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Contact: Dr. Hans Christian Tingelstad
Email: hanschristian.tingelstad@forces.gc.ca

Factors Affecting Performance on an Army Urban Operation Casualty Evacuation for Male and Female Soldiers

Etienne Chassé[a] MSc, Hans Christian Tingelstad[a] PhD, Sarah C. Needham-Beck[b] PhD, Tara Reilly[a] PhD.

[a] Human Performance Research and Development, Canadian Forces Morale and Welfare Services, Department of National Defence, Canada

[b] Occupational Performance Research Group, Institute of Sport, University of Chichester, UK

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Abstract

Introduction: This study was conducted to determine what physical and physiological characteristics contribute to the performance of an urban operation casualty evacuation (UO) and its predictive test, FORCE combat (FC) and describe the metabolic demand of the UO in female soldiers.

Methods: Seventeen military members (9 M and 8 F) completed a loaded walking maximal aerobic test, the UO and FC. Heart rate reserve (HRR) and completion time were used as efficiency/performance measures. Oxygen consumption (VO_2) was directly measured for UO on five female participants with a portable indirect calorimetry system, and analysed using descriptive statistics. Stepwise multiple regression analysis were used to determine the contribution of the non-modifiable (age, sex, height) and modifiable characteristics (lean body mass to dead mass ratio (LBM:DM), VO_{2max} corrected for load ($L.VO_{2max}$), peak force (PF) measured on an isometric mid-thigh pull (IMTP) and medicine ball chest throw distance (Dist) on to the performance of each exercise.

Results: LBM:DM and PF were the only factors included in the stepwise regression model for UO, predicting 70% of UO performance ($p<0.01$). For FC, $L.VO_{2max}$ only was included in the stepwise regression model predicting 54% of FC performance ($p<0.01$). Sex, age and height were not included in the regression model. The average metabolic cost of UO was 21.4 mL of $O_2*kg^{-1}*min^{-1}$ in female soldiers while wearing PPE

Conclusion: This study showed that modifiable factors such as body composition, PF on IMTP and $L.VO_{2max}$ are key contributors to performance on UO and FC performance.

Introduction

Many occupations require their employees' to possess a certain physical capacity to safely and effectively perform occupational tasks, particularly in military and public safety occupations. In the last two decades there has been an increase in research investigating the impact of anthropometric and physiological characteristics on occupational physical performance [1, 2, 3]. Top performers on a firefighting casualty evacuation task were taller, heavier, stronger, and had a higher maximal aerobic capacity (VO_2max) compared to their lower ranked counter parts [4]. The need for a minimal aerobic capacity and the positive relationship between leg power, lean body mass (LBM), dead mass (DM), upper body strength/endurance as well as non-modifiable characteristics such as stature and reach for performance on firefighting task has been identified [5]. Strength assessment modalities vary, but occupational fitness testing is turning towards simple and reliable field expedient tests, such as the isometric mid-thigh pull [6] and medicine ball chest throw [7].

Two recently published studies [3 8], investigated the anthropometric and physiological capacity factors affecting performance on the physical employment standard (PES) in the Canadian Armed Forces (CAF), the Common Task Fitness Evaluation (CMTFE), and its predictor test the FORCE evaluation. The CMTFE consists of six tasks; sandbag fortification, escape to cover, picking and digging, stretcher carry, vehicle extrication and pickets and wire carry, which are tasks all CAF members can be expected to encounter. The FORCE evaluation consists of 20 meter rushes, sandbag lifts, intermittent loaded shuttle and sandbag drag. Total performance on the CMFTE was dependent on aerobic capacity, upper body and core strength [3]; and LBM showed a high correlation with sandbag lift ability and sandbag drag, which are two of the main components of the FORCE evaluation [8]. Recent studies have supported these findings, and the importance of aerobic training combined with resistance training to improve performance on load carriage

exercise in males and females which reinforces the importance of modifiable characteristics such as strength and aerobic capacity in military occupations [9 10 11].

The predictive PES used by the CAF is designed to assess the ability to perform six tasks any soldier serving in the CAF could be expected to encounter. Within the CAF, Canadian Army (CA) members preparing for deployment are required to complete a physical fitness objective called FORCE Combat (FC)[12], as a part of their individual battle tasks standards. FORCE Combat replicates the physical demands of performing a loaded advance to contact march (5km), followed by a casualty evacuation in an urban operation environment (UO cas evac). Casualty evacuation is a core competency in the CA [8], however, no previous study has investigated modifiable and non-modifiable factors affecting performance on UO cas evac or its predictor test FC.

