133 - ESTIMATE OF ENERGY ON AN EXPENSE OF CLASS HIDRO

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INTRODUCTION

It is known of the great benefits caused by the practice of Hidro, but this activity is generally practiced in a group, of which this heterogeneous as the effect of activity may be relatively uneven, according to the objective of its practitioners, due organic characteristics, consequential the level of physical condition, age, body composition, among others.

On this the problem that this study involved the following question: What would be the energy expended on a class of Hidro?

Thus arises the need to be measuring and tracking the activity in specific in order to be able later, divide, and mainly improve specify the whole process, teaching, educational and physiological, according to the goals and possible limitations of its practitioners, i can yes, provide a safer activity, optimized and therefore a better result.

The goal that has guided this research was to determine the energy expenditure of a class of Hidro, through the heart of individuals in the sample during the experiment, related to body weight.

Clearly, in the same physical activity applied to a group of individuals which in turn has different characteristics morphofunctional will also different levels and consequences, disregarding principles of scientific training as: biological individuality and specificity and can thus bring significant benefits or not yet to a lesser extent, causing potential problems due to an overload also possible.

According to Amorin and Gomes (2003, p. 36), the energy expenditure is a calculation that varies according to age, weight, height and level of physical activity and considers the presence or absence of any pathology, and also varies in situations physiological as in pregnancy and lactation. There are several methods of calculating setting up the first basal metabolic rate, and applying the physical activity level of each individual.

The best way to estimate the expense enregético is using the parameter of physiological variables such as frequency cardíca, because it does not interfere in their activities of daily life (Bradfield, Saris, Boulay, Montoya, cited by Amorin and Gomes 2003, p. 156) .

It is estimated the expense from the heart, but its use is limited to predict the energy expended by problems inherent in the validation of the method. It presents the problem of not behave in a linear fashion for each individual, and in this sense, their validation by means of general equations becomes difficult. To properly validate the relationship with GE heart rate, it is necessary to measure each individual in the relationship in terms of rest and different levels of activity "(Bradfield, Griffiths, Saris, Ceesay, Collins, Haskell, Boulay, Freedson and Melanson, Montoya, Nahas , Eston, cited by Amorin and Gomes 2003, p. 127)

According Ney (1999, p. 96) for the purpose of the lesson of Hidro be achieved it is necessary that the teacher teaching follow certain principles as: principle of motivation, where the teacher should encourage and stimulate their students to maintain a pace of implementation of exercises To avoid loss of interest in the activity. The principle of individualization is characterized by the biological condition of the pupil, which determines the degree of effort that will be capable of.

The principle of continuity in the process enter the human body, which is the result of alternation between the effort and recovery, and occurs through the stimuli that may be: low, moderate, strong and very strong. And to end this sequence is the beginning of overload that gradually increases the number of repetitions, duration and intensity of exercises (Figueiredo and Ney, 1999, p. 42).

The total energy expenditure consists of three components: the resting metabolism, thermic effect of food and physical activity. The resting metabolic rate (BMR) is defined as the energy expenditure required for the maintenance of physiological processes in the post-absorptive and, depending on the level of physical activity, may comprise approximately 60 to 70% of total energy expenditure. The thermic effect of food refers to the increase in metabolic rate above the rest of values in response to the consumption of a meal and accounts for approximately 10% of total energy expenditure. Physical activity is the most variable and relates to the energy expenditure required for skeletal muscle activity. In sedentary, represents approximately 15% of total energy expenditure, while in physically active individuals, can come to understand 30% (WHO, 1998).

All components are subject to changes by external factors. Physical activity may cause an increase in the total energy expenditure of the acute form, through the energy cost of conducting the exercises and during the recovery, or chronic form, through changes in BMR (20). The acute effects will be discussed below, while the chronic can be studied in other articles in the literature available for review (GOMES & MEIRELLES, 2004).

According Who (2002, p. 26) component of the best result in energy expenditure is physical activity.

The best way to estimate the energy expenditure among the physiological variables is through the heart, because it does not interfere in their usual activities, being well supported by individual assessed (Bradfield, Saris, Boulay, Montoya, cited by Gomes Amorin and 2003, p . 156).

