



Method, Preparation and Execution of Experiment

Eight healthy female students of sports, not specifically trained for endurance, participated in the trial. The individual data concerning average age, average height and average weight were as follows: 25.4 years +/- 5.68 years, 181 cm +/- 10 cm and 78.5 kg +/- 12.2 kg.

The participants underwent two ergometer tests on bicycles, increasing in stages until exhaustion. With every stage, the intensity of strain increased by 25 watts. Each stage lasted two minutes. Between stages the subjective feeling of strain was determined by means of the Borg Scale, also the heart rate and the lactate values from the capillary blood of the earlobe.

During the tests the students continuously breathed a gas mixture via mask. In one of the tests this was a normoxic mixture and in a further test pure oxygen, which was supplied at a rate of 2 litres per minute. The selection of the breathing gas was done blindly and at random.

The statistical evaluation was carried out using the Wilcoxon Test with software SPSS. The level of significance was selected as being $p < 0.05$.



Although 3 of the 8 participants achieved higher strain levels with OXYfit, the results showed, that strictly viewing the absolute data concerning the parameters of heart rate, lactate values and subjective feeling of strain, there were no significant changes in performance achieved. (Fig. 1 and 2)

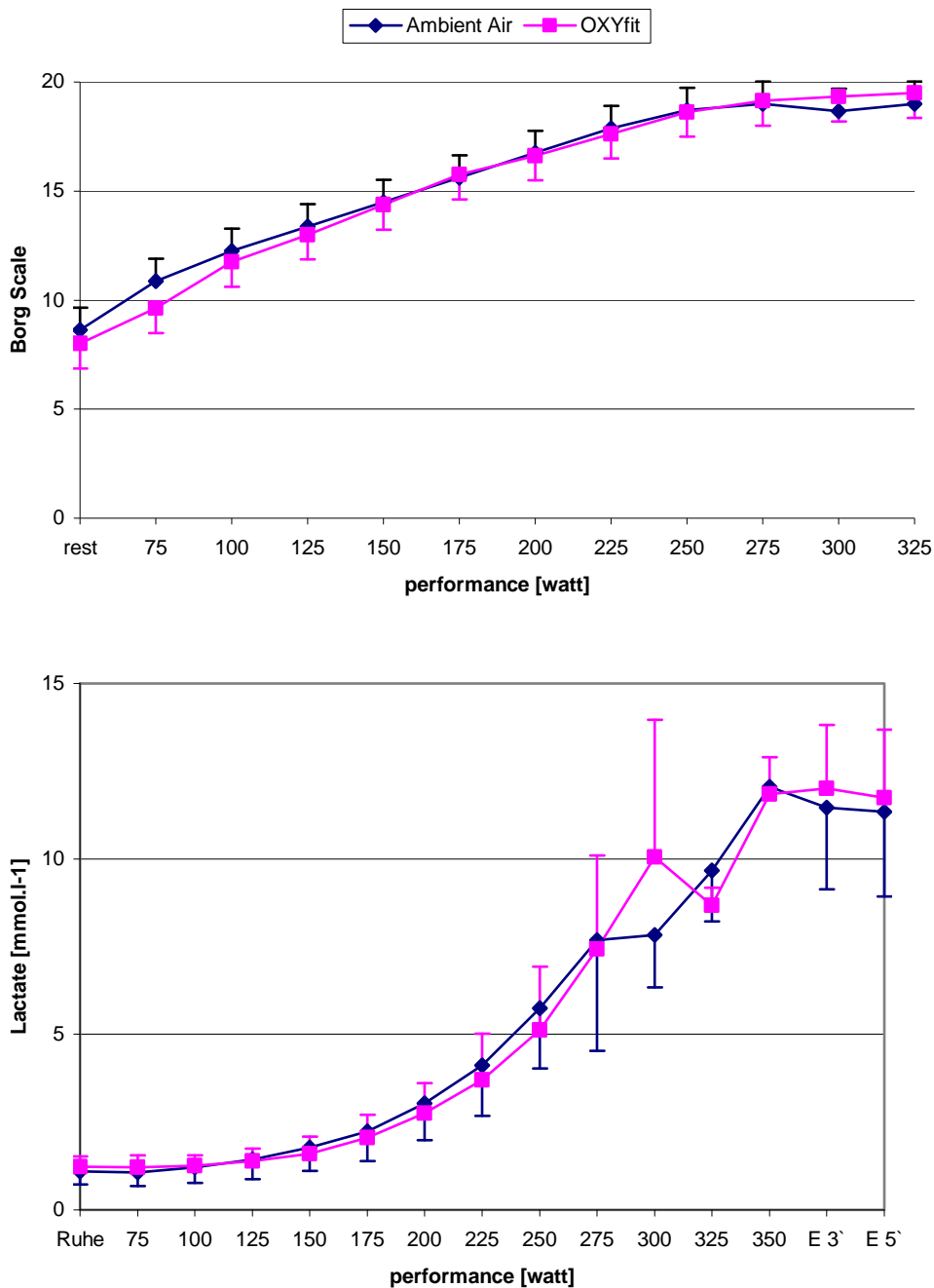


Fig. 1 and Fig. 2: Standard deviation and average lactate values as well as average subjective feeling of strain during the step by step tests.



