Colter*



*DoD photo by Staff Sgt. Alesia Goosic*

# Role of the Primary Care Manager (PCM)

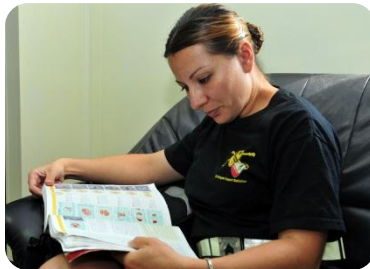
Diagnosed and confirmed concussion:

1. Provide mandatory recovery
  - 24 hours for first or second concussion within 12 months
2. For three or more concussions within 12 months refer to higher level of care for recurrent concussion evaluation
3. Provide education
  - Acute Concussion (mTBI) Educational Brochure
  - Return to Activity Educational Brochure
4. Initiate the progressive return to activity process **OR** refer to rehabilitation provider for daily monitored progressive return to activity process

All concussions should be evaluated in accordance with Department of Defense Instruction (DoDI) 6490.11; or the VA/DoD Clinical Practice Guidelines for Management of Concussion/Mild Traumatic Brain Injury

# Progressive Activity Process

- Six stage approach from 'Rest' to 'Unrestricted Activity'
- Progression is measured across physical, cognitive, and vestibular domains
- Utilizes the Neurobehavioral Symptom Inventory (NSI) for symptom tracking
- Resting heart rate (HR) and blood pressure (BP) are used as physiological measures to evaluate activity tolerance



*DoD photo by Sgt. Justin Naylor (left), MWR West Point photo (center), US MilitaryCycling.com photo (right)*



# Stages of Progressive Activity

| Rehabilitation Stages | Description                        |
|-----------------------|------------------------------------|
| Stage 1               | Rest                               |
| Stage 2               | Light Routine Activity             |
| Stage 3               | Light Occupation-oriented Activity |
| Stage 4               | Moderate Activity                  |
| Stage 5               | Intensive Activity                 |
| Stage 6               | Unrestricted Activity              |

# Neurobehavioral Symptom Inventory

- Twenty-two item inventory of non-specific but common mTBI symptoms
- Symptoms are reported on a scale of 0 to 4:
  - 0 = none
  - 1 = mild
  - 2 = moderate
  - 3 = severe
  - 4 = very severe

**Neurobehavioral Symptom Inventory (NSI)**

Please rate the following symptoms. The purpose of this inventory is to track symptoms over time. Use the 0-4 scale below to rate the symptoms. Do not attempt to score.

① **None** — rarely, if ever, present; not a problem at all.

② **Mild** — occasionally present, but it does not disrupt my activities; I can usually continue what I'm doing; doesn't really concern me.

③ **Moderate** — often present, occasionally disrupts my activities; I can usually continue what I'm doing with some effort; I feel somewhat concerned.

④ **Severe** — frequently present and disrupts activities; I can only do things that are fairly simple or take little effort; I feel I need help.

⑤ **Very Severe** — almost always present and I have been unable to perform at work, school or home due to this problem; I probably cannot function without help.

| SYMPTOMS                                                           | 0 | 1 | 2 | 3 | 4 |
|--------------------------------------------------------------------|---|---|---|---|---|
| Feeling dizzy                                                      | 0 | 1 | 2 | 3 | 4 |
| Loss of balance                                                    | 0 | 1 | 2 | 3 | 4 |
| Poor coordination, clumsy                                          | 0 | 1 | 2 | 3 | 4 |
| Headaches                                                          | 0 | 1 | 2 | 3 | 4 |
| Nausea                                                             | 0 | 1 | 2 | 3 | 4 |
| Vision problems, blurring, trouble seeing                          | 0 | 1 | 2 | 3 | 4 |
| Sensitivity to light                                               | 0 | 1 | 2 | 3 | 4 |
| Hearing difficulty                                                 | 0 | 1 | 2 | 3 | 4 |
| Sensitivity to noise                                               | 0 | 1 | 2 | 3 | 4 |
| Numbness or tingling on parts of the body                          | 0 | 1 | 2 | 3 | 4 |
| Change in taste and/or smell                                       | 0 | 1 | 2 | 3 | 4 |
| Loss or increase of appetite                                       | 0 | 1 | 2 | 3 | 4 |
| Poor concentration, can't pay attention, easily distracted         | 0 | 1 | 2 | 3 | 4 |
| Forgetfulness, can't remember things                               | 0 | 1 | 2 | 3 | 4 |
| Difficulty making decisions                                        | 0 | 1 | 2 | 3 | 4 |
| Slowed thinking, difficulty getting organized, can't finish things | 0 | 1 | 2 | 3 | 4 |
| Fatigue, loss of energy, tire easily                               | 0 | 1 | 2 | 3 | 4 |
| Difficulty falling or staying asleep                               | 0 | 1 | 2 | 3 | 4 |
| Feeling anxious or tense                                           | 0 | 1 | 2 | 3 | 4 |
| Feeling depressed or sad                                           | 0 | 1 | 2 | 3 | 4 |
| Easily annoyed, irritable                                          | 0 | 1 | 2 | 3 | 4 |
| Poor frustration tolerance, feeling easily overwhelmed             | 0 | 1 | 2 | 3 | 4 |

