FACTA UNIVERSITATIS
Series: **Physical Education and Sport** Vol. 4, N° 2, 2006, pp. 93 - 101

Scientific Paper

EFFECT OF MODERATE AND HIGH INTENSITY WEIGHT TRAINING ON THE BODY COMPOSITION OF OVERWEIGHT MEN

UDC 796: -055.1+613.25

Rahman Rahimi

Department of Physical Education & Sport Sciences, Azad University Mahabad, Mahabad, Iran
Email: Rahman.Rahimi@Yahoo.Com

Abstract. *The optimal weight training intensity to improve body composition in overweight men is unclear. The purpose of this study was to determine the effect of 12 weeks of high intensity versus moderate intensity weight training of equal work output on body composition in overweight men (BMI = 25-29.9 kg/m^2). Twenty sedentary men (age: 27 ± 0.5 year; Body weight: 84 ± 1.43 kg; BMI: 28.23 ± 1.11 kg/m) were randomized in two equal groups (n = 10): 1) moderate intensity exercise (MI; 5sets*6reps [60% (1RM-1repetition maximum)]; and 2) high intensity exercise (HI; 5sets*6reps [85% 1RM]). The weight training program was performed 3d.w . Relative body fat (% BF) was assessed by a skin-fold caliper. Significant differences between and within the groups were analyzed using a two-way split-plot analysis of variance (ANOVA). Statistical significance was accepted at p<0.05. The two-way ANOVA showed statistically significant differences between HI and MI groups, therefore, the Scheffe Post-Hoc Test showed that there was a significant decrease (p<0.05) in the relative body fat (BF) (D = 27%), percent of body fat (%BF) (22%), BMI (D = 9.34%), and body weight (BW) (D = 6.51%) in the HI group during the course of the study than in the MI group Also, comparison of means between the pre/post test showed statistically significant decreases in skinfold thickness (HI = 45%, p = 0.001; MI = 25%, p = 0.02), percent of body fat (HI = 41%, p = 0.001; MI = 23%, p = 0.04), BMI (HI = 21.5%, p = 0.001; MI = 13.7%, p = 0.03), and body weight (HI = 21.58%, p = 0.001; MI = 13.82%, p = 0.01) after participation in a 12-week weight training program. It is concluded that 12 weeks of HI weight training may be more effective in improving body composition than MI weight training in overweight young men with physical characteristics similar to the ones found in the present study.*

Key words: *obesity, weight training, body composition, men*

Received July 15, 2006

1. INTRODUCTION

Body composition refers to the constituents of your body-lean mass, fat mass and water, and is not only important for athletes, since an athlete's performance is partially influenced by the proportion of his fat-free mass (FFM) and fat mass (FM), but also for individuals of all ages, gender and ethnic groups. According to the ACSM position on the matter (2001), obesity has been shown to be associated with heart disease (Shaper et al., 1997; Willett, et al., 1985), diabetes (Lew & Garfinkel, 1979; Colditz et al., 1990), cancer (Garfinkel, 1986; Giovannucci et al., 1995), heyperlipidemia (Ashley et al., 1974; Hershcopf et al., 1982), and hypertension (Flegal et al., 1998).

In order to maintain one's ideal body weight, the energy consumed needs to equal the energy output, and when these are equal, one is said to have an energy balance. In order to gain or lose weight, each side of the equation needs to be adjusted. Exercise appears to play a critical role in body weight control management (Kraemer et al., 1993, Marra et al., 2005). It's important to consider the duration, intensity, and type of exercise that should be recommended for weight loss.

It has been shown that aerobic exercise can be an important component of weight loss intervention (Tremblay et al., 1994; Aggel-Leijssen et al., 2002), and, therefore, commonly included as part of a comprehensive weight loss management program. However, there is a controversy over whether high intensity exercise or low intensity exercise is more important for stimulating a decrease in the body fat content.

