



**COMPARISON AEROBIC AND RESISTANCE EXERCISE ON THE BLOOD
GLUCOSE, GHRELIN, GLYCEROL AND LACTATE LEVELS**

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ABSTRACT

The purpose of this research Comparison Aerobic and resistance exercise On the blood glucose, ghrelin, glycerol and blood lactate, The subjects of the study 20 male volunteers with a mean age of $22/40 \pm 1/72$, Stature $173/40 \pm 4/29$ _Weight $74/20 \pm 4/47$ And body mass index $24/69 \pm 0/716$ Were. Intensity aerobic exercise on a treadmill that 70- 75% Maximum heart rate reserve until exhaustion And resistance training also includes 8 resistance exercises bench press, biceps with barbell, Triceps machine, machine stretch underarm, leg press, leg Hague, front thigh and Ron came back. Aerobic and resistance exercise session was performed with an interval of one week. Of subjects before and immediately after exercise, blood samples were taken. Statistical Analysis the data were analyzed by analysis of variance repeated Test and a significance level of $P < 0/05$ was considered. Results show a significant reduction in ghrelin ($p < 0/001$) And a significant increase in glucose ($p < 0/001$) And a significant increase in glucose ($p < 0/001$) Glycerol ($p < 0/001$) Blood Lactate ($p < 0/001$) was after any workout. Comparison between aerobic exercise and resistance levels of ghrelin ($p < 0/001$) And glucose ($p < 0/001$) Glycerol ($p < 0/001$) Blood Lactate ($p < 0/001$) is significant. According to the results, due to higher intensity resistance training more effective and increased ghrelin, glucose, glycerol and lactate blood.

Keywords: glucose, ghrelin, glycerol, cholesterol, lactate, aerobic training, resistance training

INTRODUCTION

The regular practice of physical activity and exercise are widely recognized by the medical community and sport supported [8]. Stable weight and body composition requires that energy is compatible with its use [4]. Overweight and obesity and its related diseases due to skyrocketing costs of medical treatment will be spent To a serious economic problem in many countries has become. On the other hand, negative energy balance disturbances such as loss of appetite and weight is These are two of the leading causes of death in many patients, such as cancer, heart failure and inflammatory diseases such as infections, burns and post-operative patients are listed. Thus it can be seen that a small imbalance in energy intake or body weight is so large effects on body weight and must be adjusted by [11] in many of the studies were of moderate to severe short-term exercise temporarily suppress appetite that the so called exercise-induced anorexia. Although the mechanism of suppression of appetite and temporary short-term physical activity is not fully understood, However, some studies have found that the appetite-related hormones [6]. There are other metabolic substances that affect appetite in the present study, glycerol, glucose and serum lactate was investigated. Increasing glycerol and glucose decreased

appetite. There are other metabolic substances that affect appetite in the present study, glycerol, glucose and serum lactate was investigated. Increasing glycerol and glucose decreased appetite. Increased lactic acid due to exercise may also play a role in appetite. Lactate uptake prevent hunger and satiety after exercise is causing an increase in lactic acid [5]. Despite great advances in medical science and related disciplines such as biochemistry and pharmacology taken place, and despite the increase of human knowledge Risks related to weight problems, as well as the incidence of overweight and obesity seems Human likely to soon be able to solve it [3]. Physical activity also seems to be involved in appetite control. However, conflicting data the effect of exercise on appetite there. Exercise the muscles with exercises that utilize submaximal intensities average and to allow the body to use oxygen for energy and sustainability of the in terms of oxygen consumption and energy keep more than a few minutes, used in various studies researchers have been And shown that this type of exercise can increase endurance and cardiovascular and respiratory or intensity, frequency and duration sufficient to help achieve or maintain fitness and health [7].