There is a concern among CAF members that a minimum height or body size could be required to be able to perform FC, due to the requirement of lifting a 20 kg sandbag 100 cm, 30 times, and pulling 5, 20 kg sandbags a length of 20 meters. Previously, a study by Bilzon et al.[5], showed that participants of shorter stature had a difficulty completing certain shipboard task. Based on these findings and concerns from the CAF population, investigating a potential lower boundary for anthropometric and physiological characteristics affecting UO cas evac and FC performance would be of great interest.

Therefore, the main purpose of this study was to determine the modifiable and non-modifiable factors affecting performance on the UO cas evac scenario and on the FC physical fitness objective and evaluate if a minimal height or body size was required for performance on either tasks. Based on results from previous studies investigating similar tasks [3 5 8] it was hypothesized that strength, aerobic capacity and body composition would have a positive effect on FC and UO cas evac performance. The physiological demand of performing a UO cas evac has previously

been determined (unpublished CAF data), but the sample used in this study was only comprised of combat arms males, and no such data from female participants currently exists. Therefore, a secondary objective was to describe the physiological demands of female CA members performing a UO cas evac scenario.

Methods

This was an experimental single-cohort study consisting of one preliminary session, followed by two experimental sessions. A total of 17 participants (9 males, 8 females) were recruited from a wide range of experience levels (private to 2nd lieutenant). Exclusion criteria were heart disease or any other chronic conditions, as well as a history of lower back pain. The participant sample was diverse in sex, age and anthropometric measurements to represent the entire CA. This study was approved by the Defense Research and Development Canada Human Ethics Committee, participants provided informed consent.

Preliminary session

The preliminary session was conducted in the gym at Canadian Forces Base (CFB) Gagetown (Day 1). All participants had their age and sex surveyed, and had their height and body weight collected. An estimation of body composition was performed using bioelectrical impedance analysis (InBody 520, InBody, Cerritos, CA, USA) (Table 1). The participants' VO_2max was assessed (Figure 1) using a graded exercise treadmill walking protocol wearing 25kg of personal protective equipment (FO25). To determine lower and upper body strength and power, the participants performed three trials of a maximal isometric mid-thigh pull (IMTP) and three trials of a seated medicine ball chest throw (MBCT).

Experimental session 1

The UO cas evac took place in the training area at CFB Gagetown and consisted of a 5 km loaded advance to contact march (Day 3), which had to be completed in 50 to 60 min and a UO cas evac scenario (Figure 1). The UO cas evac scenario consisted of an approach, entering a town hall building through a 1st floor window, walking (monitored and paced by a subject matter expert (SME)) through the building to 2nd floor to pick up two 20 kg sandbags (simulating casualty stretcher carry) and carrying them back down stairs and out through the point of entry. This was repeated for a 2nd casualty evacuation on the 3rd floor. After evacuating both casualties, the participants performed a 20 m casualty drag of an 86 kg mannequin. The skill-free circuit was performed at an operational pace and monitored by a SME. Heart rate (HR) was measured continuously during the exercise. Five female were randomly selected to wear a Jaeger Oxycon Mobile portable metabolic system during the UO cas evac, to record their VO_2. Sub-sample was limited to five females due to equipment limitations, participant availability and testing schedule.

Experimental session 2

Experimental session 2 was performed 48 hours after Experimental session 1 (Day 5). Twenty four hours before experimental session 2, all participant underwent a thorough FC familiarization session (Day 4). The FC test consists of 5 km loaded march (35 kg external load), which is required to be completed in 50 to 60 min, followed by a test of maximal performance on the FC circuit. The circuit consist of four tasks: 20-m rushes, sandbag lifts, intermittent loaded shuttle, and sandbag drag. These 4 tasks were performed in a continuous manner while wearing FO25. Both sessions took place in a drill hall at CFB Gagetown. Continuous measurements of HR were recorded during the loaded march and the FC circuit.

