

## **Progressive Return to Activity/Duty**

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### ***ABSTRACT***

*There is currently no single established objective criterion for 'Return To Duty' (RTD), nor validated tools with which to guide RTD decision making in military operational settings within the NATO nations. Evidence suggests that education, normalisation and gradual resumption of activities are key components to successful recovery from MTBI sequelae.*

*The sports concussion literature has worked on being very descriptive in RTP guidance to support safe and gradual return to play to support symptom resolution and minimise reoccurrence of multiple concussions.*

*This document aims to discuss the current policies within the NATO nations as well as draw on any new evidence, specifically within the sports concussion literature, to guide RTD decision making, both in an operational and non-deployed military setting.*

### **1.0 BACKGROUND**

The emergence into the public consciousness of Mild Traumatic Brain Injury (MTBI) during military operations largely arose from the combat experiences of the United States (US) of America in the wars in Afghanistan and Iraq.

Early reports from those wars indicated that Traumatic Brain Injury (TBI) accounted for a larger proportion of casualties than in other recent US wars. Injuries to the head, face and neck were present in 22% of wounded soldiers evacuated from theatre [1]. In contrast, only 12 – 14 % of all combat casualties in the Vietnam War were diagnosed with a brain injury.

There are several possible reasons for this discrepancy [1]. First, the mortality during the Vietnam War from head injury was 75% or greater, with few head-injured personnel surviving long enough to reach a hospital. Second, improvements in personal protective equipment have more effectively shielded soldiers from penetrating injuries. Finally, the insurgent weapon of choice has been the Improvised Explosive Device (IED). Blast has been the predominant mechanism of injury for most deployment associated TBI, and closed-head injuries have outnumbered penetrating ones in those soldiers seen at the Walter Reed Army Medical Center. Of those injured by blast exposure, 59% were given a diagnosis of TBI, of which 44% were mild [1].

### **2.0 FULL SPECTRUM OF INJURY (MILD, MODERATE, SEVERE)**

The early reports by Warden [2] and Okie [1] demonstrated that blast-induced brain injuries encompassed the full range of severity, but it is MTBI that has garnered the most attention. This is because MTBI symptoms can

be subtle and therefore can easily be overlooked or discounted by both the soldier and the medical provider – but such mild deficits could nevertheless increase risk to self and others if manifested in the military operational environment. Moreover, the potentially larger numbers of soldiers who are affected by MTBI as a consequence of blast exposure, versus moderate or severe TBI, may have greater cumulative operational impact, even though the long-term sequelae are not as salient as more severe brain injuries.

### **3.0 RETURN-TO-DUTY (RTD) CONSIDERATIONS IN THOSE WITH A CLINICAL DIAGNOSIS OF MTBI**

MTBI is increasingly recognized in sports medicine where significant focus has been placed on evaluation of injured athletes with specific criteria for return to play. Evidence-based RTD criteria are essential for injured military personnel in deployed environments. MTBI affects both mission readiness and individual health. Consideration of the cumulative impact of multiple concussions should be included in the RTD decision-making process.

#### **3.1 Return-to-Duty Considerations**

There is no single established objective criterion for RTD, nor validated tools with which to guide RTD decision making in military operational settings.

The following factors may be considered in RTD decisions:

- Symptoms – The absence of symptoms is widely accepted as minimal criteria for RTD.
- Physical Examination – Physical examination, which includes a neurological exam, should be normal prior to RTD.
- Concussion History – The number, severity, and recency of prior concussions should factor into RTD considerations.
- Exertional Testing – Exertional testing with symptom monitoring can inform RTD determination:
  - 1) Exert to 65 – 85 % of target heart rate (THR = 220-age) using push-ups, sit-ups, running place, step aerobics, stationary bike, treadmill and/or hand crank;
  - 2) Maintain this level of exertion for approximately 2 minutes;
  - 3) Assess for symptoms (headache, vertigo, photophobia, balance, dizziness, nausea, visual changes etc.); and
  - 4) If symptoms exist with exertional testing, stop testing, and allow additional time for rest and recovery until asymptomatic.
- Cognitive Testing – Quick assessment tools (Standardized Assessment of Concussion [SAC], Military Acute Concussion Evaluation [MACE]) and/or more detailed neurocognitive testing in the appropriate settings may aid in RTD determinations.

Other technologies, such as neuroimaging, biomarkers, etc., have yet to demonstrate sufficient sensitivity and specificity for routine use in RTD determinations.

Relevance for NATO: The development of comprehensive policies and practices regarding RTD determination after MTBI is essential to promote mission readiness and enforces a standard and consistent approach to RTD. At a minimum, those policies should consider criteria identified above.

### 3.2 Sports Concussion Evidence

There has been no research evidence that early return to work after concussion/mTBI with or without symptoms is detrimental. Most of the literature regarding criteria for return to activities after concussion has been focused on sports medicine and return to play.

Sports organizations have developed return to play guidelines, however these were consensus based [9]. Research evidence supports that a sports-specific stepwise return to play program after resolution of symptoms is recommended in sports concussion [8].

Current guidelines for grading sports-related concussions base their return-to-play recommendations largely on two parameters:

- The severity of the injury; and
- The patient's history of concussion.

The two most widely used guidelines are those of the American Association of Neurological Surgeons (AANS) and those of Cantu. Both guidelines use a grading system to assess the injury severity that takes into account the nature and duration of key injury characteristics. Concussion is graded as I (mild), II (moderate), and III (severe).

