



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

Guidance for the Rehabilitation Provider
in Deployed and Non-deployed Settings



Learning Objectives



- Describe the role of this clinical recommendation and overall goal for recovery following acute mild TBI
- Identify the three domains for graded activity progression through five stages
- Understand the goal of each stage and identify minimum rest requirements
- Recognize the objective and subjective measures for progression
- Demonstrate understanding of progressive return to activity using clinical case studies



Traumatic Brain Injury



- 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' health, unit readiness and mission accomplishment
- TBI is a disruption of brain function resulting from a blow or jolt to the head
- TBIs are classified as mild, moderate, severe or penetrating



Source: DCoE Blog



Closed TBI Classification



Severity	Mild (Concussion)	Moderate	Severe
Structural imaging (Computed tomography)	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

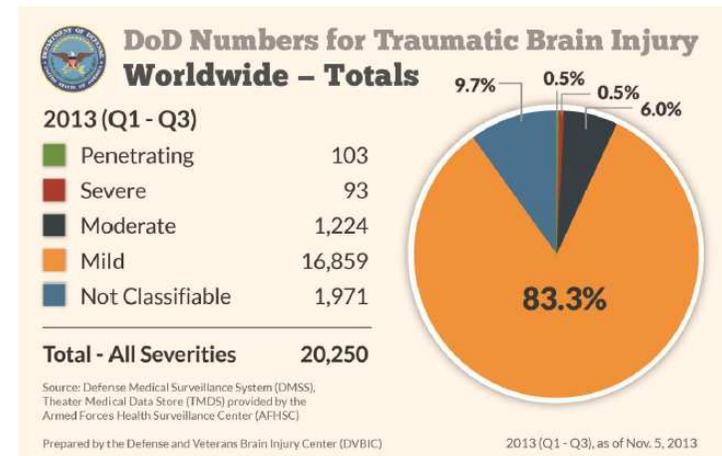
This classification refers to severity at the time of injury, not symptoms experienced



Mild TBI



- Majority of documented brain injuries (83 percent) in the DoD are mild TBIs (mTBI), also known as concussion
- All concussions should be evaluated in accordance with:
 - [Department of Defense Instructions \(DoDI\) 6490.11](#)or
 - [VA/DoD Clinical Practice Guidelines for Management of Concussion/Mild Traumatic Brain Injury](#)



Source: DVBIC.DCOE.mil



Purpose



This clinical recommendation offers guidance to rehabilitation providers in both deployed and non-deployed settings on a progressive approach from rest to return to pre-injury activity for service members who have sustained a concussion/mTBI, and continue to experience symptoms after the initial treatment.



Source: DoD Photo
Author : TSgt Prentice Colter



Source: Brainline.org



Guidance



- The rehabilitation provider guidance is a continuation of the '*Progressive Return to Activity Following Acute Concussion/ mTBI: Guidance for the Primary Care Manager (PCM)*'
- Distinction for patients between both recommendations include:
 - '*Guidance for the Primary Care Manager*' is a self-guided staged recovery
 - '*Guidance for the Rehabilitation Provider*' is a clinician-directed staged recovery



Role of Primary Care



Diagnosed and confirmed concussion:

- Provide mandatory 24 hour recovery period
- Review Acute Concussion Educational Brochure
- Symptom Management
- Initiate progressive return to activity **OR** refer to **rehabilitation provider** for a clinician-directed progressive return to activity process

Progressive Return to Activity Following Acute Concussion/Mild Traumatic Brain Injury: Guidance for the Primary Care Manager in Deployed and Non-deployed Settings