LITERATURE

Internal investigation

Hamedinia and colleagues, Effects of moderate and heavy resistance exercise on appetite, glycerol, glucose serum lactate levels in healthy men studied. This study was performed. The results of this study indicate that moderate and heavy resistance exercise in food deprivation and lack of significant negative energy balance no significant effect on appetite [3] examined the effect of aerobic activity on plasma levels of ghrelin, insulin and cortisol students engaged in untrained men. The results showed that increasing the amount of insulin hormone, cortisol, growth hormone were significantly reduced in order to increase blood glucose, insulin and blood sugar levels due to lack of sufficient, it is likely an important factor orexigenic hormone ghrelin increase followed by a session of aerobic exercise outside in sugar the body [1], the effects of resistance training on serum adiponectin levels and insulin resistance index disabled men began. The purpose of this study was to determine the effects of a single bout of resistance exercise on adiponectin levels and insulin resistance index and blood glucose until 24 hours after the activity [7] examined the effect of exercise on plasma levels of ghrelin and growth hormone in young women began. The results showed that eight weeks of aerobic training significantly increased in a significant decrease in ghrelin

and growth hormone respectively. [14] Examined the effect of aerobic exercise on serum levels of ghrelin, leptin, and obese men with sleep quality Add weight. The results showed that short-term aerobic exercise improves sleep quality indices of obesity and overweight people and overweight, and this improvement was associated with changes in serum levels of ghrelin and leptin was not [9] To investigate the effect of 12 weeks of endurance training on plasma levels of acyl ghrelin, food intake and body weight in obese rats paid. Results showed a significant reduction in body weight of twelve weeks of exercise training group compared to control created. Acyl ghrelin levels did not show significant differences between the two groups.

External Investigations

Brom *et al.*, the study concluded that both aerobic exercise and resistance exercise will be significantly suppress appetite. Suggests that aerobic exercise, strength training will go towards the suppression of appetite.

Morpargo *et al*, to investigate the effects of physical activity and diet on plasma ghrelin levels were evaluated. After taking a weight loss program that includes a three-week diet and physical activity, decreased significantly the plasma ghrelin concentrations subjects (males and females) were found.

METHODOLOGY

Quasi-experimental study.

The population

D. The population of the city is all healthy untrained men who will be invited through a call to the study.

Sample

A sample of 20 healthy untrained males 20-25 years of age who voluntarily participated in the study.

Variables:

Independent variable of aerobic exercise and resistance training

Dependent variables: serum levels of ghrelin, glucose, glycerol, blood lactate

Methods of data analysis:

After ensuring the normal distribution of data acquired by the Kolmogorov-Smirnov test, mean standard for describing personal characteristics, orientation hypothesis testing ANOVA post hoc Bonferroni test was repeated and the significance was used. All data using Spss software version 18 will be checked at the significant level 0/05.

RESULTS

Hypothesis Testing

First hypothesis: Changes in blood glucose after a session of aerobic exercise with resistance training is significant.

ANOVA with repeated measures to compare the pre-test and post-test their blood glucose levels of the subjects after aerobic exercise and resistance And also the test of aerobic and resistance exercises have

been used (Wilks'Lambda = 0.082, $p = 0.0001$). Wilks'Lambda test results are significant because Mvkhly test P ($<0/05$) is reported (**Table 4**).

ANOVA with repeated measurement results showed that the pre-test and post-test glucose levels in the two sessions of aerobic and resistance exercises significant difference can be observed. Paired comparisons with Bonferroni correction ($p < 0/0001$) stages of the test, the amount of glucose in aerobic exercise and resistance training are shown in **Table 5**.

The second hypothesis: Changes in blood ghrelin after a session of aerobic exercise with resistance training is significant.

ANOVA with repeated measures to compare the pre-test to post-test, the subjects' blood ghrelin levels after aerobic exercise and resistance And also between the aerobic and resistance exercise test was used (Wilks'Lambda = 0.055, $p = 0.0001$). **Table 6** Greenhouse-Geisser test results due to the significance of the test Mvkhly ($05/0 > p$) is reported.

ANOVA with repeated measurement results showed that the pre-test and post-test ghrelin levels in both aerobic and resistance exercise session can be significant. Paired comparisons (with Bonferroni correction: $p < 0/0001$) of the amount of glucose in aerobic exercise and resistance tests are shown in **Table 7**.

