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Effect of 8-week In-Place and Transitional Training on Obese Young Men's Body Composition and Blood Lipid Profile

Behzad Azadi[1], Lotfali Bolboli[2], Mostafa Khani[1]*, Kimiya Sadri [3]

[1.] *Department of Physical Education and Sports Sciences, Islamic Azad University of Ahar Branch, Ahar, Iran*

[2.] *Department of Physical Education and Sports Sciences, University of Mohagheghe Ardabili, Ardabil, Iran*

[3.] *Department of Physical Education and Sports Sciences, Education office of Tabriz, Tabriz, Iran*

* Corresponding author's Email: khani_ms@yahoo.com

ABSTRACT: The purpose of this study was to evaluate the effects of in-place (exercise bike + weight training) and transitional (jogging + dynamic exercise) training methods on body composition and blood lipid profile of young obese men. Participants of this study were 40 young obese (BMI>30) men (Age: 29.00±1.16, Height: 174.85±3.21, weight: 108.56±3.45) which randomly divided in to two groups of in-place and transitional training. Then, subjects did an 8-week transitional or in-place training program, three sessions a week, 75 minutes a session. Before and after intervention, body composition and blood lipid profile of the subjects has been measured. Data were analyzed using paired and independent t-test in the significance level of 0.05 under SPSS software (version 17). Findings showed that both in-place and transitional trainings had significant effect on the reduction of fat mass and improving lipid profile of blood in young obese men ($p < 0.05$) and there wasn't significant difference between the effect of two training methods. According to the findings of this study, it seems that both transitional and in-place training methods have sufficient efficiency for reduction of fat mass in obese men if training principles are considered properly. But, for obese people and those who are suffering from injuries in lower limb or don't have tolerance for increasing heart rate and breathing problems, it is suggested to use in-place training for improving body composition and controlling weight. Because, this kind of training can help reducing fat mass and improving lipid profile like transitional training and is more tolerable.

Key words: BMI, Fat Mass, in-Place Training, Lean Body Mass, Lipid Profile, Obesity, Transitional Training

ORIGINAL ARTICLE

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INTRODUCTION

Unfortunately nowadays, welfare coming from industrial development make people to prefer driving to walking, watching TV to physical exercises and so on. This life style put individuals in positive energy balance that results in cardiovascular diseases, a recently common problem which a lot of people are struggling with it. Overweighting and obesity are considered as a major health problem and has been identified as a second predictable death risk factor (after smoking), and its condition in society has significant relationship with the health rate of the society (Gwin up, 2005; Team, 2008; Kim et al., 2009). World health organization has reported the prevalence of over–weighted and obesity in Middle East countries, 54.2% among women and 31.4% among men. This issue causes to the 150,000 deaths per year in these countries (Angelopoulos et al., 2009; Beaglehole et al., 2011). In Iran, according to the recent report of WHO, 66% of non–epidemic deaths in 2011 (185922 cases), were result of chronic diseases in which overweight and obesity were main reason. This organization reported the prevalence of over–weighting among Iranian men and women 46 and 56.8% and prevalence of obesity 12.4 and 26.5% in 2011 (World Health Organization, 2011). Obesity obviously has high correlation with cardiovascular diseases, hypertension, diabetes, Asthma, renal diseases, spinal cord problems and mental disorders (Villareal et al., 2011) and is one of the risk factors for the outbreak of chronic diseases such as dyslipidemia (high cholesterol level of blood), stroke, gallbladder, osteoarthritis, sleep apnea and several malignancies (Fisher et al., 2011). But fortunately in the case of losing weight, death percent decreases by 20% in men and 33% in women (Ehrman et al., 2013).

Researches done on the inappropriate effects of obesity and subcutaneous fat storage unanimously encourage men and women to do physical activities in order to lose weight and control body composition. But inappropriate exercises according to age, weight and physical fitness can cause injury which stops deters individual from exercise and so controlling weight.