It is estimated the expense from the heart, but its use is limited to predict the energy expended by problems inherent in the validation of the method. It presents the problem of not behave in a linear fashion for each individual, and in this sense, their validation by means of general equations becomes difficult. To properly validate the relationship with GE heart rate, it is necessary to measure each individual in the relationship in terms of rest and different levels of activity (Bradfield, Griffiths, Saris, Ceesay, Collins, Haskell, Boulay, Freedson and Melanson, Montoya, Nahas, Eston, cited by Amorin and Gomes 2003, p. 127).

However, Barbanti (2003, p. 283), which defines heart "is the number of times per minute the heart is filled with blood and pumps it to the vascular system."

According Barbanti (2003, p. 283), maximum heart rate can be regarded as the highest pulse that an individual can get. Can be obtained by the formula: 220 minus age in years (220 - age = max HR). With increasing age the maximum heart rate decreases.

Where:
HR max. = 220 - age (Karnoven et al., 1957), quoted by Fernandes Filho (2003).

According Fernandes Filho (1999, p. 152) are five areas of training that correspond to different levels of intensity for the exercise and meeting various mechanisms of metabolic and respiratory transport in the body.

The area of moderate activity (50 to 60% of MHR): is the level of initial frequency for those who are beginning their training program, are inactive or in the process of rehabilitation.

The area of weight loss (60 to 70% of MHR) also known as "Threshold of aerobic conditioning works the heart with sufficient intensity so that it would strengthen and be ready for a continuous rhythm, moderate and without pain.

The area of aerobic training (70 to 80 & FCM's) benefits not only the heart but also the respiratory system, increasing the aerobic potential, the ability to carry oxygen and remove carbon dioxide from specific muscle groups.

The area of anaerobic threshold (80 of 90% of MHR) during the training in this area benefits will be increasing the body's ability to metabolize the lactic acid, to delay fatigue.

For Zílio (1994, p. 41) the zone of maximum effort (90 to 100% of HR max) is only indicated for well-conditioned athletes, while training in this area will be working above the anaerobic threshold and will be working in oxygen flow, that the body can provide to the intensity of exercise.

For Bonachela (2003, p. 7) Hidro came to Germany with the intention of meeting originally a panel of persons over age, I needed a practice safe physical activity, without causing injuries or risk the joints and they provide welfare physical and mental. With the good results obtained in the water, this activity has come to the United States, has been refined and disseminated, has won many fans, including athletes from various forms of sports.

For the purposes of the class of Hidro be achieved it is necessary that the teacher teaching follow certain principles as: principle of motivation, where the teacher should encourage and stimulate their students to maintain a pace of implementation of the exercises so that there is loss of interest in activity . The principle of individualization is characterized by the biological condition of the pupil, which determines the degree of effort that will be able to handle (Ney 1999, p. 96).

The principle of continuity in the process enter the human body, which is the result of alternation between the effort and recovery, and occurs through the stimuli that may be: low, moderate, strong and very strong. And to end this sequence is the beginning of overload that gradually increases the number of repetitions, duration and intensity of exercises (Figueiredo and Ney, 1999).

METHODOLOGY

This study of experimental feature with quantitative approach a group of 4 female volunteers aged between 20 and 30 years, practitioners of a customized training program, involving the activity of the second Hidro Gil (2007. P. 47). The experiment was conducted during a lesson Hidro from which to measure the energy consumption was used in the calculations protocol energy expenditure by heart rate, cited by Amorin & Gomes (2003. P. 134). Thus, hauve the need for measuring the frequency heart rate (HR) during all stages of the experiment, heating, development and calm returns, respectively, aiming to seek the cause-effect relationship. However to measure the FC was used a heart rate monitor on the Polar brand, model S 810, after which, measured and stored, their data were transferred to a microcomputer and worked through a software-specific analysis of heart rate. The data collection of the sample had a range of 5 seconds, providing an N = 600, result of 50 minutes of the trial.

The activities undertaken during the trial, were ativdades basic low-complexity, mainly involving large muscle groups.

