

MUSCLE METABOLISM AND HEMODYNAMICS

MUSCLE DAMAGE AND HAEMATOLOGICAL CHANGES INDUCED BY ECCENTRIC EXERCISEP. Magalhães¹, T. Barbosa¹, V. Lopes¹, M. Guerra², M. Neuparth³, J. Duarte³¹Higher School of Education, Bragança Polytechnic Institute, Portugal; ²Bragança District Hospital, Portugal;³Faculty of Sport Sciences and Physical Education, Oporto University, Portugal

Regular physical exercise of moderate intensity is normally beneficial to the human organism (Smith et al., 1990; Bury et al., 1998). Nevertheless, under some conditions, the exercise could be a source of stress for some human structures. Eccentric exercise, has been understood as a induction factor of muscle damage on the exercised muscles (Duarte et al., 1999) and, usually, it's accompanied by systemic physiologic alterations similar, in some aspects, to traumas and infections (Northoff et al., 1995). The aims of this study were: to analyse the presence of muscle damage, and to verify the haematological changes brought by a strenuous protocol of uncustomary physical exercise.

The sample consisted of 10 males (age average [21,8±1,7]) who carried out a weight lowering exercise (70% of 1 Maximal Repetition) with only eccentric force. Measurements were made for Maximal Voluntary Isometric Force (MVIF) and the plasmatic concentrations of Creatina Kinase (CK) as indicators of muscular lesion. A leucogram was also carried out through analysis of blood concentration of total leukocytes, neutrophils, monocytes, lymphocytes, eosinophils and basophils. All measurements were made at the same intervals: before exercise, 0 hours, 1 hour, 3 hours, 24 hours, 48 hours and 72 hours after exercise. The proposed exercise consists of weight lowering with elbow stretching out. The exercise was completely finished when one individual was enable to execute three repetitions during three consecutive series. The data were analysed with a repeated measures ANOVA.

Observation of the signs and symptoms of muscular lesion suggests that there were great indices of muscular lesion, with evidence of a more pronounced CK activity in the plasma and an accentuated decrease in the MVIF. An increase in systemic leukocytes was also observed, namely on the concentration of neutrophils, with a maximal observation 3 hours after the exercise. This observation could be due to the mobilisation of neutrophils from the bone marrow by influence of cortisol. On the other hand, there was a decrease in the concentration of monocytes, lymphocytes, eosinophils and basophils in the blood, in almost all the moments considered. This observation suggests that this type of eccentric exercise induce muscular injury, observed by indirect way, with a increase of systemic neutrophils concentration. The fact that the other sub-populations of leukocytes rise (monocytes, lymphocytes, eosinophils and basophils) could be due to small cardiac debit induced by proposed exercise, and the reduced migration of this cells of capillary endothelium to the blood flow. Other explanation could be the migration of this cells to the capillary endothelium with the consequent damaged tissues infiltration, and also the reduced mobilisation of this type of cells from the bone marrow.

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