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INTRODUCTION

- The Northern Warfare Challenge (NWC) is an annual competition among Reserve Officers' Training Corp (ROTC) cadets. This challenge consists of a 26.9-kilometer ruck march carrying a rucksack ranging from 13.6-22.7 kg.
- Previous literature suggests that the acute:chronic (A:C) training workload ratio should range approximately between 0.8-1.3 to reduce the risks of injury. Therefore, a thorough understanding of the external (e.g., accelerometry through g forces) and internal (e.g., heart rate and breathing rate) workloads accumulated by ROTC cadets is pivotal to ensure cadets are prepared for the demands imposed by competition such as the NWC.
- The purpose of this study was to quantify the internal and external workload demands of the NWC in relation to regimented physical training (PT) sessions leading up to the NWC.

METHODS

- Eight men who were part of ROTC (mean±SD) (age, 20.8±1.1 years; height, 177.5±8.7 cm; mass, 77.8±7.3 kg) participated in this pilot study.
- Participants were equipped with a physical activity monitor (Zephyr Bioharness) and wore it throughout the duration of the NWC, a Practice consisting ½ the NWC course (8-mile ruck), and regimented PT sessions. which monitored internal (e.g., heart rate and breathing rate) and external workload (e.g., accelerometry through g forces at a sampling rate of 100 Hz), respectively.
- Data were uploaded to the OmniSense™ 5.0 Software System (Zephyr Technology, Annapolis, United States of America) and descriptive analyses were performance to represent the NWC in comparison to other training sessions.

RESULTS

Table 1. Descriptive results from regimented sessions displayed as mean (standard deviation).

Variable	NWC	Practice	PT _{average}	PT ₁	PT ₂	PT ₃	PT ₄	PT ₅
Duration (hours)	7.25±0.72	2.88±0.22	1.07±0.09	1.12±0.05	0.96±0.02	1.19±0.05	1.01±0.05	1.09±0.07
Heart Rate_{average±} (bpm)	155±8	141±4	137±12	128±11	144±16	134±9	141±8	138±8
Total Steps Taken	43,449±5,157	15,120±1,349	7,606±882	6,737±580	7,917±268	7,216±964	7,638±464	8,391±968
Caloric Cost (kcal)	6,794±351	2,214±174	798±105	748±136	794±139	836±72	801±76	816±98
Training Load (au)	1,460±180	506±49	219±43	181±34	227±68	226±37	226±25	228±30
External Load (au)	218±44	128±18	143±37	115±31	150±59	144±29	150±29	152±23
External Intensity (au)	0.6±0.1	1.09±0.12	2.99±0.71	2.64±0.75	3.01±1.15	3.03±0.52	3.13±0.59	3.11±0.47
Internal Load (au)	2702±366	884±106	293±61	247±48	304±88	306±55	302±49	304±51
Internal Intensity (au)	6.03±1.07	6.49±0.69	5.69±1.12	4.85±0.85	6.21±1.65	5.81±1.07	5.79±0.95	5.78±0.74

NWC, Northern Warfare Challenge; PT, Physical Training Session; Practice, 8-mile ruck on the Northern Warfare Course (half the course).

- NWC had a A:C workload of 6.7 in relation to the average PT training load.

DISCUSSION

- Implementing training programs to meet the unique needs of ROTC cadets requires an understanding of training loads to maximize performance while attaining optimal A:C training workload ratios to ensure adaptation and reduce injury risk.
- The increased training load of the NWC compared to the Practice and PT sessions was primarily due to the increased duration rather than the training intensity.

PRACTICAL APPLICATIONS

- Strength and conditioning professionals should be aware of the workloads associated with events such as the NWC to ensure training progressions are implemented to best prepare cadets for the high workload and minimize the potential risk of injury.

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