

Firefighter Trainee Fitness, Reasons for Academy Release, and Predictive Capabilities of Fitness Tests

ROBERT G. LOCKIE¹, FERNANDO MONTES², ROBIN M. ORR³, & J. JAY DAWES⁴

¹Center for Sport Performance; Department of Kinesiology; California State University, Fullerton; Fullerton, CA, USA.

²Los Angeles County Fire Department, Los Angeles, CA, USA.

³Tactical Research Unit; Bond University; Robina, Qld, Australia.

⁴Tactical Fitness and Nutrition Lab; School of Kinesiology, Applied Health and Recreation; Oklahoma State University, Stillwater, OK, USA.

Category: Professional

Advisor / Mentor: Lockie, Robert (rlockie@fullerton.edu)

ABSTRACT

Firefighter trainees need a level of fitness to be admitted to and complete a training academy. Fitness could indicate a trainee's likelihood of graduation. **PURPOSE:** Determine fitness differences between trainees who graduated (GRAD) or were released due to a) injury (RELI), b) skills test performance failures (RELP), or c) resignation (RELR); and whether fitness predicted graduation or academy release. **METHODS:** Data from an occupational physical ability test (OPAT) for 686 trainees were analyzed, including: Illinois agility test; push-ups; pull-ups; leg tucks; estimated maximal aerobic capacity ($\dot{V}O_{2max}$) from the multistage fitness test; backwards overhead 4.54-kg medicine ball throw (BOMB T); 10-repetition maximum deadlift; and a 91.44-m farmer's carry with 18-kg kettlebells. Data were recorded in raw and scaled scores (based on internal department scoring). Trainees were split into GRAD (n=576), RELI (n=33), RELP (n=66), and RELR (n=11) groups. A one-way ANOVA with Bonferroni post hoc calculated between-group differences. Stepwise linear regression determined whether raw and/or scaled fitness scores predicted group inclusion. Receiver operating curves (and area under the curve; AUC) derived test accuracy for predicting academy release. **RESULTS:** The GRAD group were superior ($p \leq 0.04$) to the: RELI group in all tests except push-ups, pull-ups, and the raw farmer's carry score; RELP group in all tests except the farmer's carry; RELR group in $\dot{V}O_{2max}$, scaled deadlift, and total OPAT score. The strongest predictive regression ($r^2=0.15$) for the GRAD group included scaled scores for total OPAT, deadlift, BOMB T, and $\dot{V}O_{2max}$. For the RELI group, it was scaled $\dot{V}O_{2max}$, BOMB T, pull-up, and leg tuck scores ($r^2=0.06$), and scaled total OPAT and BOMB T scores for the RELP group ($r^2=0.06$). Scaled deadlift score was the strongest predictor for the RELR group ($r^2=0.05$). Raw $\dot{V}O_{2max}$ (AUC=0.71) and total OPAT (AUC=0.74) score had acceptable accuracy for predicting trainee release. Trainees who graduated were predicted to have a $\dot{V}O_{2max}$ of ≥ 43.05 ml/kg/min and a total OPAT ≥ 394.5 points (out of 800). **CONCLUSION:** Fitness influenced academy graduation and reasons for release. Scaled scores could predict group inclusion in this department, with $\dot{V}O_{2max}$ and total OPAT score providing the most accurate predictors for release.