

53 - COMPARISON BETWEEN TWO PROTOCOLS OF AEROBIC TRAINING FOR REDUCING THE PERCENTAGE OF FAT

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INTRODUCTION

Aerobic exercises are those that relate to the use of oxygen and metabolic adaptations in skeletal muscle. Improving aerobic performance, increases the maximum oxygen consumption and improves the cardiovascular system. (Pereira and Borges, 2006).

Lipids are considered the main substrate in exercise of low intensity and long duration. (Marangon and Welker, 2003). Lipolysis of triglycerides from adipose tissue, the absorption of fatty acids in plasma and increased fatty acid oxidation occur progressively over a training session. (Horowitz & Klein, 2000).

At low intensities, free fatty acids are mobilized from the periphery to the supply of most of the substrate, helping maintain the balance of fats. However, intermittent high-intensity exercise cause a greater reduction in skinfold thickness. (Powers and Howley, 2004).

The request is characterized by aerobic efforts to obtain the energy necessary to the resynthesis of ATP by the aerobic breakdown of glucose (aerobic glycolysis), and can also use fat as energy sources. (Pereira and Borges, 2006). The constant resynthesis of ATP is due to efficient systems contained in skeletal muscle. Among them, oxidative phosphorylation, with a characteristic low-power-dependent oxygen consumption, but with a virtually unlimited capacity in the process of energy supply, especially in long-term exercise and mild or moderate, sparing glycogen and mobilizing fatty acids. (Prestes et al., 2006).

The oxidation of carbohydrates is high during high intensity exercise to provide energy in a short period of time, producing CO₂ in greater quantity. Since the low-intensity exercise the body uses primarily the lipids as an energy source, and its oxidation produces little CO₂ and requires a relatively large consumption of O₂. (Marangon and Welker, 2003). To achieve the necessary modifications desired in aerobic training, we do combinations of basic components such as frequency, duration and intensity of efforts, aiming to achieve our goals.

The duration and intensity form an indivisible unity, conditioning each other. For many, the aerobic work is something that becomes tedious and tiring because of the long term. The adjustment between these elements is of paramount importance and can also define the type of exercise. As an example of lower intensity tend to be of longer duration, thus predominantly aerobic. According to Guedes & Guedes (1998), for Hollmann & Hettinger (1983), an aerobic physical activity should provide a long term effort and with moderate intensity. Lopes (1987) and Fetter (1994), argue that the intensity, the weekly frequency, duration of sessions and type of program directly influence the effect of aerobic training. However, Lim (1987) suggests no significant differences in training and continuous training with intervals of days, for cardiorespiratory benefits. Grunelwald & Wöllzenmüller (1984), understand why aerobic training the capacity to perform muscular work over a long period without showing significant signs of fatigue.

So aerobic training has characteristics that determine its best use, according to the American College of Sports Medicine (ACSM). The physical training programs aim to lose body fat should be conducted with approximately 60 to 70% of VO₂ max, over 30 minutes daily, five times a week.

Recent evidence revealed that only 20% of oxygen debt is used to convert the lactic acid produced during exercise on glucose (Powers and Howley, 2004). The high body temperature, gluconeogenesis and elevated blood levels of adrenaline and noradrenaline are factors that contribute for EPOC. Thus, the EPOC causes the caloric expenditure of a relatively intense activity will increase significantly. According to research conducted by Foureaux et. al. (2006), Studies have suggested that the exercise of greater increase in intensity produces EPOC longer than lower intensities of exercise (when they have equal volume) due to the fact it causes greater metabolic stress, and must then greater expenditure of energy to return to the condition of homeostasis.

OBJECTIVE:

Compare the effectiveness of two exercise training methods in reducing body fat of males.

Material and Methods:

The study sample consisted of 20 healthy, physically active, male, aged 27.75 ± 4.25 years, which underwent a pre-assessment, responding to an interview on the daily practice of physical activities and the PAR-Q (Physical Activity Questionnaire Readiness). This was achieved by a relatively low risk in the results, and may qualify them as suitable for participation. Encompassed on all the prerequisites, they signed a commitment had been signed.

