

LOWER RATE OF FATIGUE OBSERVED IN FIREFIGHTER RECRUITS COMPLETING TRAINING ACADEMY



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Introduction & Purpose

- Aspiring firefighters (FFs) must attend recruit training academy.
- Admission requirements vary by state, with some requiring that recruits successfully complete the candidate physical ability test (CPAT).
- Additional physical fitness measures (e.g., anaerobic power or body composition) are not routinely evaluated before or during training academy.
- Previous research from our lab found that there was a significant difference in Wingate relative peak power between recruits who completed vs those who dropped out, in a single class of recruits.

The purpose of this research was to investigate if anaerobic power and body composition varied significantly between recruits who completed vs dropped out of training.

Methods

- 97 recruits visited the Tactical Performance Laboratory (TPL) once to complete lab measures:

- Body composition (via bioelectrical impedance analysis [BIA])
- Anaerobic power and capacity (via Wingate anaerobic test)

- Independent sample *t*-tests evaluated differences between recruits who completed training vs. dropped out.
- Cohen's *d* effect size (ES) was calculated for comparisons.
- Alpha level set to 0.05



Figure 1: Graphical representation of the methods employed in this study.



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- 34 recruits (35%) dropped out over the course of the training.
- No significant differences between groups for most variables measured (Table 1 and Figures 2 – 7).
- Rate of fatigue was significantly lower for those that “Completed Training” versus “Dropped Out”: MD = 6.2 ± 2.9%, *p* = 0.04, ES = 0.5 (Figure 2).

Table 1. Recruit characteristics (Mean ± SD).

	Full Roster (N = 97)	Dropped out (N = 34)	Completed (N = 63)
Age	22.3 ± 4.8	22.3 ± 4.8	22.3 ± 4.9
Height (cm)	179.1 ± 7.0	180.3 ± 7.5	178.4 ± 6.7
Weight (kg)	86.9 ± 13.6	89.0 ± 14.2	85.7 ± 13.1
BMI	27 ± 3.7	27.4 ± 4	26.9 ± 3.5
SKMM (kg)	40.3 ± 5.6	41.2 ± 5.3	39.8 ± 5.7
BF%	18.7 ± 5.7	18.9 ± 5.9	18.7 ± 5.5

BMI: Body Mass Index; SKMM: Skeletal Muscle Mass; BF%: Body Fat Percentage

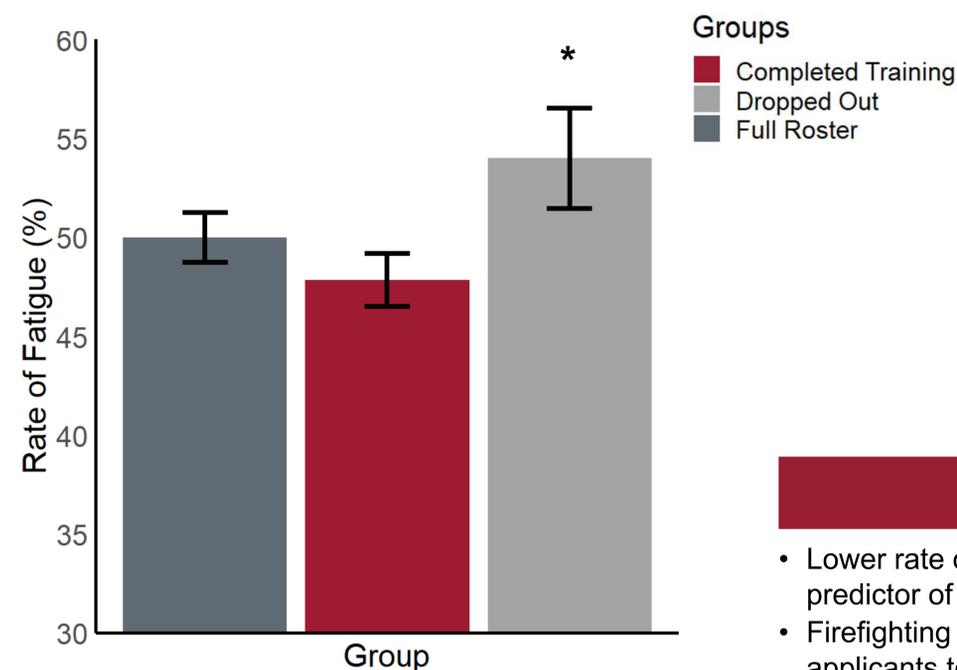


Figure 2: Rate of fatigue during the Wingate anaerobic test between groups. * significantly (*p*<0.05) different from the “Completed Training” group.