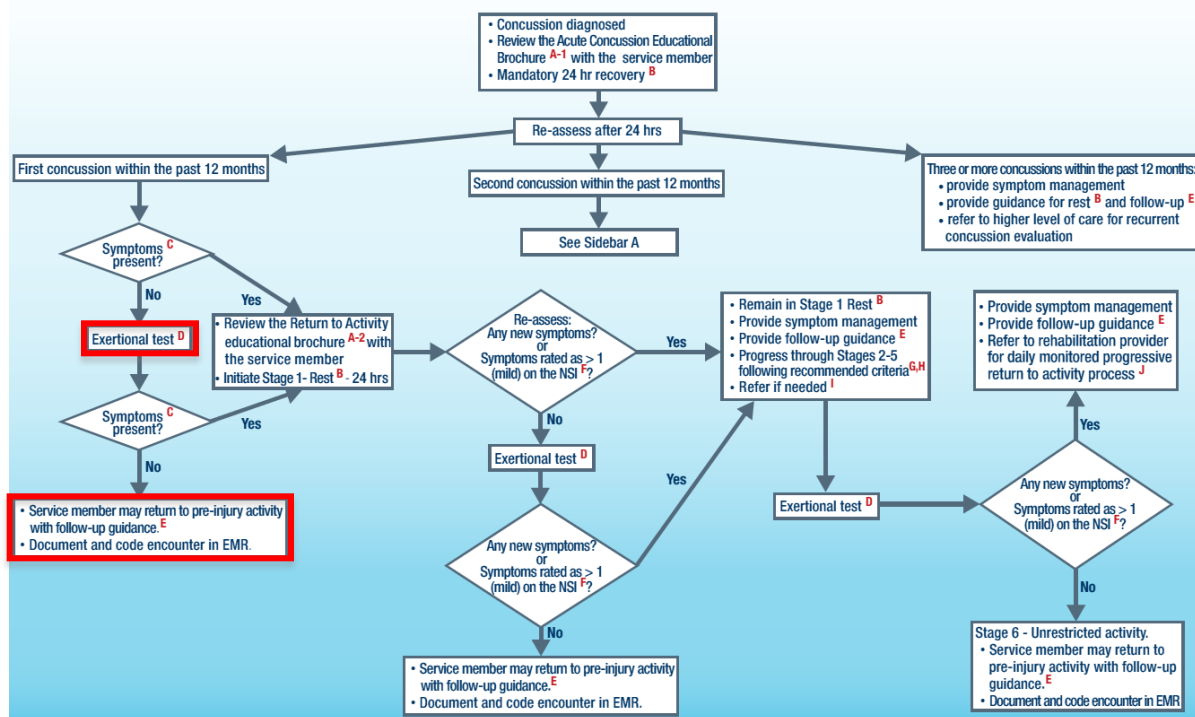
Cicerone, KD. Journal of Head Trauma Rehabilitation 1995;10(3):1-17

- NSI becomes part of the medical record

# First Concussion

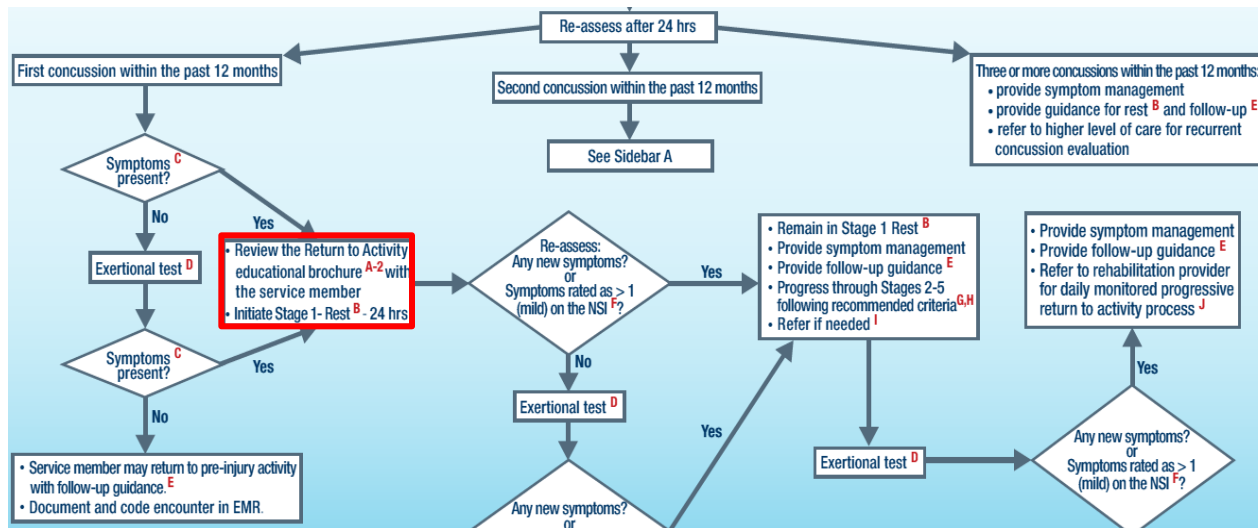
If the SM is asymptomatic after the 24 hour mandatory recovery, then exertional testing may be performed

- If the SM remains asymptomatic after exertional testing, he or she may return to pre-injury activity with follow-up guidance



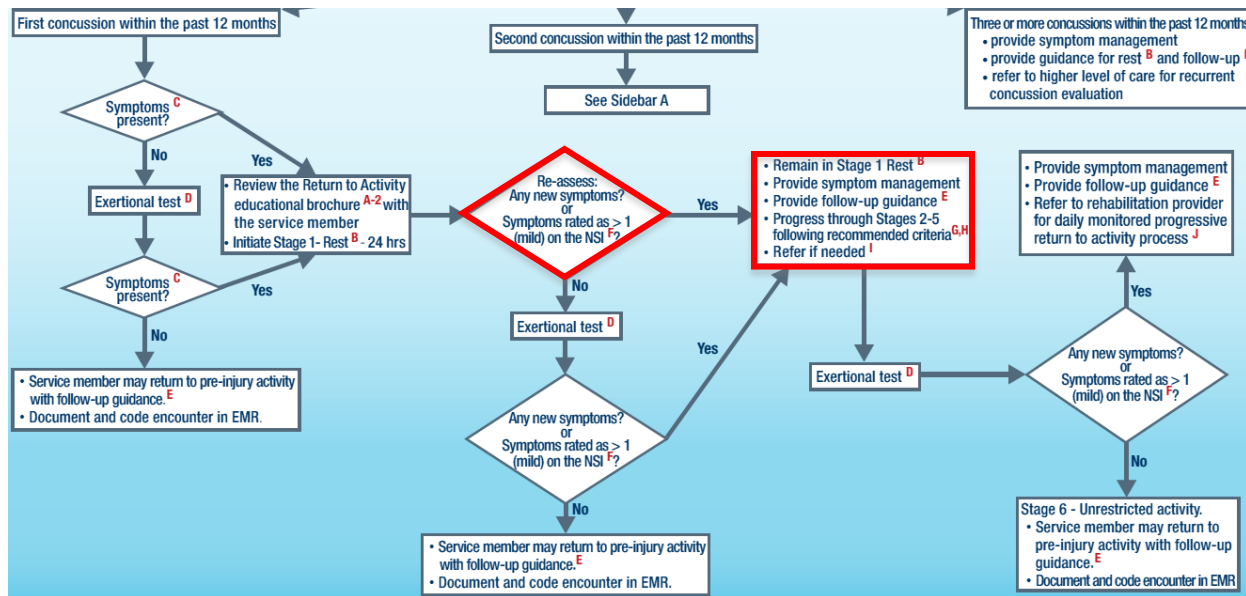
# First Concussion (cont.)

