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Hyperthermia: acute effect on copper and iron trace minerals in erythrocytes, serum and urine

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Trace elements Iron (Fe) and Copper (Cu) are essential minerals involved in several exercise-related metabolisms, like the oxygen transport in the haemoglobin and myoglobin (Grijota Perez, 2016). Its organic concentrations may be affected by exercise-induced stress, which may impair optimal metabolism. When exercise is performed in hot environments the core temperature increases significantly and thermoregulatory responses are activated in order to maintain optimal organic conditions. This fact increases the whole-body biologic tension and, consequently, the antioxidant and energetic metabolic compounds can be severely affected, like Fe and Cu. The aim of this work was to evaluate the effect of a maximal effort test in the organic concentrations of Cu and Fe in normothermia and hyperthermia conditions. Nineteen adult males (22.58±1.05 age; 178.32±5.93 height (cm); 74.98±9.08 weight (kg) and 23.63±1.83 BMI) participated voluntarily in this survey. All of them performed two maximum incremental tests in cycloergometer separated by 48 hours. The first one was carried out in normothermic (22±2ºC) conditions and the second one in hyperthermic (42±2ºC) environment. Before and after each test blood and urine samples were obtained. Once obtained, blood samples were treated in order to separate serum and erythrocyte matrixes and conserved to biochemical analysis at -80 ºC. The determination of Cu and Fe concentrations were carried out by mean of ICP-MS. Once determined the values were corrected (Dill & Costill, 1974). As in can be observed in Table 1 the seric Cu concentrations augmented significantly after the effort test in normothermic (p=0.01) and hyperthermic (p=0.002) conditions.

		Normothermic (22ºC)			Hyperthermia (42ºC)		
		Before	After	Sig.	Before	After	Sig.
Fe	Urine	14.24±7.13	11.41±4.98	0.267	11.11±10.92	12.31±12.73	0.396
	Serum	1017.87±264.56	1044.61±309.06	0.687	1019.02±272.20	1149.29±425.63	0.145
	Erythrocite	460.77±112.89	444.44±134.37	0.619	427.13±138.23	469.56±133.04	0.306
Cu	Urine	6.57±5.18	7.15±4.33	0.286	6.36±6.25	7.46±6.78	0.062
	Serum	762.96±132.22	796.57±122.16	0.010	724.59±138.13	790.58±138.07	0.002
	Erythrocite	461.29±138.26	427.78±130.87	0.356	419.61±135.67	456.15±148.67	0.071

It can be concluded that the performance of a maximal effort test induces an organic redistribution of Cu to overcome the increased metabolic stress, which becomes especially sensible in heat environments.

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Effects of Ballroom dancing in older adults: systematic review

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The combination of scientific progress and improvement of public health status, housing and working conditions has led to a decrease in birth and death rates and an increase of the average life expectancy. As a result the world's population is aging (NIS – "Projections of resident population from 2012 to 2060."). This scenario urged the need to promote a healthy and active aging among the population through physical activity programs, for example cardiorespiratory, neuromotor, flexibility and endurance exercises. (Garber, et al. 2011). Ballroom dancing is an activity that combines cardiorespiratory, endurance, balance,

coordination and flexibility training activities. Systematic revision is a very accurate way of summarising data and determining the methodologic quality of various research articles. Here we present the first systematic review of studies that investigated the effects of ballroom dancing on aging population. To assess the effectiveness of ballroom dancing in promoting healthy aging in the elderly. We searched 6 databases (Scielo, PEDro, Lilacs, PubMed, SportDiscus and Medline) for published research on the topic of ballroom dancing in the elderly using a selection of keywords: *Dance, Ballroom, Elderly, Older adults, Age, Dança, Danças de Salão, Idoso e Sénior*. The studies were selected according to the inclusion criterions and the quality and the strength of the evidence reported were assessed. Specifically, the methodological quality was assessed using the Physiotherapy Evidence Database (PEDro) and the strength of the evidence using an evidence synthesis grading system (Van Tulder, et al. 1997). Four articles were evaluated according to the PEDro scale, which obtained a mean score of 4.75, i.e. a low methodological quality. The papers showed improvements in terms of balance (3 of 4 articles analysed), strength, overall fitness, cognitive function, autonomy or gait speed. This systematic review showed, although with limited evidence, that ballroom dancing promotes the improvement of several variables such as balance, overall physical condition and gait. It is clear that the effects of Ballroom Dancing as a promoter of healthy aging, although a very promising area of research given the current status of the developed world's population, is still in its infancy.

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