However results from the sample were identified by the descriptive statistical method, emphasizing their minimum values, average, maximum and standard deviation. All data collected were also highlighted by tables and graphs of the type bar, this seeking to observe the possible heterogeneity of the sample. "(THOMAS, Jerry R; NELSON, Jack K, 2002. P. 304).

RESULTS

It was recorded during the experiment (class), by measuring heart rate, and consequently the intensity of effort of the subjects, that the purposes and objectives of a class of Hidro can not be attained by individuals with different physical conditions. The main characteristic of a class of Hidro, and it has a feature predominantly aerobic with intermittent stages, evidenced by heart rate that should not significantly exceed the 90% of maximum heart rate of the individual and remain for the most part under 80 % Of maximum heart rate.

Table 01. Figures collected the sample with respect to age, body weight, average heart rate, average energy expenditure per minute, total energy expenditure and percentage of maximal heart rate during the experiment (class).

	AV 01	*AV 02*	*AV 03*	*AV 04*
Age	21,00	22,00	29,00	28,00
Stature (cm)	157,00	170,00	160	168,00
Body mass index	20,90	33,30	25,19	27,65
Body weight	51,60	96,20	64,5	78,00
Heart average	138,00	125,00	139,00	142,000
*EE/min	4,72	8,89	5,88	7,08
**EE	235,79	449,08	294,25	354,06
% of maximum heart rate	69,35	63,13	74,77	73,96

**EE/min Mean energy expenditure of minute*
***EE Energy expenditude.*

Through the values shown in Table 01, it was found that the average intensity of the exercise remained predominantly in levels of aerobic exercise, even considering their standard deviation.

Table 02. Descriptive statistics of the sample data collected in relation to average heart rate, energy expenditure per minute, total energy expenditure and percentage of maximal heart rate during the experiment (class).

	Heart average	**EE/min*	***EE*	*% of maximum heart rate*
N	600	600	600	600
Mean	136,00 +/- 7,53	6,67 +/- 1,82	333,29 +/- 91,05	69,80 +/- 4,86

**EE/min Mean energy expenditure of minute*
***EE Energy expenditude.*

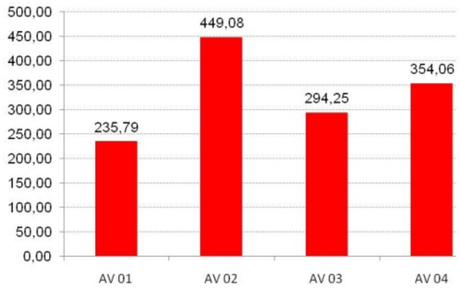
During the experiment top (class) the average heart rate (bpm) from an N = 600, were found the following figures: 125, 136, 142 + / - 7.53 for the minimum, average, maximum and standard deviation, respectively.

Meanwhile top for the experiment (class) the average energy expenditure per minute related to heart rate (bpm) from an N = 600, were found the following values: 4.72, 6.67, 8.98 + / - 1.82 For the minimum, average, maximum and standard deviation, respectively.

But to top the experiment (class) the total energy expenditure related to heart rate (bpm) from an N = 600, were found the following values: 235.79, 333.29, 449.08 and + / - 91.05, for the minimum, average, maximum and standard deviation, respectively.

For the top experiment (class) the percentage of maximal heart rate (bpm) from an N = 600, were found the following values: 63.13, 69.80, and 73.96 + / - 4.86, to minimum, average, maximum and standard deviation, respectively.

Graph 01. Energy expenditure (kcal) over the sample collected during the experiment (class).



The values found in the tables above through statistical processing and distribution of the sample shown in the chart of the type bar, has reaffirmed the concept of several authors on physiological response of individuals with different levels of physical conditioning, compared to the same stimulus. The energy expended during the trial showed significant differences, because during the same stimulus these differences were expressed not only in its final results, but also evidenced by the treatment statistic and mainly by its standard deviation, that took place due to the protocol that was used, not using parameters physiologic just as the heart, but also the weight of each individual sample, thus respecting the principle of biological individuality, making the results of the particularities of each subject, thus reducing the possibility of error.