As a parameter for evaluating the intensity we used the Borg scale thus identifying the 50% and 100% of maximum effort. The tests were performed on a treadmill (LX 160, Movement). In the aerobic group continued to monitor heart rate within the target zone training, we used a frequency meter (Polar® FT7).

Was performed after an anthropometric assessment, measuring body mass (Welmy®, Brazil), height (stadiometer accurate to 0.1 cm, fixed - Alvarez & Pavan, 2003) and skinfolds (skinfold caliper Sanny®, Brazil-Benedetti et al., 2003). The calculation and analysis of body composition were obtained through the Software Physical Test 6.1. To determine the percentage of fat, fat weight and lean weight protocol was used in three folds: chest, abdomen and thigh for men (Pollock and Wilmore, 1993). The reevaluation was done at the same time of the first assessment for more accurate results.

The subjects were divided into two groups: The first, called the group "I", consisting of 10 subjects aged 27.8 ± 4.7 years, performed an aerobic workout interval proposed by the digital magazine Max Pump eight weeks being the minimum frequency three weekly workouts and 12 minutes. The training was divided into three stages, four minutes of heating at 50% of your maximum effort, more than 8 intervals of 20 seconds at 100%, interspersed with rest periods of 10 seconds at 50%, ending over four minutes late for lower heart rate (Turn the calm) when utilizing the scale of subjective effort Borg.

Group "II" containing the same number of individuals, aged 27.7 ± 3.8 years, made the training given by the American College of Sports Medicine (1980), which recommends the exercise intensity from 50% to 85% of MHR and frequency of training 3-5 days a week and we will have a warming period of 5 to 10 minutes, keeping an exercise volume from 30 to 45 minutes. All the

people involved in the study were advised not to do any other type of aerobic activity, so as not to interfere with the ability of individuals and analysis of study results.

STATISTICAL ANALYSIS

We used the nonparametric McNemar test (paired observations) for comparisons between seasons (pre and post) with significance taken at 5%

RESULTS

Comparing the initial values of variables of the groups, it is noted that there were no significant differences in results between them, according to Table 1.

Table 1. Comparison average values between GI(n=10) and GII(n=10) pre-teste ($p>0,05$)

	Variable			Circunferences		Skinfold					
	I	P	A	CC	CA	DP	DA	DT	DS	DC	% G
G (I)	27,8	80,49	1,752	89,2	94,3	16,1	32,1	21,1	44,9	25,4	21,1
G (II)	27,7	81,47	1,761	90	95,8	16,5	33	21,2	46	25,7	21,3

(I) Age; (P)Weight; (A)Height; (CC)Waist circumference; (CA)Abdominal circumference; (DP) chest skinfold; (DA) Abdomina skinfold; (DT)tricipes skinfold;(DS)Supra-Iliac skinfold; (DC)thigh skinfold.

With respect to weight loss, exercise of high intensity and short duration were reduced by 3.43 kg more than aerobic exercise of long duration and low intensity. When analyzing the waist, we had a difference of 7.75 cm and 6.15 cm from the abdomen. It was observed that the skinfolds were also significant differences, the most significant fold suprailiac reaching a difference of 16.4mm.

As for the thickness of skin folds, the two protocols led to considerable losses, but were more evident in group I to the abdominal folds and supra-iliac, a decrease of 13.7 mm and 21.4 mm respectively.

Although the protocols have reduced the positive variables, the tests performed at high intensity intervals and in manner best results in all parameters compared to aerobic exercise of mild to moderate intensity and long duration. Table 2 shows a comparison between the results obtained.

Table 2. Comparisons of results obtained from intermittent high-intensity cardio with aerobic and long-term moderate intensity ($p < 0.05$).

