MALES EXHIBIT STRONGER CORRELATIONS BETWEEN BODY COMPOSITION VARIABLES AND ACFT PERFORMANCE THAN FEMALE ROTC CADETS

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Introduction

The United States Army recently introduced a new fitness assessment, the Army Combat Fitness Test (ACFT), which places a greater emphasis on power and strength than the previous fitness assessment and compromises six components. The US Army Reserve Officers' Training Corps (ROTC) cadets are expected to maintain acceptable fitness scores on the ACFT. Previous research suggests a correlation between ACFT performance and body composition (BC) variables, yet little is known how these correlations differ between males and females, especially considering the recent Army's policy to exempt high performers from body fat % (BF%) assessment.

Purpose

To assess sex differences in ACFT performance correlations with BC variables among ROTC cadets.

Methods

- 73 male (age=21.5±3.8 yrs, mass=79.7± 3.1kg, BF%=18.6±5.6) and 24 female (age=19.5±1.3yrs, mass=63.5±8.6kg, BF%=25.1±4.8) ROTC cadets completed the ACFT.
- BF% was collected before using a handheld bioimpedance device
- BC variables included: total mass, BF%, Body Mass Index (BMI), fat free mass (FFM), FFM to fat mass ratio (FFM:FM), and FFM index (FFMI) calculated as FFM/height(cm)^2.
- Student's t-tests were performed between sexes for ACFT raw performance components and Pearson correlations were computed between ACFT raw scores and BC variables for males and females. α was set to 0.05

Key Findings

- **Males had greater influence of body composition on ACFT Performance than females**
- **Body composition is not a prerequisite to high performance on all ACFT events**
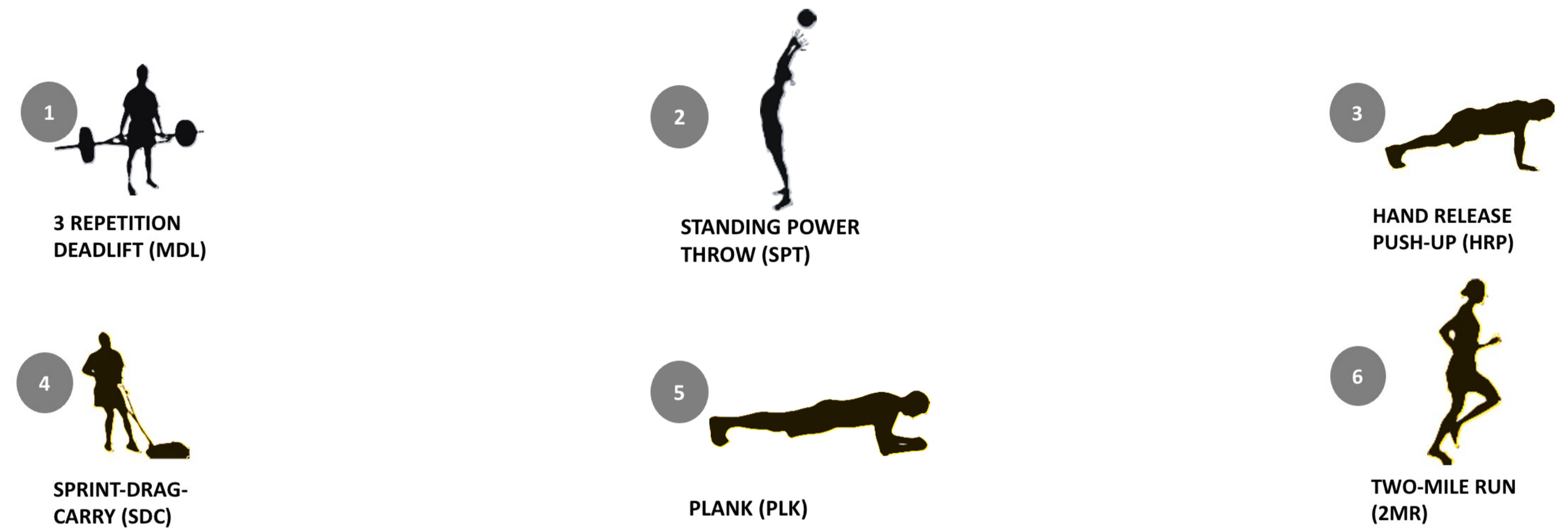- **Females can be high performers despite higher BF % due to physiology**