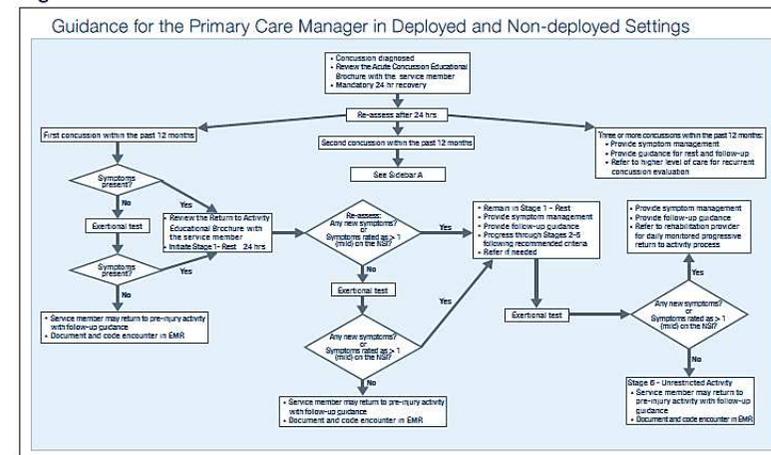
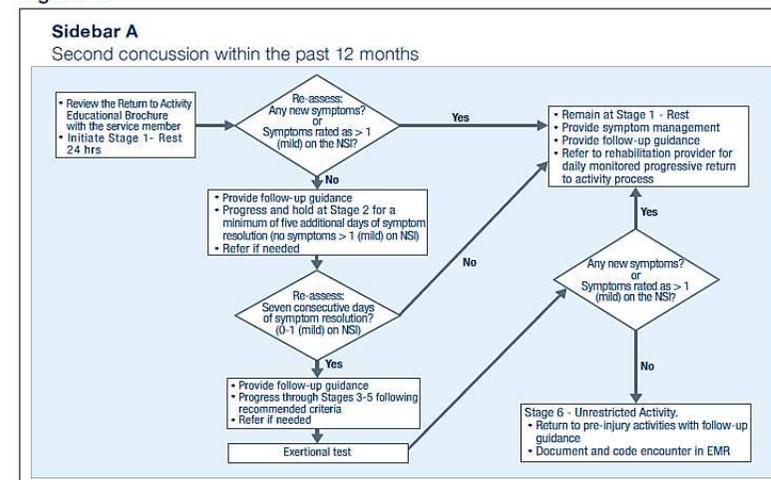


Figure 2.0





Primary Care Referral Criteria



Refer to rehabilitation provider or higher level of care per provider judgment, or if:

- Recovery is not progressing as anticipated
- There is no progression in seven days
- Symptoms are worsening
- Patient continues to be symptomatic following exertional testing after Stage 5



Progressive Return to Activity Approach



Service members may enter the progressive return to activity process if:

First Concussion

- SM experience symptoms greater than 1 (mild) after 24 hours in Stage 1 (Rest) **or** after exertional testing

Second concussion in the past 12 months

- All SM's who have sustained a second concussion in 12 months must enter the progressive return to activity process
- SM must have **7 consecutive days** of symptom resolution (defined as symptoms of 0-1 or mild) at Stage 1 and 2 before completing Stages 3-5



Progressive Return to Activity



- The progressive return to activity protocol measures three domains as parameters for ongoing evaluation:
 - Physical Progression
 - Includes activities from extremely light physical exertion to resistance training with maximum exertion tolerated (e.g. heavy military job tasks)
 - Cognitive Progression
 - Includes activity with very low cognitive demand (e.g. leisure reading) to activities that require multitasking or complex problem solving
 - Vestibular and Balance Progression
 - Includes activities with slow and limited range of head and body movement to activities that involve dynamic balancing and challenge greater vestibular needs (e.g. swimming with flip turns)





Rehabilitation Stages



Progression across each domain is measured in the following stages:

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



Progression Across Stages



Use the following tools to assess both self-reported (subjective) and objective measures of progression across each stage:

- Self-reported Measures:
 - Neurobehavioral Symptom Inventory (NSI)
 - Borg's Rate of Perceived Exertion (RPE)
- Objective Measures:
 - Theoretical Maximum Heart Rate (TMHR) during activity
 - Resting Heart Rate (HR)
 - Resting Blood Pressure (BP)



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

Patient Name: _____
ID#: _____
Date of Evaluation: _____
Date of Injury: _____

Symptom Report

Please rate the following symptoms **before** you see your health care provider. Please **DO NOT** attempt to score.

