Initial fitness levels of CFA recruit firefighters

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Background

Previous research into fire fighting has focused on the physical demands of the work or the fitness levels of experienced fire fighters (1, 2, 5). The fitness of Australian fire agency recruit fire fighters is far less understood than overseas structural fire fighters. Australian fire agency recruits are responsible for tanker based bushfire as well as structural fire fighting. The relationship between a job performance test and a number of fitness components in CFA recruit fire fighting is the focus of the research described.

Method

A battery of fitness tests were selected based upon relationships with job performance and load carriage in fire fighting and military samples (3, 4 , 5). Tests selected covered major fitness components including aerobic fitness, muscular endurance, muscular strength and muscular power. This tests battery included upper and lower body tasks expected to relate to tanker based fire fighting tasks.

The job performance test, also known as the challenge test, is routinely administered by CFA instructors to every recruit fire fighter. It comprises common fire fighting tasks in a timed circuit. Tasks include tunnel crawl, ladder climb, multi story weight haul, dummy drag, hose advance, static hose spraying, dexterity board, balance beam and ladder climb.

Results

Challenge Test Time: 9. 64 ± 1. 84 minutes. Range of 8. 16 – 14. 25 minutes.

Table 1. Correlation relationships between measured variables and job performance on the challenge test.
Correlations closer to 1.00 or -1.00 indicate stronger relationships than correlations closer to 0.00.

Task/ characteristic	Mean performance ± SD	Relationship to job performance	Strength of relationship (6)
a. Prone Bridging time to exhaustion (sec)	172.07 ± 74.03	-0.03	Trivial
b. Peak Oxygen Uptake ($mL \cdot kg^{-1} \cdot min^{-1}$)	49.9 ± 5.49	0.05	Trivial
c. Age (years)	29.8 ± 7.42	0.07	Trivial
d. Handgrip time to exhaustion (sec)	41.13 ± 25.95	-0.10	Small
e. Wall sit time to exhaustion (sec)	115.36 ± 52.01	-0.11	Small
f. Height (cm)	176.7 ± 5.73	0.12	Small
g. Isometric weight hold time to exhaustion (sec)	58.77 ± 23.79	-0.29	Small
h. Shoulder press (repetitions)	37.29 ± 9.14	-0.34	Moderate
i. Peak Oxygen Uptake ($L \cdot min^{-1}$)	3.84 ± 0.59	-0.34	Moderate
j. Bent over row (repetitions)	38.14 ± 9.21	-0.36	Moderate
k. Push ups time (repetitions)	28.79 ± 12.63	-0.36	Moderate
l. Grip Strength (kg)	50.32 ± 12.42	-0.42	Moderate
m. Standing long jump distance (cm)	196.93 ± 20.69	-0.45	Moderate
n. Body Weight (kg)	77.0 ± 8.69	-0.51	Large
o. Body Mass Index ($weight \cdot height^{-2}$)	24.7 ± 2.92	-0.55	Large

Conclusion

Challenge test performance was largely correlated with body mass index (o) and body weight (n). Moderate correlations were identified between challenge test time and measures of upper body endurance (h, j, k) and strength (l), whole body endurance (i), and lower body power (m). Physical size (including muscle mass) together with endurance may, therefore, be key components for successful challenge test performance. This data will be collected as part of an ongoing project to measure changes in fitness components over an entire 16 week recruit course. This will give us greater insight into important fitness components for training and selecting CFA recruits. This data may also provide valuable information regarding the key fitness components for tanker based bushfire fighting tasks performed by both career and volunteer firefighting personnel.

References

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