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European Journal of Experimental Biology, 2014, 4(1):129-132

ISSN: 2248 –9215
CODEN (USA): EJEBAU

The effect of 12 weeks of progressive strength training on lipid profile levels in inactive middle-aged men

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ABSTRACT

The aim of the present study was to investigate the effect of 12 weeks of progressive strength training on lipid profile levels in inactive middle-age men. Subjects of the study were 12 men (age 40-60) who participated is the study voluntarily. The training program began two days a week in the first month and continued to three non-consecutive days a week. The training intensity began with 60 percent 1rpm during the first two weeks and increased to 75-80 percent 1rpm.Triglyceride, cholesterol, LDL and HDL were measured before and after 12 week. Data was analyzed using paired t-test statistical methods. Research findings showed that levels of triglyceride, total cholesterol, LDL and HDL no significant differences in post-test compared to pre-test (p=0.062, p=0.180, p=0.082 and p=0.476 respectively). The results of this study showed that strength training cannot change the blood lipid and lipoprotein levels in inactive middle-aged men. In fact, subjects with normal lipid profiles may require greater exercise stimulus and energy expenditure further improve lipid profiles.

Keywords: strength training, Lipid and lipoproteins profile, middle-aged men.

INTRODUCTION

Cardiovascular disease has been recognized as a major leading cause of death for more than 10 decades, is known for a lot of people their lives each day to lose by this disease worldwide. Abnormal blood lipids known with increased LDL and low HDL as a risk factor for developing cardiovascular disease[1-3]. In addition, evidence suggests that physical inactivity is a risk factor for development of cardiovascular disease [4,5].

Physical activity beneficial effects such as improving abnormal lipid and lipoprotein levels, decreased blood pressure and body weight [4]. Physical activity, as a non-pharmacological treatment is often recommended for inactive individuals to positively modify lipid profile levels. Physical activity is a major modifiable determinant of cardiovascular disease [6,7]. Some studies have suggested that adults need at least 30 minutes a day of moderate-intensity exercise to participate [8,9]. Strength training with moderate intensity exercise program for people with sedentary lifestyles is partly to thereby prevent cardiovascular disease and improve functional capacity, physical fitness, health, strength, and endurance [10,11].

The effect of strength training on lipids and lipoproteins are unclear. Some of the beneficial effects of Strength training on improvement blood lipids and lipoproteins levels have been reported [4,12].Tan et al (2012) in study effects six months strength training on lipid profile levels in middle-aged men were examined and significant improvements in lipid profile levels were observed in these subjects [13].Strength training is a good way to achieve the desired weight loss due to its effect on body fat in men and women is recognized. However, some studies have also no improved the lipid profile after the Strength training has been reported [14,15]. Yktayar et al (2011)the effect of eight weeks Strength training on lipid profile levels of middle-age men, No significant changes in levels of but no improvements in lipid profile levels observed [16].

In middle-aged, some studies demonstrate that physical activity reduces cardiovascular risk by about 50 percent independent of other risk factors. In middle-aged, physical activity is associated with the prevention of the development of risk factors [4,17].Also investigate the effects of strength training on cardiovascular risk factors compared aerobic training very limited and physiological responses than aerobic training and strength training are is different [9,18]and additional research to understand the effects of different types of exercise on cardiovascular disease risk factors is needed. Therefore, this study investigated the effect of 12 weeks of progressive strength training on lipid profile levels in inactive middle-age men.

MATERIALS AND METHODS

Subjects were 12 sedentary male volunteers of 40 to 60 years old. Subjects were selected based on age, having health care provision and non-smoking. The subjects' physical characteristics are presented in Table 1. The objectives, details and possible risks of training programs were explained to the subjects and their written consents were obtained. Subjects' height and weight were recorded using a medical scale equipped with stadiometer (Seca: 220, Germany). Body fat percent and body composition were measured using a body composition analyzer (In body 3.0, South Korea).