- 0 None - Rarely if ever present; not a problem at all.
- 1 Mild - Occasionally present, but it does not disrupt my activities. I can usually continue what I'm doing; doesn't really concern me.
- 2 Moderate - Often present, occasionally disrupts my activities. I can usually continue what I'm doing with some effort. I feel somewhat concerned.
- 3 Severe - Frequently present and disrupts activities. I can only do things that are fairly simple or take little effort. I feel I need help.
- 4 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.

Handouts provided: _____

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 my body	0	1	2	3	4
Change in taste and/or smell	0	1	2	3	4
Loss of appetite or increased 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, getting tired 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
Irritability, easily annoyed	0	1	2	3	4
Poor frustration tolerance, feeling easily overwhelmed by things	0	1	2	3	4

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- NSI symptom report becomes part of the medical record



Objective Measures of Progression



- Borg's Rate of Perceived Exertion
 - Measures the intensity of physical activity based upon the physical responses that a person experiences during exercise
 - Reported on scale of 6 'no exertion at all' to 20 'maximum exertion'
- Theoretical Maximum Heart Rate
 - Calculated using: $220 - \text{age} = \text{TMHR}$
- Resting BP (max 140/90 mmHg)
- Resting HR (max 100 beats per min)

Borg Rating of Perceived Exertion (RPE) Scale

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

Centers for Disease Control and Prevention, cdc.gov



Progression Through Activity



- The following criteria apply at all stages and should be met for the service member to progress:
 - No new symptoms
 - No symptoms above rating of 1 (mild) on NSI
 - Resting BP not to exceed **140/90 mm Hg**
 - Resting HR not to exceed **100 bpm**
- Activity to rest intervals must be followed as defined
 - Example: *Stage 3 (Light Occupational-oriented Activity) - maximum of 60 minute physical activity periods followed by four hours of rest (1:4 ratio)*
- If criteria for progression are met, advance to next stage
- If criteria for progression are not met, return to prior stage for **24 hours**
- If service member reports symptoms during activity, stop activity and rest



Stage 1: Rest



Objective

- Rest, limit activity to promote recovery
- No same day return to duty/play
- Establish and document resting HR/BP



Activity and rest guidelines

- Target RPE is **6-8**, HR should not exceed **40 percent** of TMHR
- Basic activities of daily living and extremely light leisure reading
- Television with rest breaks each hour
- Limit positions where the head is below the heart

DO NOT!!!

- work or study
- drink alcohol
- exercise
- drive
- exert yourself to the point of making your heart race
- play video games

Increase demands systematically and progressively, observing for any changes that provoke symptoms; modify intensity/ duration of demands on symptom exacerbation



Stage 2: Light Routine Activity

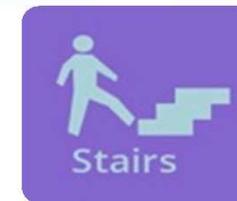


Objective

- Light routine activity limited to 30 minutes, followed by four hours of rest

Activity and rest guidelines

- Target RPE is **7-11**
- HR should not exceed **55 percent** of TMHR
- Light aerobic activity, avoid repetitive lifting
 - 30 minute periods followed by 4 hours of rest
- Cognitive activities such as computer use, leisure reading, and simple board games
 - 30 minutes maximum followed by 60 minute rest between activities
- Vestibular and balance activities such as climbing stairs, putting on boots



DO NOT!!!