- Initiate progressive activity process:
  - If SM reports symptoms greater than 1 (mild) after the mandatory 24 hour recovery period
  - If SM reports symptoms greater than 1 (mild) after exertional testing
- Provide a detailed review of allowable activities for each stage using the Return to Activity Educational Brochure



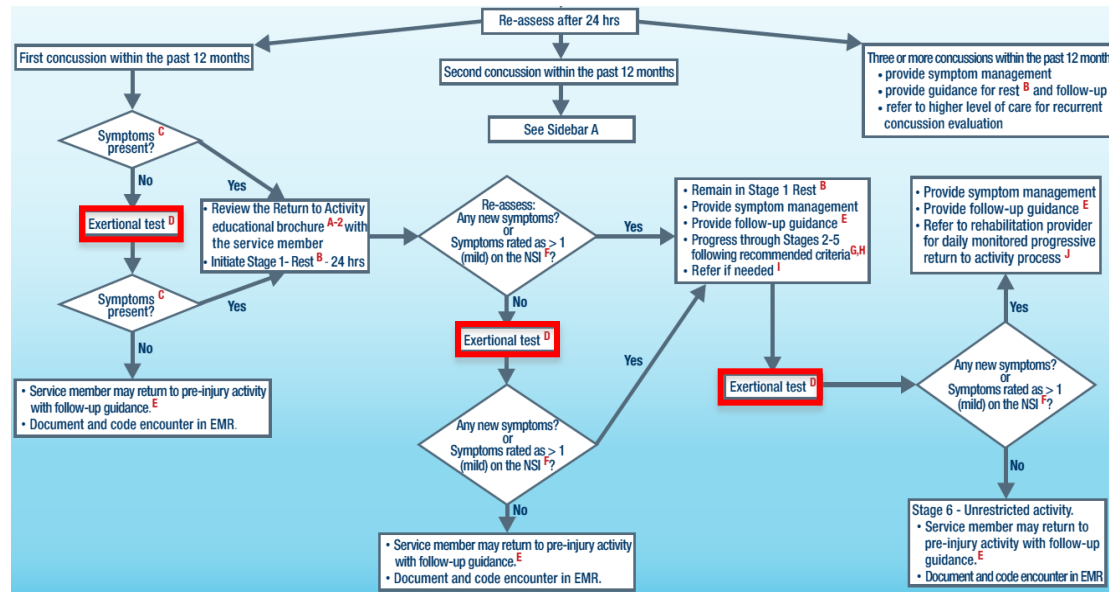
# First Concussion (cont.)

- SM to see the PCM after Stage 1 (Rest):
  - If symptoms are rated as 0 to 1 (mild) then SM may undergo exertional testing
  - If SM has new symptoms or symptoms rated >1 (mild), then SM to remain at Stage 1 another 24 hours



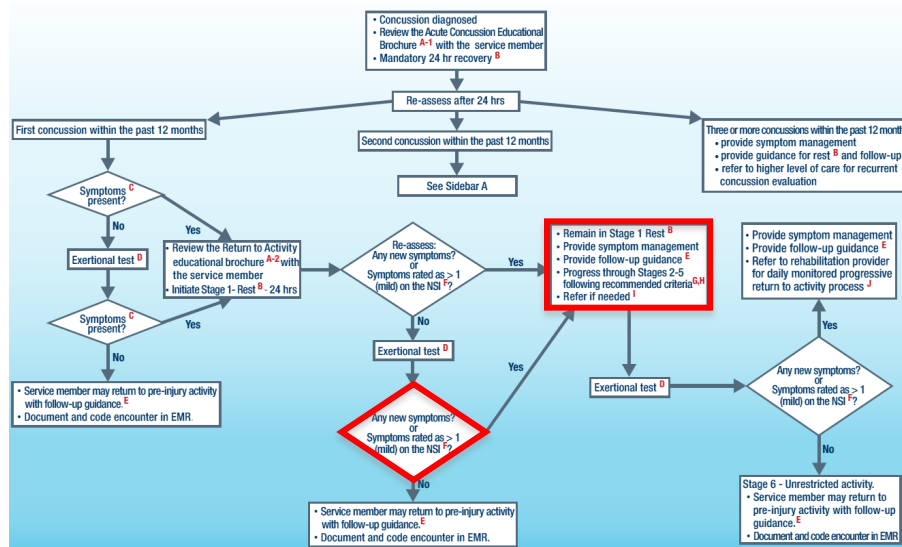
# First Concussion (cont.)