Girandola et al. (1979) and Swenson & Conlee (1979) reported that the percent of fat decreases more from low intensity (LI) than high intensity (HI) aerobic exercise. However, other studies have reported no differences on %BF between LI and HI aerobic exercise in overweight sedentary women (Duncan et al., 1991; Jakičić et al., 2003). Van Aggel-Leijssen et al. (2002) also reported no %BF differences between LI (40% VO2max) and HI (70% VO2max) exercise after 12 weeks in obese men. Nevertheless, Bryner et al. (1997), and Tremblay et al. (1994) reported that relative body fat decreases more in young overweight women in the case of HI rather than LI aerobic exercise.

Although most research studies have examined the effect of endurance exercise on weight loss, weight training has recently become an important component of a successful weight loss program by helping to preserve FFM and maximizing fat loss (Ballor et al., 1988; Geliebter et al., 1997; Osterberg & Melby, 2000). Gettman and Pollock (1981) summarized the effects of five weight training and six circuit weight training studies on changes in body composition. The studies showed a mean decrease in body weight of 0.12 kg, increase in lean body mass of 1.5 kg, and a decrease in fat mass of 1.7 kg. Campbell et al. (1995) reported that resting metabolic rate and energy intake required to maintain body weight significantly increased in older adults following 12 weeks of strength training.

Recently, the effects of excess post-exercise oxygen consumption (EPOC) on weight management have appeared (Osterberg et al., 2000). Because the body continues to expend energy after exercise, EPOC plays a supplemental role in an exercise program in weight management. Holtom et al. (1999) have shown that a high-intensity, intermittent-type of training has a more pronounced effect on EPOC. Also, it appears that resistance training produces grater EPOC responses than aerobic exercise (Burleson et al. 1998). Unfortunately; because of conflicting studies, the impact of resistance exercise intensity on body fat stores in overweight men is still unclear. Thus, the purpose of this study was to determine the effect of HI and moderate intensity (MI) weight training, of equal work output, on body composition in overweight young men.

2. METHODS

Subjects

Twenty overweight men (age: 27±0.5 years; body weight: 84±1.43 kg; BMI: 28.23±1.11 kg/m^2), who did not participate in any organized exercise, were recruited to participate in a 12-week weight training program. Following a detailed explanation of the tests and training programs involved, the subjects signed a human subject's informed consent form before participating in this study and completed a medical history questionnaire in which they were screened for any possible injury or illness. Also, they were requested not to change their eating patterns during the study. Then subjects were divided into two groups: 1) the High intensity exercise group (HI), 2) and the Moderate intensity exercise group (MI).

Exercise Training Protocol

Both groups performed the same volume of weight training program 3 d.w^{-1} for 12 weeks. The training intensities were different and included High Intensity (HI; 5 sets * 6 repetitions with 85% 1RM) and Moderate Intensity (MI; 5 sets * 6 repetitions with 60% 1RM) groups. The exercises included the Bench Press, Military Press, Arm Curl, Latissimus Pull, Leg Press, and Leg Curl that were performed with the Nautilus and The Universal Gym machines (Table.1).

Table 1. Weight Training Program

Exercise	High Intensity training group	Moderate Intensity training group
Bench Press	5*6 (85% 1RM), 3-minute¶	5*6 (60% 1RM), 3-minute
Military Press	5*6 (85% 1RM), 3-minute	5*6 (60% 1RM), 3-minute
Arm Curl	5*6 (85% 1RM), 3-minute	5*6 (60% 1RM), 3-minute
Latissimus Pull	5*6 (85% 1RM), 3-minute	5*6 (60% 1RM), 3-minute
Leg Press	5*6 (85% 1RM), 3-minute	5*6 (60% 1RM), 3-minute
Leg Curl	5*6 (85% 1RM), 3-minute	5*6 (60% 1RM), 3-minute

¶ Sets*Repetitions (Resistance), Rest between Sets

Subjects were required to warm up prior to each training session. The warm-up consisted of 4 minutes of low intensity on a cycle ergometer, followed by a 3 minutes of static stretching; they then performed 1 set of 8 repetitions and 1 set of 5 repetitions at 30 and 40% of their estimated 1RM respectively. The warm-up procedure was held constant throughout all the testing sessions. All of the pre tests (skinfold, 1RM in BP, MP, AC, Lat P, LP, and LC) were conducted one week before the initiation of the training period. In these sessions, after a 5-minute warm-up, 3-5 1RM attempts were performed with 4 minutes of rest between each attempt. After each repetition, the weight was increased by 2.5-10 kg for each repetition until failure; the final weight lifted was the 1RM (Cotterman, 2005), then 85% and 60% of 1RM was selected for the loads used in this study, respectively for the HI and MI groups. The same procedure was completed for the 1RM testing on the bench press, military press, arm curls, latissimus pull, leg curl and leg press exercise on each type of equipment, with only one test performed in each session. (Sharkely, 1990). After six weeks of training, the subjects' 1RM loads were measured again in order to determine their loads for remaining period (the next six weeks).