- drink alcohol
- drive
- play video games
- do resistance training or repetitive lifting
- do sit-ups, push-ups or pull-ups

Increase demands systematically and progressively, observing for any changes that provoke symptoms; modify intensity/ duration of demands on symptom exacerbation



Stage 3: Light Occupation-oriented Activity



Objective

- Full body, complicated coordinated movements

Activity and rest guidelines

- Target RPE is **10-12**
- HR should not exceed **65 percent** of TMHR
- Aerobic activity
 - 60 minute periods followed by 4 hours of rest (1:4 ratio)
- Light cognitive activities
 - 30 minutes maximum followed by 60 minutes of rest between activities
- Vestibular and balance activities: walking on uneven surface, steps/stairs, swimming (no flip turns)



DO NOT!!!

- drink alcohol
- drive
- play video games
- participate in combatives or collision sports

Increase demands systematically and progressively, observing for any changes that provoke symptoms; modify intensity/ duration of demands on symptom exacerbation



Stage 4: Moderate Activity



Objective

- Increase in intensity and complexity of exercise and cognitive activity

Activity and rest guidelines

- Target RPE is **12-16**
- HR is **70-85 percent** of TMHR
- Non-contact sports, brisk hike (no additional load), light resistance training
 - 90 minutes maximum followed by four times the amount of rest (1:4); *i.e. 30 minutes of activity requires minimum 2 hours of rest*
- Video games, driving simulation
 - 20 minutes to maximum of 40 minutes, followed by 80 minutes cognitive rest (1:2)
- Activities with greater vestibular/balance demand including swimming with flip turns, navigating uneven terrain



DO NOT!!!

- drink alcohol
- drive
- participate in combatives/collision sports

Increase demands systematically and progressively, observing for any changes that provoke symptoms; modify intensity/ duration of demands on symptom exacerbation



Stage 5: Intensive Activity



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Objective

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

Activity and rest guidelines

- Target RPE is **16+**, HR is **85-100 percent** of TMHR
- Resume usual physical exercise routine
- Driving (as appropriate), weapons simulator or target practice
- Cognitive activities should include multitasking and problem solving
 - 50 minutes maximum
- Greater exercise intensity and dynamic balance activities: running, patrol duty, jump landing, use of night vision goggles



DO NOT!!!

- drink alcohol
- participate in combatives/collision sports
- go outside the wire in a combat zone

Increase demands systematically and progressively, observing for any changes that provoke symptoms; modify intensity/ duration of demands on symptom exacerbation



Accompanying Tools



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

- Patient Activity Guidance After Concussion handouts
- Progressive Return to Activity Clinical Support Tool (CST)

Patient Activity Guidance After Concussion
Stage 1: Rest
If your symptoms get worse or you have new symptoms, stop the activity immediately and tell your provider.

Physical Activities	Thinking/Decision Activities
<ul style="list-style-type: none"> rest sleep (6-8 hrs at night, daytime naps as needed) wear comfortable clothes sit down if you feel you need to while s walk at an distances pay atten holding y over or ar hold your 	<ul style="list-style-type: none"> rest in a quiet environment with low lighting wear your corrective lenses and sunglasses if needed periods of television with

Write in your:
• Resting HR _____
• Active HR _____

Max Heart Rate
Age 40%
15 82
20 80
25 78
30 76
35 74
40 72
45 70
50 68
55 66
60 64
65 62

220-Age-100% HR

Body Move
• limit post is below
• pay atten that caus
• put your s foot to yo with your

Practice good
Please compl

Patient Name: _____
ID#: _____
Date of Evaluation: _____
Date of Injury: _____

Symptom Report
Please rate the following symptoms before you see your health care provider. Please **DO NOT** attempt to score.

- None** - Rarely if ever present; not a problem at all.
- Mild** - Occasionally present, but it does not disrupt my activities. I can usually continue what I'm doing; doesn't really concern me.
- Moderate** - Often present, occasionally disrupts my activities. I can usually continue what I'm doing with some effort. I feel somewhat concerned.
- Severe** - Frequently present and disrupts activities. I can only do things that are fairly simple or take little effort. I feel I need help.
- 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.