- Exertional testing:
  - If SM is asymptomatic after 24 hour mandatory recovery
  - If SM has no new symptoms or has an NSI score of 0 to 1 (mild) following Stage 1
  - After successful completion of Stage 5



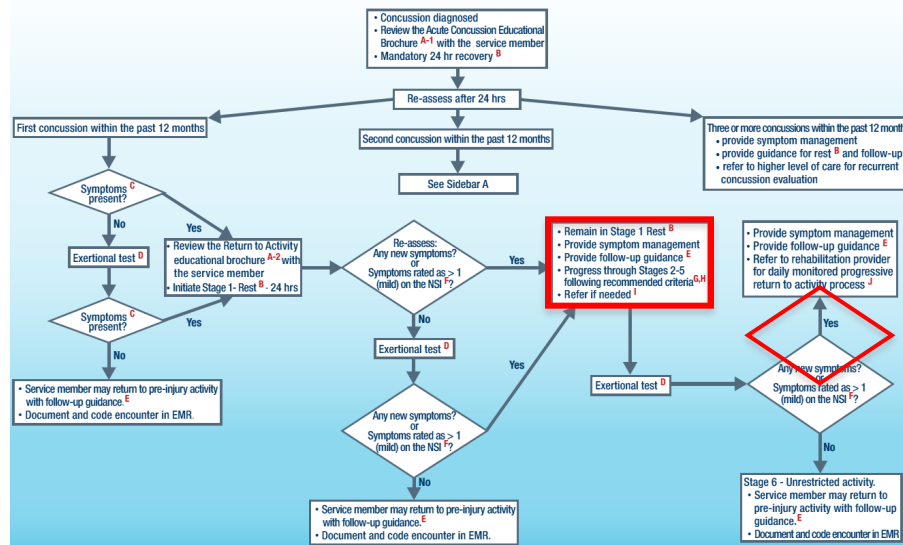
# First Concussion (cont.)

- Continue progressive activity process:
  - SM completes the NSI daily after spending at least 24 hours in a given stage
- Progress to next stage:
  - If SM has been in current stage for at least 24 hours
  - If SM has no new symptoms
  - If daily NSI symptoms are reported as 0 to 1 (mild)



# First Concussion (cont.)

- Refer to the rehabilitation provider for daily monitored progressive return to activity process:
  - If recovery is not progressing as anticipated
  - If there is no progression in seven days
  - If symptoms are worsening
  - If SM reports symptoms following exertional testing after Stage 5

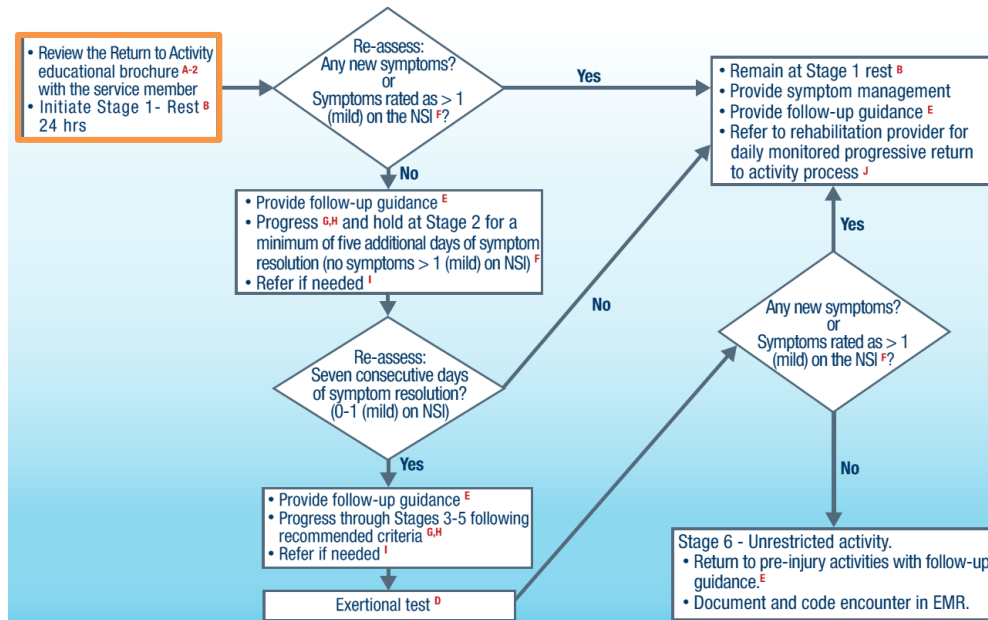




# Second Concussion

- Initiate progressive activity process after the mandatory 24 hour recovery period
- Begin at Stage 1 and provide a detailed review of allowable and avoidable activities for each stage using the Return to Activity Educational Brochure

Second concussion within the past 12 months

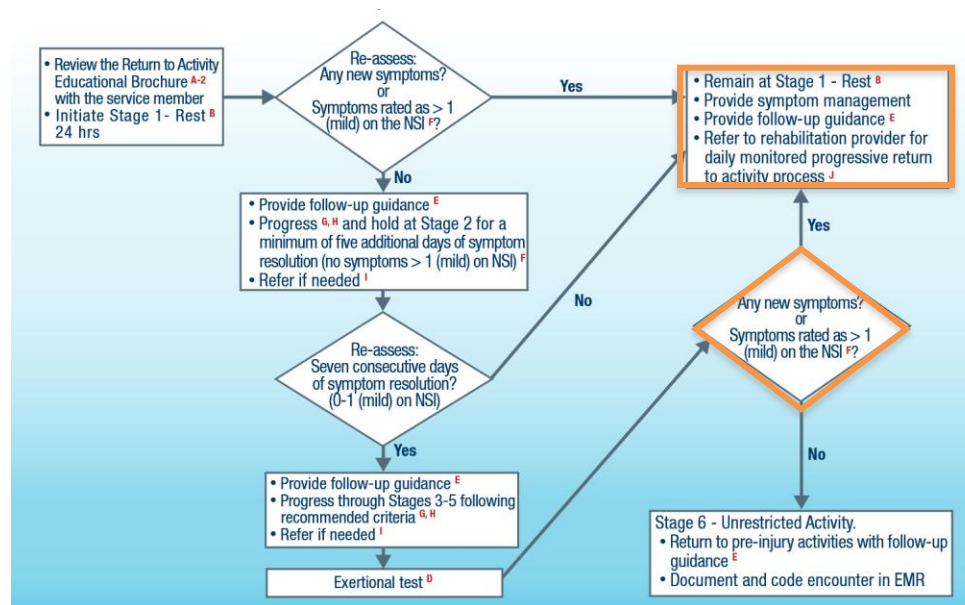


# Second Concussion (cont.)

- Administer NSI after an additional 24 hours rest (Stage 1):
  - If symptoms rated as >1 (mild) on NSI:
    - Refer SM to a rehabilitation provider for daily monitored progressive return to activity process
    - Provide symptom management
    - Hold patient at Stage 1
  - If NSI score 0 to 1 (mild):
    - Hold at Stage 2 for a minimum of five additional days
- After seven consecutive days of symptom resolution (all symptoms 0 to 1 (mild) on NSI and no new symptoms):
  - Progress through Stages 3-5 following recommended criteria
  - Conduct exertional testing after Stage 5

