

37 - EFFECT OF A PERSONALIZED AEROBIC TRAINING ON THE PROFILE OF METABOLIC SYNDROME IN YOUNG ADULTS

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1. INTRODUCTION.

When doing an analysis about the sedentary lifestyle, we noticed an increase in obesity and its complications, highlighting the metabolic syndrome, because, being overweight is the main risk factor. Obesity contributes to hypertension, high levels of total cholesterol, low levels of HDL - cholesterol and hyperglycemia, therefore associated with the elevated risk of cardiovascular diseases (COSTA, JUNQUEIRA, MAGALÃES, 2011; GUALANO, TINUCCI, 2007).

The high index of chronic diseases originating from the metabolic syndrome provides a set of diseases highlighting insulin resistance. Metabolic syndrome occurs when three of the five criteria are present; obesity; waist circumference greater than 102cm in men and 88cm in women; Altered glycemia (blood glucose of 110mg / dl) or diagnosis of Diabetes; HDL cholesterol - in women less than 50mg / dl and in men less than 40mg / dl; Hypertension - systolic blood pressure 130 mmHg and / or diastolic pressure 85 mmHg; triglycerides 150 mg / dl (GUTTIERRES, MARINS, 2008; VASCONCELLOS et al, 2013).

The concentration of body adiposity is increasingly related to the cause or one of the causes significant to predict the health condition of the individual. Mainly the accumulation in the abdominal region is related to the development of cardiovascular diseases, diabetes mellitus and causing mortality. The decrease of fat percentage in this region leads to the prevention of these diseases and to the control of risk factors (GUTTIERRES, MARINS, 2008; POLLOCK, WILMORE, 1993; S.B.C, 2007).

Metabolic Syndrome (MS) is a set of interrelated metabolic risk factors that directly contribute to the development of cardiovascular disease (PENALVA, 2008). Thus, according to Bodanese, Cruz and Gottlieb (2008), MS is an aggregation of metabolic disorder caused by the breakdown of body homeostasis. A dysfunction of glucose metabolism (hyperinsulinemia, insulin resistance, glucose intolerance, or type II diabetes) and lipids (increased triglycerides and decreased HDL-cholesterol), abdominal obesity, hypertension, and coagulation imbalance (increased platelet adhesion and the plasminogen activator inhibitor - PAI-1).

It is important to emphasize that the regular practice of physical activity contributes to the decrease, both directly and indirectly the risk of coronary diseases, having influences on obesity, insulin resistance and hypertension (POWER; HOWLEY, 2000).

According to Pollock and Wilmore (1993), the young adult population is overweight. It can be analyzed through the body mass index (BMI), which is established of the relation between weight and height, being established that of 18.5 and 24.9 kg / m² is low weight, 18.5 and 24.9 Kg / m² normal weight, 25 and 29.9 kg / m², overweight, 30 and 34.9 kg / m² obesity I, 35 and 39.9 kg / m² obesity II and greater than 40 kg / m² morbid obesity. These same authors also comment that there is another way to verify health risks, being through the abdominal circumference, in which men up to 102 cm and for women up to 88 cm. When these values are higher, these individuals are at greater risk of developing cardiovascular disease and early death.

Obesity causes insulin resistance at the post-receptor level, causing compensatory hyperinsulinemia, due to stimulation in the beta cells of the pancreas, which is capable of causing even the failure of these and the insensitivity of the peripheral receptors (GUTTIERRES, MARINS, 2008).

A major influence on health, psychological well-being, longevity and quality of life, provide the body with various diseases. Most of the time obesity is due to sedentary lifestyle (SEGAL, 2002; VASCONCELOS, COSTA, 2008).

Reinforcing the importance of physical exercise for the prevention of obesity and the metabolic syndrome. The numerous health damages to obesity entails, highlighting cardiovascular diseases and even some types of cancers, increasing the level of morbidity and mortality due to cardiovascular diseases (PEIXOTO, 2006). These metabolic syndromes are the fastest growing, both because of poor diet, heredity and mainly physical inactivity in the case of sedentarism (TAVARES, NUNES and SANTOS, 2010).

