131 - THE EFFECT OF THE AQUATIC EXERCISE ON RESISTANCE AERÓBICA ANDTHE VO2máx IN AGED.

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INTRODUCTION

Although the functional decline during the aging presents diverse causes, involving the combination of the biological age, of the illness and the inactivity, they is esteem that at least 50% of these losses are prevented or exactly reversible, if the physical atone will be detected and it will have been adjusted for an intervention to the level of physical activity. Many aged ones have a dependent life, had to its style of sedentary life, they live of dangerous form, almost reaching its maximum capacity in its daily activities as, for example, to go up stairs and to walk for one definitive place. Any decline or small physical retrocession will be able conduit them of a state of independence for another one of dependence what it will go to request assistance for accomplishment of activities of routine, e also increases the risk of life of this population RIKLI and JONES, 1999).

Powers and Howlley (2000) tell that, the physical inactivity is an important factor of risk for coronations illnesses similar to the tobacconist, how much a hypertension and to the sanguineous high cholesterol level. Therefore, the lack of the physical activity also favors to the risks of illnesses that harm the cardio respiratory system all.

It is of utmost importance to detach us that the cardiac debit of aged people is, diminished it considers. With a reduction of up to 50% between the 18 to the 80 years of age moreover, bigger reduction of the skeletal muscular mass occurs consecutively reduces maximum muscular power (GUYTON and HALL, 2002).

The training to cardiopulmonary or cardio respiratory as Dantas (2003) are, part of the physical preparation that it aims at to provoke alterations in the organism, mainly in the systems respiratory and cardio circulatory and, including the system of oxygen transport and the mechanism of balance acid-base, de forma to propitiate improvement an performance.

Os exercises cardio respirators they are characterized by activated of resistance, the organism of the individual will go to suffer some physiological adaptations as, as adoptions no muscle a training they can affect an use of substrates. The training of mitochondria's resistance increases the density of the muscle, it increases the hair density, transverse of muscular staple fibers of type I increases the area of the section, it increases the content to intramuscular of triacilglicerides e the capacity to use the durant's lipoids as power plant the intensities sub maxims of exercise. The training also guarantees increase of the security of the lipid to intramuscular to be a power plant during the exercise. These and other physiological effect diminish the tax of use of the muscle glycogen and of the sanguine glucose and also the cumulative lactate tax during the phase sub maxima of exercises. At last, the resistance training provokes muscular and cardiovascular adaptations that will go to influence in the processes of the related functional capacities with the release, capitation and use oxygenic, e of the tax of use of ATP of the active muscle being this, co-ordinate for the ATP supplement tax involving the use of carbohydrates and lipoids as main fuels of energy (MOUGHAN et al. 2000).

The capitation (consumption) maximum of oxygen ($VO_{2máx}$) accepted as is measured normative of cardio respiratory aptitude. The maximum capitation of oxygen is product of the cardiac debit máximo (ml of O2/l). The maximum capitation of oxygen is product of the cardiac debit maximum (ml of O2/l). The difference of two the three times in VO2máx (lmin) that it exists between the populations must mainly to the differences in the maximum cardiac debit. Carrying, the $V_{O2máx}$ is related to the functional capacity of the heart. The VO2máx can in such a way be measured directly how much indirectly, this last one, it is esteem through predictive equations that if base on the reply of the cardiac frequency (FC) in standardized loads of effort; in the permanence time and a protocol; e in the distances covered in tests with times settled or same in the time expense to cover definitive distances or stimulations. The direct measured of the VO2máx needs raised costs, how much to the indirect measured it can be used in an ample variety of effort tests sub maxima and maximum. These tests are validated, therefore they had been, compared between the measured VO2máx directly how much the $VO_{2máx}$ measured from the physiological answers with the exercise sub maxima. Despite the test sub maxima not to be so necessary how much the maximum test, it provides to a necessary consequence sufficient of the aptitude card respiratory of the individual, with lower cost, requiring little time of effort of individual (ACMS, 2003).