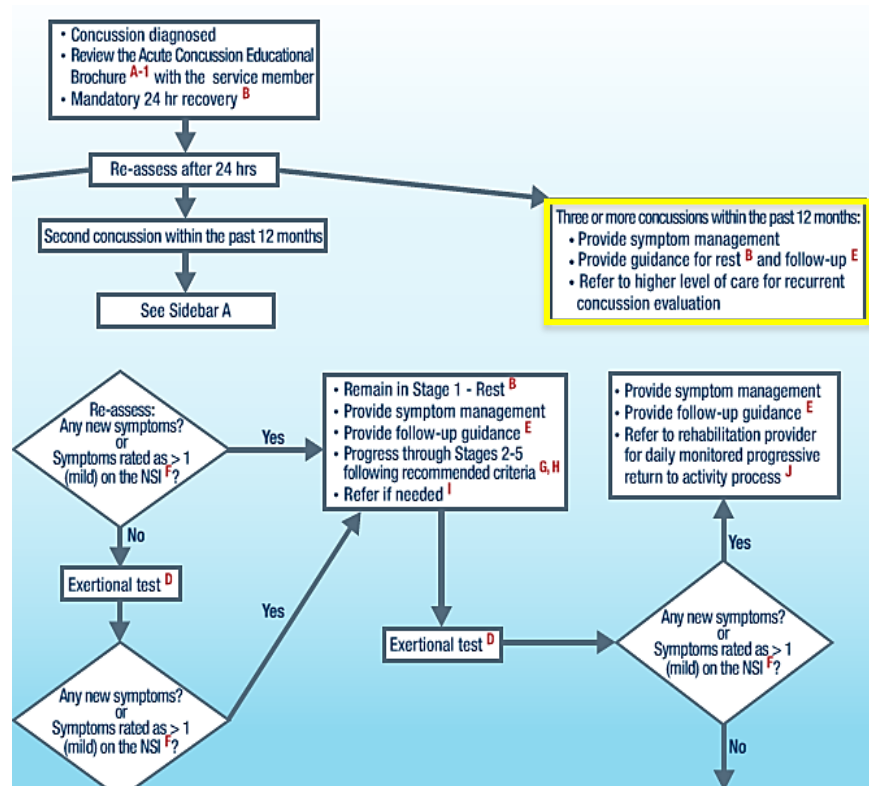
# Second Concussion (cont.)

- Refer to the rehabilitation provider for the daily monitored return to activity process:
  - If recovery is not progressing as anticipated
  - If there is no progression in seven days
  - If symptoms are worsening
  - If SM reports symptoms following exertional testing after Stage 5



# Third Concussion

- Provide symptom management
- Provide guidance for rest and follow-up
- Refer to higher level of care for recurrent concussion evaluation



# Progression Through Activity

Following conditions apply at all stages and should be met for the SM to progress:

1. Each stage lasts a minimum of 24 hours and specifies activities permitted
2. The NSI is completed daily every morning
3. SM may move to the next stage only if symptoms are reported as not greater than 1 (mild) and there are no new symptoms on NSI
4. If the SM reports an increase in the number or severity of symptoms during or after an activity:
  - The current activity must be **stopped** and the SM remains at the previously tolerated completed stage
  - Contacts their PCM for follow up

# Progression Through Activity (cont.)

5. It is recommended that all SMs see the PCM after Stage 5 for exertional testing prior to resuming and before release to Stage 6 (Unrestricted Activity)
6. Refer the SM to a rehabilitation provider or higher level of care if:
  - Symptoms are worsening
  - Recovery is not progressing as anticipated
  - There is no progress for **seven days**
  - SM is symptomatic after exertional testing following Stage 5, or per provider judgment

# Stage 1: Rest

## Objective

- Extremely light physical, cognitive and vestibular-balance activity with the goal of symptom resolution

## Activity and rest guidelines

- Primarily rest with extremely limited cognitive activity
- Basic activities of daily living and extremely light leisure activity
- Extremely light vestibular-balance activity is permitted, including walking on level surfaces and limited head movements
- No work, exercise, video games, studying or driving



SM may return to pre-injury activity with follow-up guidance if NO symptoms are present (following exertional testing) after Stage 1

# Stage 2: Light Routine Activity

## Objective

- Initiate and promote limited effort
- Activity limited to 30 minute intervals or less followed by four hours of rest

## Activities

- Outdoor or indoor light physical activities, such as stretching, walking, stationary cycling at low pace and resistance
- Cognitive activities such as computer use, leisure reading, and simple board games
- Vestibular and balance activities such as climbing stairs, putting on boots, and bending tasks
- **NO video games, driving, resistance training, repetitive lifting, sit-ups, push-ups or pull-ups**

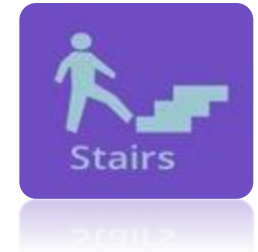




# Stage 3: Light Occupation-oriented Activity

## Objective

- Increase intensity and complexity of exercise and cognitive activity



## Activities (in addition to previous stage)

- Lift and carry objects less than 20 lbs., use elliptical or stair climber machines, or light military tasks such as cleaning equipment
- Cognitive activities such as increasing exposure to light and noise, performing a maintenance check on vehicle or shop for one item
- Balance activities including walking on uneven terrain, swimming (avoiding flip turns) or standing on one foot
- Physical activities not to exceed 60 min. followed by minimum four hours rest; Light cognitive activities not to exceed 30 min. followed by minimum 60 min. rest
- **NO video games, driving, combatives or collision sports**



