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## Abstract Details:

**Breakout Session:** Novel Clinical Assessments and Interventions for mild Traumatic Brain Injury

**Submission Category:** Poster Only

**Title:** The Complex Assessment of Military Performance for mTBI Assessment: Patrol Exertion Task Test-Retest Reliability

**Abstract:**

**Introduction:** The Complex Assessment of Military Performance (CAMP) test battery was developed for active-duty military service members (ADSM) after mTBI to assess the readiness to return to duties that often require high levels of mobility, endurance, and skill. After mTBI ADSM may not be able to resume duties, as symptoms such as exertional headache, dizziness, and cognitive impairment may negatively affect exercise tolerance, reaction-time, memory and recall, among others. The Patrol Exertion Task or PET is the 3rd task in the CAMP test battery and is a virtual foot patrolling scenario conducted with the ADSM carrying a simulated weapon while viewing a virtual video and repeatedly stepping onto a 12" step maintaining an exercise level of heart rate 65-85% of age adjusted maximal heart rate. During the 10-minute task there are reaction time challenges and memory requirements while heart rate, rate of perceived exertion, and presence of symptoms are tracked. This tool, as part of the CAMP battery, provides an ecologically valid clinical test that simulates conditions that service members may experience. Test-retest reliability of the PET is an important psychometric property that will allow test interpretation in clinical use. With novel tasks such as this there may be practice or learning effects that must be taken into account when interpreting re-test values.

**Objective:** To describe characteristics of healthy control ADSM performing the PET and examine test-retest reliability and possible practice/learning effects of the Patrol Exertion Task.

**Subjects:** Six male service members at Fort Bragg and Joint Base Lewis-McChord participated. Average age is 30.7 years, 83.3% were white, 100% were in the Army, and 83.3% listed "Some College". Mean years in service was 10.2 years with 100% reporting readiness to physically deploy in 72 hours. Self-reported scores for PCL-5 (post-traumatic stress) mean 14.8; NSI (mTBI symptoms) mean 12, DVPRS (pain) mean rating 2/10. Note: Final presentation will include data from at least 20 participants.

**Methods:** The Patrol Exertion Task (PET) includes a virtual foot patrol scenario with video. Two versions of the video were created to allow a retest to be completed with the scenario being similar but not identical to the initial test. The PET involves the subject carrying a simulated weapon instrumented with a reaction time button that is pressed when an audible tone is presented. Service members perform two working memory tasks during the patrol video: 1- count (visual attention and search) and remember (working memory) the total number of black flags observed during the video, and 2- identify which direction they are facing at the end of the virtual foot patrol following presentation of a compass at the video start. Reaction time is tested first in standing, then while beginning stepping up/down a 12-inch step repeatedly, and 12 times throughout the 10-minute video. Heart rate is collected using a Polar H10 monitor, RPE and presence of symptoms are assessed before and after the task. Participants completed two trials of the CAMP battery scheduled 4 weeks apart using slightly different versions of the virtual scene. Mean scores on reaction time, mean heart rate, ratings of perceived exertion, and working memory task accuracy were examined to assess consistency of variables across trials and between videos are reported, but test-retest reliability (ICC) will be calculated based on a more appropriate sample size for the final presentation (at least 20 participants).

**Results:** Mean reaction times (RT) for standing test1: 250ms, test2: 285ms; stepping test1: 292ms, test2 was 288ms; foot patrol video, test1: 415ms, test2: 391ms. Average RT between the first six and last six audible beeps was assessed. Average RT in test1 for the first six = 458ms with the last six RTs being faster at 372ms. In test2 average RT for the first six = 382ms and 399ms for the last six. Mean HR values at baseline for test1 was 87.2, and 92 for test2 and at end of the video for test1 was 137.5 and 137.2 for test2. RPE averages were for test1 standing RPE AVG trial 1= 7.8, stepping RPE AVG trial 1= 9.8, and video end RPE AVG trial 1= 11.7, and test2 standing RPE AVG trial 2= 8.3, stepping RPE AVG trial 2= 9.8, and video end RPE AVG trial 2= 11, reported on Borg's RPE scale of 6-20. Two subjects made errors remembering the total number of targets observed during the task (working memory component) in test1. Three subjects incorrectly identified direction facing at the end of the video (2 in test1, 1 in test2).

**Conclusions:** There may be a learning effect with the reaction time task in the first test, as SMs become familiar with the components of the task. Reaction times for the first 6 responses were slower on average than those in the later half of the test or in the retest. HR and RPE challenges appear to be stable across two test sessions. Healthy control subjects were consistent in target identification during the patrol, but made some errors in the working memory and direction tracking components of the task, more often making errors in the test1. PET is a test that can be conducted easily in typical clinical space to challenge ADSM exertion ability and provide cognitive challenges that are pertinent to active-duty roles. With analysis of a larger sample, conclusions about test retest reliability, practice effects and stability of responses will be summarized that will inform interpretation of test results when the PET is used in practice.

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### **Learning Objectives**

1. Describe the components of the PET as part of the CAMP battery.
2. Identify components of the PET that appear stable in a second test with healthy control participants.
3. Identify components of the PET that may demonstrate practice effects in healthy control participants that should be taken into consideration while interpreting a second test result.

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