

Intra-and Inter-Individual Reproducibility of the CAN-LEAP Obstacle Course

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Introduction. The Canadian version of the Load Effects Assessment Program obstacle course (CAN-LEAP) was developed in 2011 to better understand the effect of soldier physical load, bulk and stiffness on physical performance of combat-related tasks. The CAN-LEAP comprises a timed series of 10 physical obstacles (tunnel traverse, sprint, stairs and ladder climbs, agility run, casualty drag, window climbs, bounding rushes, balance beam, front and back low crawl, and wall climbs) followed by three separate performance tasks stations (marksmanship, vertical jump, weight transfer). Four different experimentations were performed with CAN-LEAP since 2012 in both indoor and outdoor. **Objective.** The objective of the present study was to investigate the reproducibility of the CAN-LEAP data within the same subjects (intra-individual reproducibility study) and between subjects for the same experimental condition (inter-individual reproducibility study). **Methods.** For the intra-individual study, 34 military male participants volunteered [mean age 28.0 ± 4.5 years; stature 1.77 ± 0.06 m; body mass 93.5 ± 16.8 kg; body mass index 29.6 ± 4.9 kg/m²; estimated VO_{2max} 44.4 ± 5.1 mL/kg min; estimated adiposity of 18.7 ± 4.4 %] and were required to perform the CAN-LEAP course twice within a one week period using the same clothing and physical load. For the inter-individual study, a second population of 32 military male participants volunteered [mean age 26.7 ± 3.9 years; stature 1.77 ± 0.07 m; body mass 82.4 ± 12.4 kg; body mass index 26.3 ± 3.2 kg/m²; estimated VO_{2max} of 48.1 ± 4.4 mL/kg min] and were required to perform the CAN-LEAP course using the same clothing and physical load as for the first population. Both populations were of combat arms occupations. During both studies, the environmental conditions were similar (indoor with air temperature of 15.3 ± 1.4 °C and 16.7 ± 0.8 °C for the intra and inter-individual studies respectively) and the subjects donned a baseline condition of combat trousers, t-shirt, combat shirt, combat boots, combat eyewear, and soft hat; and a loaded condition, which in addition of the baseline condition, comprised of a C7A2 rifle and sling (one fully weighted magazine), in-service helmet, tactical vest with standard combat load (4 loaded dummy magazines, 2 dummy frag, 2 dummy smoke, water, Personal Role Radio, 2 field dressing). The total weight of the clothing and equipment for the condition tested was 18.4 kg. **Results.** The times to perform each obstacle were compared between two trial repetitions performed within the same population (intra) and for the two trials performed for different populations (inter). The results demonstrate that the times for each obstacle were similar for the two trials performed within the same population. Similarly, the results shows that the normalized times to complete each obstacle were similar for the two trials performed for different populations. **Conclusion.** The present results show that the performance data generated by the CAN-LEAP obstacle course can be reproduced within the same test population and between comparable test populations when similar experimental conditions are being compared.