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The acclimation process of the Portuguese race-walking team in preparation for the Tokyo 2020 Olympic Games

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INTRODUCTION:

The Walk Race competition of the 2020 Tokyo Olympic Games, was held in Sapporo during summer, where it was foreseen a temperature of 34°C with high humidity (>70%) for the race time, which means a thermal stress indicator (WBGT) > 31°C which falls already in the dangerous category. With this type of warning, the acclimation process becomes essential in an athletes sports preparation, not only to improve his/her sport performance but also to preserve the athlete's physical integrity.

METHODS:

Two Portuguese Walk Race Team athletes, one male and one female, participated in this study. Both underwent three periods of acclimation composed by six days spaced 15 and 20 days apart respectively. Tests were performed in a climate chamber (CC) (4.5 x 4.5 x 3 m³) located at the Industrial Aerodynamics Laboratory (LAI). The indoor environmental conditions within the CC were imposed through control of the supplied air and the inner wall temperatures and the tests took place under calm conditions, with air velocities inside the CC lower than 1.9 m.s⁻¹. A treadmill (HP Cosmos) was used where maximum oxygen consumption tests were performed on the first day of each acclimation period using a gas analyser (Metamax cortex), in order to define the work intensity of the following acclimation sessions (60% of VO₂ max). Before and after each session, body mass and urine density and temperature were assessed. In addition, heart rate and lactate concentration (Dr. Lange, Germany) and fluid consumption, loss of plasma volume and percentage of loss of body mass throughout each session were controlled.

RESULTS:

For the same percentage of VO₂ max an increase of 13.33% and 14.02% in velocity was recorded, followed by the increase in efficiency, that translated into a decrease in oxygen consumption of 1.5 ml/kg/min and 1 ml/kg/min for the female and male athletes respectively. During the tests mean blood lactate concentration was 1.44 mmol/l and 1.36 mmol/l, mean core temperature was 37.6±0.2°C and 38±0.1 °C, urine density before exercise 1011.88±3.09 and 1006.7±2.64, after exercise 1010.85±2.62 and 1007.1±2.84, sudation increased 1433ml and 397ml, while % of body mass loss was higher 1.34% and lower 0.08% for female and male athletes respectively. Furthermore, plasma volume loss was lower on the last acclimation period, from 7.01±2.72 to 5.75±0.95 and from 7.42±2.64 to 0.02±2.18 % for female and male athletes respectively.

CONCLUSION:

In the acclimation process we found an increase in velocity at 60%VO₂max with the same core temperature, and therefore higher efficiency. It was also verified, higher liquid ingestion, decrease in oxygen consumption, decrease in plasma volume lost and decrease in urine density through the all acclimation process was also found. In conclusion the physiological adaptations from the acclimation process are key towards performing in these extreme environmental conditions while preventing heat stress related constraints.

Topic: Training and Testing

Presentation Poster

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