Performances variables

The performance variable on the UO cas evac scenario was determined to be efficiency, quantified by % heart rate reserve (%HRR), since the participants were paced and completed the scenario in relatively the same amount of time (Table 2). Heart rate was measured during the VO_2max test and both experimental sessions using a Polar RS800 (Polar, Kempele, Finland) and a Bodyguard 2 (Firstbeat technologies Oy, Jyväskylä, Finland) as a back-up. The highest HR recorded during the preliminary session, or on either of the two experimental sessions was used as HRmax, and %HRR was calculated using the Karvonen formula [18]. Resting HR was determined following a 5 min standing at rest wearing FO25.

The performance variable on FC was determined to be time (sec) to complete the circuit. The first task of the circuit, 20 meter rushes, consisted of running 80m while going prone on the floor every 10m. The second task, sandbag lifts, consisted of lifting 30 20kg sandbags to a height of 1m. The third task, intermittent loaded shuttles consisted of carrying a 20kg sandbag intermittently for 400m. The fourth task consisted of dragging sandbags producing a resistance force of 33.1kg for 20m. These 4 tasks were performed at best effort, in a continuous manner while wearing FO25. A more detailed description of the circuit can be found at www.forcecombat.com.

Non-modifiable factors

Data on age and sex from each participant was surveyed during the preliminary session. Height was measured, in cm, using a standing stadiometer (Seca stadiometer; Seca Deutschland, Hamburg, Germany). Height was recorded bare-feet following a normal expiration at the beginning of the preliminary session.

Modifiable factors

Body composition was estimated following manufacturers procedures on a bio-impedance scale (InBody 520, InBody, Cerritos, CA, USA). Lean body mass (LBM) to dead mass (DM) ratio

(LBM:DM) was calculated using an external load of 25kg (FO25) ; DM represents the sum of fat mass and external load and its ratio to LBM is used to characterize the impact of the external load on metabolic demand [13]. The participants' loaded VO_2max was assessed following a graded exercise treadmill protocol [14] where grade was increased by 1% every minute, and speed remained constant. The starting speed was determined based on height [15] using the following equation:

$$Speed\ (mile * h^{-1}) = height(m)\ x\ \ 2.25\ \left(\frac{mile * h^{-1}}{m * sec^{-1}}\right) x\ 0.95$$

During the VO_{2max} test, participants wore personal protective equipment (PPE) uniform and walking boots for a total external load of 25 kg (FO25). A loaded walking protocol was used in order to be task specific with other experimental sessions. A previous study reported loaded VO_2max to be a more accurate measure of a participant's maximal capacity during loaded march, compared to an unloaded VO_2max [16]. To better represent the metabolic demand ($ml*kg^{-1}*min^{-1}$) of loaded exercise, it is recommended to divide absolute cost by the total load (body weight + external load) resulting in a corrected metabolic cost (i.e. $L.VO_{2max}$) [17]. This protocol was developed in accordance with recent findings on metabolic cost of loaded locomotion [15] and limitation in testing equipment. A metabolic cart (TrueOne 2400, Parvomedics, Sandy, UT, USA) was used to quantify oxygen consumption during the treadmill protocol. Participants performed three trials of a maximal isometric mid-thigh pull (IMTP) test. The IMTP was conducted using a mobile squat rack (Rogue S1 squat stand, Columbus, OH, USA) and 2 force plates (PASPORT force plate, PS-2141, PASCO Scientific, Roseville, CA, USA), which measured ground reaction force to measure absolute peak force in N applied during the IMTP. The PF analyzed was the best performance recorded. Strength is a key component for military readiness [19]. Maximal isometric contractions are considered a valid way of assessing maximal strength [20]. PF on IMTP is reported to be a simple and strongly correlated predictor of 1RM squat and/or deadlift test, thus an indicator of overall body strength [6] [21]. Participants performed three trials of a seated medicine ball chest

throw (MBT) in order to assess power. The MBT was using a 4kg York medicine ball and a standardized pre-establish protocol [7]. Distance thrown (Dist) in meters was used as the performance measure. The Dist analyzed was the best performance recorded. Distance on MBT is a relatively recent test used to assess upper body power and was reported to be a reliable, low cost, easy and quick-to administer alternative to isokinetic testing for evaluating upper extremity strength [22].