Handouts provided: _____

Symptoms

Symptom	None	Mild	Moderate	Severe	Very Severe
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 my body	0	1	2	3	4
Change in taste and/or smell	0	1	2	3	4
Loss of appetite or increased 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, getting tired 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
Irritability, easily annoyed	0	1	2	3	4
Poor frustration tolerance, feeling easily overwhelmed by things	0	1	2	3	4

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Clinical Support Tool - January 2014

Neurobehavioral Symptom Inventory (NSI) completed at onset of Stage 1.
Note any symptoms rated above 1 (mild).

Rehabilitation Stage	Stage Objective	Physical Progression	Cognitive Progression	Rest/Behavior and Balance Progression
Stage 1	Rest, avoid activity to promote recovery	Extremely light physical activity, primarily rest although total rest may not be recommended	Extremely light cognitive activity, primarily rest	Slow and steady change of head and body movement when changing positions to limit symptoms
Rest	No phone use, no TV, no computer, no driving, no exercise, no alcohol, no caffeine and nicotine	Head on "rest"	Head on "rest"	Limit positions where head is below the neck
Physical and Balance	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet
Advance Stage 2 the day after Stage 1. Prior to Stage 2, the following requirements must be met: no more symptoms, no symptoms above a rating of 1 on the NSI, resting HR not to exceed 140/90 and resting HR not greater than 150.	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet
Stage 2	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet	Head on "rest" with patient Stage 1 education sheet

NSI scores are reported as follows: 0 = no symptoms, 1 = mild, 2 = moderate, 3 = severe, 4 = very severe. NSI scores are reported as follows: 0 = no symptoms, 1 = mild, 2 = moderate, 3 = severe, 4 = very severe.



Conclusion



- The role of this clinical recommendation is to provide a clinician-directed, progressive approach for return to activity following acute concussion/mild TBI
- Progression should be measured in three domains: physical, cognitive, and vestibular/balance
- Progressive return to activity does not begin until completion of mandatory rest periods
- Required measures of progression include: NSI no symptoms above 1 (mild), no new symptoms, resting HR < 100 bpm and resting BP < 140/90 mm Hg
- Increase demands systematically and progressively, observe changes, modify intensity/duration of activity based on symptom exacerbation



Case Study 1



Case Study 1

While deployed, MSgt Steve Rogers (43-year-old male) sustained a concussion due to close exposure to an improvised explosive device while on his third consecutive day of foot patrol.

He describes a brief alteration of consciousness, and is seen at the Battalion Aid Station (BAS). He presents with symptoms of headache, photophobia, dizziness, and has an abnormal Tandem Romberg test. No TBI red flags are present on the physical exam. His MACE score is 24/Red/B.

The diagnosis of mild TBI is confirmed and the primary care manager (PCM) at the BAS provides MSgt Rogers with post-concussive education, prescribes acetaminophen for headaches, and 24-hour mandatory recovery starts.

After the 24-hour recovery period, MSgt Rogers continues to experience headaches, photophobia and dizziness. He is reexamined by the PCM and is ordered additional 24-hour rest (Primary Care Stage 1).



Case Study 1 (cont.)

The following day, he returns to primary care and the NSI is administered:

- 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)
 - Resting BP is 130/80 mm Hg; HR 68 bpm and is recorded as baseline

Based on PCM judgment, he is referred to the rehabilitation provider and placed on the progressive return to activity process. At Stage 1 (Rest), he is instructed to monitor HR, not to exceed 40 percent (71 bpm) of TMHR during activity, and is given patient activity guidance handout.

He is also instructed to track his symptoms on the NSI, which is located on the back of the patient activity handout. The PCM also provides him with a patient education sheet for headaches.



Case Study 1 (cont.)



