

Changes in Health and Physical Fitness Parameters After 6 Months of High-intensity Group Exercise in Firefighters

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ABSTRACT

Cities annually budget thousands of dollars for rehabilitation services due to work-related injuries that affect firefighters. Proper training methods may be used as an effective preventative measure for many of the musculoskeletal injuries sustained as a first responder that are inherent with the profession. The physical demands of firefighting require that the individuals employed in this profession be, at minimum, in good physical condition. The traditionally low fitness levels and poor exercise habits of firefighters may predispose this population to an increased risk of chronic conditions, such as cardiovascular and metabolic disease.

Purpose: The purpose of this study was to analyze changes in health and fitness parameters of professional firefighters across North Texas during a 6-month training program. **Methods:** Twenty-five professional firefighters (23 males and 2 females; age 37.5 ± 10.0 years; height 70.9 ± 2.7 in; weight 96.4 ± 15.7 kg; BMI 29.8 ± 7.6 kg/m²) completed 6 months of high-intensity group training, consisting of 2 training sessions per week. Exercises were chosen to mimic common activities of firefighting. These included: farmer's walks, squats, pushups, planks, sled pushes, sled drags, rows, tire flips, sledgehammer strikes, and medicine ball slams. These individuals underwent a pre- and post-fitness testing protocol that consisted of body composition, range-of-motion, anaerobic power, muscular endurance, and cardiorespiratory fitness. A repeated-measures MANOVA was used to determine any differences between testing periods. A significance level of 0.05 was used. **Results:** Comparing post-testing to pre-testing values, improvements in sit-and-reach (31.8 ± 7.5 vs. 25.3 ± 6.5 cm; $p < 0.001$), mean power (706.9 ± 125.2 vs. 660.2 ± 125.5 W; $p < 0.001$), fatigue index (54.0 ± 8.0 vs. 60.8 ± 7.4 %; $p < 0.001$), curl ups (48 ± 26 vs. 21 ± 15 ; $p < 0.001$), pushups (35 ± 16 vs. 30 ± 15 $p = 0.005$), VO_{2max} (38.2 ± 5.8 vs. 35.6 ± 4.9 ml/kg/min; $p = 0.005$) & energy expenditure (11.0 ± 1.5 vs. 10.1 ± 1.3 METS; $p = 0.003$) were found following the 6-month training program. No differences in body composition or peak power were observed ($p > 0.05$). **Conclusion:** Six months of high-intensity group exercise may improve measures of physical fitness in firefighters.