According to Foss and Keteyian (2014), when systolic and diastolic pressures are chronically elevated when they are at rest, values higher than 130mmHg and 85mmHg analyzed during various visits. Some clinical problems related to hypertension, heart failure, stroke, kidney failure and heart attack. Exercise training can reduce blood pressure to the point that only a small medication or possibly no medication is needed.

Exercise programs have been shown to prevent and reduce systolic and diastolic blood pressure in both hypertensive and normotensive individuals. Thus, physical exercise is an ally as an important tool to prevent and treat hypertension and metabolic syndrome (CIOLAC and GUIMARÃES, 2004).

Diabetes mellitus is one of the metabolic diseases identified by hyperglycemia, which has a consequence in insulin secretion deficit, in the functioning of insulin or both. Disturbance in carbohydrate metabolism, identified by excess blood glucose, due to the absence or inefficiency of insulin, hormone produced by the endocrine pancreas (MARTINS, DUARTE, 1998). Type 1 diabetes achieves better control of blood glucose and lower daily insulin requirements as a result of exercise training, but this is not always the case. Even so, it is recommended as it improves cardiovascular fitness and psychological well-being (FOSS, KETELYAN, 2014). Type 2 is the most common type of diabetes, reveals itself in adulthood. In this type it becomes easier to control through a diet and physical activity, only in cases some oral medications (SILVA, LIMA, 2002). You have to be very careful in training for diabetics, it is of the utmost importance that the diabetic keep his glucose under control. Avoiding

late-night exercises, avoiding possible hypoglycemia during sleep (VERISSIMO, 2010).

For the verification of perimeter measurements, flexible anthropometric tape is used that allows constant pressure to be placed on the surface of the skin throughout the measurement. Regarding the understanding of the values identified in the waist / hips ratio, the literature has reference indicators that can identify the intensity of the risk predisposing to the appearance and development of chronic metabolic dysfunctions according to the age and sex of the evaluated. Another suggested way to predict the risk associated with health due to the greater accumulation of fat in the central region of the body is the recurrence only to the measures of the waist circumference. In this case, waist circumference dimensions greater than 102cm and 88cm for men and women, respectively, tend to increase the incidence of chronic-degenerative dysfunctions (POLLOCK, WILMORE, 1993; S.B.C, 2007).

Obesity is a globalized epidemic that affects all ages. After many complications to the individual, that is, many diseases are caused by obesity, among them are metabolic complications such as type 2 diabetes, hypercholesterolemia, gout, hyperuricemia, among others. It can also cause sleep apnea, osteoarthritis, and cardiovascular complications such as ischemia, heart failure, hypertension, venous insufficiency (MELO, 2012; RIBEIRO, 2006). In this sense, this research aimed to verify the effect of a personalized aerobic training on the profile of the metabolic syndrome in young adults.

2. METHODOLOGY.

This descriptive characteristic search was performed through observations, recording and analysis of the facts and variables collected in loco. Data were collected before and after the personalized aerobic training program, with 50 sedentary individuals, composed of 18 male subjects and 32 female subjects aged 18 to 58 years. Before starting the research, the individuals signed a Term of Informed Consent - TCPI, shortly after, it was done before and after 180 days of the training, the anamnesis.

Blood Pressure (P.A.) was checked using the Hem 6221 Omron digital pulse apparatus. VO2 test will be performed using the manual ramp protocol of the Aloysio de Castro State Institute of Cardiology (Annex I). The glucose test was analyzed by the ACCU-CHECK ACTIVE glucose meter. They analyzed the triglyceride levels, LDL, HDL, through the enzymatic colorimetric method.

Body mass index (BMI) was obtained by body weight divided by height in square meters (Guedes, 2006). The maximum heart rate (HR) proposed by Karvonen (220-age), for individuals aged 12 to 69 years and measured with the finger pulse oximeter model choiceMMed-MD300C1 Fingertip.