During Stage 1, MSgt Rogers is allowed to participate in the following activities:

- Showering
- Wearing casual clothing
- Light leisure reading
- Eating in the dining hall (which is close to his sleeping quarters and on level ground)
- Limited range of head and body motion

MSgt Rogers is able to refer to the handout for prohibited activities, such as breath-holding, exertion, playing video games and driving. He is encouraged to monitor his HR before and during activity (not to exceed 40 percent of TMHR, max of 71 bpm during activity for his age).

- He rests in quarters but only takes two 30-minute naps
- He is instructed to complete the NSI the following morning when returning to the rehab provider



Case Study 1 (cont.)

The next morning MSgt Rogers is re-evaluated. His updated NSI shows improvement, with all symptoms now rated as 1 (Mild) with non-narcotic headache pain medication. His resting HR is 68 bpm, resting BP is 130/75 mm Hg.

He is advanced to Stage 2 (Light Routine Activity) and provided the patient activity guidance handout for Stage 2.

The handout describes acceptable/prohibited activities, and rest periods between activities.

He is scheduled for re-evaluation the next day, after he has performed the recommended activities, rested as appropriate, and completes a new NSI.

- MSgt Rogers is reminded when performing an activity his HR is not to exceed more than 55 percent (97 bpm) TMHR



Case Study 1 (cont.)



MSgt Rogers returns the next day as directed, and has progressed through his activities without difficulty.

A repeat NSI has ratings of all 1 (mild) and he is advanced to Stage 3 (Light Occupation-oriented Activity.) His resting HR is 68 bpm, resting BP is 126/77 mm Hg.

He is provided the patient activity guidance handout for Stage 3, scheduled for a follow-up appointment the next day.

- MSgt Rogers is reminded when performing an activity his HR is not to exceed more than 65 percent (115 bpm) TMHR



Case Study 1 (cont.)



MSgt Rogers is seen the next day. His updated NSI has an increased score for difficulty making decisions at 2 (moderate) which started when he was shopping and lasted for a few hours.

His headache has also increased to 2 (moderate) despite non-narcotic pain medication. MSgt Rogers denies engaging in any activities not indicated on the patient activity guidance handout.

Upon examination:

- Resting BP is 150/95 mmHg
- Resting HR is 105 bpm

Based on above symptom changes, MSgt Rogers is returned to the most recently tolerated stage (in this case Stage 2):

- Continue with non-narcotic pain medication when needed
- Review and follow Stage 2 patient activity guidance handout
- Follow-up appointment for the next day



Case Study 1 (cont.)



On his following day, MSgt Rogers now rates all of his NSI symptoms as 1 (mild.)

- He is advanced to Stage 3 (Light Occupational-oriented Activity) with appropriate rest periods
- His resting HR and BP remains within parameters

MSgt Rogers enters Stage 4 (Moderate Activity), and no symptoms were reported and all progression conditions are successfully met.

- He is provided a Stage 4 patient activity guidance handout

The remainder of MSgt Rogers' recovery is uneventful.

- He follows the protocols through Stage 5 (Intensive Activity) and Stage 6 (Unrestricted Activity) as recommended
- There is a minimum of one day in each stage. He is returned to full-activity nine days after his injury



Knowledge Test

Question 1:

In the case of MSgt Rogers, this was his first concussion. What are the guidelines for entering the progressive return to activity process?

- a) NSI symptoms greater than 1 (mild) after 24 hours in Stage 1 (Rest)
- b) NSI symptoms greater than 1 (mild) after exertional testing
- c) NSI symptoms rated as 1 (mild) after 7 consecutive days
- d) No symptoms after the 24 hour mandatory recovery period



Knowledge Test



Question 2:

During Stage 1 of the progressive return to activity process, which of the following activities are permitted?

