

Effect of Exercise Modality on Cutaneous Blood Flow during Recovery in Normal Subjects

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Introduction: During the exercise there is a decrease in cutaneous blood flow (CBF) that tends to increase during recovery; however, the postexercise response depends on the modality and intensity of the exercise.

Objective: To assess the effect of a session of aerobic exercise (AER) and anaerobic (AN) on cutaneous blood flow, assessed with infrared thermography, during post-exercise recovery (RPE) in normal subjects.

Material and Methods: A prospective quasi-experimental study was conducted with 39 normal second-year students of the health faculty, with an average age of 21.7 ± 2.28 years, body weight of 68.34 ± 10.78 kg, height of 171 ± 5.05 cm, body surface area of 1.79 ± 0.15 and BMI of 23.38 ± 3.4 . After determining the maximum aerobic capacity (MAC) and the maximum anaerobic power PAM with the Wingate test, two groups were randomly assigned: Aerobic (AER) that exercised 70% of VO₂Max, and anaerobic (AN) with exercise 80% of the maximum power. Before the exercise and at the end in minutes 10, 20, 30, 40, 50 and 60, the temperature of the skin of the forehead (T ° fr), of the anterior thorax (T ° ta) and of the anterior part was measured. Of the forearm (T ° ab) using a camera for infrared thermography. Additionally, axillary T ° ax (T ° ax), systolic blood pressure (SBP), diastolic (DBP), mean (MAP), heart rate (HR) and respiratory (FR) were recorded at the same time.

Results: Statistically significant differences were accepted with $p < 0.05$ and thus are reported in all statistical tests. There are statistically significant differences ($p < 0.05$) due to the effect of the main time factor in T ° ab, T ° ta, T ° fr, PD, PS and FC; by effect of the exercise modality in T ° ab, T ° pa, T ° ax and FC and by effect of the interaction in T ° ab, T ° pa, T ° fr, Tax and FC, according to the ANOVA with repeated measures. The

AN exercise caused a greater decrease in $T^{\circ} ab$ and $T^{\circ} pa$ compared to the AER in minutes 20, 30 and 40 of recovery; while the answer was similar in $T^{\circ} ax$ and $T^{\circ} fr$ but this time in all the moments of post-exercise recovery. The AN exercise presented higher FC values in all the moments analyzed with respect to the AER exercise. The HR values were higher than the rest in both exercise modalities. Multiple pairwise comparisons with Bonferroni adjustment show statistically significant intragroup differences in $T^{\circ} ab$ with respect to rest with lower values in minutes 20, 30, 40, 50 and 60 of the recovery when performing AN exercise. There are no differences in $T^{\circ} ab$ when performing AER exercise. There are intra-group differences with rest in the $T^{\circ} pa$ in the AN exercise in minutes 10 to 50; and in minutes 20, 30, 50 and 60 when performing AER exercise. In the case of the $T^{\circ} fr$, the significant differences with respect to rest, are presented when performing AN exercise in minutes 10, 20, 30 and 40, and do not occur in the AER exercise. In the three regions of interest (ROI) mentioned, the temperature values of the AN group were always below the AER group. In the case of $T^{\circ} ax$, there are statistically significant differences in the AN group in minutes 20, 30 and 40 of the recovery with lower values with respect to rest, while there are no differences in the AER exercise. The values of $T^{\circ} ax$ of group AE were always above the resting value, although they were not statistically significant. For both treatments, the PS, PD and PAM values in the RPE were below the resting value while the FC remained above the resting values in the two modalities.

Conclusions: The anaerobic exercise produces a more intense decrease in the FSC in the three regions of interest (ROIs) evaluated compared to the changes produced by aerobic exercise, during the hour following the performance exercise. The infrared thermal images are useful to detect differences in the FSC and in the physiological evaluation of normal subjects in post-exercise.

Keywords: regional blood flow, infrared rays, aerobic exercise, high intensity interval training.

Acknowledgments: The Universidad del Cauca, the VRI and the volunteer students of the Faculty of Health participated in the study. FT Carlos Eduardo Estupiñán for facilitating some teams.

Source of research support: this research has the financial support of the Vice-Rector for Research of the Universidad del Cauca. To the members of the research group in Experimental Physiological Sciences (CIFIEX).