

The Relationship of Physiological and Fitness Variables to Performance in CrossFit®-based Exercise: Preliminary Findings

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ABSTRACT

CrossFit® is a rapidly expanding exercise program as well as an emerging competitive sport. Little is known regarding the correlation of physical fitness measures and performance in CrossFit®-based events. **PURPOSE:** The purpose of this study was to determine the relationship between various physiological and fitness variables and performance in a typical CrossFit®-based workout. **METHODS:** Nine male participants (age = 32.2 ± 3.6 yrs; height = 173.1 ± 9.8 cm; weight = 86.1 ± 11.6 kg; BMI = 28.6 ± 1.2 kg/m²) who had performed CrossFit® as their primary exercise program at least 3 days/week for the past 12 months were recruited. Participants performed a test of maximal aerobic fitness (VO_{2max}), a Wingate test, a DEXA scan, a 1RM Clean and Jerk, and a series of exercises that would typically be included in a CrossFit®-based workout. More specifically, participants performed 15 Wall Ball exercises (20 lbs.), 15 Box Jumps (24 in.), 10 Burpees over a barbell, and 10 Kipping Pullups. If all exercises were completed, the participants repeated the exercises in the same order. The participants were asked to stop after 12 min, and the total number of repetitions completed was recorded. Questions regarding the participants' exercise history and dietary habits were asked. Spearman's correlation was used to identify relationships between the variables and performance (number of repetitions completed) during the CrossFit®-based workout. Participants were also grouped into "high" (\geq median) or "low" ($<$ median) groups, and independent samples t-tests were used to compare how each group performed during the CrossFit®-based workout. Statistical significance was set at .05. **RESULTS:** Performance during the CrossFit®-based workout had strong, positive relationships with strength-to-body weight ratio ($r = .686$; $p = .041$), 1RM Clean and Jerk ($r = .915$; $p = .001$), and years of experience ($r = .869$; $p = .002$). Participants with higher strength-to-body weight ratios ($p = .036$), lower fatigue index ($p = .022$), lower body fat percentage ($p = .022$), higher weight lifted during the 1RM Clean and Jerk ($p = .017$), and more years of experience ($p = .027$) completed more repetitions during the CrossFit®-based workout. Significance was not found with any other variable. **CONCLUSION:** Based on these early findings, anaerobic fatigue resistance, body fat percentage, muscular power, and exercise history appear to be significant predictors of performance in CrossFit®-based workouts.