- a) Treadmill walking at low speed
- b) Shopping in the exchange for a single item
- c) Video games
- d) Television with rest breaks each hour



Knowledge Test



Question 3:

Which of the following are criteria for progressing to the next stage of the progressive return to activity process? **Choose all that apply.**

- a) Scores of 1 (mild) in at least half of the NSI
- b) Warrior feels ready to get back to his/her unit
- c) Commander needs the warrior for combat duties
- d) Resting blood pressure <140/90 mm Hg and heart rate <100 bpm
- e) None of the above



Knowledge Test



Question 4:

Which of the following activities are permitted in Stage 4 of the Progressive Activity process. **Choose all that apply.**

- a) Foosball
- b) Elliptical or stair climber
- c) Driving
- d) Jumping rope
- e) Collision sports



Answers



Question 1.

Answer: Both a) and b): The entire progressive return to activity process is recommended for those concussed service members who remain symptomatic after an additional 24 hours in Stage 1 (Rest) or those who become symptomatic after exertional testing.

Question 2.

Answer: d) Television with rest breaks each hour

Question 3.

Answer: d) Patients should have resting blood pressure <140/90 mm Hg and heart rate <100 bpm before progressing to next stage.

Question 4.

Answer: a, b, and d. Foosball is permitted beginning in Stage 2, and is therefore acceptable during all later stages. Driving and collision sports are not recommended at this stage.



Case Study 2



Case Study 2

SFC James Smith, 31-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. SFC Smith reports having sustained a concussion four months ago. After treating his symptoms, the ER provider discharged him with quarters for 24 hours, and instructed him to rest and 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 even after taking appropriate medications prescribed by the ER. His Resting BP and HR are documented as 128/88 mm Hg, 72 bpm (baseline).

The PCM administers the NSI. SFC Smith rates all symptoms as 1 (mild) except for headache, which was rated as 3 (severe), difficulty falling asleep as 2 (moderate), and loss of balance as a 2 (moderate). He is ordered an additional 24 hours rest (Primary Care Stage 1). The PCM documents that this is SFC Smith's second concussion in 12 months.

The following day he returns to the clinic and is seen by his PCM. He reports no change in his symptoms. The PCM refers him to the rehabilitation provider for progressive return to activity process. SFC Smith enters the Rehabilitation Stage 1.



Case Study 2 (cont.)



During Stage 1, SFC Smith is instructed to continue his non-narcotic medications for his headaches, and advised to rest as much as possible. He is also instructed to return the next day to be re-evaluated. Patient activity guidance handout is provided, and the patient is encouraged to monitor resting HR not to exceed 40 percent (78 bpm) of TMHR.

The next morning, SFC Smith is re-evaluated. His updated NSI shows improvement, with all symptoms now rated as 1 (mild). His resting HR is 80 bpm and resting BP is 120/88 mm Hg.

He is advanced to Stage 2. Patient activity guidance handout for Stage 2 describes acceptable and prohibited activities, including:

- Mandatory rest between activities
- Active HR not to exceed 55 percent (107 bpm) of TMHR

He is scheduled for re-evaluation the next day.



Case Study 2 (cont.)

SFC Smith returns to the clinic as directed, and has progressed through his activities. A repeat NSI has ratings of all 1 (mild). Since this is his second concussion within six months, SFC Smith remains at Stage 2 for an additional five days.

After this five day period, he is advanced to Stage 3. His resting HR is 84, resting BP is 140/80 mm Hg.

He is provided patient activity guidance handout for Stage 3, and a follow-up appointment is made for the next.

- Active HR not to exceed 65 percent (126 bpm) of TMHR
- He is instructed to refrain from prolonged periods (longer than 30 minutes) of cognitive activities such as shopping in crowded areas or walking on uneven terrain/surfaces (i.e. hiking)



Case Study 2 (cont.)

The following morning, the NSI is repeated and has ratings of all 1 (mild). His resting HR and BP remains within recommended parameters.

He is advanced to Stage 4, Moderate Activity, given the patient activity guidance handout for the stage and reminded to monitor his HR.