When considering the performance achieved and the heart rates at 2 and 4 mmol/litre lactate, it became clear, that a significantly higher performance could be achieved when breathing OXYfit at 4 mmol/litre lactate (233 Watts with OXYfit versus 224 Watts). The higher performance at 2 mmol/litre lactate (173 Watt with OXYfit versus 163.5 Watts) and the higher heart rates in beats per minute at 2 and 4 mmol/litre lactate (143 with OXYfit versus 139; 167 with OXYfit versus 163) were indicators of tendency. The level of significance was however never reached (Fig. 3 and Fig. 4).

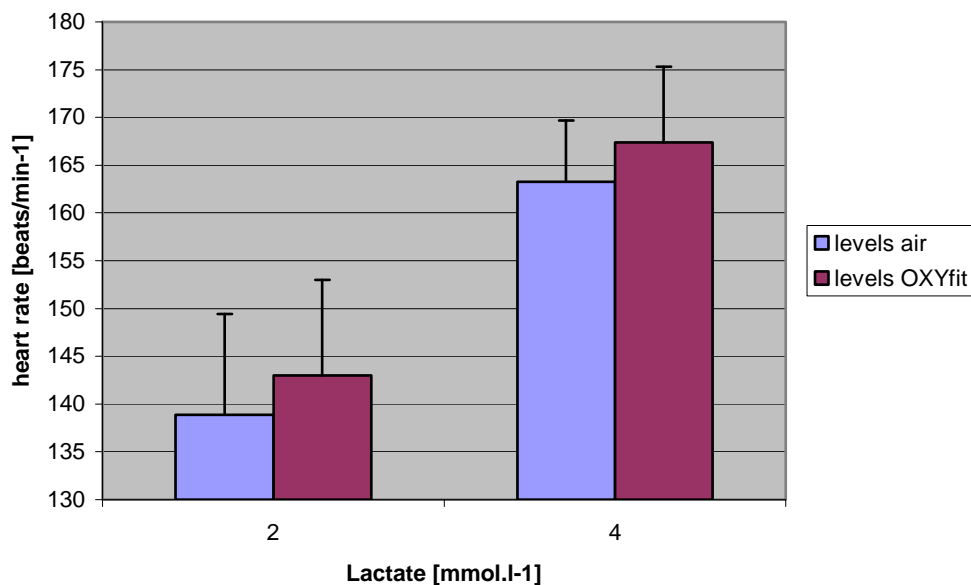
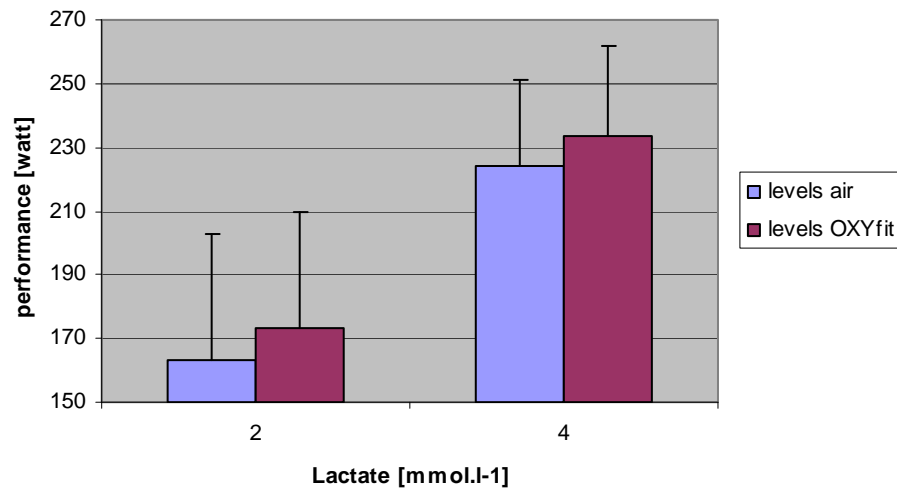


Fig. 3 and Fig. 4: Average heart rates and performance at levels with 2 and 4 mmol/litre lactate.



Assessment

In Sports Sciences the concept of Lactate Levels is an established measure for the assessment of the capacity of the body. It is used to guide training programs and to evaluate training interventions. The 2 mmol lactate level has special significance, because this is the range where the basic endurance limits performance and the 4 mmol lactate levels which represent the boundary to anaerobic metabolism. Improved endurance performance capability goes hand in hand with the capability to utilise higher heart rates at the different levels. Equally a better endurance performance capability should enable higher performance at the levels. In training science these changes are described as a right shift of the lactate curve.

The breathing of OXYfit in our study brought about a right shift of the lactate curve. The changes in performance achieved in the region of the 4 mmol lactate level were statistically significant. For the other parameters a trend towards improvement could be measured because of the ongoing breathing of OXYfit during endurance performance. The right shift is probably due to the increase in oxygen in the blood (oxygen circulation system) which is required for the endurance performance capability and the consequent of increased supply of oxygen to the performing muscular system.