The AAN guidelines emphasize the qualitative importance of loss of consciousness (LOC), whereas Cantu guidelines (1986; 1998) distinguish between brief and extended LOC, and draw attention to the duration of posttraumatic amnesia.

### 3.3 The CDC Guidance to Return to Play Includes 5 Steps

- **Return to Play Progression**
- There are five gradual steps to help safely return an athlete to play:
- **Baseline: No Symptoms**  
As the baseline step of the Return to Play Progression, the athlete needs to have completed physical and cognitive rest and not be experiencing concussion symptoms for a minimum of 24 hours. *Keep in mind, the younger the athlete, the more conservative the treatment.*
- **Step 1: Light aerobic activity**  
The Goal: Only to increase an athlete's heart rate.  
The Time: 5 to 10 minutes.  
The Activities: Exercise bike, walking, or light jogging.  
Absolutely no weight lifting, jumping or hard running.
- **Step 2: Moderate activity**  
The Goal: Limited body and head movement.  
The Time: Reduced from typical routine.  
The Activities: Moderate jogging, brief running, moderate-intensity stationary biking, and moderate-intensity weightlifting.
- **Step 3: Heavy, non-contact activity**  
The Goal: More intense but non-contact.  
The Time: Close to typical routine.

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The Activities: Running, high-intensity stationary biking, the player's regular weightlifting routine, and non-contact sport-specific drills. This stage may add some cognitive component to practice in addition to the aerobic and movement components introduced in Steps 1 and 2.

- **Step 4: Practice & full contact**  
The Goal: Reintegrate in full contact practice.
- **Step 5: Competition**  
The Goal: Return to competition.

It is important to monitor symptoms and cognitive function carefully during each increase of exertion. Athletes should only progress to the next level of exertion if they are not experiencing symptoms at the current level. If symptoms return at any step, an athlete should stop these activities as this may be a sign the athlete is pushing too hard. Only after additional rest, when the athlete is once again not experiencing symptoms for a minimum of 24 hours, should he or she start again at the previous step during which symptoms were experienced.

The Return to Play Progression process is best conducted through a team approach and by a health professional who knows the athlete's physical abilities and endurance. By gauging the athlete's performance on each individual step, a health care professional will be able to determine how far to progress the athlete on a given day. In some cases, the athlete may be able to work through one step in a single day, while in other cases it may take several days to work through an individual step. It may take several weeks to months to work through the entire 5-step progression.

### 4.0 ZURICH 2012

RTP protocol RTP protocol following a concussion follows a stepwise process. With a stepwise progression, the athlete should continue to proceed to the next level if asymptomatic at the current level. Generally, each step should take 24 h so that an athlete would take approximately 1 week to proceed through the full rehabilitation protocol once they are asymptomatic at rest and with provocative exercise.

If any post-concussion symptoms occur while in the stepwise programme, then the patient should drop back to the previous asymptomatic level and try to progress again after a further 24 h period of rest has passed.

*Same day RTP:* It was unanimously agreed that no RTP on the day of concussive injury should occur. There are data demonstrating that at the collegiate and high school levels, athletes allowed to RTP on the same day may demonstrate Neuro-Psychological deficits post-injury that may not be evident on the side-lines and are more likely to have delayed onset of symptoms.

### 5.0 SUMMARY

Not one NATO nation uses the same approach:

- The UK requires the individual to show resolution of symptoms and signs based on concussion/ MTBI Score Chart (RPQ).
- The US and Canada require that the individual be asymptomatic with a MACE Score > 25, following exertional testing.
- If symptoms persist, individualised approach related to return to full duties (graduated return to activities) – no set guidance provided.

This is therefore still an area to focus on especially with the sports concussion literature being very descriptive in RTP guidance.

## **6.0 REFERENCES**

- [1] Okie, S. Traumatic brain injury in the war zone. *N Engl J Med.* 2005; 352(20):2043-7.
- [2] Warden, D. Military TBI during the Iraq and Afghanistan wars. *J Head Trauma Rehabil.* 2006; 21(5): 398-402.
- [3] DVBIC. Defence and veterans brain injury center working group on the acute management of mild traumatic brain injury in military operational settings: Clinical practice guidelines and recommendations. USA: DVBIC. 2006.
- [4] VA/DoD clinical practice guideline for the management of concussion/mild traumatic brain injury. *J Rehabil Res Dev.* 2009; 46(6):CP1-68.
- [5] von Holst, H. and Cassidy, J.D. Mandate of the WHO collaborating centre task force on mild traumatic brain injury. *J Rehabil Med.* 2004; 43 Suppl:8-10.
- [6] Guskiewicz, K.M., Bruce, S.L., Cantu, R.C., Ferrara, M.S., Kelly, J.P. and McCrea, M., et al. National athletic trainers' association position statement: Management of sport-related concussion. *J Athl Train.* 2004; 39(3):280.
- [7] McCrory, P., Johnston, K., Meeuwisse, W., Aubry, M., Cantu, R. and Dvorak, J., et al. Summary and agreement statement of the 2nd international conference on concussion in sport, Prague 2004. *Br J Sports Med.* 2005; 39(4):196-204.
- [8] Kissick, J. & Johnston, K.M. Return to play after concussion: principles and practices. *Clin J Sport Med.* 2005; 15 (6):426-431.
- [9] McCrory, P., Meeuwisse, W., Johnston, K., Dvorak, J., Aubry, M. and Molloy, M., et al. Consensus statement on concussion in sport—the 4<sup>th</sup> international conference on concussion in sport held in Zurich, November 2012. *Br J Sports Med.* 2013; 47: 250-258.