Statistical analyses

Results were reported as mean +/- (SD). Differences in descriptive characteristics between male and female participants were determined using a students t-test. VO_2 of UO case vac was analyzed using descriptive statistics. Normal distribution of all factors was confirmed using a Shapiro-Wilk test of normality. Drop-outs or incomplete data sets were not included in the data analyses. Relationships between performance measure (%HRR for UO case vac and completion time for FC) and modifiable (LBM:DM, L.VO2max, PF and Dist) and non-modifiable (age, sex, height) characteristics were assessed using a stepwise multiple linear regression technique. Two-tailed Student T-Tests were completed to examine the difference in performance between extreme tertile sub-groups of the sample for height and LBM:DM. A $p \leq 0.05$ was considered significant. All statistical analyses were performed using IBM SPSS 24.

Results

The 17 participants mean (SD) physical and physiological characteristics are found in Table 1. Of the 17 participants included in this study, data were analyzed from 14 participants due to dropouts (2 females) and missing data (1 male) for UO cas evac. The sub-sample comprising the five females analyzed on VO_2 during UO cas evac is also presented in Table 1. Comparing descriptive statistics between males and females showed that males older, had more LBM, a higher LBM:DM ratio, a higher absolute and relative VO_{2max}, higher peak IMPT force and longer MBCT distance.

A Pearson's correlations matrix was first completed to identify the collinearity between all potential factors affecting performance (sex, age, height, weight, LBM, Body fat (%), LBM:DM, absolute VO2max, L.VO_{2max}, PF on IMTP, Dist on MBCT) and performances on UO cas evac (%HRR) and FC (completion time). From the matrix, taking collinearity into account, the characteristics with the highest correlation to the performance measure of UO cas evac and FC were selected to be included in the regression analysis (sex, age, height, LBM:DM, L.VO_{2max}, PF on IMTP, and Dist on MBCT). After running a stepwise multiple linear regression analyses, the only characteristics found to have a significant predictive effect on UO cas evac performance were LBM:DM and PF (Table 3; effect size = 2.38). For FC, the only characteristic found to have significant predictive ability on FC performance was L.VO_{2max} (Table 3; effect size of 1.16). Sex was not found to be a significant predictor of performance on either the UO cas evac, or FC.

To investigate the presence of a lower boundary for height and LBM:DM to accomplish UO cas evac and FC, the sample was divided into tertiles (5-6 participants per sub-group) by height and LBM:DM; only the highest and lowest tertiles were compared. Results showed that by height, there was no significant difference between tertiles performance (165.3 (2.3) cm vs 182.1 (3.4) cm) on UO cas evac or FC, but that by LBM:DM, a significant difference was found in performance (1.6 (0.1) vs 1.1 (0.1) on UO and FC ($p<0.05$). The sample was also divided by sex and no significant difference ($p>0.05$) was found in performance between males and females on UO cas evac (712 (231) vs 542 (104) sec, for females and males, respectively) or FC (74.6 (4.04) vs 62.6 (15.2) %HRR, for females and males, respectively).

The metabolic cost of UO was measured in five female participants. Peak VO_2 during UO cas evac was 24.1(3.1) ml*min^{-1}*kg^{-1}, [17.8 (2.1) ml*min^{-1}*kg^{-1}corrected for load] and occurred during

the second casualty carry. On average, the metabolic cost of UO cas evac was 21.4 (3.1) $ml*min^{-1}*kg^{-1}$[15.9(2.1 $ml*min^{-1}*kg^{-1}$ corrected for load)]

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Discussion

The main purpose of this study was to investigate the modifiable and non-modifiable factors affecting performance on UO cas evac and FC, determine if a lower boundary of anthropometric or physiological capacity exists for performance, and to describe the metabolic demand of army urban operation casualty evacuation. To our knowledge, this is the first report of directly measured oxygen consumption on an UO cas evac in female soldiers. The results showed that only modifiable characteristics were affecting performance on UO cas evac and FC; LBM:DM and PF on IMTP predicted 75% of variability in HRR on UO cas evac, and L.VO_2max predicted 57% of the variability in FC completion time. Therefore, the hypothesis was partly confirmed as only one or two factors were included in the performance prediction of the tasks. The results indicated that the metabolic demand of performing UO cas evac was on average 21.4 $ml*min^{-1}*kg^{-1}$in female soldiers while wearing PPE (FO25). Overall findings from this study showed that only modifiable factors were predictors of performance on UO cas evac and FC and, although there was significant differences in height, LBM and strength between males and females, sex was not a significant factor explaining performance outcome.

