EFFECTS OF ENDURANCE TRAINING AND STRENGTH TRAINING ON CARDIOVASCULAR PERFORMANCE DURING AN 8-WEEK MILITARY TRAINING

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Regular physical activity is essential for improving physical fitness of soldiers and for prevention of obesity. Some reports have shown significant increases in aerobic capacity (VO2max) of soldiers during a basic training (BT) season (Kraemer et al., 2004). On the contrary, some studies have found no changes in VO2max (Marnick et al., 1985) or even a reduction (Legg et al., 1996). The purpose of the present study was to examine the effects of endurance and strength training compared to a standardized physical training programme on cardiorespiratory functions of the conscripts during an 8-week BT period.

In the beginning of BT, male conscripts were divided into endurance (ET), strength (ST) and normal training (NT) groups (n=24/group). Their mean age was 19.2±0.9 yr., height 1.79±0.06 m, initial body mass (BM) 73.8±12.4 kg, and body mass index (BMI) 23.0±3.8 %. The overall physical loading of the military training was the same in ET, ST and NT but the groups differed with regard to three specific training sessions per week (cycling, nordic walking and running for ET, strengthening for ST and overall physical exercise for NT). VO2max was measured by a bicycle ergometer until exhaustion. Oxygen uptake was continuously measured using a gas analyzer (SensorMedics), and blood samples were drawn every 2nd min for blood lactate analysis. Heart rate (HR) was continuously recorded using a HR monitor (Polar Vantage).

There were no initial differences between the groups in age, height, body mass, physical activity, muscle strength and aerobic capacity. Significant decreases in BM (1.1%, p<0.05) and BMI (1.1%, p<0.05) were found only in ST. Waist circumference (WC) decreased in ET (2.6%, p<0.01) and ST (2.9%, p<0.001). However, percentage of body fat (7-skinfold) decreased by 5.2% (p<0.01) in ET, 16.3% (p<0.001) in ST and 9.5% (p<0.01) in NT throughout BT. VO2max increased by 8.5% in ET (p<0.05), 10.8% (p<0.01) in ST and 13.4% in NT (p<0.001) but the changes did not differ between the groups. However, no improvements were observed, if initial VO2max exceeded 55.6 ml/kg/min. In addition, no significant changes were observed in maximal HR.

The present 8-week strength, endurance and normal training programs in association with the present BT (including physical, combat and march training) improved significantly VO2max of the conscripts. The study demonstrated that it is not possible to achieve additional benefits in VO2max during the BT season by increasing specifically endurance training to the training programs. In conclusion, the current BT programme including a high amount of endurance training as such improves cardiovascular performance of the conscripts. In addition, training influences positively to body composition by decreasing body fat and WC.

References

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