Variable	G I (n=10)		G II (n=10)	
	Pre	Pos	Pre	Pos
Age	27.8	27.8	27.7	27.7
Weight (Kg)	80.49	73.73	81.47	78.14
Height (Cm)	1.752	1.752	1.761	1.761
Circumference (cm)				
Waist	89.2	78.5	90	87.05
Abdominal	94.3	84.2	95.8	91.85
Skinfold (mm)				
Chest	16.1	10.2	16.5	14.3
Abdomen	32.1	18.4	33	29.1
Triceps	21.1	12.6	21.2	17.2
Supra-iliac	44.9	23.5	46	41
Thigh	25.4	16.2	25.7	21.5

The two groups were successful in reducing body fat, while group I had better results with a percentage of 8.1% and 2.7% group II, based on the initial physical assessment.

Comparação da média dos resultados obtidos relativos ao % Gordura

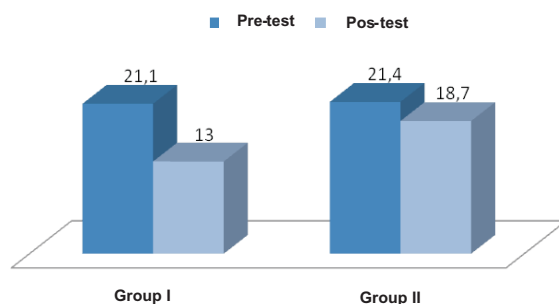


Figure 1: Comparison of results of the average fat percentage before and after the training protocol ($p < 0.001$ for Group I and $p < 0.05$ for group II)

DISCUSSION

In a study on the effect of physical activity associated with nutritional orientation for obese adolescents, comparing aerobic and anaerobic bacteria, related to reduced fat mass, aerobic exercise caused a continuous decrease of 2% while the intermittent exercise experienced a reduction of 3%. In relation to skinfolds, examining each fold in this study, the triceps and supra-iliac decreased 1.5% and 2% respectively in continuous aerobic exercise. In the intermittent anaerobic exercise, there was a 1% reduction in triceps skinfolds and 2% in supra-iliac. In this study we observed that the differences were significantly higher in the comparison of two protocols examined, and the responsible exercise of characteristic intervals for better results in body composition of individuals. This result could mean the effects of EPOC (Excess Post-exercise Oxygen Consumption) in exercises performed at high intensity. According to the study of Adams and Smith (2008), found that high intensity interval training has been more effective in promoting greater energy expenditure in isolated sessions of training, which may contribute more significantly to the reduction of body weight and aesthetically viable to changes in body composition, besides the advantage of breaking the monotony of a continuous aerobic work, and therefore can be used as a good strategy for adherence to exercise programs. It should be noted that although satisfactory, the exercises performed in a high-intensity intervals and may increase the risk of injury.

CONCLUSION:

High-intensity exercise performed in intervals and despite strenuous, are more effective for both weight loss and to decrease body fat percentage. Although the time required for completion of interval workouts is much smaller, the results were more satisfactory than those of long duration cardio. Although the results are positive as found in group I, high-intensity exercise should not be applied to students beginners or sedentary individuals because of normal wear and tear, leading to abandonment or failure to continue the practice of regular physical exercise. This study encourages further research be undertaken to elucidate the subject being discussed here.

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COMPARISON BETWEEN TWO PROTOCOLS OF AEROBIC TRAINING FOR REDUCING THE PERCENTAGE OF FAT**ABSTRACT**

Aerobic exercises are those that relate to the use of oxygen and metabolic adaptations in skeletal muscle. At low intensities, free fatty acids are mobilized from the periphery to the supply of most of the substrate, helping maintain the balance of fats. However, intermittent high-intensity exercise resulted in a higher reduction of skinfold thickness. The results were statistically analyzed using the nonparametric McNemar test (paired observations) for comparisons between seasons (pre and post) with significance taken at 5%. The aim of this study was to compare efficacy of two training methods in reducing body fat of 20 males, aged 27.75 ± 4.25 years. Although the protocols have reduced the positive variables, the tests performed at high intensity and intermittently obtained better results in all parameters compared with aerobic exercises for mild to moderate and long duration.

KEY-WORDS: aerobic exercise; fatty acids; skinfold.

