# The effects of an eight-week aerobic exercise training program on serum leptin and cardiovascular risk factors among obese men with type II diabetes

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**Abstract:** Most diabetics suffer from obesity and one of the factors related to obesity is leptin hormone metabolism disorder. Reducing abnormal levels of this substance in the blood can prevent cardiovascular diseases. Thus, the aim of this study was to examine the effects of aerobic exercise training on serum leptin and cardiovascular risk factors among obese men with type 2 diabetes. In this clinical study, 53 patients in the age of 45±6 who had type 2 diabetes mellitus were selected purposely and classified randomly into two groups, i.e., an aerobic exercise group (27 patients) and a control group (26 patients). The former participated in an eight-week training program three times a week that included 45 to 60 minutes with the intensity of 60 to 80% of maximum heart rate. The subjects' blood samples, physical aspects, and oxygen consumption were taken before and after aerobic exercise training in the exercise group and in the control group. Aerobic exercise training caused a significant reduction in fat percentage ($p = 0.02$) and serum leptin of the patients ( $p = 0.000$), and it also significantly increased the HDL-c average ($p = 0.048$) and the maximal oxygen consumption ($p = 0.000$). It caused no significant changes in body weight, body mass index, waist-to-hip ratio (WHR), cholesterol, triglycerides, or LDL-C. This study indicated that metabolic disorders, which are considered to be the most important syndromes of type II diabetes, can be decreased by regular aerobic exercise training. Physical activities mixed with aerobic exercise training can decrease metabolic disorders by reducing the percentage of fatty tissue and serum leptin.
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## 1. Introduction

Most patients with type 2 diabetes suffer from obesity, and one of the factors related to obesity is leptin hormone metabolism disorder. Leptin is a hormone derived from fatty tissues, and it exists in the bound and free structures of human serum. The concentration of serum leptin demonstrates the stored energy level in fatty tissue. Leptin production can be increased by raising the mass of fat. The amount of leptin is indicative of the level of stored fat inside the human body, and it can indicate the existence of an imbalance in the energy condition in the human body (1). Leptin and other molecules secreted from fatty tissue can affect the body's sensitivity to insulin. Also, it has been demonstrated experimentally that leptin plays an important role in the formation of diseases related to obesity disorders, such as atherosclerosis and other cardiovascular problems (2). Thus, leptin can be considered as one of the major factors concerning obesity and heart coronary, and each process that helps reduce abnormal levels of this substance could help prevent cardiovascular diseases (3).

Lehmann et al. (2001), in an article entitled "Abdominal Fat Reduction and Improvement of Cardiovascular Risk Factors in Patients with Non-Insulin-Dependent Diabetes Mellitus" (NIDDM) reported that a three-month regular aerobic exercise training with the intensity of 50 to 70% of Vo2max resulted in a 20% reduction in plasma triglyceride concentration (TGC) in the fasting state and an increase in the low density lipoprotein (LDL) level. Also, physical exercises with moderate intensity caused an increase in lipolytic enzymes and an increase in HDL in the plasma (4). Maiorana et al. (200) examined the effects of long-term aerobic exercises (eight weeks) using ergometer bikes and treadmills with the intensity of 70 to 85% of Vo2max for male patients with type II diabetes. They reported that Vo2max was increased after such exercises for eight weeks, but they found no changes in LDL, HDL, TG, or body mass index (BMI). However, fat percentage and weight height ratio (WHR) decreased