Anthropometry

Height (to the nearest cm) and weight (to the nearest 0.1 kg) were recorded with the subjects dressed in exercise clothes and without shoes. Skinfold measurements (to the nearest mm) were obtained form three sites (chest, abdomen, and front thigh) on the right side of the body by the same investigator using a skinfold caliper. The percent of body fat was calculated using a Baun & Raven nomogram (Sharkely, 1990). Standing height and weight was used to calculate the BMI (kg/m^2).

Statistical analysis

Descriptive statistics were calculated as the mean and standard deviations (mean ± SD). The data were analyzed using a 2*2 ANOVA (group vs. pre/post test measurement) for repeated measures using the Statistical Software (SPSS 12.0, Chicago, IL, USA). The differences detected by the ANOVA were located with *Scheffe post hoc* tests. All of the tests were two tailed, and an *alpha* level of p<0.05 was regarded as statistically significant (Table 2).

3. RESULTS

Table 2. Shows the physical characteristics of the HI and MI groups, both before and after a 12-week weight training program. There were no statistically significant differences between the HI and MI groups in the pre-test. The two-way split-plot showed statistically significant decreases in skinfold thickness (HI = 45%, P = 0.001; MI = 25%, P = 0.02), percent of body fat (HI = 41%, P = 0.001; MI = 23%, P = 0.04), BMI (HI = 21.5%, P < 0.001; MI = 13.7%, P = 0.03), and body weight (HI = 21.58%, P = 0.001; MI = 13.82%, P = 0.01) after participation in a 12-week weight training program (Figure 1, 2, 3, 4).

Table 2. Mean values (±SD) for physical measures of the High Intensity and Moderate Intensity groups before and after a 12-week weight training program

Measurement	High Intensity group (HI n = 10)		Moderate Intensity group (MI n = 10)	
	Pre	Post	Pre	Post
Age (yrs)	27 ± 0.8	–	27 ± 0.3	–
Height (cm)	171.6 ± 4.32	–	173.5 ± 2.95	–
Weight (kg)	84.8 ± 0.78	66.5 ± 2.87*£	83.2 ± 2.09	71.7 ± 1.88¶£
BMI(Kg/m^2)	28.18 ± 0.96	22.12 ± 1.46*£	28.28 ± 1.26	24.4 ± 1.67¶£
Σ Skinfolds = Chest + Abdomen + Thigh	87.5 ± 2.99	48.1 ± 2.1 *£	89.3 ± 3.26	66.55 ± 3.4¶£
Body fat (%)	25.5 ± 1.3	14.8 ± 0.3 *£	25 ± 1.5	19.2 ± 1.6¶£

***** Significant difference between Pre and Post Test in HI (P< 0.05).
¶ Significant difference between Pre and Post Test in MI (P< 0.05).
£ Significant difference between HI and MI groups (P< 0.05).

Also, comparison of means between groups showed that there were significant differences between the groups regarding change in percent of body fat, sum of skinfold, BMI, and body weight, and the results of the HI group were better than for the MI group; therefore, the *Scheffe Post Hoc* test was used for a pair-wise comparison of the programs, and showed that there was a significant decrease ($P < 0.05$) in the relative body fat (D = 27%), percent of body fat (22%), BMI (D = 9.34%), and body weight (D = 6.51%) in the HI group during the course of the study, than for the MI group.

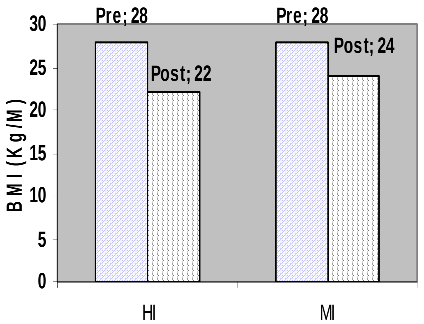

Fig. 1. BMI changes as a result of training.