- Active HR not to exceed 70-85 percent (140-170 bpm) of TMHR

While playing video games at home he started to feel dizzy, and experienced a worsening headache. He stopped the activity and rested. He checked his resting HR and recorded it at 120 bpm.



Case Study 2 (cont.)



During his follow up visit the next day, his updated NSI has an increased score for headaches of 3 (severe) and dizziness is 2 (moderate). His resting HR and BP remains within recommended parameters.

Based on that symptom change, he is regressed to Stage 3 for an additional day, prescribed non-narcotic pain medications for the headache and given a follow-up appointment, along with the Stage 3 patient activity guidance handout reminding SFC Smith:

- Active HR not to exceed 65 percent (126 bpm) of TMHR
- Avoid cognitive activities with increased exposure to light or noise distractions such as video games and driving



Case Study 2 (cont.)



The following morning, the NSI is repeated and SFC Smith continues to have headache reported as 2 (moderate) with non-narcotic pain medication and rates his dizziness as a 2 (moderate).

- No new symptoms are present
- His resting HR and BP remains within recommended parameters

He is regressed to Stage 2, continues to take non-narcotic pain medications, and his symptoms remain unchanged over the next 24 hours.



Case Study 2 (cont.)



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).

- No new symptoms are present
- His resting HR and BP remains within recommended parameters

SFC Smith is progressed to Stage 3, however the severity of his symptoms increase with the level of activity at Stage 3. He spends several days between Stages 2 and 3 without being able to successfully demonstrate progression.

Based on the recommendation of the rehabilitation provider, SFC Smith is referred to a higher level of care.



Knowledge Test

Question 1:

In the case of SFC Smith, if his NSI did not return to 1 (mild) for after activities at stage 3, what would be the course of action by the provider:

- a) An additional 24 hours of rest
- b) Referral to next level of care
- c) Progress to Stage 1
- d) Regress to Stage 2



Knowledge Test

Question 2:

Since SFC Smith had sustained a concussion four months prior to this injury, what would be the appropriate duration of symptom resolution (asymptomatic at Stages 1 and 2)?

- 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) Resting blood pressure >140/90 mm HG
- c) Resting heart rate >100 bpm
- d) All of the above



Knowledge Test

Question 4:

SFC Smith started experiencing dizziness and headaches after playing video games during Stage 4. Are video games recommended during Stage 4?

- a) Yes
- b) No



Knowledge Test



Question 5:

Which of the following activities are permitted in Stage 5 of the progressive return to activity process. **Choose all that apply.**

- a) Grocery shopping
- b) Video games for up to 60 minutes
- c) Jump rope
- d) Brisk hike (> 3 mph) no additional load
- e) All of the above



Knowledge Test



Question 6:

It is permissible to skip a stage if the service member is asymptomatic.

- a) True
- b) False



Answers



Question 1.

Answer: d) Regress to Stage 2

Question 2.

Answer: c) Seven days

Question 3.

Answer: d) All of the above.

Question 4.

Answer : a) Yes. The patient may engage in cognitive activities such as video games and driving simulation for 20 minutes to maximum of 40 minutes during Stage 4, however, should stop immediately if he/she start to experience symptoms

Question 5.

Answer: a, c, and d. Video sports games are permitted for a maximum of 40 minutes.

Questions 6.

Answer: b) False: The brain needs time to recover from concussive events. Stages cannot be skipped.



Key Points



- Patients entering process cannot skip stages (the brain requires time to recover from concussive events)
- If symptoms reported on the NSI are above 1 (mild), or if there is an increase in the number of symptoms, then the patient should not be advanced to the next stage and should be returned to prior stage for 24 hours
- The patient does not need to do all of the activities on the handout to advance (the examples provided are for reference)
- The patient is recommended to stay at each stage for minimum of one day
- Appropriate rest between activities should also be considered
- NSI results for each stage should be entered in the permanent health record
- Additional patient education handouts for specific symptoms (e.g. sleep, headaches, dizziness) are available at dvbic.dcoe.mil