CONCLUSION

The related study has demonstrated the parameters of the sample heterogeneity and its consequences for a school in groups, especially the class of Hidro. There were several factors cited in its results that affirm the need for a differentiated approach to division of classes and its primary importance, in both divisions of class as the drafting and implementation of lessons. The lessons should be drawn up respecting all principles of training, especially the biological individuality, and that case is, the resizing of the lesson must be done so that we can achieve the proposed goals of the sport.

This study represents one more step on the immensity and consequence of physical activity for its participants and the importance of improvement and upgrade of its professionals.

Also emphasize the need for various physiological parameters of these studies cited here for further evidence, suggesting that even beyond the verification of energy expenditure, is its intensity checked and what is the borderline zone of anaerobic to aerobic activity of each individual, ie what is the anaerobic threshold of each subject, to also know what the efficiency and safety of a class of Hidro.

It follows that the energy spent on a lesson Hidro, even this has its predominance aerobics and trying to reach people at different levels as its efficiency and safety, this unsatisfactory and may bring harm the health of its practitioners. It is extremely impractical put in the same class of individuals heterogeneous physical constraints, even knowing that today there is an entire technology that can be used to monitor these activities in groups, such as heart rate monitors.

Recall also that more than just professionals, educators or physical, are health care professionals, and more than aesthetics physical activity and exercise is his first goal for search and preservation and safeguarding the health of human beings.

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ABSTRACT

It is known of the great benefits caused by the practice of Hidro, but this activity is generally practiced in a group, of which this heterogeneous as the effect of activity may be relatively uneven, according to the objective of its practitioners, due organic characteristics, consequential the level of physical condition, age, body composition, among others.

This study aimed to estimate the energy expenditure of Hidro class. This study of experimental feature with quantitative approach a group of 4 female volunteers aged between 20 and 30 years, practitioners of a customized training program, involving the activity of Hidro. To measure the energy consumption was used in the calculations protocol energy expenditure by heart rate, cited by Amorin & Gomes (2003. P. 134). But to top the experiment (class) the total energy expenditure related to heart rate (bpm) from an N = 600, were found the following values: 235.79, 333.29, 449.08 and + / - 91.05, for the minimum, average, maximum and standard deviation, respectively.

It follows that the energy spent on a lesson Hidro, even this has its predominance aerobics and trying to reach people at different levels as its efficiency and safety, this unsatisfactory and may bring harm the health of its practitioners. It is extremely impractical put in the same class of individuals heterogeneous physical constraints, even knowing that today there is an entire technology that can be used to monitor these activities in groups, such as heart rate monitors.

Keywords: energy expenditure, Hidro, heart rate.

ESTIMACIÓN DE L´´ENERGIE SUR UNE CHARGE DE LA CLASS HIDRO

ABSTRACT

Il est connu de grands avantages causés par la pratique de la hydrauliques, mais cette activité est généralement pratiqué en groupe, de ce qui hétérogène que l'effet de l'activité mai être relativement inégale, conformément à l'objectif de ses praticiens, en raison des caractéristiques biologiques, en conséquence le niveau de condition physique, l'âge, la composition corporelle, entre autres.

Cette étude visait à évaluer la dépense d'une ULA enregético de hidro. Cette étude d'une fonctionnalité expérimentale approche quantitative avec un groupe de 4 volontaires de sexe féminin âgés entre 20 et 30 ans, les praticiens d'une formation sur mesure, impliquant l'activité de hidro. Pour mesurer la consommation d'énergie a été utilisée dans les calculs protocole dépense d'énergie par la fréquence cardiaque, cité par Amorin et Gomes (2003. P. 134). Mais au début de l'expérience (classes) de l'énergie totale des dépenses liées à la fréquence cardiaque (bpm) à partir d'un N = 600, ont été retrouvés les valeurs suivantes: 235.79, 333.29, 449.08 et + / - 91.05, pour le minimum, moyenne, maximum et l'écart-type, respectivement.

Il s'ensuit que la enregético passé sur une leçon hydrauliques, ce qui a encore sa prédominance d'aérobic et d'essayer d'atteindre les personnes à différents niveaux, comme son efficacité et sa sécurité, et non satisfaisante mai porter atteinte à la santé de ses praticiens. Il est extrêmement pratique mis dans la même catégorie de personnes physiques hétérogènes, sachant que même aujourd'hui il existe un ensemble de technologies qui peuvent être utilisés pour surveiller ces activités en groupes, tels que des moniteurs de fréquence cardiaque.

