THE CHANGING OF ROWING TECHNIQUE AS A FUNCTION OF EXERTION

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INTRODUCTION

The analysis of technique improvement is a most important question at rowing. There are several studies about the rowing performance (Gerber et al. 1983, Schneider, 1980) and the physiological background of rowing (Prampero et al. 1971, Fukunaga et al. 1987). Each club, each school each nation has another technique and for decades there has been a lively debate about the following technical problems: the angle of bending fonvard, the angle of bending backwards and the degree of allowance. Beneath the technique there is another important factor: physical condition. The stability and the performance of the sportsmen can best be described by the lactic acid curve. These consideration have led me to the topic of my lecture: the relationship and the interaction of metabolism and rowing technique. The following question will be answered: how do the parameters determining the range of the movement of the different parts of the body change as a function of an exertion with growing intensity.

Tlie purpose of this study was to examine the effect of the added exertion on the changing of technique in the rowing motion under laboratory conditions.

METHODOLOGY

The tests were performed by the aid of the Hungarian junior national quartet. Their main parameters are: age 17 years, body height 186 cm and body weight 80 kg.

The exertion test was performed using a Concept II. rowing ergometer. It shows the performance in watts, the number of strokes and the average performance per stroke. It was programmed for the time intervals of exertions and rest ueriods. A multi-step exertion test was applied. The base level of exertion was at 150 watt, the exertion steps were 50 watt, the duration of each step was two minutes and the resting time was one minute.

At tlie end of each step a blood sample was taken from the ear to determine tlie level of lactic acid.

The range of movement of the body segments was examined using a SELSPOT system, which consisted of a computer and two special cameras. Diodes were fixed to the wrist, the elbow, the shoulder and the hip, the point of relation was the ankle. The computer evaluated the data. The sampling interval lasted three seconds and was taken in the second minute of each exertion step.

RESULTS AND DISCUSSION

The relationship between lactate acid level (mmol/l) and mechanical power (watt) in various rowing intensities is shown in Figure 1. At low intensities of rowing, below 250 watt, the lactate level increased slowly, at higher intensities, however, a steeper ascent was observed.

At the evaluation of the nearly hundred diagrams there were exa ned, first of all, the changing of the minimum of the elbow ankle, changing of the maximal course of the hip and of the wrist as a function of exertion, that means of the lactic acid level, showing the condition (Figure 2.). This is an increasing function and both the average of the maximal course of the hip and that of the wrist were related to this increment, but they did not show significant increase. There is the same relation for the elbow ankle, which shows a significant decrease in the aerobe-anaerobe transitional zone, but after that it remains relatively stable.

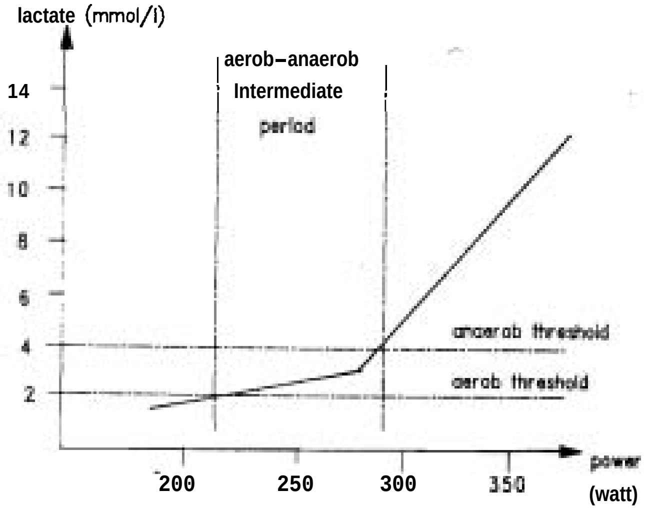

Figure 1. Lactate level related to exertion.

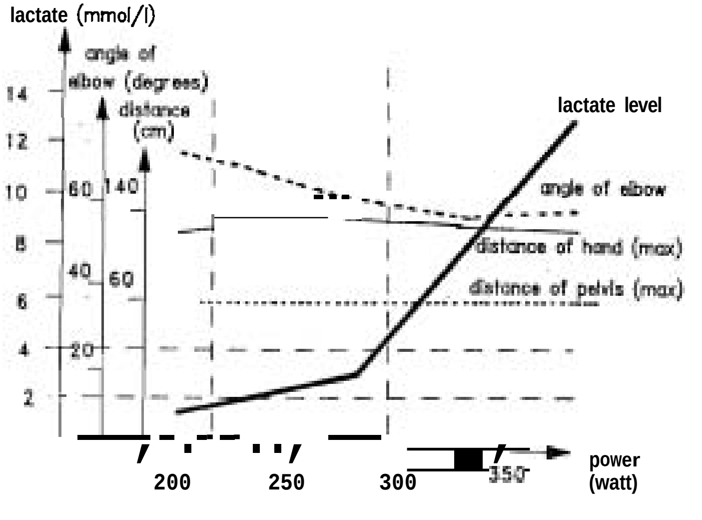

Figure 2. Curves of body segments comparing to the exertion steps of rowing.

At the analysis of the curves it was turned special attention to the changing of the elbow ankle and of the course of the wrist before and after the anaerobic threshold. These values were also compared to each other - they were only weakly correlated. This correlation is shown on the Figure 3.

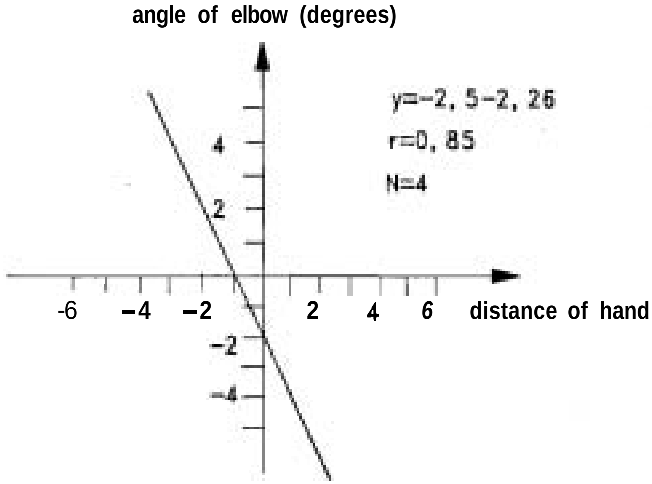

Figure 3. Change of angle in connection with distance of hand in the anaerob threshold zone.

CONCLUSION

It seems that the SELSPOT system is very suitable to trace the motion of the parts of the body. The differences between the steps of exertion and the individuals can be detected.

The results of our examination can be summarized by the following statements: when, as a result of exertion the anaerobic metabolism takes over, the organism of athletes used its last inner reserves. No change follows in the work of the main muscle groups and big muscles, as we have seen, that the range of the motion is not altered. In contrast, the more subtle motions controlled by the smaller muscles are changing significantly. It has important to take special attention at the trainings to these changes, then the competitors can be able even under the race situation to inhibit the negative effects of the tiring caused by the exertion on their rowing technique.

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