Table 1- Participant Characteristics at Baseline

Parameter	Resistance training
Age (year)	49.50±7.63
Height (cm)	173.09±8.44
Body weight (kg)	70.71±8.24
Body Mass Index (kg/m2)	24.96±2.11
Body fat (%)	26.38±4.09
Lean body mass (kg)	56.04±5.25

Subjects were taught the correct techniques before starting the Strength training sessions. The training program began two days a week in the first month and continued to three non-consecutive days a week. The training intensity began with 60 percent 1rpm during the first two weeks and increased to 75-80 percent 1rpm. One to two sets were performed during the first month. The program included 10 strength movements for lower and upper body muscle groups. 3 sets of 8 to 10 repetitions (90 to 120 seconds rest between sets)were performed, and exercises included: bench press, seated row, shoulder press, chest press, lateral pull-down, abdominal crunches, leg press, leg extension, triceps pushdown, seated bicep curls.

Blood samples were collected after 12 hours fasting at pre-test and 48 hours after the last training session at post-test. After collecting blood samples at each step, 10 cc of blood was obtained from left hand in sitting position. Pars Azmoon kit model number (90015, 90017 and 91004) and enzymatic method were used for the measurement of plasma levels of triglyceride, total cholesterol and high density lipoprotein; and low-density lipoprotein was calculated by Friedwald equation(LDL=TC-(HDL+ TG/5) in terms of milligrams per deciliter.

Statistical analysis was performed using SPSS version 18. Data normality was determined by Kolmogorov-Smirnov test. Independent t-test was used for between-groups comparison and paired t-test was used for within-groups comparison of measured variables. The significance level of the test was also considered $p \leq 0.05$.

RESULTS

Comparison of within-group differences of research variables are presented in Table 2. Research findings showed that levels of triglyceride, total cholesterol, LDL and HDL no significant differences in post-test compared to pre-test (p=0.062, p=0.180, p=0.082 and p=0.476 respectively).

Table 2-The results of paired t-test in case group before and after the intervention

Parameter	Phase	Aerobic training	P-value
TG (mg/dl)	Per	162.75±30.71	0.062
	post	155.92±29.62	
TC (mg/dl)	Per	165.92±36.72	0.180
	post	161.33±30.07	
LDL (mg/dl)	Per	135.17±38.94	0.082
	post	128.50±33.81	
HDL (mg/dl)	Per	46.17±9.11	0.476
	post	47.33±12.02	

DISCUSSION

This study was designed to investigate the effect of 12 weeks of Strength training on lipid profile levels of inactive middle-age men. The findings revealed that there were no significant differences in triglyceride levels at post-test compared to pre-test. The results were consistent with Soori et al (2011)but did not match with Gorzi et al (2011), Soori et al (2007), and Gelecek et al (2006).Much research has demonstrated that physical activity and the risk cardiovascular diseases reduce and, according to some research evidence, sedentary individuals at risk for cardiovascular diseases. One of the mechanisms for reducing the risk of cardiovascular diseases could be due to lower triglycerides. Triglycerides from food or produced by the liver [20,22].Probably Subjects of triglyceride levels during strength training not to break down fatty acids have not been able to use it to produce energy in the active muscles.

The findings revealed that there were no significant differences in cholesterol levels at post-test compared to pre-test. The results were consistent with Soori et al (2011) but did not match with Gorzi et al (2011), Bemelmans et al (2007), and Gelecek et al (2006).Decrease in insulin during physical training can cause changes in plasma cholesterol levels [4,5]. Probably Changes in insulin levels are not to be decrease cholesterol.

The findings revealed that there were no significant differences in LDL levels at post-test compared to pre-test. The results were consistent with Soori et al (2011) but did not match with Gorzi et al (2011), and Gelecek et al (2006).The effect strength training are unclear, but strength training on blood lipids with high volume and short rest periods between training sessions and probably has the greatest effect on blood lipids. During exercise can increase the body's endocrine system hormones epinephrine, norepinephrine, growth hormone, and cortisol increases lipolysis and fatty acids as fuel use [3,4].Probably this kind of strength training volume and rest periods could induce endocrine system of fat oxidation to the significant changes in LDL levels was not observed between these subjects.

The findings revealed that there were no significant differences in HDL levels at post-test compared to pre-test. The results were consistent with Soori et al (2011) but did not match with Bemelmans et al (2011), and Gelecek et al (2006).Lipoprotein lipase is an enzyme that plays a major role in the conversion of vLDL to HDL plays. The effect of exercise on lipoprotein lipase activity increases [10,11].

CONCLUSION

The results of this study showed that strength training cannot change the blood lipid and lipoprotein levels in inactive middle-aged men. In fact, subjects with normal lipid profiles may require greater exercise stimulus and energy expenditure further improve lipid profiles.

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