84 - CONSIDERATIONS ABOUT THE INFLUENCE OF PHYSICAL CONDITIONING AND CLIMATIZATION IN FLUID LOSS

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Introduction

During the physical exercise the organism if in accordance with holds the metabolic necessities, until the point where the exercise ceases or until where the organism obtains to supply the metabolic demand. Evident that the physical condition provides specific physiological modifications for each type of activity, amongst them the adaptation to the heat. The increase of the body temperature is probably, in the majority of the times, the main cause of fatigue, that in general coincides with temperatures central offices between 38ºC and 40ºC10. Beyond the raised tax of sudorese that it influences directly in the organic functions, secondary effect can occur and harm the performance. A good understanding of the termorregulation is essential to prevent bigger riots during the physical exercise. How much bigger it will be the carried through work, bigger will be the energy expense, then bigger the necessity to eliminate heat for the environment, of this form the organic adaptations are specific, amongst which we will go to approach the tax of sweat and its implications. The regular exercise in a hot environment produces a series of physiological adjustments destined to minimize the decurrent riots of the homeostasia of it estresse térmico[11].

Materials e methods

A group of studentes of university(n=25) with 10 men and 15 women, average age of 20,57(+ 3,55) years for the men and 19,29(+ 1,8) for women of the GH. The average age for men of the GNH was of 20,33(+ 1,53) and for women 18,75(+ 1,28). The group carried through a session of physical exercises of one hour of duration in the campus of the Universidade Federal Rural do Rio de Janeiro(UFRRJ). All the integrant ones of the group had carried through the test of 2400m previously to evaluate the aerobic power(VO_2máx). The group was formed by pupils of the group of the first period of the course of licenciature in Physical Education of the UFRRJ in the first semester of the year of 2004, all the individuals kept regular physical activity for at the very least 1 month before the collection of data in the schedule and place of accomplishment of the test. The integrant ones of the sample had carried through the test of VO2máx two days before the collection of data.

In the day of the collection of data the group was divided in two sub-groups, where the GH carried through the exercises consuming 200ml of water to each 15minutos. The GNH carried through the exercises without ingesting liquids during the period of test. Before the test all the integrant ones of the group had been weighed, this if it repeated after the test immediately. None of the participants of the test had been able to leave the place during the period of collection of data and accomplishment of the exercise. The difference the initial PC and the final PC is relative the amount of lost fluids during the exercise and allows to evaluate the level of dehydration of each individual.

Results

In the study the tested ones had been analyzed 6 measures in all. The PC suffered reduction in the two groups. The GH had an average PPC of 185,71g while the GNH had an average PPC of 745,45g. Some integrant ones of the GH had presented PC profit after the CT, this demonstrate the importance of the planning of the hídrica replacement during the practical one of physical exercises. When compared men and women, the average of PPC for men of the GH was of 131,19g and for the women of the GH it was of 42,86g. The average of PPC of the men of the GNH was of 1066,67g and for women it was of 625g.

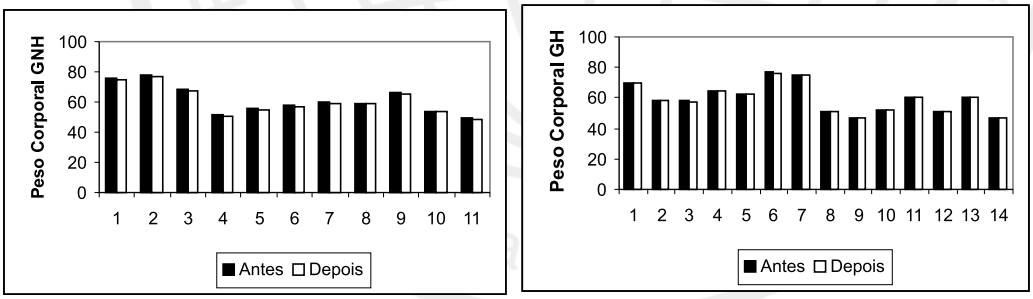

Fig. 1. Diferença of the PC before and after the accomplishment of the CT.