Research literature shows that, appropriate exercise for lipolysis, is continuous training and trainings in which weight transition takes place and has focus on aerobic energy system, because lipolysis rate is maximum in these kinds of trainings (Nicklas, 2001). It is suggested that, training program should include 2-5 sessions in a week,

with the intensity of 40–75% maximal heart rate for 45–60 minutes and burns 300–400 kilocalorie in total (Armstrong, 2006). While, people experience some injuries such as shin-splint and meniscus damages in lower limb and chronic backaches because of weight bearing (transitional) aerobic trainings, which can put a stop to the training and controlling the weight (Jacobsson et al., 2012). In addition, adherence and doing these trainings is mentally hard. In other hand, a person who is over-weight and has inappropriate body composition may be handicapped in lower limb, so transitional trainings is not possible for him/her.

In contrast, some studies about in-place trainings and local fat redaction have reported that in-place training programs including isotonic and isometric will cause a reduction in local subcutaneous fat and of body measures (Glowacki et al., 2004; Levinger et al., 2007and Lambers et al., 2008).

This question comes to the mind of a many people that, which kind of training method will have better output in losing weight, considering their outcomes. Since American College of Sport Medicine mentions that continuous trainings especially weight bearing (transitional) ones, cause better fat reduction (Haskell et al., 2007), but heavy individuals can't do weight bearing training easily and in-place training is more tolerable for them, the purpose of this study was to evaluate the effects of two training methods of in-place (exercise bike + weight training) and transitional (jogging + dynamic exercise) methods on body composition and blood lipid profile of young obese men to make on appropriate answer to the question of priority of training choice.

MATERIALS AND METHODS

Considering that body fat percentage and training intensity increases and decreases respectively from age of 30 to 35 (Ekelund et al., 2005), Participants have been selected from the age range of 25±5. Participants of this study were 40 young obese (BMI>30) men (Age: 29.00±1.16, Height: 174.85±3.21) which were selected voluntarily from the men who came round to body building and wrestling gyms in Ahar, Iran to lose their weight. The preliminary selection criteria of individuals were BMI > 30 and not doing organized sport activity during 2 years before this research. The participants have been examined about the cardiovascular diseases and pain in lower limb and none of the subjects mentioned a problem. After explaining the goal and process of research and completing written informed consent, the subjects have been randomly divided in to 2 groups of 20 participants for in-place and transitional training. It should be mentioned that all study methods and protocols were approved in advance by the Institutional Review Board at the University of Mohaghegh Ardabili (grant No: 2010144).

Procedure

After sampling and before starting pretest body composition and blood lipid profile of the subjects has been measured as follow:

1. Body Composition: Percentage of body fat was calculated using a Body Composition Analyzer (JAWON IOI 353, Korea). The calibration procedure uses an internal calibration system. Participants wore light clothing and were barefoot during body composition analysis.

2. Blood sampling: Measures were performed as described previously (Martins et al., 2010). Venous blood samples were collected into EDTA containing tubes, in the morning between 8:00 am and 9:30 am, after 12 h fasting. Participants were in a seated position and rested for five minutes. The cholesterol assessments were direct enzymatic clearance tests conducted at the Shafa Laboratories. Total cholesterol (TC) was determined using a Triderbased (CHOD-PAP) colorimetric end-point assay (CH 3810, Shafa Laboratories Ltd, Iran). High-density lipoprotein cholesterol (HDL-C) was determined using a direct two-point kinetic assay kit (CH 2652, Shafa Laboratories Ltd, Iran). Low-density lipoprotein cholesterol (LDL-C) was determined with a direct two-point kinetic assay kit (CH 9702, Shafa Laboratories Ltd, Iran). Triglycerides (TG) were determined using a Trinder- based (GPO-PAP) colorimetric end point assay (TR 3823, Shafa Laboratories Ltd, Iran).