The increase of the cardiac frequency is responsible, for bigger ratio of the increase in the cardiac debit that the systolic increase during the extenuate exercise. Normally, the systolic debit reaches its maximum when the cardiac debit is only in way of its maximum value. Any additional increase in the cardiac debit will have that to occur through increases of the cardiac frequency. During the maximum exercise in such a way the cardiac frequency how much the systolic debit increases about 95% in relation to its levels we sub maxim's. As I debit it cardio path is equal to the systolic debit multiplied by the cardiac frequency, it is inferred that the cardiac debit approximately corresponds 90% of the maximum that the person obtains to reach. Therefore it can be evidenced easily that, in normal conditions, the cardiovascular system is much more limit ante for the VO2máx that, the respiratory system, therefore the use of the oxygen for the body never will be able to exceed the intensity with that the cardiovascular system obtains to carry oxygen to the fabrics (GUYTON and HALL, 2002).

Consecutively, the method most common to establish the intensity of the exercise, in order to improve or to keep the aptitude cardio respiratory is the FC. The cardiac frequency is used as guide to establish the intensity of the exercise for the linear correlation with percentage of the $VO_{2máx}$. The objective is to consist of keeping adequate an average FC, the point to determine the intensity of the training.

Some methods exist to determine a variation of the white FC with purpose of training lapsing. One of these, it is the percentage of the FC_{max}, in which it establishes the variation of the white FC. This variation of the intensities is come close to 55 a75% of the $VO_{2máx}$ and provides the stimulation necessary to improve or to keep the VO2máx. E another one, it is the method of the reserve of FC (RFC), in this method the FC in rest (FC reposed) is deducted from the FC_{max} to get the RFC, thus we will get the white FC. The sixty eighty percent of the RFC 80% of the VO2máx for more apt individuals are approximately 60, however if they more soul relate the percentage of the reserve of volume of oxygen (VO2R). Therefore, these methods in provide a quantification to them in relation to the intensity of the characterized training, for the cardiac frequency of the training (FCT) or also known as method of Karvonen (ACMS, 2003).

However, to if quantifying the work intensities it must be taken in consideration the places where the exercises will be proportionate. As well as, the exercises carried through in the aquatic way are different of the terrestrial way, therefore the physical properties of the water act in the form body that, the physiological aspects are affected mainly on the FC.

Avellini cited for Aborrage (2003) tells that, the aquatic physical exercise produces physiological reactions in the cardio respiratory system, different of those to the outdoors, had to the physical aspects of the water as hydrostatic weight and temperature, e the capacity to intensify the loss of heat.

However, some physiological changes are in controversy in literature. Therefore, in some studies they show that, the FC increases, others verify the reduction of the same one and others tell that it does not have modifications.

Witley and schoene (1997) compare the answers of the FC in rest (FCr) and the FC in the walked one in 4 different speeds. E had not found significant differences in the FCr but, the FC of walked of the water the answers had inside been significantly higher of the one than in the mat. On the other hand, Ritche and Hopkins (1991) had not after found significant differences in the FC when studying 8 corridors of cross Country 30 minutes in 159 deep water having bpm, in rolling mat 160 bpm and race of 158 street bpm. However Kruel (1999) when analyzing the behavior of the FC, in 54 individuals, in the vertical position, static in different depths of water bpm with the water in the height of knee found an average reduction of FC of the 2 and of 16 bpm with the water in the height of the shoulder, with stabilization it enters the 20 40 seconds, a you measured that the body went immerging into different the depths, with exception of the anatomical points of the neck and the shoulder with the arms for it are of the water. According to author, probably the FC with the arms for is of the water increased due to the increase of the hydrostatic weight when this removed its arms for is of the surface of the water, or for the modification that must occur in the venous return and the sanguineous flow with the adopted position.

Despite the divergences of the scientific productions, the practicing individuals of aquatic exercise, periodically it acquires a good cardio respiratory conditioning, mainly when it has a work periodic for the professional who gives training (ABORRAGE, 2000).

The presented study however it considers its problem of inquiry the effect of the aquatic exercise on the cardio respiratory system verifying the aerobic resistance and the $VO_{2máx}$.

OBJECTIVE

The present study it is centered in verifying, if the practical one planning of the aquatic exercise can provide increase in the aerobic resistance and the VO_{2max} in aged.

