



US DEPARTMENT OF DEFENSE
BLAST INJURY RESEARCH PROGRAM
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Simulations

A Novel Assessment for Readiness Evaluation during Simulated Dismounted Operations: A Reliability Study

The Center for the Intrepid (San Antonio, TX) developed a Readiness Evaluation during simulated Dismounted Operation (REDOp) assessment, performed in a virtual reality environment. This assessment consists of a simulated combat patrol with activities aligned with current doctrine and informed by input from previously deployed Service members. Measures of activity tolerance and shooting performance are used to identify limitations that may negatively impact a Service member's ability to successfully return to their occupation. The purpose of this investigation was to establish the psychometric properties of the novel REDOp assessment (Figure 1).

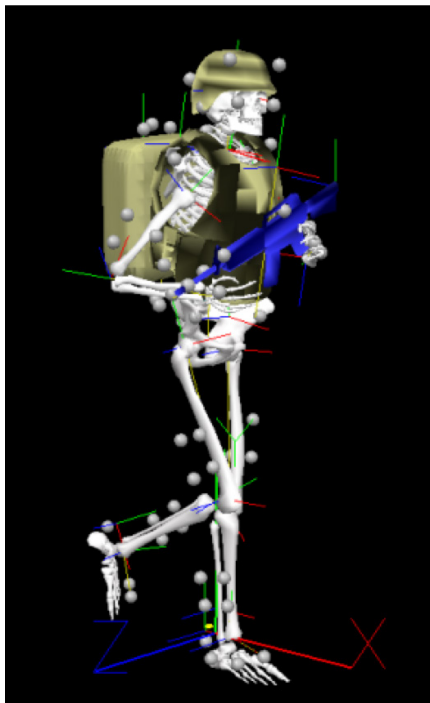


FIGURE 7-41: Three-dimensional biomechanical depiction of a subject participating in the Readiness Evaluation during Simulated Dismounted Operations assessment. The image was created from motion capture recordings while the participant wore body armor and carried a simulated weapon. White balls represent that tracking markers on each body segment and object. The color lines show the axes of these segments and objects. (Figure used with permission from the authors)

Eighteen able-bodied individuals with no history of musculoskeletal or neurologic injury participated in this study. They wore a Kevlar vest and helmet and employed a replicated M4 rifle during a simulated combat patrol performed in a virtual reality environment with a six degree-of-freedom motion platform with embedded treadmill. These individuals walked over variable terrain (e.g., pitches and rolls of the platform) on the treadmill as speed and incline progressively increased over approximately 55 minutes, for a total distance of 4.5 km. Participants progressed through the assessment until they requested to stop, were stopped by a member of the study team for safety concerns, or they completed the assessment. At specific intervals, 20 targets (10 enemies and 10 friendlies), would appear along the patrol. Participants had to identify all targets and make shoot/don't shoot determinations for each (shooting the enemy targets and avoiding the friendly targets) while continuing to walk. Each participant returned approximately two weeks later to repeat the REDOp assessment.

Distance traveled and shooting measures including accuracy, precision, and target acquisition time were similar between the two assessments. Out of the 18 participants, two completed all 4.5 km of the assessment in Session 1 and 6 completed it in Session 2. In Session 1, the primary performance limiter was cardiovascular endurance with 50 percent (9/18) of participants noting it as the reason for stopping. Pain was the next most common limiter at 28 percent (5/18) and 11 percent (2/18) stopped due to some





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combination of both cardiovascular endurance and pain.

REDOp's simulated combat patrol task has high ecologic validity and aligns with military occupational requirements.

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