Changes in cardiorespiratory fitness and coronary heart disease risk factors following 24 wk of moderate- or high-intensity exercise of equal energy cost

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This study was designed to investigate the effect of exercise intensity on cardiorespiratory fitness and coronary heart disease risk factors.

Maximum oxygen consumption ($\dot{V}O_{2\text{max}}$), lipid, lipoprotein, and fibrinogen concentrations were measured in 64 previously sedentary men before random allocation to a non-exercise control group, a moderate-intensity exercise group (three 400-kcal sessions per week at 60% of $\dot{V}O_{2\text{max}}$), or a high-intensity exercise group (three 400-kcal sessions per week at 80% of $\dot{V}O_{2\text{max}}$).

Subjects were instructed to maintain their normal dietary habits, and training heart rates were represcribed after monthly fitness tests. Forty-two men finished the study. After 24 wk, $\dot{V}O_{2\text{max}}$ increased by 0.38 ± 0.14 l/min in the moderate-intensity group and by 0.55 ± 0.27 l/min in the high-intensity group. Repeated-measures analysis of variance identified a significant interaction between monthly $\dot{V}O_{2\text{max}}$ score and exercise group ($F = 3.37, P < 0.05$), indicating that $\dot{V}O_{2\text{max}}$ responded differently to moderate- and high-intensity exercise. Trend analysis showed that total cholesterol, low-density lipoprotein cholesterol, non-high-density lipoprotein cholesterol, and fibrinogen concentrations changed favorably across control, moderate-intensity, and high-intensity groups. However, significant changes in total cholesterol (–0.55 ± 0.81 mmol/l), low-density lipoprotein cholesterol (–0.52 ± 0.80 mmol/l), and non-high-density lipoprotein cholesterol (–0.54 ± 0.86 mmol/l) were only observed in the high-intensity group (all $P < 0.05$ vs. controls).

These data suggest that high-intensity training is more effective in improving cardiorespiratory fitness than moderate-intensity training of equal energy cost.

These data also suggest that changes in coronary heart disease risk factors are influenced by exercise intensity training; lipids; lipoproteins; non-high-density lipoprotein cholesterol; fibrinogen (emphasis added)