Mots-clés: dépenses énergétiques, hydrauliques, la fréquence cardiaque.

ESTIMACIÓN DE LOS GASTOS DE ENERGIA RELATIVA EN UMA CLASE DE HIDRO

RESUMEN

Se sabe de los grandes beneficios causados por la práctica de la Hidro, pero esta actividad se practica en general un grupo, de los cuales este heterogéneo como el efecto de la actividad puede ser relativamente desigual, de acuerdo con el objetivo de sus practicantes, por las características orgánicas, como consecuencia el nivel de condición física, edad, composición corporal, entre otros.

El objetivo de este estudio para estimar el gasto de un ULA enregético de Hidro. Este estudio experimental de la función de enfoque cuantitativo con un grupo de 4 mujeres voluntarios con edades comprendidas entre los 20 y 30 años, los profesionales de un programa de entrenamiento personalizado, con la participación de la actividad de la Hidro. Para medir el consumo de energía se ha utilizado en los cálculos de protocolo gasto de energía por frecuencia cardíaca, citado por Amorin y Gomes (2003. P. 134). Sin embargo, al principio del experimento (clase) de la energía total los gastos relacionados con la frecuencia cardiaca (BPM) de un N = 600, se encontraron los siguientes valores: 235,79, 333,29, 449,08 y + / - 91,05, para el mínimo, promedio, máximo y desviación estándar, respectivamente.

De ello se deduce que la enregético gastado en una lección Hidro, aunque este tiene su predominio aeróbic y tratar de llegar a la gente a diferentes niveles como su eficacia y seguridad, esta insatisfactoria y puede traer daños a la salud de sus practicantes. Es muy práctico poner en la misma clase de individuos heterogéneos limitaciones físicas, incluso a sabiendas de que hoy hay toda una tecnología que puede utilizarse para controlar estas actividades en grupos, tales como monitores de ritmo cardíaco.

Palabras clave: gasto de energía, Hidro, la frecuencia cardiaca.

ESTIMATIVA DO GASTO ENERGÉTICO RELATIVO DE UMA AULA DE HIDROGINÁSTICA

RESUMO

Sabe-se dos grandes benefícios provocados pela prática da hidroginástica, porém ésta atividade geralmente é praticada em grupo, do qual este por ser heterogêneo o efeito da atividade poderá ser relativamente desigual, de acordo com o objetivo de seus praticantes, devidas características orgânicas, conseqüentes do nível de condicionamento físico, idade, composição corporal, entre outros.

Este estudo teve por objetivo estimar o gasto enregético de uma ula de hidroginástica. Fizeram parte deste estudo de característica experimental com abordagem quantitativa um grupo de 4 voluntários do sexo feminino com idade entre 20 e 30 anos, praticantes de um programa de treinamento personalizado, envolvendo a atividade de hidroginástica. Para mensuração do consumo energético foi utilizado os cálculos protocolares de gasto energético pela freqüência cardíaca, citados por Amorin & Gomes (2003. p. 134). Contudo para topo o experimento (aula) o gasto energético total relacionado à freqüência cardíaca (bpm) de um N=600, foram encontrados os seguintes valores: 235,79, 333,29, 449,08 e +/- 91,05, para a mínima, média, máximo e desvio padrão, respectivamente.

Conclui-se que o gasto enregético relativo de uma aula de hidroginástica, mesmo ésta tendo sua predominância aeróbica e tentando atingir pessoas de níveis diferentes quanto a sua eficiência e segurança, esta insatisfatória, podendo trazer prejuízos a saúde de seus praticantes. É extremamente inviável colocarmos em uma mesma aula indivíduos de condicionamentos físicos heterogêneos, ainda sabendo que existe hoje toda uma tecnologia que se pode utilizar para o monitoramento destas atividades em grupo, como os monitores de frequência cardíaca.

Palavras-chave: gasto energético, hidroginástica, frequência cardíaca.