Another used measure to evaluate the dehydration level was the use of percentage for the PPC. The percentile average of PPC in the GH was of 0,26% and in the GNH it was of 1,19. Figure 2 shows the distribution of PPC in percentage in the two groups.

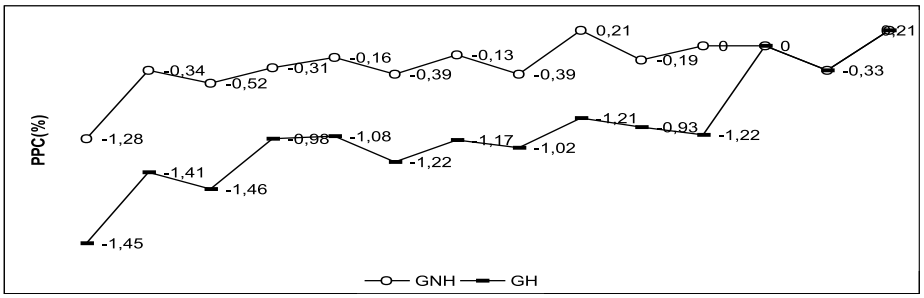

Fig. 2. PPC in percentage in the GH and the GNH

The integrant ones of the two groups had been divided in classrooms in accordance with the level of VO_2máx. To determine the number of classrooms the total amplitude of the one of the values of VO_2máx of the sample gotten in the test of 2400m in track was calculated. The number of classrooms was determined by the criterion of Euler, shown below, where NC corresponds to the number of classrooms and n to the number of integrant of each sub-group.

$$NC = 2{,}5\sqrt[4]{n}$$

Tables 1 and 2 present the boundary-values of the classrooms and freqüência() of individuals in each classroom. The average point of each classroom is represented by Xi and proportional the relative frequency for Pr.

Classes		f	Xi	Pr
27,30	-- 31,73	6	29,52	6/11
31,74	-- 36,17	2	33,96	2/11
36,18	-- 40,61	2	38,40	2/11
40,62	-- 45,05	0	42,84	0/11
45,06	-- 49,49	1	47,28	1/11

Tabela 1. Simple frequency of VO_2máx test in GNH.

Classes		f	Xi	Pr
27,30	-- 31,96	5	29,63	5/14
31,97	-- 36,63	4	34,30	4/14
36,64	-- 41,30	2	38,97	2/14
41,31	-- 45,97	1	43,64	1/14
45,98	-- 50,64	2	48,31	2/14

Tabela 1. Simple frequency of VO_2máx test in GH.

How much the relation enters the level of physical aptitude and the loss of corporal fluids, figure 3 sample that the individuals with the raised VO_2máx more had had a bigger PPC when compared with individuals with VO_2máx lower. The tax of sudorese in men with bigger levels of VO2máx was bigger of the one than in women with VO2máx greater. The PPC also was bigger in men when men and women with lower VO2máx had been compared. These results suggest a bigger adaptation of the termorregulador system in individuals of the masculine and trained sex.

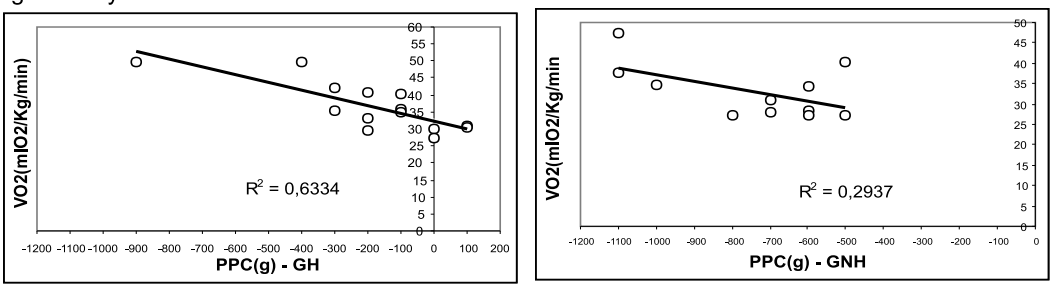

Fig. 3. Report between VO_2máx and tax of sudorese in the GH and the GNH. The results show greater tax of sudorese in the individuals with VO2máx greater.