Results

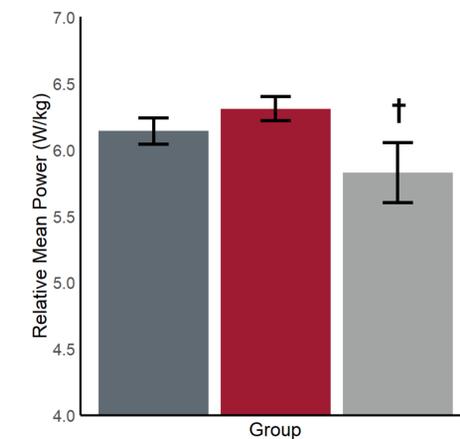


Figure 3: Relative mean power achieved during the Wingate anaerobic test between groups. † Near significant difference from completed training group (*p*=0.053)

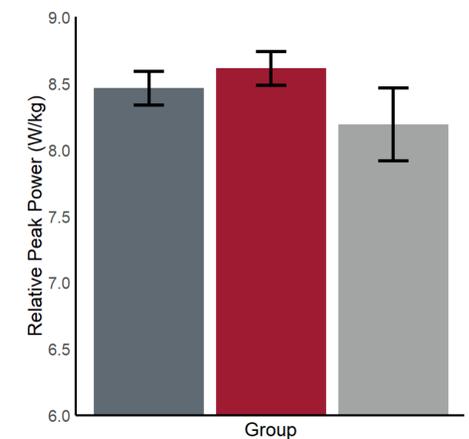


Figure 4: Relative peak power achieved during the Wingate anaerobic test between groups.

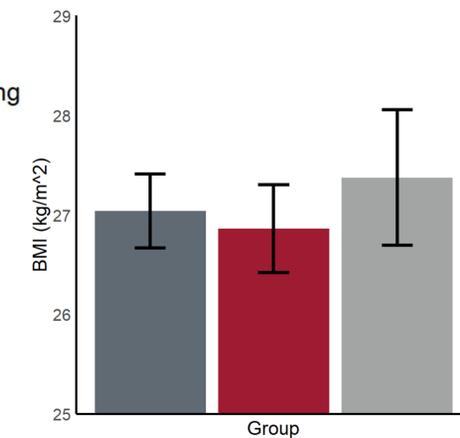


Figure 5: Body mass index by group.

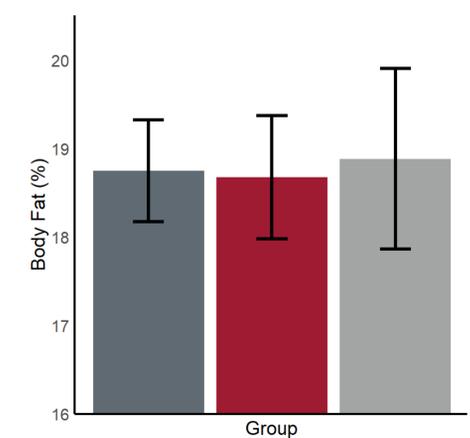


Figure 6: Body fat percentage by group.

Conclusion & Practical Application

- Lower rate of fatigue and higher relative at baseline may serve as a predictor of who has a higher chance of completing FF training.
- Firefighting academies and training programs should consider encouraging applicants to increase anaerobic capacity prior to training.
- Further assessments should be done to determine the impact of aerobic capacity and upper body muscular endurance on ability to complete training.