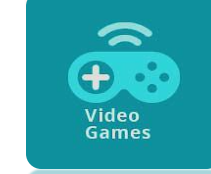
# Stage 4: Moderate Activity

## Objective

- Increase in intensity and complexity of exercise and cognitive activity to match demands of occupation

## Activities (in addition to previous stage)

- Physical activities such as brisk hike, jogging to running as tolerated, light resistance training or non-contact sports
- Cognitive activity with greater demand such as video games, land navigation, driving simulator, weapons simulator or target practice
- Vestibular/balance activities with greater demand such as swimming with flip turns, jump rope
- Physical activities not to exceed 90 min. followed by minimum six hours rest; Cognitive activities not to exceed 40 min. followed by minimum 80 min. rest
- **NO driving, combatives or collision sports**



# Stage 5: Intensive Activity

## Objective

- Duration/intensity of activity parallels service member's typical role, function and tempo

## Activity (in addition to previous stage)

- Resume usual physical exercise routine
- Cognitive activities may include driving (as appropriate), weapons simulator or target practice
- Vestibular/balance activities may include running, patrol duty, jump landing, use of night vision goggles
- Physical activity duration is only limited if symptomatic; cognitive activities not to exceed 50 min. followed by rest
- Include multitasking and problem solving
- **NO combatives or collision sports**

*\*SM to see PCM after Stage 5 for exertional testing and before release to Stage 6*



# Stage 6: Unrestricted Activity

## Objective

- Resume pre-injury activities

Return to provider if symptoms return

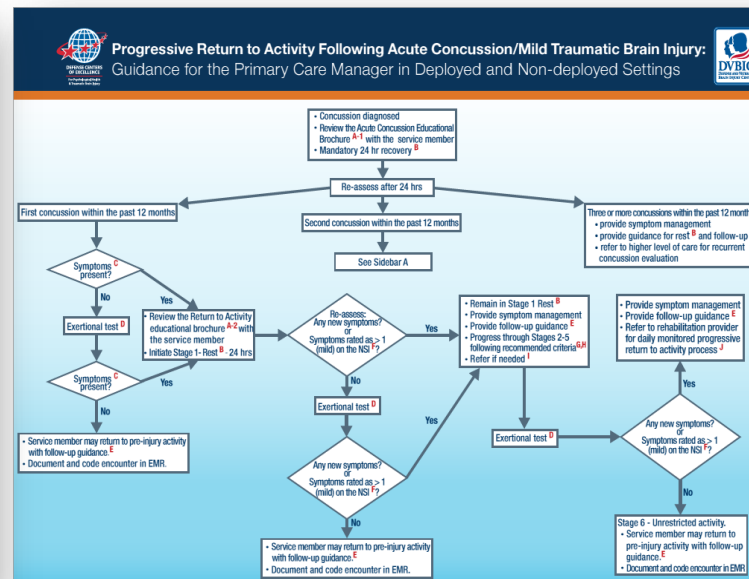
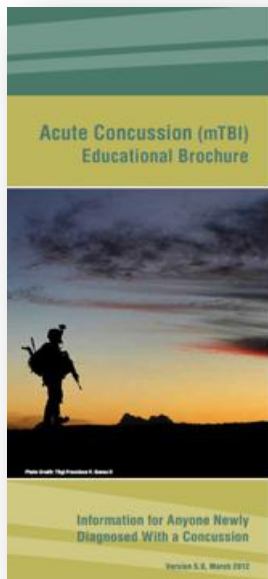