Discussion

It isn't newness that the practised physical activity in favorable climatic conditions tends to provoke a hipohidration state. Front to this situation, strategies for replacement of lost corporal fluids in function of the corporal termorregulationn are used to minimize the effect of the loss of liquids. The dehydration is associated the diverse organic riots that harm the porting income.

The ability to ingest liquids to prevent great losses of fluids is very important, however others two aspects must be considered: the physical condition and the state of organic adaptation to the heat. The term acclimatization to the heat describes the collective physiological modifications that improve the tolerance to heat[10].

In studies that had compared the physical performance after the dehydration showed that the physical conditioning was associated with improvement in the performance during the dehydration process, while the acclimatization to the heat did not present improvement in this aspect[5]. Other studies show that the physical condition, with or without acclimatization to the heat, did not produce apparent improvement in the reply of the heart rate(HR) or in the arterial pressure of passive fall after dehydration[2]. The induced dehydration for the high tax of sudorese provokes an increase in the HR because of the reduction of the sistolic volume (SV), however the reflected increase in the HR does not obtain to counterbalance the reduction of the SV, what it causes a fall the maximum cardiac debit[10].

Bass et. al. the plasmatic volume does not seem to after suffer to modifications the physical conditioning with or without adaptation to heat[1], however the physical training suggests an increase in the secretory activity in the human sweat glands[4]. Powers, in contrast to Bass, affirms that the acclimatization to the heat causes an increase of 10-12% of the plasmatic volume, which if must to an increase in plasmatic proteins and keeps a central sanguineous volume.

The main adaptations that occur as resulted of the acclimatization to the heat are the increase of the plasmatic volume, precocious beginning of perspiration, greater tax of sudorese, reduction in the loss of sodium chloride in the sweat and reduction of the cutaneous sanguineous flow[11]. One of the receivers of heat in the body is the subcutaneous receivers that act with the termorregulador system increasing the tax of sudorese. Different temperatures of the skin do not affect the VO_2máx in body temperatures below of normal[3], however in high temperatures it can be one of the causes of the fatigue precocious, mainly if associated the high relative humidity of air.

The decurrent adaptations of the exposition drawn out to the heat are not chronic adaptations, with this are necessary the repeated exposition to the heat so that the acclimatization is maintained[11]. The decurrent cardiovascular adjustments of the associated physical activity to the heat have the function to waste the heat produced in the center of the body and to prevent the risk of injury for the heat. The regulation of the central body temperature is critical because the cellular structures and the metabolic ways are affected by temperature[11]. The importance of if knowing the physiology of the exercise well provide the knowledge of the mechanisms of corporal termorregulation and allow to recognize the metabolic necessities of the exercise.

Despite the importance of the acclimatization to the heat it is important to know that the excellent acclimatization requires a good hidration[10]. The loss of corporal liquids promotes, beyond the riots related to the termorregulation, losses in the metabolism that are basic to the good income of the athlete, amongst which we can cite a precocious accumulation of lactate, consuming of the glycogen reserves and premature fatigue during the moderate however drawn out exercise. The adenosine

triphosfate(ATP) use can be increased during the exercise in the heat therefore this increase in the energy demand is predominantly in function of the increase in anaerobic glicolysis and hydrolysis of Phosfate creatine(PC), preventing a reduction in the total adenine concentration nucleotídeo[2].

The level of physical conditioning is another important factor in the capacity of organic reply to estresse it thermal provoked for the heat. The adaptations to the training facilitate the elimination of the metabolic heat generated by the exercise. They occur in general in a period of 8-12 training weeks for an exercise intensity that exceeds 50% of the VO_2máx.