Performance prediction is essential for determining physical capability and development of tactical training strategies. To evaluate the significance of each modifiable and non-modifiable characteristic on UO cas evac and FC performance, a stepwise multiple regression was performed. For UO cas evac, 70 % of the performance (very large effect size) can be explained by LBM:DM and PF. As previously reported in CA members, strength and LBM are important elements explaining performance on prolonged military exercises[3 8] and the same applies for a more complex but shorter task such as UO cas evac. Strength improvements through resistance

training combined with aerobic training is promoted to be an efficient regime to improve occupational performance in both males and females [9 26]. For FC, only one factor was included in the stepwise multiple regression: L.VO_{2max}. As previously reported, maximal aerobic capacity and endurance in military personnel is an important contributor to performance on tasks that consists of lifting and/or load carriage [9]. Since FC consist of a circuit lasting more than 10 min on average and completed wearing FO25, it is not surprising that L.VO_{2max} which represents the individual's maximal aerobic capacity while removing the mass bias towards larger individuals [27], is a significant contributor. Sex was not included in the regression model for either UO cas evac or FC, suggesting it was not an important predictor of performance.

Previous study in CA reported no LBM lower threshold for performance on the CAF PES [8]. Similar investigation were completed to determine if a minimal height or LBM:DM was necessary to perform on UO cas evac or FC. No significant difference in performance on UO cas evac nor FC was observed between the different height tertiles. Consequently, there would not be any detrimental effect of height on both exercises conversely to previous findings suggesting the importance of height on stretcher carry and overhead task [5]. The discrepancy might be due to the simplicity of the UO cas evac scenario which does not require any overhead lifting and had only 130 meters of stretcher carry. Although, these results only apply to 165.3 cm compared to 181.1 cm which might not be the case for shorter or taller individuals. For LBM:DM, there was a significant difference ($p<0.01$) in performance on both UO cas evac and FC between the lowest and highest sub-groups. People with a LBM:DM of approximately 1.6 performed better than people with a LBM:DM of approximately 1.1. To illustrate LBM:DM, taking the average CA member of 86 kg [8] carrying FO25, a ratio of 1.1 is synonym to 32% body fat or obesity but 1.6 results to 21% body fat which is lightly overweight if male [28]. This result is somewhat contrary to previous results reporting that there was no LBM lower limit observed for performance on sandbag lifting and dragging [8]. However, in the previous study, exercises were not completed wearing an external

load. The discrepancy between results might come from the effect FO25 or the consideration of fat mass. When comparing males and females performances on both tasks, no significant difference was found in performance on UO cas evac or FC. Even though this is one of the first attempts at determining factors affecting performance in males and females on military combat tasks, a careful body of research examining physical work performance indicates that many of the differences in task performance between males and females are due to body size rather than sex, and some women are fully capable of performing many physically demanding occupations [23].

Due to relative absence of females in combat roles [23 24], current data on metabolic demand of combat tasks in females are crucially lacking. Therefore, oxygen consumption was quantified during UO cas evac in five females. The average metabolic demand was 21.4(3.1) $ml*min^{-1}*kg^{-1}$ or 15.9(2.1) $ml*min^{-1}*kg^{-1}$corrected for load making the skill-free circuit classified as moderate intensity, similar to hiking [25] ; however somewhat lighter in intensity compared to a highly-technical casualty evacuation previously measured at 31 $ml*min^{-1}*kg^{-1}$ in combat arms males (unpublished CAF data). As previously reported, the impact of any fixed load is a function of the relationship between its mass and each person's body mass, with the metabolic impact being greater for smaller people [17]. Based on the maximal acceptable work duration previously reported [17], it is suggested that soldiers could perform UO cas evac approximately 5 times (≈ 40 min of work). However, with a higher aerobic and muscular maximal capacity, acceptable work duration would increase and therefore UO cas evac could be performed repeatedly.