Table 1: Descriptive variables studied subjects

The mean and standard deviation	Property
22/40±1/72	Age (years)
173/40±4/29	Height (cm)
74/20±4/47	Weight (kg)
24/69±0/716	BMI (kg m)

Table 2: Descriptive statistics were

After testing the resistance group (mean ± SD)	After the aerobic test (mean ± SD)	Pretest (Mean ± SD)	Variable Steps
14/44±1/49	16/12±1/57	16/47±1/59	Ghrelin (pico gram per milliliter)
84/78±2/33	83/85±2/56	81/79±2/40	Glucose (milligrams per deciliter)

Table 3: the results of the Kolmogorov-Smirnov test for normality of the data set in the pre-test, post-test (aerobic and resistance training)

Significant level	Statistics Z	The time	Variable
0/641	0/742	Pretest	Ghrelin
0/680	0/719	Posttest (aerobic)	
0/983	0/464	After testing (RT)	
0/943	0/529	Pretest	
0/977	0/453	Posttest (aerobic)	
0/922	0/551	After testing (RT)	

Table 4: in the case of factor analysis of variance

Significant	F statistics	Error	Degrees of freedom	Value	Source statistics
0/0001	1/008	18/000	2/000	0/082	Glucose

Table 5: Comparison of paired

Significant	Degrees of freedom	Difference		Variable statistics
		Standard deviation	Average	
0/0001	19	0/233	-2/055	
0/0001	19	0/207	-2/982	Before testing aerobic _Tmrynat
0/0001	19	0/164	-0/927	Before Zmvn_Tmrynat resistance

Table 6: Analysis of variance for the case

Significant	StatisticsF	Mean square	Degrees of freedom	The sum of squares	Source Statistics
0/0001	19/265	54/309	1/002	54/414	Ghrelin
		0/282	19/037	5/366	Error

Table 7: Compares the test

Significant	Degrees of freedom	Difference		Variable statistics
		Standard deviation	Average	
0/0001	19	0/006	0/030	Pretest - aerobic training
0/0001	19	0/144	2/035	Pre-workout resistance
0/0001	19	0/147	2/005	Aerobic exercises - Resistance Training

CONCLUSION

The first hypothesis examined changes in blood glucose after a session of aerobic exercise with resistance training is a significant difference. ($p < 0/001$)

Stored in muscle glycogen and blood glucose, the main source of energy in the first few minutes of exercise and the exercises are very intense that is not enough to meet the needs of aerobic metabolism. Blood glucose can provide 30 to 40 percent of total energy active muscles. During the early stages of glucose circulating in practice 40% of the active muscles to provide energy. During the initial stages of training on muscle blood flow and glucose consumption suddenly increases and the workout will continue [5, 10]. Increased blood levels of glucose, glucose receptor neuron discharge rate of satiety center in the ventromedial nucleus of the hypothalamus increases ventricular mid and far. The rate of increase blood levels of glucose, glucose-sensitive neurons in the simultaneous depletion reduces hunger lateral hypothalamus. In addition, some amino

acids and lipids as well as the discharge rate of neurons and other neurons that are related to the influence [1, 4, 11]. Exercise may suddenly increase in muscle blood flow and glucose consumption And with continued practice will continue to be subject to the increased blood glucose This was most likely due to resistance exercise intensity and duration is more than aerobic exercise, resistance training. The results of the investigation, [1], which examines the effect of moderate and heavy resistance training on appetite, glycerol, glucose and lactate levels in healthy men engaged [1], which examined the effects of resistance training on serum glucose, serum adiponectin and insulin resistance index in men paid off match. The second hypothesis examined changes in plasma ghrelin after a session of aerobic exercise with resistance training is a significant difference ($001/0 > p$). Like other hormones secreted into the blood ghrelin and its receptor by in different parts of the body do its job. Ghrelin most important factor stimulating hunger and food intake in the body. When fasting plasma ghrelin

levels increase and decrease the plasma levels of approximately one hour after food intake, is [5]. Hypothalamus and especially in the arcuate nucleus, controlling hunger and satiety center of the brain [9]. Environmental signals of hunger and satiety hormones associated with sending data to trigger the hypothalamus or terminate the balance of food intake and energy homeostasis Help (Iran dust et al., 1389: the results of research [13], which examined the effects of resistance training on the circle plasma ghrelin young women began. [13], which examines the effect of resistance training on the circular surface plasma ghrelin to obestatin healthy young women began. [3], which examines the impact of Help [6] the results of research [13], which examined the effects of resistance training on the circle plasma ghrelin young women began. [13], which examines the effect of resistance training on the circular surface Plasma ghrelin to obestatin healthy young women began. [4], which examines the effect of aerobic exercise on plasma levels of ghrelin and growth hormone in young women discussed and demonstrated a significant increase in plasma ghrelin levels. The results of the investigation, [3], which examines the effect of aerobic activity on plasma levels of ghrelin, GH, insulin and cortisol in untrained males began.