Another factor that have influence in termorregulation is the clothes. In the current days the technology used in the sports, mainly the sport of high level provides to the athlete resources facilitadores of the performance. The use of clothes that facilitate the evaporation of the sweat is beneficial to the organism, considering that it reduces or at least delays the increase sudden of the central body temperature. The clothes for the hot climate must be wide to allow to the free circulation of air between the skin and the ambient way10. The hipertermia with or without dehydration harms the VO_2máx and the high intensity in performance[11].

Conclusion

A deeper analysis of the results will be necessary for better interpretation of the results, however in first analysis we can observe the great necessity of hidratar itself during the physical activity, mainly if this will be practised under intense heat.

The hidration during the practical one of physical exercises prevents physiological riots provoked by hipohydration. We can conclude that, with or without acclimatization to the heat, the good physical conditioning of the individual is important so that the effect of thermal stress are minimized. The trained organism better supports the consuming provoked for the physical activity of that the untrained one. The evidences found on the acclimatization still leave doubts. Probably the main benefit of the acclimatization is the reduction of the loss of electrolytes and consequently it improves in the maintenance of the plasmatic volume.

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CONSIDERATIONS ABOUT THE INFLUENCE OF PHYSICAL CONDITIONING AND CLIMATIZATION IN FLUID LOSS

Abstract

The intention of this study is to evaluate the level of dehydration that university students may reach in a session of outdoor exercises with the duration of one hour and to verify the relation between the tax of sudorese, level of physical aptitude and acclimatization. A group (n=25) of men and women who kept regular physical activity were submitted to make one hour of physical exercises in a track of running a circuit training (CT). The group was divided in two sub-groups, hydrated (GH) and not hydrated (GNH). Each integrant of the GH ingested 200ml of water in the beginning of the CT and every 15minuts during the total time of exercises. The GNH did not have any type of hydration during the CT. The analyzed variable were the initial body weight(BW), the PC after the CT and the difference enters the values of the PC. The average of PPC for GH and GNH was respectively 185,71g and 745,45g. PPC values of 1,1Kg were found in some individuals of the GNH, while in the GH some individuals had gained 100g of corporal weight. The average of PPC for men of the GH was 131,19g and for the women of the GH was 42,86g. The average of PPC of the men of the GNH was 1066,67g and for women was 625g. The values obtained suggests a bigger secretory activity of the glands sweat in trained men and women. Comparing men and women, the men had presented greater gland production.

CONSIDÉRATIONS AU SUJET DE L'INFLUENCE DU TRAITEMENT PHYSIQUE ET DU CLIMATIZATION DANS LA PERTE LIQUIDE

Le sommaire

L'intention de cette étude doit évaluer le niveau de la déshydratation que les étudiants d'université peuvent arriver en session de panneau-réclame d'exercices avec la durée d'une heure et vérifier la relation écrit l'impôt de sudorese, de de niveau de l'aptitude et de l'acclimatation physiques. Un groupe (n=25), composition pour les hommes et femmes qui ont gardé l'activité physique régulière et ont été soumis pour exécuter une heure d'exercices physiques dans une voie d'atletismo dans un modèle de la formation de circuit (CT). Le groupe n'a été divisé dans deux sous-groupes, hidratados (GH) et pas hidratados (GNH). Chacun l'intégrant du GH a ingéré 200ml de l'eau dans le commencement du CT et à chaque 15minutos pendant toute la période des exercices. Le GNH n'a exécuté aucun type de hidratação pendant le CT. Les variables analysée avaient été le corporal(PC) initial de poids, le PC après le CT et la différence écrit les valeurs du PC. La moyenne de PPC pour le GH et le GNH était respectivement de 185,71g et les valeurs 745,45g. de PPC de 1,1Kg avaient été trouvées dans quelques individus du GNH, alors que dans le GH quelques individus avaient gagné 100g de poids corporel. La moyenne de PPC pour les hommes du GH était de 131,19g et pour les femmes du GH elle était de 42,86g. La moyenne de PPC des hommes du GNH était de 1066,67g et pour des femmes elle était de 625g. Les valeurs jointives suggèrent une plus grande activité de secretória

des sudoríparas de glandes chez les hommes et les femmes qualifiés. Comparant des hommes et des femmes, les hommes avaient présenté une plus grande production pour la glande.