SAMPLE

The component sample of this study was selected in an academy, in the state of Rio De Janeiro, being studied 27 aged ones between 50 the 73 years, all of the feminine sex, normal arterial pressure and that, already they possess a ballast of physical aptitude of at least 5 months.

After, chosen teams, the individuals had participated of a program of cardio respiratory training in aquatic exercise, with a planning of 8 micro cycles (Dantas, 2003). The training was systemize in three times per week in which, in first the two weeks the cardiac frequency of training (FCT) was of 55% of the reserve of the cardiac frequency (RFC), third and fourth week of 65% of the RFC, fifth and sixth week of 75% of the RFC and finally in the seventh and eighth week of 85% of the RFC.

MATERIALS AND METODOS

The methodology of the present research is of almost experimental format, therefore, but possessed the experimental group (MATTOS et al, 2000).

To evaluate aerobic resistance, it was used the test of Rikli and Jones (1999). The instruments used for the had test had been: chronometer of the Blitz mark, metric ribbon, cones, wood stockades (woods), chalk, marker and had been displayed chairs throughout some points, in the part of it are of the circuit. For security reasons, it was verified to the arterial pressure and the cardiac frequency in rest.

The test involves, walking in a possible maximum distance, during six minutes throughout a passage of fifty meters, being marked segments of five meters. The individuals walk continuously around of the marked passage. The internal perimeter of the measured distance was, delimited with cones and the segments of five meters marked with chalk. The area of the passage was in perfect conditions of illumination and its surface was not smooth and sliding. When counting the distance process, in the end of each return they were distributed straw being registered in a fiche. To determine in the distance covered, it was registered mark next to the place where the executants stopped and added it the number of received straw, coherently transformed into meters.

This study also of Sport Medicine provided to a verification of the VO_{2max} for the indirect method under test sub maximum with the protocol of the American College (2003), with the metabolic equation for the rude or total cost of oxygen.

DATA HANDLING

The data daily pay and after-program had been treated through descriptive and inferential statistics. First with the descriptive part that, it had as units of interest the differences gotten between daily pay and after-test and the consecutive averages. Soon after them inferences to be done relatively to the comparison between the individuals, analysis of pareado test t was used, with verification of significance detected for each main analysis. It accuses it of significance defined for the test was the conventional for research of this nature, or either, p = or < 0,05.

PRESENTATION AND QUARREL OF DATA

The results of the test of the aerobic resistance are in sample in figures 1 and 2, with the values gotten in covered distance, or either, in meters.

Figura 1

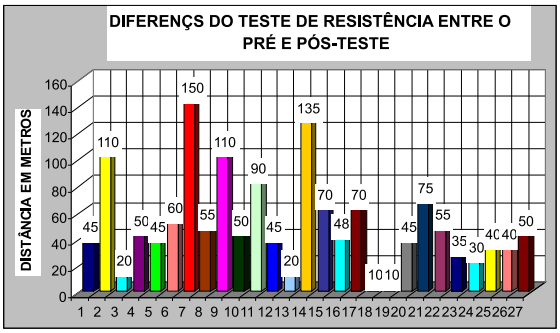
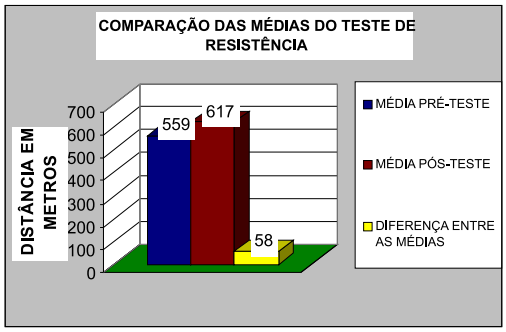


Figura 2



The graph of the figure 1 sample that, all the individuals had after, had improvements in the test of aerobic resistance the period of trainings. E in the graph of figure 2, it all portrays the average of the resistance of the group in the daily pay and after-test, e difference between them, also getting a sufficiently interesting difference comparing between the daily pay and the after-training.