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REFERENCES

- [1] Abedy.B, Azerbaijani M, Pyry.m. Rsayy.m (2011) Effect of resistance training on serum adiponectin levels and resistance index disabled men .mjlh insulin Journal of Medical Sciences, Vol. XIV, Shmarh5, 53-62.
- [2] Broom D, Batterham R, King J, Stensel D. Influence of resistance and aerobic exercise on hunger, circulating levels of acylated ghrelin, and peptide YY in healthy males. Am J Physical Regul Integr Comp Physical 2009; 296: 29-35.
- [3] Deloee, Ghanbari Niaki, , Fathi .r, (2011) Effects of aerobic activity on plasma levels of ghrelin, GH, insulin and cortisol in untrained males Journal of Endocrinology fine and Metabolism of the thirteenth round, No. 2.
- [4] Gayton A, Hall J, Gaytvn Medical Physiology. Eleventh Edition (2007), Volume II, translated doctor

- Ahmed Niavarani 2004, Semat Press, first edition: 1183-92.
- [5] Hamedinia M, Yarahmdy.h, Hosseini Kakhak., Haghghi.a (2010) Effects of exercise moderate and heavy resistance on appetite, glycerol, glucose and lactate levels in healthy men. Journal of Sabzevar University of Medical Sciences. Shmarh17.s.s: 108-115.
- [6] Irandoust, K. (2010) "Effects of aerobic exercise on plasma ghrelin and leptin concentrations in obese women with normal weight. "Journal of the Olympics. Eighteen years - 2 consecutive 50.
- [7] Jonaidy M, Gaeini AS, Kordi, Sori, Hagh Shenaz, (2012) the effect of 12 weeks of endurance training Syldar plasma ghrelin levels, food intake and body weight in obese rats. Journal of Sport Biosciences No. 14 .s55-69.
- [8] Jafari, A. Saeedi, S., Zakeri,R, Malekirad, A, (2012) Comparison of static and dynamic effects of resistance training on some indices of cardiovascular function, plasma lactate and rat locus in peripheral blood of healthy women. Shhrekord.dvrh Medical Journal 14, No. 1.s66-76.
- [9] Leidy HJ, Gardner JK, Frye BR, Snook ML, Schuchert MK, Richard EL, et al. Circulating ghrelin is sensitive to changes in body weight during a diet and exercise program In normal, weight young woman. J Clin Endocrinol Metab 2004; 89(6):2659-64
- [10] Morpurgo P.S, Resnik M, Agosti F, Cappiello V, Sartorio A, Spada A. Ghrelin secretion in severely obese subjects before and after a 3-week integrated body mass reduction program. Endocrinol Invest 2003; 26(8): 723-7.
- [11] Neary NM, Small CJ, Wren AM, Lee JL, Druce MR, Palmieri C, *et al.* Ghrelin Increase Energy Intake in Cancer Patients with Impaired Appetite: Acute, Randomized, Placebo-
- [12] Controlled Trial. The Journal of Clinical Endocrinology & Metabolism 2004; Vol. 89, No. 62832-2836.
- [13] Rshydlamir.a, Myrzendeh g, Abrahimi, Atri, (2011), the effect of aerobic exercise on plasma plasma ghrelin and growth hormone in young women .mjlh University of Medical Sciences - Shahid Year Yazd Volume XIX, number five.

- [14] Saghebjo M. Ghanbari A. Niaki, Rajabi H, F, Rajabi to Rahbari Zadeh, Hedayati, M (2010) Effect of exercise intensity resistance circle on the surface of plasma ghrelin and obestatin healthy young women. *Journal of Endocrinology and Metabolism, Shahid Beheshti University of Medical Sciences and Health Services. Course XII, No. 6, pp. 632- 626.*
- [15] Saremi A, Shavandi, N, Bayat, N, (2012) Effects of aerobic exercise on serum levels of ghrelin, leptin and quality obese and overweight men sleep. *Journal of Arak University of Medical Sciences. , Vol. 15, No. 52-60 1.s.*
- [16] William D. Mac Ardel, Ferank I. .Ay, Kach VictorE I.Kach (1995) *Exercise Physiology. Translated by Khaledan. 2005. antsharat side.*