CONSIDERACCIONES EN RESPECTO AL NIVEL DE APTIDION FISICA Y ACLIMATACION RELACIONADO A LA PIERDA DE FLUIDOS CORPORALES

El resumen

La intención de este estudio es evaluar el nivel de la deshidratación a que los estudiantes de la universidad pueden llegar en una sesión de la cartelera de los ejercicios con la duración de una hora y verificar la relación incorpora el impuesto de sudorese, de llano de la aptitud física y de la aclimatación. Un grupo (n=25), composición para los hombres y mujeres que mantenían actividad física regular y fueron sometidos para llevar con una hora de ejercicios físicos en una pista de atletismo en un modelo del entrenamiento del circuito (CT). Dividieron al grupo en dos subgrupos, hidratados (GH) y no hidratados (GNH). Cada uno el integrant del GH injirió 200ml de agua en el principio del CT y a cada 15minutos mientras la época total de ejercicios. El GNH no realizo cualquier tipo de hidratación mientras el CT. Las variables analizadas habían sido el peso corporal (PC) inicial, el PC después del CT y la diferencia incorpora los valores del PC. El promedio de PPC para el GH y GNH fue respectivamente de 185,71g y del 745,45g. Valores de PPC de 1,1Kg habían sido encontrados en algunos individuos del GNH, mientras en el GH algunos individuos habían ganado 100g de peso corporal. El promedio de PPC para los hombres del GH fue de 131,19g y para las mujeres del GH fue de 42,86g. El promedio de PPC para hombres del GNH fue de 1066,67g y para mujeres fue de 625g. Los valores unidos sugieren una actividad mayor de secretoria de las glándulas sudoríparas en hombres y mujeres entrenados. Comparando hombres y mujeres, los hombres habían presentado mayor producción para la glándula.

CONSIDERAÇÕES QUANTO AO NÍVEL DE APTIDÃO FÍSICA E ACLIMATAÇÃO RELACIONADO PERDA DE FLUIDOS CORPORAIS

Resumo

O propósito deste estudo é avaliar o nível de desidratação que estudantes universitários podem chegar em uma sessão de exercícios *outdoor* com a duração de uma hora e verificar a relação entre a taxa de sudorese, nível de aptidão física e aclimatação. Um grupo (n=25**),** composto por homens e mulheres que mantinham atividade física regular e foi submetido a realizar uma hora de exercícios físicos em uma pista de atletismo em um modelo de *circuit training* (CT). O grupo foi dividido em dois subgrupos, hidratados (GH) e não hidratados (GNH). Cada integrante do GH ingeriu 200ml de água no início do CT e a cada 15minutos durante o tempo total de exercícios. O GNH não realizou qualquer tipo de hidratação durante o CT. As variáveis analisadas foram o peso corporal(PC) inicial, o PC após o CT e a diferença entre os valores do PC para determinar a perda de PC (PPC). A média de PPC para GH e GNH foi respectivamente de 185,71g e 745,45g. Valores de PPC de 1,1Kg foram encontrados em alguns indivíduos do GNH, enquanto no GH alguns indivíduos ganharam 100g de peso corporal. A média de PPC para homens do GH foi de 131,19g e para as mulheres do GH foi de 42,86g. A média de PPC dos homens do GNH foi de 1066,67g e para mulheres foi de 625g. Os valores encontrados sugerem uma maior atividade secretória das glândulas sudoríparas em homens e mulheres treinados. Comparando homens e mulheres, os homens apresentaram maior produção por glândula.