Descriptive in figure 3 and 4, we will demonstrate to an analysis of the test sub maximum

characterized, for the values of VO_{2max} in ml/kg/min. Being thus these figures it compares the maximum volume of oxygen between the daily pay and after-test

Figura 3

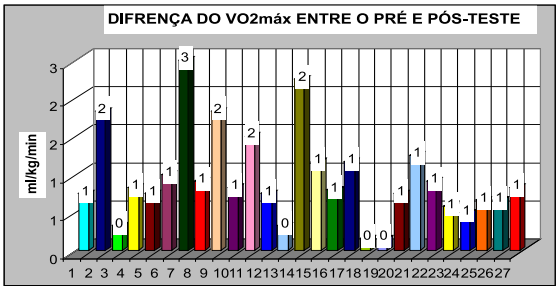
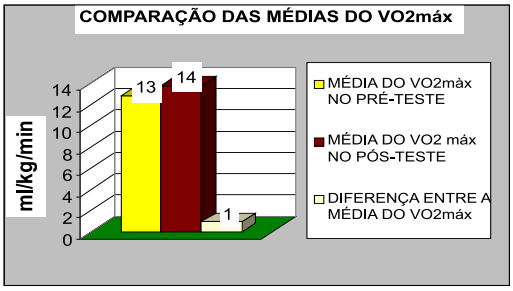


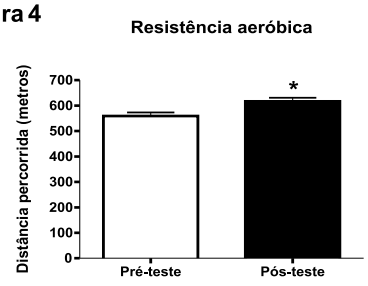
Figura 4



The graph of figure 3 represents the difference of the VO_{2max} of each individual, acquired the training program after. E we verify through the results that, the training provided increase of the VO_{2max}. in the majority of the individuals. To confirm the maximum consumption of oxygen in the individuals, we show in the graph of figure to the averages of the 4 daily pay and after-test, thus verifying, an increase in the VO_{2max}.

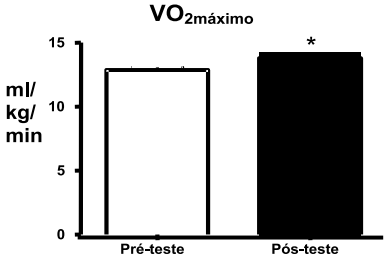
To consolidate the effectiveness of the present study, the results of the main hypothesis had been analyzed by the inferential statistical treatment for test t pareado with the probabilistic edge of p = or < 0,05. Therefore, figures 5 and 6 show clearly the significance of the results of the aerobic resistance and the VO_{2max}.

Figura 4



* Pareado da distância de p < 0,0001

Figura 5



* Pareado do VO_{2max} de p < 0,0001

You prop up them above had demonstrated that, through the statistical treatment a significance of 0,001 can be verified comparing the period of daily pay and after-training, as much in the aerobic resistance how much in the VO_{2max}. Characterized thus, these results had become significant the main hypothesis, therefore, they had been lesser of that the probabilistic edge (p = or < 0,05).

CONCLUSION AND RECOMMENDATIONS

It can be concluded, therefore that, the planning cardio respiratory training in aquatic exercise for aged individuals propitiates increases in the aerobic resistance and the VO2máx. However an adequate planning and the verification of the, intensities of each training, each lesson and for each individual is preponderant important to get itself resulted of success.

One sends regards that, in future research, other methods of evaluation are used, new verifications of intensities as well as other methods of training.

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THE EFFECT OF THE AQUATIC EXERCISE ON RESISTANCE AERÓBICA ANDTHE VO2máx IN AGED.

ABSTRACT

The present study it is centered in verifying, if practical periodic of the aquatic exercise can provide to an increase in the aerobic resistance and the VO_{2max} in aged. The component subjects of the sample had been, aged of 50 the 73 years, all of the feminine sex, normal arterial pressure, and that, they a ballast of training of at least 5 months. Apes chosen teams, the subjects had participated of a training program cardio respiratory in aquatic exercise, with one periodic of 8 micro cycles. To evaluate aerobic resistance aerobic, was used the test of walked of Rikli and Jones (1999), and to verify the VO_{2max} the data

handling was carried through by method indirect with protocol of AMCS (2003, was of descriptive and inferential characteristic (test t pareado with the probabilistic edge of p = or < 0,05). In accordance with the respective ones you prop up of the study, one concludes that, p < 0.0001 has a significant difference of it enters the comparison of the daily pay and after-test.