Military exercises and mission are not scaled on physical characteristics. Every CA member is expected to be able to perform at the operational minimal standard. Evaluations or scenarios that discriminate against an inherent non-modifiable characteristic (age, sex, and height) would be challenged. Therefore, FC needs to be inclusive. Interestingly, none of the non-modifiable characteristics were included in the regression models. The results show that neither age, sex nor height had an effect on performance on FC. In general, females tend to demonstrate

a slower completion time on FC when compared to males CA (unpublished Reilly, 2018) but it was previously reported that, with the proper training, women can increase performance on military exercises or loaded march [11 29], thus meet the standard.

The present study has limitations. Due to a limited sample size, regression models only predicted 70% and 54% of the performance measures on UO cas evac and FC respectively. However, the sample was diverse in demographics, anthropometric measurements and physiological capacity and relatively evenly represented by males and females (table 1). Also, PF on IMTP and Dist on MBT may not fully represent total body strength and power. However, they are currently used internationally in the military as a feasible field expediency test [30]. Due to the limited sample size available for this field study there is a risk for false negative, however due to the large effect size observed between means we are confident in our results.

Conclusion

Overall findings from this study showed that modifiable factors contribute to performance on a casualty evacuation in an urban operation or the PFO FC, but neither age, sex nor height were contributors to the performance of each tasks. To our knowledge, this is the first study to report of direct measure of metabolic demand on an UO cas evac in female soldiers, which was measured 21.4 (3.1) $ml*min^{-1}*kg^{-1}$. Future investigations should determine the influence of environmental factors such as ambient temperature or altitude on the performance of a casualty evacuation in an urban operation in male and female soldiers.

Practical Implications

- Body Composition and maximal strength are important contributors to the performance on an urban operation casualty evacuation in both males and females.

- Aerobic capacity relative to the total mass is an important contributor to the performance of FORCE combat, the Canadian Army deployment physical fitness objective, in both males and females.

- The average metabolic demand of an urban operation casualty evacuation in female soldiers is 21.4 $ml*min^{-1}*kg^{-1}$, which is classify as moderate intensity exercise.

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Table 1. *Mean (SD) of characteristics for the 17 participants and the sub-sample of 5 female participants which had metabolic demand measured on the Urban Operation Casualty Evacuation.*

	Total	**Male**	**Female**	**Female sub-sample**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**
N	17	9	8	5
Age (years)	34.2 (7.7)	39 (4)	29 (7)*	25.8 (1.9)
Height (cm)	172.6 (7.5)	175.7 (8.2	169.3 (5.2)	169.0 (6.1)
LBM (kg)	59.6 (8.6)	64.9 (8.6)	53.7 (2.6)*	54.2 (2.6)
Body Fat (%)	24.1 (6.3)	22.5 (5.6)	25.9 (7.0)	25.6 (7.9)
LBM:DM	1.36 (0.22)	1.47 (0.19)	1.24 (0.19)*	1.25 (0.20)
Absolute VO_{2max} (L/min)	3.02 (0.71)	3.5 (0.5)	2.5 (0.6)*	2.70 (0.20)
L.VO_{2max} (mL/kg*min)	28.4 (6.0)	25.0 (3.2)	21.2 (5.1)*	27.5 (2.1)
Peak Force on IMPT (N)	1570 (522)	1805 (608)	1244 (423)*	1365 (463)
Distance on MBCT (m)	4.1 (0.7)	4.6 (0.6)	3.6 (0.3)*	3.6 (0.1)

LBM: Lean Body Mass; LBM:DM: Lean Body Mass to Dead Mass Ratio; IMTP: Isometric Midthigh Pull; MBCT: Medicine Ball Chest Throw; m: meters; N: newton, * significant difference between male and female $p \leq 0.05$