The subjects underwent aerobic training according to their HR, in the intensity of 40% to 50%, in the walking or running mat with duration of 30 to 60 minutes. Statistical data were obtained through the biostatic program 5.3.

3. RESULTS AND DISCUSSION.

The following data will be presented and discussed, the data before and after the 180-day aerobic training, being evaluated the percentage of fat, body mass index, waist hip ratio, maximum volume of oxygen per minute, waist circumference, blood pressure, LDL, HDL, triglycerides and glycemia.

VARIÁVEIS METABÓLICAS	MÉDIA PRÉ TREINAMENTO	MÉDIA PÓS TREINAMENTO	RESULTADO	TESTE "t"
Fat percentage	31,65%	28,55%	3,1%	12,93
Body mass index	32,05 Kg/m ² .	29,27 Kg/m ² .	- 2,78 Kg/m ² .	4,11
Hip Waist Ratio	0,86	0,81	-0,05	2,49
Maximum Oxygen Volume	36,11 ml.kg ⁻¹ .min ⁻¹	43,28 ml.kg ⁻¹ .min ⁻¹	+7,17 ml.kg ⁻¹ .min ⁻¹	6,37
Abdominal circumference	105,25 cm	97,99 cm	-7,26 cm	3,33
Systolic Blood Pressure	13,78mHg	13,24mHg	-00,54mHg	5,70
Diastolic Blood Pressure	93,88mHg	88,42mHg	-5,46mHg	5,04
Cholesterol - LDL	173,82mg/dl	154,00mg/dl	-19,82mg/dl	8,64
Cholesterol - HDL	45,34mg/dl	53,25mg/dl	+7,91mg/dl	5,63
Treglicerídeos	171,10ml/dl	155,29ml/dl	-15,81ml/dl	7,85
Glycemia	117,62mg/dl	107,18mg/dl	-10,44mg/dl	6,09

Table 01 - Values of the training result. ("T" tabulated, 2.60).

Analyzing Table 01, it can be verified that there were significant differences in the results before and after the application of the protocol with the test ("t") calculated higher than ("t") table with 49 degrees of freedom. Only the variable perimeter of the waist showed improvement, but not statistically significant. These changes had already been noticed in previous studies by KATZMARZYK (2000), and Penteado and Gomes (2008) evidenced important changes in all the components of MS in 621 sedentary individuals and MS patients, after aerobic training, the results indicated improvement in the same. Regarding the reduction in fat percentage, in the studies by HAMDY and collaborators (2003), 24 obese subjects with MS were observed after six months of moderate intensity physical exercise, the results indicated weight loss of approximately 6.6%, with improvement insulin sensitivity and endothelial function, despite the degree of glucose tolerance. Data confirming the importance of aerobic training for glycemic control, already pointed out in the studies of (FOSS, KETEVIAN, 2014).

An interesting result observed was the increase in Aerobic capacity, pointed out in the study with the increase of the maximum volume of oxygen. Coming to the study of Neri (2011), which confirmed in his research that the maximum volume of oxygen, is directly related to the functional capacity of the cardiovascular system. Thus it was possible to verify an increase of HDL cholesterol. These data, according to the researchers' studies, Sesso et al. (2000) apud Neri (2011), who state that an aerobic capacity is related to elevated levels of cardiorespiratory fitness and thus decreasing risks of premature deaths due to cardiovascular diseases, providing innumerable to the health of the individual

It was also noted that there was a reduction in triglyceride, an increase in HDL level and a decrease in LDL level. Coming to the meeting with the Brazilian Society of Cardiology, which reports that regular personalized aerobic exercise contributes to prevention measures in dyslipidemias and metabolic syndrome, favoring the reduction of triglyceride levels and the increase of HDL cholesterol levels (MELO, 2012; S.B.C, 2007). As well as decreasing visceral fat, which when waist circumference dimensions greater than 102cm and 88cm for men and women, respectively, will increase the incidence of chronic-degenerative dysfunctions (RIBEIRO, 2006; POLLOCK, Wiley, 1993; SBC, 2007).