1. 3 REPETITION DEADLIFT (MDL)
2. STANDING POWER THROW (SPT)
3. HAND RELEASE PUSH-UP (HRP)
4. SPRINT-DRAG-CARRY (SDC)
5. PLANK (PLK)
6. TWO-MILE RUN (2MR)

Figure 1: Student's t test between sexes and correlations between ACFT components and BC variables

Males (n=73)	Mean	Mass	BF%	BMI	FM	FFM	FFM/FM	FFMI
MDL (Kg)	119.68 ± 24.83 d	0.606 ***	0.276 *	0.627 ***	0.407 ***	0.631 ***	-0.284 *	0.714***
SPT (m)	8.93 ±1.89 d	0.517 ***	0.078	0.434 ***	0.244 *	0.615 ***	-0.102	0.565***
SDC (s)	101.63 ±12.38 d	-0.274 *	0.098	-0.123	-0.01	-0.412 ***	0	-0.261*
HRP (reps)	42.3 ± 9.36 d	0.035	-0.068	0.191	-0.053	0.093	0.042	0.311**
PLK (s)	175.3 ± 50.57	-0.268*	-0.379***	-0.18	-0.369***	-0.143	0.345**	-0.021
2MR(s)	964 ± 126.52 d	0.285*	0.284*	0.332**	0.337**	0.191	-0.186	0.267*

Females (n=24)	Mean	Mass	BF%	BMI	FM	FFM	FFM/FM	FFMI
MDL (Kg)	75.38 ± 45.45 d	0.285	0.3	0.401	0.314	0.203	-0.291	0.416 *
SPT (m)	5.38 ± 1.18 d	0.17	-0.012	0.108	0.063	0.247	0.04	0.173
SDC (s)	143.29 ±21.11 d	-0.127	0.083	-0.094	-0.012	-0.219	-0.123	-0.196
HRP (reps)	33.5 ± 11.98 d	-0.251	-0.194	-0.125	-0.229	-0.227	0.201	-0.057
PLK (s)	163.8 ± 59.44	-0.566**	-0.508*	-0.525**	-0.579**	-0.447*	0.464*	-0.448*
2 MR(s)	1168 ± 159.24 d	0.352	0.348	0.259	0.361	0.271	-0.359	0.161

d – significant differences between sexes' means (student's t test).
Correlations statistical significance: *p<0.05, ** p<0.01, *** p<0.001. Correlations strength were classified as: trivial: 0–0.1; small: 0.1–0.3; moderate: 0.3–0.5; large: 0.5–0.7; very large: 0.7–0.9; near perfect >0.9.

Results

- Males exhibited at least one significant correlation (p<0.05) between BC variables and each ACFT component.
- Females performance exhibited correlation only with PLK and MDL.
- In males, large correlations were found between MDL and Mass, BMI, FM, and FFM and a very large correlation (0.71) with FFMI. Large correlations were found between SPT and mass, FFM, and FFMI. SDC was moderately corelated with FFM (-0.41).
- Females exhibited large correlations only between PLK and total mass, BF%, BMI, and FM.

Summary and Conclusion

- Males generally had greater influence of BC on ACFT performance than females.
- These differences may also reflect additional influential variables other than BC.
- Females performed highly despite higher BF%.

Practical Applications

- BC is not a prerequisite to high performance and are supportive of the 2023 Army's directive exempting high performance soldiers from BF% assessment.
- Future research should investigate potential confounding factors, other than BC, that can influence sex differences in ACFT performance.