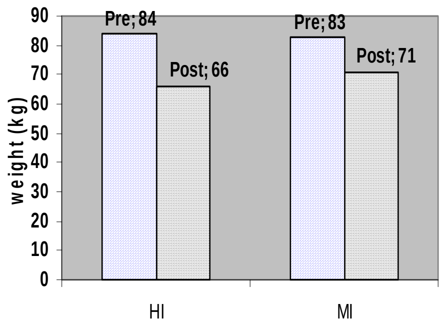

Fig. 2. Body weight changes as a result of training.

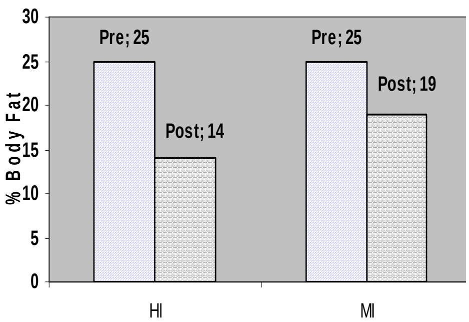

Fig. 3. % Body Fat changes as a result of training.

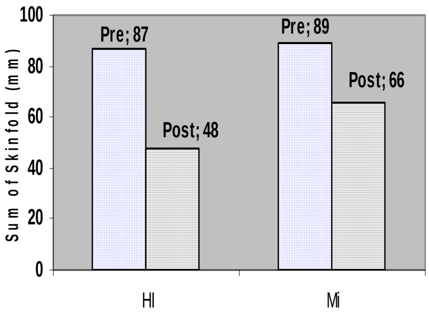

Fig. 4. Sum Skinfold changes as a result of training.

4. DISCUSSON

Obesity is a major public health problem in the developed world, and there is evidence that it is rapidly becoming a problem in the developing world. Obesity is a risk factor for diabetes, coronary artery daises, hypertension, gallstones, gout, and osteoarthritis, as well as cancer of the breast, colon, and prostate. Thus, it is important to develop programs that improve the prevention and treatment of obesity. Therefore, the purpose of this study was to compare the effects of high-intensity (HI) and moderate-intensity (MI) weight training on the body composition of overweight men.

The results showed that both groups showed significant decreases in BF, %BF, BMI, and BW after a 12-week weight training program. There were also significant differences between the groups after the course of the study and subjects that participated in HI training program showed significant decreases in BF, %BF, BMI, and BW in relation to the

MI group. These results are in accordance with previous studies (Campbell et al., 1995; Gettman and Pollock, 1981; Osterberg et al., 2000), showing that a resistance exercise program can significantly decrease BW, BF, and %BF.

As we know, exercise training increases the ability to use both fat and carbohydrates, with fat oxidation being predominant at low and moderate exercise intensity, and carbohydrate utilization being the dominant fuel for high intensity exercise. Brooks and Mercier (1994) have reviewed exercise macronutrient utilization based on the interaction between exercise intensity-induced responses and exercise-induced adaptations. They describe the crossover point as the power output at which energy derived from carbohydrates predominates over energy derived from lipids, with further increases in exercise intensity producing incremental increases in carbohydrate utilization and concomitant decreases in fat oxidation. During high intensity exercise, the carbohydrate-related adaptations in the trained individual allow the utilization of large amounts of glucose needed for high power output. After exercise training, the same amount of submaximal work can be performed with a greater contribution of fat oxidation to meet the energy requirement (Gollnick, 1985).

Therefore, the results of this study may be related to this physiological principle, as the results have shown that HI training results in a greater improvement in body composition than the MI training protocol. Although the energy expenditure was not measured, based on previous studies it was concluded that these results can partially be related to greater carbohydrates being depleted in high intensity – rather than moderate intensity - weight training programs.

