Introduction

The study of the perspiration is not a new subject, about the year of 1600 the duct of the sweat gland was described, although the existence of the sweat gland was not accepted until approximately 1800 (Shibasaki, 2006). During the practice of physical exercises the perspiration begins a dehydration process that can provoke harmful physiologic disturbances to the organism and fall in the sporting acting, as well as increasing the risks associated to the effort and to the heat (Moreira, 2006). The disturbances provoked by the body thermoregulation are known and it doesn't seem there to be differences when we compared men and women, as well as the thermoregulation in atmosphere cold or hot (Armstrong, 2005), however a comparison of those disturbances among the groups becomes inevitable, tends in view the inherent hormonal events the woman, mainly in what he/she concerns the phases of the menstrual cycle. In case some difference is detected, it will be necessary to determine the composition of a solution of specific replacement for each group, as well as determining a specific strategy of rehydration.

Previous studies didn't show differences in the synthesis of proteins, collagen (Miller, 2005) or in the muscular (Jonge, 2000) contractility in different phases of the menstrual cycle. An initial hypothesis would be to smallest production of heat in absolute values due to smaller amount of corporal mass, however a relative production of heat without significant difference when compared the results between men and women. If the initial hypothesis is true, we will have a normal distribution of the relationship of the corporal weight(PC) and of the loss of corporal weight(PPC) in men and women.

It is waited with the study to verify the hydration needs in young women and case has a need peculiar of hydration during the effort, to serve as base of information for determination of a strategy of replacement of fluids.

Methods

Sample

Seven men and seven women healthy university students participated in this study. The men had their averages (+ I deviate standard) of age, initial (PCI) corporal weight and VO2máx respectively equal to 20,5 + 3,5 years, 66,4 + 7,6 kg and 42 + 5,8 ml / min -1. The women had their averages (+ I deviate standard) of age, initial (PCI) corporal weight and VO2máx respectively equal to 19,2 + 1,7 years, 52,6 + 5,8 kg and 30,7 + 2,3 ml / min -1. All were informed of possible risks and discomforts before they sign the consent term. This study is in accordance with the ethical norms of the Declaration of Helsinque 1975, revised in 1983. The members of the sample were physically assets, they practiced exercises at least three times a week.

Experimental design

The two groups, men and women in normohidration state, accomplished a series of exercises in an athletics track during one hour in an intensity of effort moderated to induce a hipertermia process and dehydration. During the series of exercises the two groups were moisturized with 300ml of water to each 15 min.

Body weigh and VO2máx

PC was measured with digital scale accurately of centigrams. PC was obtained with the individuals in swimsuit and dry to increase the precision of the measure. PPC was determined by the difference of PCI and of PC at the end of the series of exercises (PCF). VO2máx was determined by a track (test of Jogging of 2400m) test through the formula application.

Calculations

The formula used to calculate VO2máx was the following:

\[ VO_{2\text{max}} = \frac{2400\text{m} \times 60 \times 0.2}{3.5 / \text{time (sec)}} = \frac{VO_{2}}{\text{in ml} / (\text{kg.min})} \]

Statistical analysis

The Welch Two Sample t-test was used for comparison among independent averages. In this in case the test is of the type H0: µ 1 = µ 2. The mean level admitted was P < 0,05. In case the value-p it is very small should accept the alternative hypothesis H1: There is difference among the groups. Another form of analyzing if there is difference among the averages is to observe the 0 is out of the certain trust (IC) interval of 95%. The relationship analysis between PC and PPC was made through the dispersal graph.

Results

Initially PPC was analyzed in the two groups for us to determine the normality of the distribution.

After establishing the normality of distribution of the sample, the effect of the series of exercises was observed in the individuals’ corporal mass. The figure 3 display the distribution of initial PC of the two groups in box plot. The figure 4 display the difference of PPC among the groups after the session of exercises. With a value p=0 .03381 the hypothesis of equality is rejected among PPC of the groups. We can observe certain IC: -547,4... -23,9. The difference among the groups is quite clear.
Discussion
As larger the dehydration, smaller the capacity of redistribution of the blood flow for the periphery, smaller the sensibility of the hipotalâmica for the perspiration and smaller the capacity aerobics for a die heart debit (Armstrong, 1997). The reduction of the heart debit during physical exercises in function of the perspiration is very illustrious in the literature. The competition between outlying sanguine flow and muscular sanguine flow in some cases can be decisive factor of the muscular fatigue. Other factors as the cardiovascular flotation and the fall in the medium blood pressure (Alonso, 1998) were also already well studied.

The physiologic behavior of the dehydration still was not told considering the sex difference. Seemingly there are no differences. In a study with rugby players, the tax of medium perspiration was of 8,0 ± 3,7mL / min, varying from 3,3 to 12,5mL / min, representing a significant (p < 0,05) reduction in the final weight and the % of liquid loss in relation to PC was of 1,5 ± 0,7% (Perrela, 2005). That study showed proportional differences in PPC if compared the other studies where men accomplished exercise during 100-120min and they had a medium PPC of 4% (Alonso, 1997).