*DoD Photo, by Sgt. Jeffrey Alexander (3<sup>rd</sup> Brigade Combat Team)*

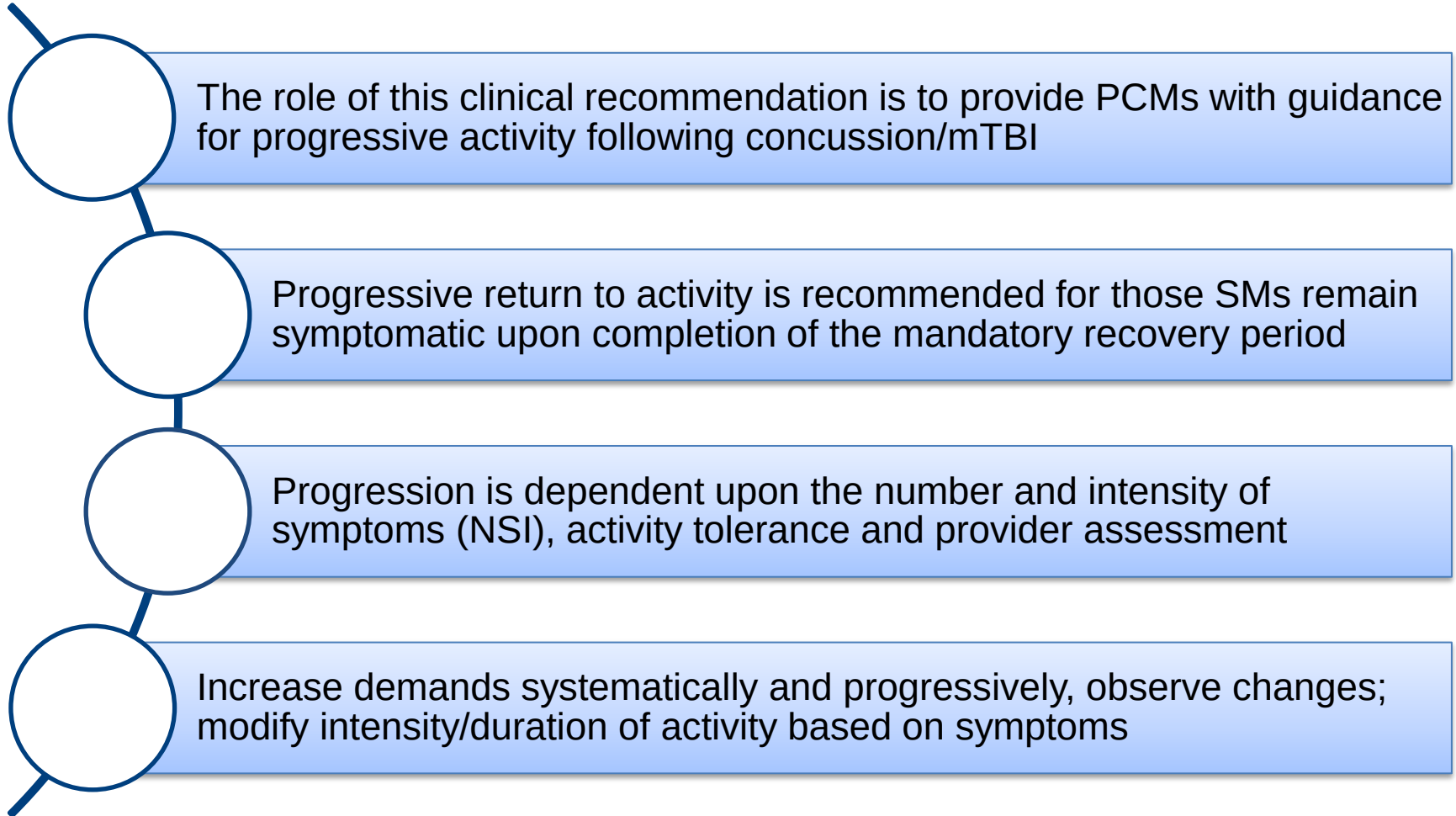
# Accompanying Tools

Use the following tools to guide and assess the progression through each stage:

- Acute Concussion (mTBI) Educational Brochure
- Return to Activity Educational Brochure
- Progressive Return to Activity Following Acute Concussion Clinical Support Tool (CST)



# Conclusion





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# Knowledge Test / Case Studies



# Knowledge Test

Question 1:

Criteria for progression at each stage includes:

- a) Intensity of mTBI symptoms (using the NSI scale)
- b) Number of symptoms (using the NSI scale)
- c) Activity tolerance at each level based on physiological parameters
- d) All of the above



# Knowledge Test

## Question 2:

All of the following require SMs to be referred to a rehabilitation provider, EXCEPT:

- a) If the SM rates symptoms as >1 (mild) on NSI after Stage 1 for second concussion
- b) If the SM rates symptoms as >1 (mild) on NSI after exertional testing following Stage 5
- c) If the SM complains of symptoms after exertional testing performed following the mandatory 24 hour recovery period following his/her first concussion
- d) If the SM remains in one stage for more than seven days without symptom resolution

# Case Study

While deployed , TSgt Rogers (30 year old male) sustained a concussion due to close exposure to an improvised explosive device (IED) while on his third consecutive day of foot patrol.

He described a brief alteration of consciousness, and was seen at the Battalion Aid Station. His MACE findings were 24/Red/B. He presented with symptoms of headache, photophobia, dizziness, and balance problems. Neuro exam noted an abnormal Tandem Romberg. There were no TBI red flags.

The diagnosis of mild TBI is confirmed and the primary clinician provides the patient with post-concussive education using the Acute Concussion Educational Brochure, prescribes acetaminophen for headaches, and begins a 24 hour mandatory recovery period. This is his first diagnosis of mild TBI within the last 12 months.

# Case Study (cont.)

After the 24 hour mandatory recovery period (day 2 post injury), the NSI is administered and TSgt Rogers continues to report headaches, difficulty concentrating, feeling dizzy and sensitivity to light. NSI Results:

- All symptoms are rated as 1 (mild) except for:
  - Headaches and sensitivity to light are rated as 3 (severe)
  - Poor concentration, can't pay attention, easily distracted is rated as 2 (moderate)

He is examined, prescribed non-narcotic medications for his headaches, given dark glasses for photophobia, and advised to initiate Stage 1 (Rest). The Return to Activity Educational Brochure is reviewed with him.

- Resting BP is 130/80 mm Hg; HR 80 bpm and is recorded as baseline

# Knowledge Test

## Question 3:

In the case of TSgt Rogers, this was his first concussion. Based on the symptoms reported what should be the next step for the primary care provider?

- a) Perform exertional testing
- b) Close out evaluation, patient may return to pre-injury activity
- c) Refer to a rehabilitation provider for comprehensive progressive return to activity process
- d) Hold SM at Stage 1 (Rest) and instruct SM to follow up in 24 hours

# Answers

## Question 1.

Answer: d) All of the above

## Question 2.

Answer: c) If the SM complains of symptoms after exertional testing performed after the mandatory 24 recovery period following his/her first concussion. In this situation, the SM would receive the Return to Activity Educational Brochure and enter Stage 1 (Rest) for 24 hours

## Question 3.

Answer: d) Hold SM at Stage 1 due to symptoms rated >1 (mild) on NSI and instruct SM to follow up in 24 hours

# Case Study 2

SFC James Smith, 35-year-old male, arrives at the base clinic for a follow-up visit. The previous night, while walking home, SFC Smith was assaulted by several men. He was jumped from behind and struck over the head with a blunt object. He recalls waking up on the ground and being kicked in the head multiple times.

After the incident he was evaluated at the ER where he was diagnosed with a concussion. His CT was negative for a bleed/fracture. His physical exam was normal except for a superficial laceration to his scalp. His primary symptoms included headache and dizziness. He reported that this was his **second concussion in six months**.

After treating his symptoms and providing education using the Acute Concussion Educational Brochure, the ER provider discharged him to mandatory recovery for 24 hours, and instructed him to follow up with PCM the next day.

# Case Study 2 (cont.)

After the mandatory 24 hour recovery period, SFC Smith arrives at the clinic. He continues to complain of a headache and dizziness, and reports difficulty sleeping.

