

Physiological and Fitness Adaptations Following Eight Weeks of CrossFit® Exercise

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ABSTRACT

Over the past decade, CrossFit® has been rapidly growing in popularity. There are currently over 5,000 CrossFit® gyms around the world and the number of gyms is increasing each year. Health professionals are unable to provide clear recommendations for CrossFit® due to the limited amount of existing research that includes the program as an exercise intervention. **PURPOSE:** To characterize the cardiorespiratory responses, body composition, and other health-related physical fitness parameters before and after 8 weeks of CrossFit® exercise in sedentary adults. **METHODS:** Fourteen participants, including men ($n = 4$; age = 30 ± 8 yrs; height = 176.03 ± 7.57 cm; weight = 114.6 ± 43.56 kg) and women ($n = 10$; age = 26 ± 6 yrs; height = 163.21 ± 7.53 cm; weight = 70.71 ± 18.28 kg) who were inexperienced with CrossFit® and had not performed regular structured physical activity for the past 12 months, completed all procedures. All participants completed 8 weeks of CrossFit®, exercising 3 days per week at a CrossFit® gym in Lewisville, TX. Each workout lasted about 1 hour and consisted of a warm-up, resistance exercise, circuit training that included a combination of aerobic and resistance exercise, and flexibility training. Resting heart rate, resting blood pressure, cardiorespiratory fitness, body composition, muscular strength, muscular endurance, and muscular flexibility were assessed before and after the 8-week protocol. Dependent t-Tests were performed to determine any differences between the two time points. A significance level of 0.05 was used. **RESULTS:** Following the 8-week CrossFit® program, resting heart rate (73 ± 12 vs. 68 ± 11 bpm; $p = 0.006$) and resting diastolic blood pressure (71 ± 7 vs. 65 ± 6 mmHg; $p = 0.01$) were reduced, while resting systolic blood pressure (112 ± 13 vs. 108 ± 12 mmHg; $p = 0.13$) remained unchanged. Absolute VO_{2peak} (2.53 ± 0.68 vs. 2.69 ± 0.66 L/min; $p = 0.003$) and relative VO_{2peak} (32.51 ± 8.84 vs. 34.31 ± 8.63 ml/kg/min; $p = 0.003$) were improved. Lean body mass (106.03 ± 29.41 vs. 108.38 ± 30.38 lbs; $p = 0.006$) was increased, but fat mass (71.57 ± 44.98 vs. 70.22 ± 44.52 lbs; $p = 0.23$) did not change. Performance on the leg press (5RM; 362 ± 120 vs. 444 ± 149 lbs; $p < 0.001$), bench press (5RM; 86 ± 44 vs. 102 ± 47 lbs; $p < 0.001$), YMCA bench press (26 ± 13 vs. 37 ± 16 reps; $p < 0.001$), one-minute sit-up (25 ± 9 vs. 32 ± 10 reps; $p < 0.001$), and sit-and-reach (30.36 ± 11.36 vs. 32.14 ± 9.66 cm; $p = 0.01$) were all increased. No significant or chronic injuries were reported. **CONCLUSION:** CrossFit® may be a safe and effective exercise program for improving health-related physical fitness parameters in sedentary adults.