It has also been shown to improve both systolic and diastolic pressure, an important variable for the prevention of cardiovascular health (CIOLAC et al., 2003), because according to Foss and Keteyian (2014), high blood pressure levels will contribute to illness.

According to the data presented in this study, the fight against sedentarism in this contemporary world is fundamental to combat the metabolic syndrome and consequently improve the lives of people in all their age groups (COSTA, JUNQUEIRA, MAGALÃES, 2011; GUALANO, TINUCCI, 2005, 2007; VASCONCELLOS et al, 2013).

4. CONCLUSION.

It is concluded with the present study that the personalized aerobic training contributes to the metabolic syndrome, highlighting the studied variables, being the percentage of fat, body mass index, waist hip ratio, maximum volume of oxygen per minute, waist circumference, pressure arterial, LDL, HDL, triglicerídeos and glicemia. It is possible to verify the importance of personalized aerobic training for an improvement in quality of life.

It was possible to observe significant results in all the data, being evidenced that a program of personalized aerobic exercise is able to control and to prevent SM, and also, to promote an improvement of the general conditions of the individual. Another important factor was that in 180 days, personalized aerobic training indicated important data for the population studied. In this sense, it is suggested that other studies be done to monitor the effects of long-term personalized aerobic training on human health.

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ABSTRACT

The Metabolic Syndrome is a set of risk factors of origin in the deficiency of metabolism, which contribute to the development of cardiovascular disease. Obesity contributes to hypertension, high levels of total cholesterol, low levels of HDL - cholesterol and hyperglycemia, therefore associated with the high risk of cardiovascular diseases. The regular practice of physical activity contributes to the decrease, both directly and indirectly in the risk of cardiovascular diseases. This study aimed to verify the effect of a personalized aerobic training in the prevention of metabolic syndrome in young adults. This descriptive characteristic search was performed through observations, recording and analysis of the facts. Data were collected before and after the personalized aerobic training program, with 50 sedentary individuals, composed of 18 male subjects and 32 female subjects aged 18 to 58 years. All signed an Informed Consent Term for anamnesis and training lasting 180 days. It was verified that there were significant differences in the results before and after the application of the protocol ("t") calculated greater than ("t") table, in the variables fat percentage, body mass index, maximum volume of oxygen per minute, circumference abdominal, blood pressure, LDL, HDL, triglicerídeos and glicemia. It was possible to observe significant results in all the data, being evidenced that a program of personalized aerobic exercise is able to control and to prevent the Metabolic Syndrome, and also, to promote an improvement of the general conditions of the individual.

Key Words: Metabolic Syndrome; sedentary lifestyle; obesity.

RÉSUMÉ

Le syndrome métabolique est un ensemble de facteurs de risque de source dans un déficit métabolique, qui contribuent au développement de maladies cardiovasculaires. L'obésité contribue à l'hypertension, le cholestérol total élevé, faible taux de HDL - cholestérol et donc l'hyperglycémie associés à un risque élevé de maladies cardio-vasculaires. La pratique régulière de l'activité physique contribue à la diminution directe et indirecte du risque de maladies cardiovasculaires. Cette étude visait à vérifier l'effet d'un entraînement aérobique personnalisé dans la prévention du syndrome métabolique chez les jeunes adultes. Cette recherche de caractéristiques descriptives a été effectuée à travers des observations, l'enregistrement et l'analyse des faits. Les données ont été recueillies avant et après le programme de formation aérobique sur mesure, en cours avec 50 personnes sédentaires, composé de 18 sujets masculins et 32 sujets féminins âgés de 18 à 58 ans. Tous ont signé un délai de consentement éclairé pour une anamnèse et une formation d'une durée de 180 jours. On a constaté qu'il y avait des différences significatives dans les résultats avant et après la mise en œuvre du protocole (« t ») calculé supérieur (« t ») sous forme de tableau dans les variables de pourcentage de graisse, l'indice de masse corporelle, le volume maximal d'oxygène par minute circonférence abdominale, la pression artérielle, LDL, HDL, trigricerideos et glicemia. On a observé des résultats significatifs dans toutes les données étant montré qu'un programme personnalisé d'exercice aérobique est capable de contrôler et de prévenir le syndrome métabolique et aussi promouvoir l'amélioration des conditions générales de l'individu.