The PCM administers the NSI. SFC Smith rates all symptoms as 1 (mild) except for headache, which was rated as 2 (moderate), difficulty falling asleep as 2 (moderate), and loss of balance as a 2 (moderate).

The PCM provides the SM with symptom management.

He is ordered an additional 24 hours at Stage 1 (Rest), provided a detailed review of allowable activities for each stage using the Return to Activity Educational Brochure, and scheduled to follow-up the next day.

# Case Study 2 (cont.)

The following day he returns to the clinic. His updated NSI shows improvement, with all symptoms now rated as 1 (mild).

He is advanced to Stage 2 (Light Routine Activity). Patient activity guidance for Stage 2 describes acceptable and prohibited activities, including:

- Activity limited to 30-minute intervals or less followed by four hours of rest
- NO video games, driving, resistance training, repetitive lifting, sit-ups, push-ups or pull-ups

Because this is his second concussion, SFC Smith is instructed to remain at Stage 2 for a minimum of five days. He is also advised to complete the NSI daily and to follow up with PCM immediately if he develops any new symptoms, or if his symptoms increase in severity (>1 on NSI) for more than one day.



# Case Study 2 (cont.)

SFC Smith returns to the clinic in five days as directed. A repeat NSI has ratings of all 1 (mild). Since he has had seven consecutive days at Stages 1 and 2, he is advanced to Stage 3 (Light Occupation-oriented Activity).

He is provided activity guidance for Stages 3 through 5. Patient activity guidance for Stage 3 describes acceptable and prohibited activities, including:

- Physical activities not to exceed 60 min. followed by minimum four hours rest; Light cognitive activities not to exceed 30 min. followed by minimum 60 min. rest
- **NO video games, driving, combatives or collision sports**

# Case Study 2 (cont.)

The following day, the NSI is repeated and SFC Smith continues to reports his headache as 1 (mild) with non-narcotic pain medication, and rates his dizziness as 1 (mild). No new symptoms are present.

He is advanced to Stage 4 (Moderate Activity), continues to take non-narcotic pain medications, and his symptoms remain unchanged over the next 24 hours.

The following morning, the NSI is repeated and SFC Smith now reports his headache as 1 (mild) with non-narcotic pain medication, and rates his dizziness as 1 (mild).

He is advanced to Stage 5 (Intensive Activity) and scheduled for exertional testing the next day.

# Knowledge Test

## Question 1:

In the case of SFC Smith, if he reports his symptoms were rated as 2 (moderate) or higher after attempting Stage 3 activities, what would be the course of action by the provider:

- a) An additional 24 hours of rest
- b) Referral to a higher level of care
- c) Progress to Stage 4
- d) Return to previously tolerated stage (Stage 2)

# Knowledge Test

## Question 2:

If SFC Smith had not sustained a concussion six months prior to this injury, what would be the appropriate duration of mandatory recovery?

- a) 24 hours
- b) 72 hours
- c) Seven days
- d) 48 hours

# Knowledge Test

## Question 3:

Which of the following would prevent SFC Smith from progressing to the next stage of the progressive return to activity process?

- a) Symptoms greater than 1 (mild) on the NSI
- b) New symptom complaints
- c) Spending less than 24 hours in any given stage
- d) All of the above

# Knowledge Test

Question 4:

SFC Smith started experiencing dizziness and headaches after playing video games during Stage 4 (Moderate Activity). Are video games allowable during Stage 4?

- a) Yes
- b) No

# Answers

## Question 1.

Answer: Both b) and d): Because symptoms were rated >1 (mild), SM should return to the previously tolerated stage. Also, since this is his second concussion within the past 12 months, referral to a higher level of care may be recommended.

## Question 2.

Answer: a) 24 hours

## Question 3.

Answer: d) All of the above

## Question 4.

Answer: a) Yes. SM may engage in cognitive activities such as video games and driving simulation for a maximum of 40 min. during Stage 4. In Stage 4, SM should be advised to maintain a 1:2 cognitive activity to rest interval ratio. Therefore, 40 min. of video gaming would be followed by 80 min. of rest.

# Key Points

- The progressive return to activity process is recommended for those concussed service members who remain symptomatic after the mandatory recovery period and an additional 24 hours in Stage 1 (Rest) **or** those who become symptomatic after exertional testing
- If symptoms reported on the NSI are above 1 (mild), or if there is an increase in the number of symptoms, then the SM should not be advanced, remain at their current stage, and follow-up the next day
- If the SM fails to progress for more than seven days they should be referred to a rehab provider or concussion care specialist
- The SM does not need to do all of the activities on the handout to advance (the examples provided are for reference)
- The SM is recommended to stay at each stage for a minimum of one day



# Key Points (cont.)

- **1<sup>st</sup> Concussion:**

- SM may return to pre-injury activity level if:
  - SM remains asymptomatic or reports symptoms as 0 to 1 (mild) on NSI after exertional testing
- Exertional testing may be performed:
  - If SM is asymptomatic after 24 hour mandatory recovery period
  - If SM has no new symptoms or has an NSI score of 0 to 1 (mild) following Stage 1 (Rest)
  - After successful completion of Stage 5 (Intensive Activity)

- **2<sup>nd</sup> Concussion:**

- SM may return to pre-injury activity level if:
  - SM has seven consecutive days of symptom resolution *and* remains asymptomatic or reports symptoms as 0 to 1 (mild) on NSI after exertional testing following Stage 5 (Intensive Activity)

# Conclusion

- ‘The Progressive Return to Activity Following Acute Concussion/Mild Traumatic Brain Injury Guidance for the Primary Care Manager in the Deployed and Non-deployed Settings’ is consistent with current policies and medical literature
- This recommendation provides a standardized approach for progressive activity following mild TBI and is intended to serve as a guide for PCMs and SMs as they work together for recovery to safely rest, remediate residual post-concussive symptoms, and return to pre-injury activity
- For additional information and/or product request please visit [\*\*\*dvbic.dcoe.mil\*\*\*](http://dvbic.dcoe.mil)