

## CONTRIBUTION OF ENERGY SYSTEMS FOR AEROBIC TRAINING SESSION WITH AND WITHOUT BLOOD FLOW RESTRICTION

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### Resumo

The aerobic training (AT) is able to induce the increase in cardiorespiratory aptitude and increased energy expenditure, when performed at high intensity, improving the quality of life of the population. Studies have shown similar gains when the AT is performed at low intensity, with blood flow restriction (BFR). The objective of this study was to compare the total energy expenditure and the respective contribution of each energy system (aerobic, anaerobic lactic and alactic) in aerobic training sessions in different conditions: high intensity, low intensity and low intensity with BFR.

**Key words:** oxygen consumption, total energy expenditure, blood flow restriction.

### Introdução

Studies have shown that aerobic training (AT) is able to induce the increase in cardiorespiratory aptitude, measured by potency and aerobic capacity and total energy expenditure, which contribute to the reduction of inactivity and improve the population's quality of life. In the American College of Sports Medicine recommended if specific protocols performed at high intensity (greater than or equal to 70% of  $VO_{2max}$ ) for developing and maintaining the above mentioned gains. However, studies have shown similar gains with aerobic training performed at low intensity, with blood flow restriction (BFR). The objective of this study was to compare the total energy expenditure and the respective contribution of each energy system in aerobic training sessions of high-intensity, low intensity and low intensity with blood flow restriction

### Resultados e Discussão

**Sample:** They were part of the three experimental conditions seven males (age  $24.5 \pm 4.04$  years, BMI  $25.36 \pm 3.28$   $kg/m^2$ ). To obtain the Peak oxygen consumption ( $VO_{2peak}$   $34.7 \pm 3.81$  mL/kg/min), the volunteers performed a test on a cycle ergometer until exhaustion (1), collected gas exchange continuously breathing to breathing. **Sessions Aerobic Training:** the sessions lasted 30 minutes of exercise on a cycle ergometer, as follows: Low intensity (40%  $VO_{2max}$  with blood flow restriction - ATBFR), low-intensity (40%  $VO_{2max}$  - ATLO), and High Intensity 70% of  $VO_{2max}$  - ATHI).  $VO_2$  were collected during the different AT session and arterial blood samples before and after the effort to lactate levels. **Analysis of data:** We calculated the total amounts of energy expenditure and relative contribution of metabolism (2). The analysis for comparison of the protocols was by ANOVA one-way for repeated measures and post hoc Tukey.

**Results:** The total energy expenditure values were higher in ATHI than ATLO and ATBFR ( $p < 0.05$ ). Regarding the contribution of each energy system, the contribution of the aerobic system in ATHI was higher than ATLO and ATBFR ( $p < 0.05$ ); the contribution of the anaerobic lactic system in ATHI was higher than in ATLO ( $p < 0.05$ ) but not higher than the ATBFR ( $P > 0.05$ ); the contribution of the lactic anaerobic system was not different between training sessions ( $p > 0.05$ ).

**Table 1.** Mean  $\pm$  sd of Total Energy Expenditure and Relative Contribution of the Energy Systems.

	ATHI	ATLO	ATBFR
<b>Total Energy Expenditure (kCal)</b>	261,62* $\pm 31,79$	141,56 $\pm 24,59$	155,27 $\pm 22,2$
<b>Aerobic (KCal)</b>	249,69* $\pm 136,7$	136,7 $\pm 24,14$	148,51 $\pm 21,43$
<b>Anaerobic Lactico (KCal)</b>	5,4 # $\pm 1,1$	1,1 $\pm 1,64$	2,43 $\pm 2,45$
<b>Anaerobic Alactic (kCal)</b>	6 $\pm 3,86$	3,86 $\pm 1,93$	4,33 $\pm 2,01$

\* $p < 0.05$  para ATHI vs ATLO e ATBFR; # $p < 0.05$  para ATHI

### Conclusões

No differences were found between ATBFR and ATHI as the contribution of Anaerobic System (Lactic and alactic), assisting in the interpretation of data showing increases in strength and muscle mass for these training programs.

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