Mots clés: Syndrome métabolique; mode de vie sédentaire; obésité.

RESUMEN

El Síndrome Metabólico es un conjunto de factores de riesgo de origen en la deficiencia del metabolismo, que contribuyen al desarrollo de enfermedad cardiovascular. La obesidad contribuye a la hipertensión, altos niveles de colesterol total, bajos niveles de HDL - colesterol e hiperglucemia, por lo que se asocian al alto riesgo de enfermedades cardiovasculares. La práctica regular de actividad física contribuye a la disminución, tanto directamente como indirectamente en el riesgo de enfermedades cardiovasculares. Este estudio tuvo como objetivo, verificar el efecto de un entrenamiento aeróbico personalizado en la prevención del síndrome metabólico en adultos jóvenes. Esta investigación de característica descriptiva fue realizada a través de observaciones, registro y análisis de los hechos. Los datos fueron recolectados antes y después del programa de entrenamiento aeróbico personalizado, siendo realizada con 50 individuos sedentarios, compuesta por 18 sujetos del sexo masculino y 32 sujetos del sexo femenino con rango de edad entre 18 a 58 años. Todos firmaron un Término de Consentimiento Esclarecido para la anamnesis y entrenamiento con duración de 180 días. Se verificó que hubo diferencias significativas en los resultados antes y después de la aplicación del protocolo ("t") calculado mayor que ("t") tabulado, en las variables porcentual de grasa, índice de masa corporal, volumen máximo de oxígeno por minuto, circunferencia abdominal, presión arterial, LDL, HDL, trigéter y glucosa. Se observaron resultados significativos en todos los datos y se evidenció que un programa de ejercicio aeróbico personalizado es capaz de controlar y prevenir el síndrome metabólico y promover una mejora de las condiciones generales del individuo.

Palabras claves: Síndrome metabólico; sedentarismo; obesidad.

RESUMO

A Síndrome Metabólica é um conjunto de fatores de risco de origem na deficiência do metabolismo, que contribuem para o desenvolvimento de doença cardiovascular. A obesidade contribui para a hipertensão, níveis elevados de colesterol total, baixo níveis de HDL - colesterol e hiperglicemia, por conseguinte associados ao risco elevado de doenças cardiovasculares. A prática regular de atividade física contribui para a diminuição, tanto diretamente quanto indiretamente no risco de doenças cardiovasculares. Este estudo teve como objetivo, verificar o efeito de um treinamento aeróbico personalizado na prevenção da síndrome metabólica em adultos jovens. Esta pesquisa de característica descritiva foi realizada através de observações, registro e análise dos fatos. Os dados foram coletados antes e após o programa de treinamento aeróbico personalizado, sendo realizada com 50 indivíduos sedentários, composta por 18 sujeitos do sexo masculino e 32 sujeitos do sexo feminino com faixa etária entre 18 a 58 anos. Todos assinaram um Termo de Consentimento Esclarecido para a anamnese e treinamento com duração de 180 dias. Verificou-se que houve diferenças significativas nos resultados antes e após a aplicação do protocolo ("t") calculado maior que ("t") tabelado, nas variáveis percentual de gordura, índice de massa corporal, volume máximo de oxigênio por minuto, circunferência abdominal, pressão arterial, LDL, HDL, trigricerideos e glicemia. Foi possível observar resultados significativos em todos os dados, sendo evidenciado que um programa de exercício aeróbico personalizado é capaz de controlar e prevenir a Síndrome Metabólica, e ainda, promover uma melhora das condições gerais do indivíduo.

Palavras Chaves: Síndrome Metabólica; sedentarismo; obesidade.

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