IMPACT OF BODY FAT CHANGE ON ACFT PERFORMANCE IN ROTC CADETS DURING AN ACADEMIC YEAR

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INTRODUCTION

- The Army Combat Fitness Test (ACFT) measures physical readiness across six events, with ROTC cadets held to active-duty standards.
- BF% is negatively, and FFM positively, associated with ACFT performance.
- However, how body composition (BC) changes over an academic year affect performance is less known.

PURPOSE

To evaluate how BC changes over an academic year affect ACFT performance in ROTC cadets

METHODS

- 47 males (21.7±3.9 yrs; 79.6±12.5 kg; BF%=19.0±5.5) and 13 females (19.1±1.0 yrs; 61.1±8.5 kg; BF%=23.5±4.8) ROTC cadets completed the ACFT twice over 6 months.
- BF% was measured using handheld bioimpedance.
- T-tests compared BF%, FFM, and ACFT scores between timepoints.
- Cohen's kappa assessed ΔBC and ΔACFT agreement; RM correlation analyzed their relationship (α = 0.05).

RESULTS

Kappa Agreements and RM with ACFT Performance

BC Variable	All cadets (k)	Cadets with BF%>3 (k)	All cadets (r)	Cadets with BF%>3 (r)
BF%	-0.33	-0.51	0.00	-0.21
FFM	0.28	0.31	0.13	-0.08

Table 1: Kappa agreement (k) and repeated measures correlations (r). Abbreviations: BC, body composition; BF%, body fat %; FFM, fat free mass; RM, repeated measures; ACFT, Army Combat Fitness test. Cohen's kappa (k, slight: 0-0.2; fair: 0.2-0.4; moderate: 0.4-0.6; substantial:0.6-0.8; near perfect: 0.8-1)

Key Findings

- BF% changes showed only fair to slight agreement with ACFT performance over 6 months.
- Greater agreement in cadets with >3% change
- Differentiated influence of body composition on individual ACFT events
- Fitness Adaptations likely to require more time

Contingency tables showing agreement between ΔBC and ΔACFT over an academic year

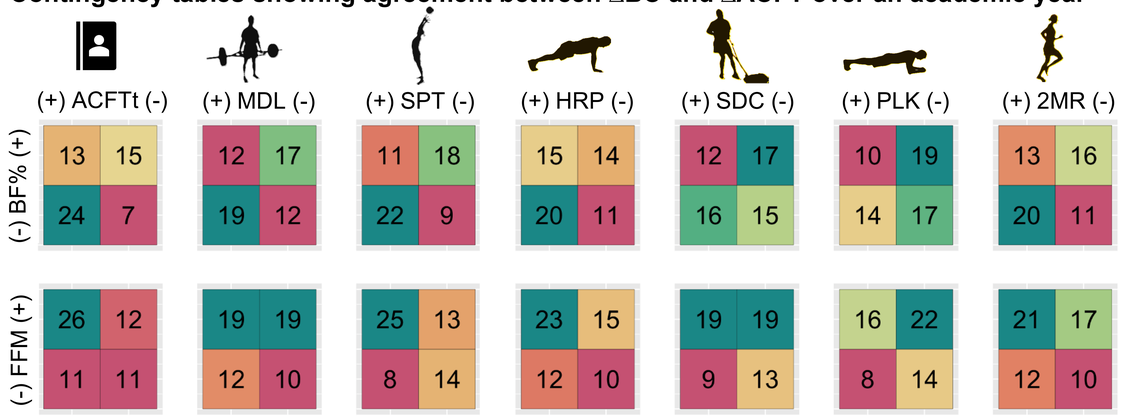

Figure 1: Contingency tables showing agreement between changes in body composition (BC) and ACFT total score over an academic year. (+) indicates increase and (-) indicates decrease.

Mean differences across the two time points

Timepoint / Metric	ACFT (Mean ± SD)	BF% (Mean ± SD)	BF% Range	FFM (Mean ± SD) (kg)	FFM Range (kg)
T1	507.9 ± 54.3	20.0 ± 5.7%	5.6% – 31.7%	60.2 ± 10.8	36.0 – 80.9
T2	516.8 ± 46.4	19.7 ± 6.3%	4.7% – 31.1%	61.0 ± 10.2	39.2 – 81.6

- Greatest event agreement was with SPT with BF% (k=-0.33) and FFM (k=0.28).
- RM correlation between ΔBC and ΔACFTt was insignificant but near significant between ΔFFM and ΔSDC event (r=0.25, p=0.054) and between ΔBF% and Δ2MR (r=0.23, p=0.069)

Abbreviations: BC: body composition; BF%: Body fat percentage, FFM: Fat free mass, ACFTt: Army Combat Fitness Test total score, MDL: Maximum Repetition Deadlift, SPT: Standing Power Throw, HRP: Hand Release Pushup, SDC: Spring-Drag-Carry, PLK: Plank, 2MR: Two Mile Run

BF% and FFM across class years (1-4)

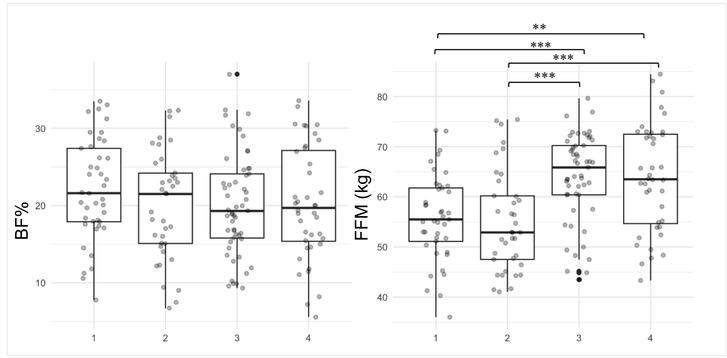

Figure 2: Body composition trends across class years (1-4). Abbreviations: BF%, body fat %; FFM, fat free mass; ANOVA group differences significance: *p < 0.05, ** p < 0.01, *** p < 0.001

CONCLUSIONS

- BC changes showed fair to slight agreement with ACFT, but a moderate link appeared in cadets with ΔBF% >3.
- Near-significant correlations between ΔFFM and ΔSDC, and ΔBF% and Δ2MR, suggesting differential body composition influence on performance.
- Larger, long-term studies are needed to clarify guidelines, as fitness adaptations may need more time to align with ΔBC as suggested by figure 2.

PRACTICAL APPLICATIONS

- Factors beyond ΔBC (e.g., familiarization, targeted training, motivation) likely influence ACFT as ΔBC over a 6-month period have limited impact.
- ROTC programs should address event-specific interventions due to differentiated BC influence.

References

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