

## Abstract

Rowing is a water sport in which competition takes place in a 2000 meters race course. In the case of our study (male lightweight quadriscull) it takes about 5 minutes and 55 seconds. This time depends not only on the type of boat but also on the technical and tactic ability of rowers (Steinacker e col., 2000).

This study focuses on the evaluation and control of training in a male team of lightweight quadriscull rowers. After a thorough characterization of this sport in general and of the rowers in particular, we have also pointed out the anthropometrical and physiological characteristics of our rowers. We have also identified the existing relationship between the studied anthropometrical variabilities (mass, stature, fat and slim body percentage) and the physiological ones (anaerobic threshold, heart rate, power at Lan 4 mmol/ l, power at individual anaerobic threshold and average speed at 2000 meters).

We have, thus, tried to determine the individual training indicators which allow a personal prescription of training concerning heart rate, power output and individual anaerobic threshold.

The use of 4 mmol/l. anaerobic threshold instead of individual anaerobic threshold is widely used by Rowing coaches as it is stated by some famous authors, such as Steinacker e col., 1998, amongst others. Knowing anaerobic threshold varies from individual to individual, we have decided to investigate (using the rowers of the quadriscull crew of Clube dos Galitos de Aveiro) the relationship between individual anaerobic threshold and 4 mmol/ l anaerobic threshold, so as to achieve a more individualized training prescription.

An anthropometrical characterization of the sample was made, for which all rowers were informed of the need of adopting a anthropometrical reference position in all the measuring that took place. For the skin folds measuring, the procedures indicated by Cárter (1982) and Ross (1983) were followed. For calculating the percentage of fat, the equations of Yuhasz e Cárter were used. As for the physiological characterization, two tests were conducted:

Maximal 2000 meters test in the rowing ergometer (Concept II, D Model);

Indirect maximal and progressive protocol in a rowing ergometer (Concept II, D Model).

During this test we have collected blood samples, so as to determine the blood lactate concentration, using a mini DR. LANGE / LP 20 spectrophotometer. In order to control the heart rate, we have used a heart rate transmitter Polar, model S-810, at a data collecting rate of beat per beat.

The steps of the protocol were adjusted to the performance shown in the maximal 2000 meters test.

Regarding the analysis of the results and based on a review of the most relevant literature, we have proceeded to a possible theoretical conceptualization that would explain the present results.

The sample consisted of four rowers of  $25,90 \pm 3,43$  years old,  $174,48 \pm 6,68$  cm high, with a body mass of  $70,75 \pm 3,28$  kg. We have measured  $\Sigma$  skin folds, obtaining the following data:  $39,18 \pm 1,42$ , IMC de  $23,26 \pm 0,92$  kg/m<sup>2</sup> e % MG de  $6,78 \pm 0,24$ mm.

Regarding the results in the rowing ergometer tests, the group registered  $4,95 \pm 0,16$  meters/segundos speed with an individual anaerobic threshold of  $3,74 \pm 0,74$  mmol/l, a power output of  $241 \pm 26,11$  W and an average heart rate of  $172,7 \pm 16,40$  beats per minute.

We came to the conclusion that the data performance obtained by our sample concerning power and heart rate in the 4 mmol/l. anaerobic threshold and in the individual anaerobic threshold are very similar. However, this fact can be justified through the training methodology used in the last four seasons in which training was directed to the 4 mmol/l. anaerobic threshold, which brought the individual anaerobic threshold closer to the 4 mmol/l. anaerobic threshold.

To what concerns body mass, our sample as presented results that are very close to those of World champions – 70,75 Kg which is not surprising since lightweight athletes can only weight up to 70 Kg

As to the athletes' height, this is where the biggest difference occurred for our sample's average height is  $174,48 \pm 6,68$  cm whereas World champion athletes' average is 186,0 cm

As to average power, the 4 mmol/l. anaerobic threshold is  $246,47 \pm 33,50$  and in individual anaerobic threshold is  $241,61 \pm 26,11$

Concerning average speed at 2000m our sample's average speed is/was  $4,95 \pm 0,16$  m/s whereas World champion rowers did the same distance with an average speed of 5,5 m/s.