Although few studies have focused on the impact of both high intensity and moderate intensity resistance training on body composition, there are many studies that have addressed the impact of HI and MI aerobic training on body composition. For example, the results obtained by Phelan et al. (1997) were similar to those obtained in this study, which examined the effects of low and high-intensity exercise of similar total energy output on energy expenditure during and after exercise and on substrate oxidation in eight eumenorrheic active females. They found that, as expected, carbohydrate oxidation was significantly greater for the high intensity protocol (75% VO2max) than for the low intensity (50% VO2max) activity. Total fat oxidation (exercise plus a 3-h recovery) was greater during the low intensity exercise treatment. However, the calculated fat oxidation was 23.8% higher 3h after the cessation of HI compared to LI exercise. Other recent studies provide further evidence that acute glycogen-depleting exercise enhances fat oxidation during recovery (Melby et al., 1993; Osterberg & Melby, 2000).

Bryner et al. (1997) ran a 15-week investigation with subjects (women aged 18 to 34) engaging in exercise four times a week. The study was designed to compare continuous running aerobic exercise at low intensity (heart rate around 132 beats/min) and high intensity (heart rate around 163 beats/min), with sessions lasting approximately 40 to 45 minutes for both groups. The authors found that under the high-intensity aerobic exercise the percent of body fat dropped from 27 ± 7.0 to $22 \pm 4.0\%$ ($p < 0.05$), while in the low-intensity group the reduction of 22 ± 6 to $21 \pm 6\%$ was not significant ($p > 0.05$). The authors concluded that the high-intensity physical exercise resulted in a significant percent of fat reduction even with no caloric restriction. Results obtained by Bryner et al. (1997) were similar to those in this study, in which the group engaging in high intensity weight training (85% 1RM) had a significant percent of fat reduction.

Haweley (1998) stated that low intensity exercises strongly stimulate lipolysis from peripheral adiposities, while the rate of fat oxidation is highest during moderate activities. We also observed that HI weight training had a greater statistically significant decrease in BF, %BF, BMI, BW than the MI training.

It is well recognized that during weightlifting exercise, phosphocreatine and skeletal muscle glycogen are the major sources of fuel for ATP synthesis. However, there remains the possibility that during the rest periods between sets and during the post-exercise recovery period fat may contribute to energy needs (Melby & Hill, 1999). Melby et al. (1993) found the RQ to be lower 15 h following a strenuous bout of weightlifting, which likely reflects greater fat oxidation at this point. Also, the results of my study support these principles and may be related to EPOC after acute weight training. It has been shown that during EPOC the body continues to expend energy not only to restore the depleted carbohydrates, but also to restore creatine phosphate, ATP, and the re-oxygenation of blood, restoration circulatory hormone, decrease in body temperature, return to normal ventilation and heart rate. Therefore, the result is a large energy requirement after exercise needed to restore the body systems to normal (Burleson et al., 1988). Thus, it appears that fat oxidation is enhanced during recovery from resistance exercise as well as after other types of high intensity exercise. This serves to spare available carbohydrates for glycogen resynthesis.

5. Conclusion

As could be expected, both training regimens HI (85% 1RM) and MI (60% 1RM) weight training had a significant effect on body composition. This should be account for as support to use weight lifting programs in weight management protocols. However, this study showed that high intensity weight training disturbs the body's to homeostasis to a greater degree than moderate intensity training, which results in a more pronounced greater EPOC response. It has been shown that a greater EPOC resulted a large amounts of energy requirement after exercise in order to restore the body's systems to normal (Osterberg & Melby, 2000). In conclusion, it appears that 12 weeks of HI weight training is more effective in increasing fat loss than MI weight training in overweight young men.

Acknowledgements. *The author would like to express his appreciation to the subjects for their participation in this study, also to Mr. Mohammad Rahimi for his support, statistically and otherwise, throughout the course of this project.*

References

1. ACSM. (2001). Position Stand on the Appropriate Intervention Strategies for Weight Loss and Prevention of Weight Regain for Adults. *Med Sc. Sports Exerc*, 33(12), 2145–2156.
2. Ashley, F.W., & Kannel, W.B. (1974). Relation of weight change to changes in atherogenic traits: the Framingham Study. *J Chron* Dis*,* 27,103–114.
3. Brooks, G.A. & Mercier, J. (1994). Balance of carbohydrate and lipid utilization during exercise*, J App. Physio,* 76, 2253-2261.
4. Bryner, R.W., Toffle, R.C., Ullrich, I.H., & Yeater, R.A. (1997). The effects of exercise intensity on body composition, weight loss, and dietary composition in women. *Am J Clin Nutr*, 16, 68-73.
5. Burleson, M. A. et al. (1998). Effect of weight training exercise and treadmill exercise on elevated post-exercise oxygen consumption. *Med Sci Sports Exerc*, 30, 518-522.

