

The Effect of Mobility and Strength Training on Firefighter Cadet Functional Mobility

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ABSTRACT

Strength and Conditioning programs have positive effects on athletic performance (Hedrick, 2002). Similarly, firefighters have to be adequately fit to perform their job duties which require muscular strength and endurance, and aerobic fitness (Smith, 2011). Thus, firefighter's health and fitness, including mobility, is crucial in their job performance. **PURPOSE:** We examined the effects of a strength, conditioning, and mobility program on functional mobility in firefighter cadets. **METHODS:** 43 firefighter cadets who were enrolled in a 12-week basic firefighter academy course participated. Cadets were separated into one of three cohorts; 1) No program; 2) Unmonitored Program; and 3) Indirectly Monitored Program. Participants either completed daily physical fitness training tasks on their own or set by fire instructors. A certified strength and conditioning specialist (CSCS) set up the physical fitness training modes for cohorts 2 and 3; however, the CSCS did not monitor training directly. Mobility was assessed by ROM exercises using DARI Motion Capture® (DARI Motion, Kansas City, Missouri). Motions included bodyweight bilateral squat, unilateral squat right and left, forward lunge right and left, and lateral lunge right and left. Post testing was completed 12-weeks after initial assessments. Statistical analysis was conducted using SPSS. **RESULTS:** Overall Cohort 3, Indirectly Monitored Program, had the greatest positive mobility changes when comparing pre post testing. There were significant increases in bodyweight squat left knee flexion in cohort three (115.58 ± 16.0 to 124.56 ± 16.42 , $p=0.02$). Bodyweight squat left ankle flexion also significantly increased (24.20 ± 11.78 to 34.98 ± 12.03 , $p=0.005$). Significant increases in bodyweight squat percentage of lower body height in cohort three were also positive ($47.3 \pm 10.7\%$ to $52.7 \pm 10.0\%$, $p=0.037$), indicating that greater squat depth was achieved after the indirectly monitored program. However, negative effects on the bodyweight squat includes left and right knee valgus both increasing showing a lack of stability in dynamic knee control while squatting (left: 4.65 ± 1.33 to 5.02 ± 0.66 , $p=0.039$; right: 3.97 ± 2.06 to 4.87 ± 1.33 , $p=0.005$). Unilateral squat depth percentage of lower body showed significant changes in Cohort 3 ($26.9 \pm 8.3\%$ to $32.0 \pm 13.6\%$, $p=0.032$). Unilateral squat knee and ankle flexion both showed positive significant differences (knee: 83.70 ± 18.05 to 94.62 ± 23.49 , $p=0.02$; ankle: 24.34 ± 9.38 to 34.57 ± 12.25 , $p=0.001$). **CONCLUSION:** The results of the current study suggest that even indirect monitoring of tactical strength and conditioning programming can have a positive effect on firefighter cadet's functional mobility. In the future, programming should be more direct including the installation of tactical personnel to aid and facilitate training programs with proper supervision.