Modifications in the hydration appear among 30-50 minutes of exercise and they become usually significant after a hour of exercise (Alonso, 1998). Along the exercise they happen modification in the sanguine concentration of some hormones, among them the insulin and the glucagon, that suffer a decrease and an increment, respectively (Roy, 2000). The same study demonstrated that the dehydration process doesn’t provoke damage in the oxidation of carbohydrate or fat. Although the mentioned study has been accomplished in men, according to the procedures, it doesn’t seem there to be reasons to believe that the organic reactions would be different in women.

Another factor that should be taken into account is the composition of the replacement solutions. The capacity of reabsorption of electrolytes in the perspiration can determine if there is adult need of replacement of salts in women. A study done by Kenney, 2002 speech on the dietary ingestion of reference, that is a group of nutritional guidelines proposed from necessity dear average, recommended dietary ingestion, appropriate ingestion and tolerable superior limit of ingestion. The daily needs of ingestion of water are larger than 3,7L / day for men and 2,7L / day for women, depending on the activity accomplished along the day, however there was not distinction in the needs of sodium and potassium (Kenney, 2002).

Studies on the thermoregulatory responses were made and they described in details the physiologic effects of the dehydration, with emphasis in the thermal and circulatory effects during the exercise (Armstrong, 1997), but they were also studies addressed to masculine groups. As for the effects on the heart frequency, it seems there to be a difference in the absolute values when we compared results obtained in studies pilot when we compared men and women. These results when analyzed show that in relative values those differences are minimum, probably for known behaviors that differentiate the feminine and masculine cardiovascular behavior, owed mainly to you differentiate anatomical of size of the heart and vases in general.

An exact neurological road responsible for the perspiration is not totally known (Shibasaki, 2006). There are no indications that the feminine answer mechanism is different from the masculine. Acetylcholine is the primary neurotransmitter released from cholinergic sudomotor nerves and binds to muscarinic receptors on the eccrine sweat gland, although sweating can also occur via other factors as the competition between outlying sanguine flow and muscular sanguine flow in some cases can be decisive factor of the muscular fatigue. Other factors as the cardiovascular flotation and the fall in the medium blood pressure (Alonso, 1998) were also already well studied.

Volumes around 600ml induce an emptying of 30ml/min (Perrela, 2005), men seem to have larger capacity to support great amounts of liquids in the stomach than women. On the other hand the women seem to be more attentive the rehidration need.

Conclusion
We know that exist differences between men and women in practice of the physical exercise, mainly in what concerns the high acting. It is observed in the results that there was a great difference in the dehydration tax among the groups. We didn’t observe relationship between initial PC and the perspiration tax, what discards the individuals’ possibility with larger PC perspire more in relative values, however we observed a larger PPC among the men, what suggests that individuals with larger muscular mass produce more heat and they need larger dissipation. Logical conclusion. After the analysis of the obtained information it was ended that no there is a special necessity in the hydration of a group or other, the essential cares stay in the athlete’s hydration as the climatic adaptation, adaptation to a strategy of replacement of liquids and the formulation of a replacement drink the closest possible of the individual needs.

References
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abreviatura utilizada fue la menor PPC en mujeres después del logro de los ejercicios.

PALABRAS CLAVE: los ejercicios, la deshidratación, la diferencia del sexo.

RÉSUMÉ

TERMORREGULATION DURANT EXERCICE: DIFFÉRENCES POSSIBLES ET SOLDAT NEEDS DANS LES FEMMES(*)

RESUMEN

(*) Las investigaciones están basadas en la ética de la Resolución no. 196, de octubre 10, 1996, de Consejo Nacional de Salud.

Las investigaciones respondieron a la exigencia de agotamiento de la hidratación en agentes de la salud. La investigación se realizó mediante el levantamiento de algunas cuestiones sobre la hidratación y sus consecuencias en mujeres. En una sesión de ejercicios de calentamiento, los hombres y mujeres de peso corporal similar midieron su pérdida de peso corporal después de la actividad y se compararon con resultados previos. El consumo máximo de O2 (VO2max) en hombres y mujeres fue 42 mlO2/kg/min (+5.8) y 30.7 mlO2/kg/min (+2.3), respectivamente. La pérdida de peso en hombres fue 32.5 g y 42.8 g con desviación estándar de 27.51 y 127.2, respectivamente. La diferencia entre los hombres y mujeres fue de 232.3 y estaba fuera del intervalo de confianza. La relación entre el peso corporal y la pérdida de peso fue significativa en los hombres, mientras que en las mujeres no se encontró una correlación. La pérdida de peso fue menor en mujeres después del logro de los ejercicios. PALABRAS CLAVE: ejercicios, desidratación, diferencia entre sexos.