COMPARAISON ENTRE DEUX PROTOCOLES DE LA FORMATION AEROBIE POUR REDUIRE LE POURCENTAGE DE FAT**RÉSUMÉ**

Les exercices d'aérobie sont celles qui ont trait à l'utilisation de l'oxygène et des adaptations métaboliques dans le muscle squelettique. A faible intensité, les acides gras libres sont mobilisés à partir de la périphérie à la fourniture de la plupart des substrats, aider à maintenir l'équilibre des graisses. Toutefois, intermittent exercice de haute intensité a entraîné une réduction plus importante de l'épaisseur du pli cutané. Les résultats ont été analysées statistiquement par le test non paramétrique de McNemar (jumelé observations) pour les comparaisons entre les saisons (pré et post) présentant un intérêt fixé à 5%. Le but de cette étude était de comparer l'efficacité de deux méthodes de formation dans la réduction de graisse du corps de 20 hommes, âgés de $27,75 \pm 4,25$ ans. Bien que les protocoles ont permis de réduire les variables positives, les tests effectués à haute intensité et de façon intermittente obtenu de meilleurs résultats dans tous les paramètres par rapport aux exercices d'aérobie pour les formes légères à modérées et à long durée.

MOTS-CLÉS: l'exercice aérobie; acides gras; pli cutané.

COMPARACIÓN ENTRE DOS PROTOCOLOS DE FORMACIÓN PARA LA REDUCCIÓN DE AEROBIC EL PORCENTAJE DE GRASA**RESUMEN**

Los ejercicios aeróbicos son aquellos que se relacionan con el uso de oxígeno y las adaptaciones metabólicas en el músculo esquelético. A intensidades bajas, los ácidos grasos libres se movilizan desde la periferia hacia el suministro de la mayor parte del sustrato, ayudando a mantener el equilibrio de las grasas. Sin embargo, el ejercicio intermitente de alta intensidad como resultado una mayor reducción del espesor del pliegue cutáneo. Los resultados fueron analizados estadísticamente utilizando la prueba no paramétrica de McNemar (observaciones pareadas) para las comparaciones entre las estaciones (antes y después) con importancia para la toma del 5%. El objetivo de este estudio fue comparar la eficacia de dos métodos de formación en la reducción de grasa corporal de 20 varones, con edades $27,75 \pm 4,25$ años. Aunque los protocolos han reducido las variables positivas, las pruebas realizadas a alta intensidad y de forma intermitente obtenido mejores resultados en todos los parámetros en comparación con los ejercicios aeróbicos de leve a moderada y de larga duración.

PALABRAS CLAVES: ejercicio aeróbico, los ácidos grasos; Pliegues cutáneos.

COMPARAÇÃO ENTRE DOIS PROTOCOLOS DE TREINAMENTO AERÓBIO PARA A REDUÇÃO DO PERCENTUAL DE GORDURA**RESUMO**

Os exercícios aeróbicos são aqueles que se referem ao uso de oxigênio e adaptações metabólicas no músculo esquelético. Nas baixas intensidades, os ácidos graxos livres são mobilizados da periferia para o fornecimento da maior parte do substrato utilizado, auxiliando na manutenção do balanço das gorduras. Contudo, exercícios intermitentes de alta intensidade, provocaram maior redução da espessura das dobras cutâneas. Os resultados foram analisados estatisticamente através do teste não paramétrico de McNemar (observações pareadas) para comparações entre as temporadas (pré e pós) com significância adotada de 5%. O objetivo deste estudo foi comparar eficácia de dois métodos de treinamento na redução do percentual de gordura de 20 indivíduos do sexo masculino, com idades $27,75 \pm 4,25$ anos. Embora os protocolos tenham reduzidos de forma positiva as variáveis analisadas, os testes realizados em alta intensidade e de forma intermitente obtiveram melhores resultados em todos os parâmetros avaliados comparados aos exercícios aeróbicos de intensidade leve a moderada e longa duração.

PALAVRAS-CHAVE: Exercício aeróbico; Ácidos graxos; Dobras cutâneas