Words keys: cardio respiratory, resistance aerobic, VO_{2max}

THE EFFECT OF THE EXERCICIO AQUATIQUE ON RESISTANCE AERÓBICA AND THE $VO_{2máx}$ IN ÂGÉ.

Sommaire

La présente étude il est centré dans la vérification, si l'un prévu pratique du exercicio aquatique peut fournir augmentez dans la résistance d'aeróbica et le $VO_{2máx}$. dans âgé. Les individus composants de l'échantillon avaient été, âgé de 50 les 73 années, tout le sexe féminin, normotensos, e qui, déjà ils possèdent un ballast d'aptitude physique au moins de 5 mois. Après, équipes choisies, les individus avaient participé d'un programme de cardiorespiratoire s'exerçant dans lê exercicio aquatique, avec un prévu de 8 microcycles. Pour évaluer la résistance d'aeróbica, l'essai de marché de Riklil et de Jones a été employé (1999), e pour vérifier le $VO_{2máx}$, il a été exécuté par la méthode indirecte avec le protocole d'AMCS (2003. Le traitement des données était de caractéristique descriptive et inferencial (pareado d'essai t avec le bord probabiliste de p=ou<0,05). Selon les respectifs vous étayez vers le haut de l'étude, on conclut cela, il écrit la comparaison du salaire quotidien et de l'après-essai.

Clefs de Mots: cardiorespiratoire, résistance d'aeróbica, $VO_{2máx}$.

EL EFECTO DEL EL EXERCICIO ACUÁTICO EN LA RESISTENCIA AERÓBICA Y $VO_{2MÁX}$ EM ENVEJECIÓ.

Resumen

El actual estudio se centra en verificar, si el un planeado práctico del exercicio aquatique puede pour fournir aumente de la resistencia del aeróbica y del VO2máx. en envejecido. Los individuos componentes de la muestra habían sido, envejecido de 50 los 73 años, todo el sexo femenino, pression artérielle normale, e cela, poseen ya un lastre de la aptitud física de por lo menos 5 meses. Después de equipos elegidos, los individuos habían participado de un programa del cardiorespiratório entrenando dans exercicio acuático, con un à planeado de 8 microciclos. Il s'arrête evaluar resistencia del aeróbica, la prueba de caminado de Riklil y de Jones fue utilizada (1999), arrêts de e verificar el $VO_{2máx}$, fue llevado a través por el método indirecto con el protocole de AMCS (2003). El tratamiento de datos estaba de caractéristique descriptiva e inferencial (pareado de la prueba t con el borde probabilistico de p=ou<0,05). De acuerdo con los espectivos usted apoya para arriba del estudio, uno concluye eso, incorpora la comparación del pago diario y de la despue's-prueba.

Llaves de las palabras: cardiorespiratório, resistencia del aeróbica, $VO_{2máx}$.,

OS EFEITOS DA HIDROGINÁSTICA SOBRE A RESISTÊNCIA AERÓBICA E O $VO_{2máx}$ EM GERONTES.

RESUMO

O presente estudo centra-se em verificar, se a prática periodizada da hidroginástica pode proporcionar um aumento na resistência aeróbica e no $VO_{2máx.}$ em idosos. Os indivíduos componentes da amostra foram, idosos de 50 a 73 anos, todos do sexo feminino, normotensos, e que, já possuem um lastro de aptidão física de pelo menos 5 meses. Após, selecionados, os indivíduos participaram de um programa de treinamento cardiorespiratório em hidroginástica, com uma periodização de 8 microciclos. Para avaliar resistência aeróbica, foi utilizado o teste de caminhada de Riklil e Jones (1999), e para verificar o $VO_{2máx}$, foi realizado pelo método indireto com protocolo do AMCS (2003. O tratamento de dados foi de característica descritiva e inferencial (teste t pareado com a margem probabilística de p= ou < 0,05). De acordo com os respectivos escores do estudo, conclui-se que, há uma diferença significativa de p < 0,0001, entre a comparação do pré e pós-teste.

Palavras chaves: cardiorespiratório, resistência aeróbica, $VO_{2máx}$.,

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