6. Campbell, W.W., Crim, M.C., Young, V.R., et al. (1995). Effects of resistance training and dietary protein intake and protein metabolism in older adults. *American Journal of Physiology, 268,* E1143–E1153.
7. Colditz, G.A., Willett, W.C., Stampfer, M.J., et al. (1990). Weight as a risk factor for clinical diabetes in women. *Am J Epidemiol,* 132, 501–513.
8. Cotterman, M.L., Darby, L.A., & Skelly, W.A. (2005). Comparison of muscle force production using the smith machine and free weights for bench press and squat exercises, *J. Strength and Cond. Res*., 19 (1), 169-176.
9. Duncan, J.J., Gordon, N.F., & Scott, C.B. (1991). Women walking for health and fitness: how much is enough? *JAMA***,** 266, 3295-3299.
10. Flegal, K.M., Carroll, M.D., Kuczmarski, R.J., & Johnson, C.L. (1998). Overweight and obesity in the United States: prevalence and trends 1960–1994. *Int J Obes,* 22, 39–47.
11. Garfinkel, L. (1986.) Overweight and mortality. *Cancer* 58, 1826–1829.
12. Gettman, L.R., & Pollock, M.L. (1981). Circuit weight training: A critical review of its physiological benefits. *Phys Sports Med, 9,* 44–60.
13. Giovannucci, E., Ascherio, A. Rimm, E.B. Colditz, G.A., Stampfer, M.J., & Willett, W.C. (1995). Physical activity, obesity, and risk for colon cancer and adenoma in men. *Ann Intern Med,* 122, 327–334.
14. Girandola, R.N. (1979) Body composition changes in women: Effects of high and low exercise intensity. *Arch Physical Med Rehab*, 57, 297-300.
15. Gollnick, P.D. (1985). Metabolism of substrates: energy substrate metabolism during exercise as modified by training, *Fed Proc*, 44, 353-357.
16. Haweley, J.A. (1998). Fat burning during exercise: can ergogenics change the balance? *Phys. Sportsmed,* 26, 56-62.
17. Hershcopf, R.J., Elahi, D., Andres, R., et al. (1982). Longitudinal changes in serum cholesterol in man: an epidemiological search for an etiology. *J Chron Dis,* 35, 101–114.
18. Holtom, R.W. et al. (1999). Circuit weight training and its effects on EPOC. *Med Sci Sports Exerc*, 31, 1613-1618.
19. Jakičić, J.M., Marcus, B.H., Gallagher, K.I., Napolitano, & M., Lang, W. (2003). Effect of exercise duration and intensity on weight loss in overweight, sedentary women. *JAMA* 290, 1323-1330.
20. Kraemer, W.J., Volek, J.S., Clark, K.L. et al. (1999). Influence of exercise training on physiological and performance changes with weight loss in men. *Med Sci Sports Exer,* 31, 1320–1329.
21. Lew, E.A., & Garfinkel, L. (1979). Variations in mortality by weight among 750,000 men and women. *J Chron Dis*, 32, 563–576.
22. Marra, C., Bottaro, M., Oliveira, R.J., & Novaes, J.S. (2005). Effect of moderate and high intensity aerobic exercise on the body composition of overweight men. *J E Ponline*, 8(2), 39-45.
23. Melby, C.L., Hill, J.O. (1999). Exercise, macronutrient balance, and body weight regulate. *Sport Sci Exchange*, 12, 1-14.
24. Melby, C.L., Scholl, C., Edwards, G., & Bullough, R. (1993). Effect of acute resistance exercise on postexercise energy expenditure and RMR. *J. Appl. Physiol*. 75, 1874-1853.
25. Osterberg, K.L. & Melby, C.L. (2000). Effect of acute resistance on postexercise oxygen consumption and resting metabolic rate in young women. *Int. J. Sport Nut. Exe. Met.* 10 (1), 71-81.
26. Phelan F.J., Reinke, E. Harris, M.A., & Melby. C.L. (1997). Postexercise energy expenditure and substrate oxidation in young women resulting from exercise bouts of different intensity. *J Am Coll Nutr*, 16, 140-146.
27. Shaper, A.G., Wannamethee, S.G., & Walker, M. (1997). Body weight: implications for the prevention of coronary heart disease, stroke, and diabetes mellitus in a cohort study of middle aged men. *Br Med J 314*, 1311–1317.
28. Sharkely, B.J. (1990). Physiology of fitness (84-85). Champaign, IL: Human Kinetics. 29. Swenson, E.J., Conlee, R.K. (1979). Effects of exercise intensity on body composition in adult males. *J Sports Med***,** 3, 323-326.
30. Tremblay, A., Simoneau, J.A., & Bouchard, C. (1994). Impact of exercise intensity on body composition fatness and skeletal muscle metabolism*. Metabolism***,** 43, 814-18.
31. Van Aggel-Leijssen, D.P.C., Saris, W., Wagenmakers, A.J.M., Senden, J.M., & Van Baak, M.A. (2002.) Effect of exercise training at different intensities on fat metabolism of obese men. *J Appl Physiol*, 92, 1300-9.
32. Willett, W.C., Browne, M.L. Bain, C., et al. (1985). Relative weight and risk of breast cancer among premenopausal women. *Am J Epidemiol*, 122, 731–740.