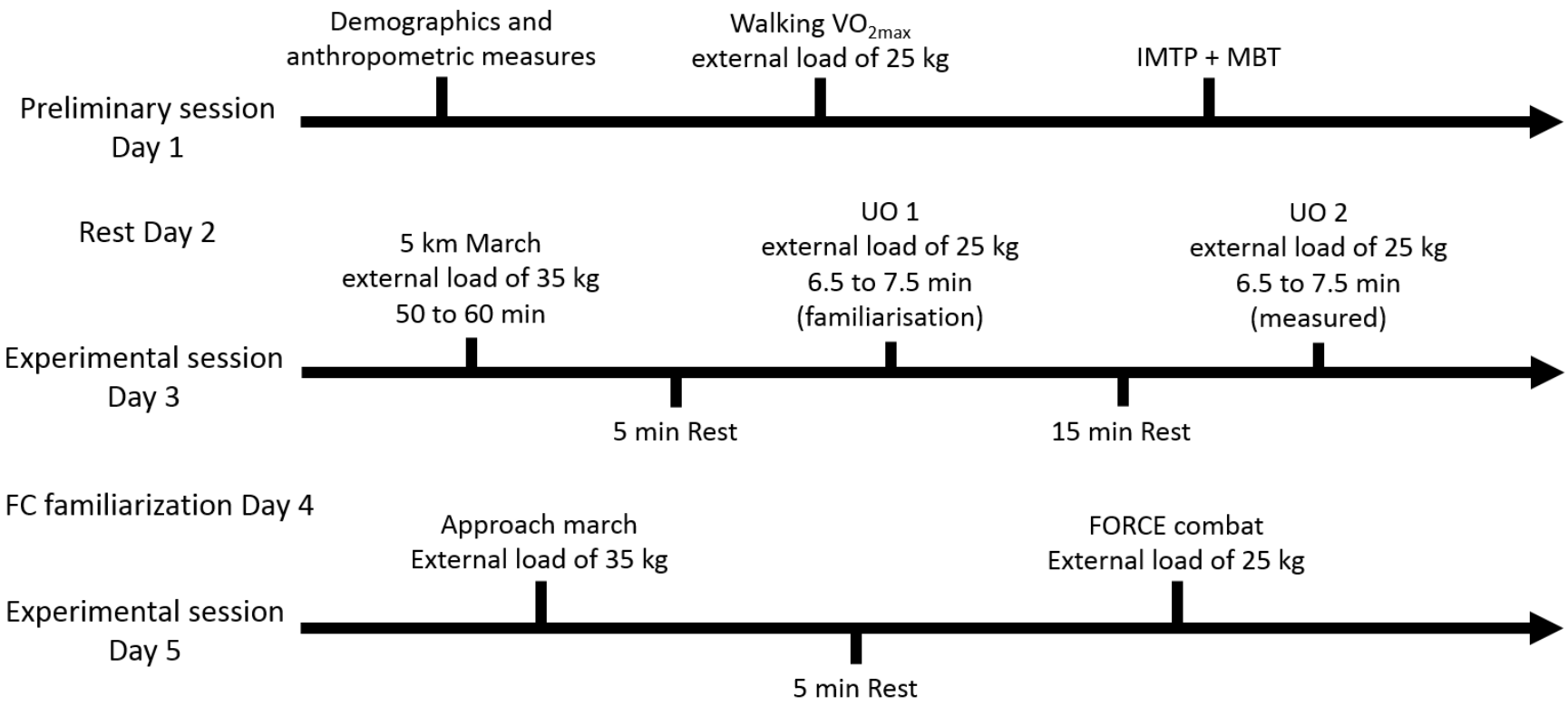

Figure 1. Figure showing the layout of the preliminary and experimental sessions. IMTP: Isometric mid-thigh pull, BMT: Medicine ball throw, UO: urban operation casualty evacuation scenario.

Table 2. *Performance measures for the Urban Operation Casualty Evacuation(UO) and FORCE Combat™.*

	Casualty Evacuation in an Urban Operation		FORCE Combat™	
	Ave (S.D)	Range	Ave (S.D)	Range
Completion time (sec)	417 (32)	365 - 471	621 (191)	406 - 1203
HRR (%)	67.7 (13.0)	41.8 - 80.2	81.2 (6.5)	70.5 - 90.6
HR (bpm)	157 (22)	113 - 192	172 (11)	146 - 189

Table 3: Results from stepwise linear regression analysis

	Unstandardized Beta Coefficient				
	B	**Std. error**	**Sig.**	**F-test**	**Adjusted R^2**
UO cas evac					
(Constant)	1353.0	14.6	0.00		
LBM:DM ratio	-47.4	10.2	0.00		
IMTP peak force	-0.01	0.01	0.05		
Model				15.622	0.704
FORCE Combat					
(Constant)	1353.0	173.1	0.00		
L.VO_{2max}	-25.0	6.0	0.00		
Model				17.195	0.536