After passing these steps, 8–week of transitional and in-place training in 3 sessions a week, every session 75 minutes have been applied on experimental groups. Site of the training for two groups were red-crescent body building gym and wrestling club of Ahar. The Average of temperature in training environment was 28 °C during training. Also, a day after the end of training program, post-test has been taken from all the subjects and then results were statistically analyzed.

3.Training program

3.1.In-place training program: This program included 3 parts that every part has been done in one day and this program has been used rotary during 8 week. Every session of training lasted 75 minutes.

3.1.1. **First session**: 12 minutes of ergometer bicycle (for warm-up) with the intensity of 60-70% of maximal heart rate, 2*20 sit-ups, 5 sets * 12- 15 repeats of bench press and upper chest press with machine, butter fly, and finally 12 minutes exercise on ergometer bicycle with 65 -70% of maximal heart rate.

3.1.2. Second session: 12 minutes ergometer bicycle (for warm-up) with 65-70% of maximal heart rate, 2*20 repeats of sit-up, 5 sets*12-15repeats of leg extension, leg curl, hack squat with machine and finally 12 minutes work on ergometer bicycle with 65-70% of maximal heart rate .

3.1.3. Third session: 12 minutes exercise on ergometer bicycle with 65-70% of maximal heart rate, 2*20 repeats of sit- ups, 5 sets * 12-15 repeats of back and front lat pull-down, dumbbell pull-over on bench, and finally 12 minutes work on ergometer bicycle with 65-70% of maximal heart rate.

3.2. Transitional training program: This program was also 3 sessions in a week, every session lasting 75 minutes. Each sessions included: 5 minutes of stretching, 2*12 minutes jogging (one minute active resting, walking, between 2 sets of jogging) with 65-70% of maximal heart rate, 30 minutes calisthenics exercises (usually includes hip and shoulder joint), 12 minutes of jogging (with 65-70% of maximal heart rate), and finally 3 minutes stretching. One day after accomplishment of 8-week trainings, post-test including all variables of pre-test has been done.

Statistical analysis

Descriptive and inferential methods have been used for analyzing the gathered data. Normal distribution of data was evaluated by Kolmogorov-Simonov test. For comparing the intra-group mean in pre-test and post-test, paired-sample t test has been used, and independent sample t test was used for comparing inter-groups differences. All data was analyzed under SPSS software (version 17) in the significant level of 0.05.

RESULTS

In table 1 Body characteristics of the subjects before and after intervention has been illustrated. According to the findings of this study, it has been identified that in-place training had significant effect on the reduction of fat mass in young obese men ($p < 0.05$). Transitional training had significant effect on the redaction of fat mass in young obese men too ($p<0.05$). Our data showed that there isn't any difference between the effects of two training methods on body composition. ($p=0.15$, $t38=1.43$). This means that both transitional and in-place methods caused to reduction of fat mass in the same rate.

Also, the results showed that lipid profile of blood has changed significantly in a good way after both training program ($p<0.05$). By the way, there is not difference between the effects of two training methods (table2).

Table1. Body characteristics of the subjects before and after intervention

Variable	In place		Transitional	
	pre	post	Pre	Post
Weight (Kg)	109.15±2.73	103.40±2.66*	106.95±2.45	**101.25±3.02***
Body fat percent	31.15±0.93	27.85±0.98*	31.15±1.18	**27.70±1.03***
Fat mass (Kg)	34.05±1.53	28.79±1.32*	33.36±1.37	**28.26±0.98***
Lean body mass (Kg)	75.09±2.06	74.90±2.07	73.58±2.58	**72.98±3.07**
Body Mass Index ($Kg.m^{-2}$)	36.14±1.48	35.23±1.25*	34.91±1.24	**31.05±1.35***

* Significant difference comparing to pre-test ($p<0.05$)

Table2. Effect of in-place and transitional training methods on lipid profile of blood

