

Lactic Acid: a great help for the canoeing coach.

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Introduction

More advanced training methods require the ability to perform assessment tests and correct the work out, trying to make it more and more personalized for the athletes.

Methods

Six athletes who are practicing canoe kayak (n. 4) and canadese (n. 2, Mirko and Enrico) were submitted to an incremental test of 1000 meters which was repeated three times with an increasing speed. The test was carried out at the river named Ticino, in an area with constant water depth and no current. The first course was performed with a heart rate lower by 25 beats per minute than the one considered as threshold, the second one with intensity of 70% of the maximum and heart rate 10 beats per minute less than the one considered as threshold and the third one was executed with the maximum effort and therefore with heart rate above the threshold. At the end of every course the athlete came close to the anchored support boat where a blood sample was collected from the ear lobe. The sample was analyzed by a piece of equipment named Lactate Plus Meter produced by the company Novabiomedical U.S. After the sample collection, the athlete departed for the next course.

We tested advanced athletes, athletes that were recovering from an injury and young athletes in order to get personalized directions regarding their training in the future.

Results

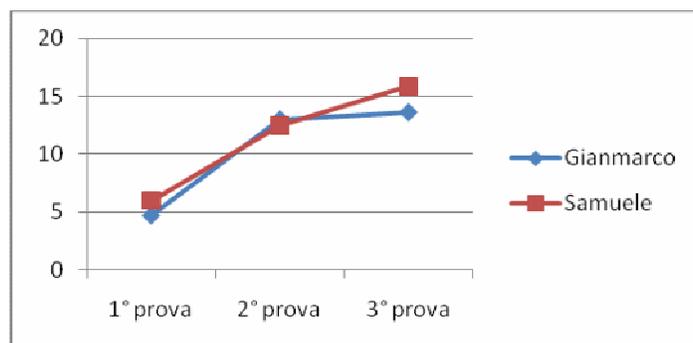
The collected data are the following:

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	baseline	1st try	2nd try	3rd try
Gianmarco		4,7	13	13,6
Samuele		6	12,5	15,9
Stefano		4	8,4	12,4
Davide		4,2	7,4	12,1
Mirko	4,3	9,8	9,7	14,1
Enrico	8,8	20	10,4	11,7

The determination of the baseline was performed only for two athletes, those who came to the starting point of the test after the warm-up. The other four athletes had been waiting for logistic reasons, therefore remaining practically still in the water and for this reason it was not considered necessary to perform the determination of the baseline for them.

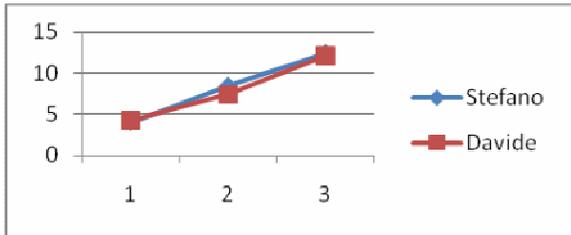
In the young athletes (Gianmarco and Samuele) with a previous training time of approximately two years , the curve presents a sharp increase (greater than 100%) between the first and the second test, with only one adjustment between the second and the third test.



An adjustment of this type to the production of lactic acid is a sign of a poor maintenance in medium-high effort. So the advice towards the coaches is to work on medium-high aerobic intensity. The work will be proposed, during the training plan as a number of repetitions of 250 meters races with predefined speed and

number of paddles. During the next months the length of the route will be gradually increased, leaving the speed unchanged.

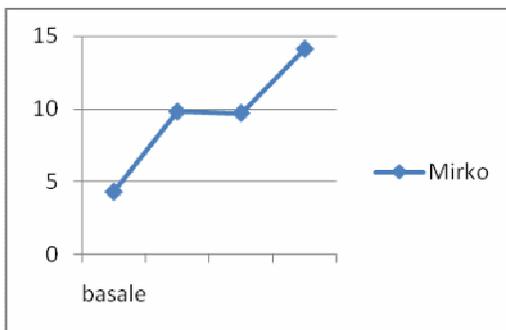
Two athletes (Stefano and Davide) have shown a regular increase of the lactic acid's concentration although they did not reach the desired performance at the three tests.



We suggest to the coaches to work on the athletes' overall power and the strength expressed in the water. So we suggest a training preparation with weight lifting at 90% of the R.M. at least two times per week integrated with practice on the boat using the break. Working with a break is achieved by adding to the boat's profile immersed in the water a rubber tube with a diameter of 5 cm; the tube increases the gliding resistance and forces the athlete to increase the force exerted in order to maintain the speed.

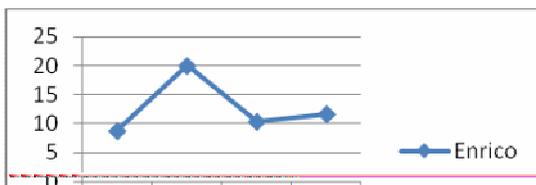
The two athletes that practice the canoe canadese constitute two special cases for different reasons, even though they are both two advanced athletes of high level.

Mirko resumes activity after three months of inactivity, due to injury. After the warm-up he presents already a high rate of lactic acid increased by 100% at the end of the first test. It remains stable during the second test and increases sharply in the third one reaching high levels of lactic acid in his blood.



The training will mainly rely on the tolerance to sustained effort, so repeated work outs (3-4 series for 8 -10 times) will be recommended in distances that start from 500 meters (race distance) that will increase gradually (100 meters per week) until one thousand meters (race distance).

Enrico is a special case; he is an athlete of international level that ran two marathons in a row (one in C1 and the other in C2) valid for the World Cup of canoe (the second one three days before the test). He wanted equally to be tested in order to see how he tolerated the competitive effort.



He has proved an excellent tolerance to repeated efforts, absolutely compatible with two marathon races. The test will be repeated on the athlete at the next European Championship.