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Exercise training and weight loss both reduce cardiovascular risk, but the independent importance of the two strategies is unclear. We aimed to investigate independent and combined effects of exercise training and weight loss on lipoproteins and dyslipidemia in overweight sedentary men. Sixty individuals were randomized to 12 weeks of endurance training (T), energy-reduced diet (D), training and energy increased diet (T-iD), or control (C). Equal energetic deficits (-600 kcal/day) were prescribed by exercise for T and caloric restriction for D. T-iD completed similar exercise but remained in energy balance due to the dietary replacement of calories expended during exercise. Total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), apolipoprotein B and A1, preβ-HDL, and susceptibility of LDL-C to oxidation were measured. Body weight was reduced similarly between T (-5.9±0.7 kg) and D (-5.2±0.8 kg) while T-iD (-1.0±0.5 kg) and C (0.1±0.6 kg) remained weight stable. Plasma TC, LDL-C, and apolipoprotein B were reduced in T compared to C (P<0.001 for both), but this was not observed for D (P>0.17). Changes in TC and LDL-C were associated with changes in body weight and body fat (P<0.01). In T-iD, increases in HDL-C and apolipoprotein A1 were observed (P<0.001). In conclusion, an exercise-induced decline in body weight reduces pro-atherogenic apoB-containing lipoproteins, whereas exercise compensated by energy intake increases the key component of reverse cholesterol transport, i.e. ApoA1-containing HDL-C.

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