Variable	Transitional exercise		In-place exercise	
	Pre	Post	Pre	Post
Total cholesterol (mg/dl)	247.5±38.90	205.2±35.8*	250.32±27.44	207.8±40.21*
Triglycerides (mg/dl)	209.04±15.3	133.2±40.8*	207.73±17.21	130.25±40.8*
High-density lipoprotein (mg/dl)	39.5±3.55	70.6±15.2*	40.05±4.29	72.5±10.31*
Low-density lipoprotein (mg/dl)	146.0±32.2	93.45±19.16*	146.3±26.09	95.32±30.07*

* Significant difference comparing to pre-test ($p<0.05$)

DISCUSSION

According to the findings of this study, both transitional and in-place training methods have equal positive effect on improving body composition and lipid profile. In fact, controlling the energy balance in exercising individuals should reduce extra fat mass. In this study significant reduction of fat mass in both groups has been observed after training, too. This result is in agreement with the Heydari et al. (2012); Foster-Schubert et al. (2012); Heijden et al. (2010); Mcguigan et al. (2009); Ara et al. (2004) and also Dorosty et al. (2002), because exercise and diet in these studies caused to significant reduction of fat mass. Previous studies have also shown that 12-week of aerobic or strength training significantly decreased body fat composition, triglyceride, and CHOL levels (Fenkci et al., 2006). It is obvious that endurance exercises increases the lipolysis during and right after exercise due to changes in concentration of regulatory hormones (reduction of insulin and increase in catecholamine) and lipolysis capacity of adipocyte cells (Nicklas, 2001). On the other hand, in healthy individuals, with normal baseline lipid profile, five months of

resistance training was associated with significant decreases in CHOL and LDL concentrations (Boyden et al., 1993). Moreover, 14-week resistance training had a favorable effect on lipid profile and body fat percentage in a similar type of population (Prabhakaran et al., 1999). Thus, it seems that when the stimulus is sufficient, the resistance training could positively influence the lipid profile. Also, in the present study, in-place trainings included combination of weight training and exercise bike which can help lipolysis and alter energy balance in favor of weight reduction and improving lipid profile of blood in obese men. The fact that both, in-place and transitional training programs, had a reduction in the LDL and total cholesterol levels after the training period is in agreement with other studies that previously showed that especially when negative caloric balance is present a decrease in LDL and total cholesterol can be found (Dattilo and Kris-Etherton, 1992).

Although, according to the findings of this study both in place and transitional trainings were effective in reducing fat mass and cholesterol but, in place training seems to be better. Because, weight training, can also increase muscular mass in long term, opposite of endurance training only. The above mentioned fact generally shows that, in-place training method is proper method for reduction of fat mass, retaining or increasing muscle weight and preventing from micro-injuries resulted from training process because:

A. not only in-place method didn't have statistical difference with transitional one, but also by comparing the means of weight reduction in both groups it can result more weight reduction.

B. in-place method can prevent proteolysis because weight training can help gaining muscle mass in long term.

C. because of the long time increase in heart rate and breathing problems between non-athlete individuals, this method is more tolerable than transitional method for obese people.

D. in in-place trainings, adjusting training intensity as the most important principle of training principles is easier than transitional program, so proper rate of energy cost can be adjusted for obese people during training.

E. because of non-horizontal or vertical transition of gravity center on lower limbs as a result of increase in training intensity, possibility of shin splints and other injuries in knee, talus, hip and also ligaments and tendons of these areas is reached to the least and helps individuals not to avoid weight reduction and controlling body composition as a result of these problems. Authenticity of this, is the finding that 42.8 % of our participants in the transitional group had a lot of complain about anterior leg pain while they have used proper running sneaker on the mat during training.

Generally, according to the findings of this study, it seems that both transitional and in-place training methods have sufficient efficiency for reduction of fat mass in obese men if training principles are considered. But, for obese people and those who are suffering from injuries in lower limb or don't have tolerance for increasing heart rate and breathing problems, it is suggested to use in-place training for improving body composition and controlling weight, Because, this kind of training can help reducing fat mass, and improving lipid profile like transitional training.

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