EFEKTI UMERENO-INTENZIVNOG VEŽBANJA NA TELESNI SASTAV GOJAZNIH MUŠKARACA

Rahman Rahimi

Optimalni intenzitet vežbanja koji utiče na poboljšanje telesnog sastava kod gojaznih muškaraca još uvek nije utvrđen. Cilj ove studije je bio da se utvrdi efikasnost 12-to nedeljnog intenzivnog, odnosno umerenog vežbanja jednakog radnog opterećenja i njegovog uticaja na telesni sastav gojaznih ljudi (BMI = 25-29.9 kg/m^2). Dvadeset sedećih ljudi je podeljeno u dve jednake grupe (starosti 27 ± 0.5 godina, težine: 84 ± 1.43kg; BMI: 28.23 ± 1.11 kg/m^2) i to (n = 10): 1) grupa koja je umerno vežbala (MI; 5 setova po 6 ponavljanja – 60% od 1RM) i 2) i grupa koja je intenzivno vežbala (HI; 5 setova po 6 ponavljanja – 85% od 1RM). Izvođeno je tri treninga u nedelji. Relativna masnoća tela je merena kaliperom za merenje nabora kože. Značajne razlike između i unutar grupa su analizirane dvosmernom split analizom varijanse (ANOVA). Statistička značajnost je prihvaćena na nivou p < 0.05. Dvosmerna ANOVA je pokazala statistički značajne razlike između HI i MI grupa, pa je stoga Sheffe Post-Hoc test pokazao značajno smanjenje (p<0.05 kod relativne masnoće tela (BF) (D = 27%), postotka masnoće (%BF) (22%), BNI (D = 9.34%) i težine tela (BW) (D = 6.51%9 kod HI grupe tokom istraživanja u odnosu na MI grupu. Takođe, poređenje sredina pre i post testova je pokazalo značajno smanjenje u debljini kožnog nabora, (HI = 45%, p = 0.001; MI = 25%, p = 0.02), postotka masnoće tela (HI = 41%, p = 0.001; MI = 23%, p = 0.04), BMI (HI = 21.5%, p = 0.001; MI = 13.7%, p = 0.03) i težine tela (HI = 21.58%, p = 0.001; MI = 13.82%, p = 0.01) nakon učešća u 12-to nedeljnom programu vežbanja. Zaključeno je da 12-to nedeljno intenzivno vežbanje može biti efektivnije nego umereno vežbanje u poboljšanju telesnog sastava kod mladih gojaznih muškaraca sa sličnim fizičkim karakteristikama..

Ključne reči: *gojaznost, snažno vežbanje, telesni sastav.*