A TRAINING PROTOCOL FOR INCREASE THE ANAEROBIC THRESHOLD IN SPRINT SWIMMERS

Maria Luisa PUGLISI
University of Catania

Biagio SANFILIPPO
University of Catania

Giacomo PAPOTTO
University of Catania

Giulio Maria Federico PAPOTTO
University of Catania

Andrea BUSCEMI
Study Centre for Italian Osteopathy (CSdOI), Catania

Lucio S. G. COCO
University of Catania

Corresponding Author
Lucio COCO
luciosgcoco@gmail.com
Catania

INTRODUCTION

For sprint swimmers the main aim of training is to increase the execution time for achieving best results.

In fact, they should work on their anaerobic capabilities for increasing their anaerobic threshold[1,2].

This increase allows the athlete to maintain, as long as possible, a performance at maximal levels without decrease of efficiency[3-5]. Direct effects are from one side to neutralize the well-known negative effects exerted by blood lactate[6-8] on attentional mechanisms[9-12] and from the other one to ameliorate the cerebellum-dependent motor control[13-14].

It is worth noting that the rise of anaerobic threshold increases maximum aerobic capacity expressed as maximal oxygen uptake (VO_2 max).

The purpose of this work was to design a training protocol for the increase of the anaerobic threshold in sprint swimmers.

MATERIALS AND METHODS

Six swimmers specialized in speed (mean age: 16.5 years ± 1.97 SD) participated to the study carried out during the period of preparation for competitions (March-May 2014). The athletes were trained in crawl six days a week for the specialties of the 200 m and 400 m.

The possible improvement of capabilities was estimated by evaluating maximum aerobic capacity and anaerobic threshold.

Maximum aerobic capacity was assessed with the 2.000 meters test which consists in measuring the time necessary to conclude the test at the maximal individual speed. This time divided by 40 gives the mean time necessary to cover 50 meters e correspond to the maximal aerobic capacity of the swimmer.

Anaerobic threshold was evaluated through the administration of the Differential Test whose execution requires the performing in pool of:

1. a 400 meters swim at maximal individual speed,
2. a total recovering,
3. a successive execution of 200 meters swim at maximal individual speed.

The differential time is obtained by subtracting from the time used for the 400 meters, the time taken for the 200 meters; the resulting time correspond to a performance's intensity at limit of anaerobic threshold.

The training protocol included two types of training:

a) to increase the anaerobic threshold, session having duration of 40 minutes, with the use of all distances (50m, 100m, 200m, 400m) with ranges from 10 to 30 seconds, for a total work of 3000 m.

b) to improve the V02 max, sessions having duration of 25 minutes, organized in repetitions with a single duration between 3 and 6 minutes, with recovery intervals between 1 - 3 mins, with the possibility of increase the duration up to 6 - 8 minutes, to allow higher intensities, for a total work of 1000 - 2500 meters (divided into series of 300-600).

RESULTS

Figure 1 shows the results obtained at beginning (March), at middle (April) and at the end (May) of training period; it can be observed observe a general improvement, with a significant differences between March and May.

Table 1 shows the values measured in swimmers for calculating Differential Test.

In Figure 2, we observe a significant improvement of Differential Test and Anaerobic Threshold, with significant differences between March and May.

CONCLUSION

The purpose of this study was to evaluate a training protocol designed for increasing of the anaerobic threshold in sprint swimmers.

The observed results confirm that the proposed training protocol is capable to induce a significant increase of Anaerobic Threshold[15-19] after two months of work.

Therefore this protocol could be represent an useful tool for obtaining significant changes in only two months of training.

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Fig.1

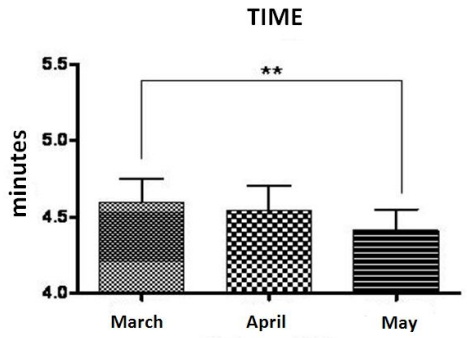
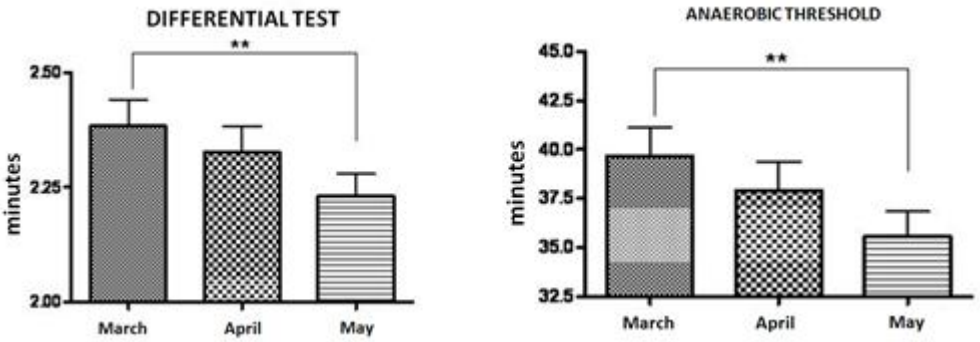


Fig.2



Tab 1. Evaluation of the anaerobic threshold

ATHLETES	DISTANCE	TIME	DIFFERENTIAL	THRESHOLD SPEED AT 50 M
1	**1 X 400**	**5'. 08''**	**2'. 58''**	**44''. 5**
1	**1 X 200**	**2'. 50''**		
2	**1 X 400**	**4'38''**	**2'. 34''**	**38''. 5**
2	**1 X 200**	**2'. 04''**		
3	**1 X 400**	**4'. 35''**	**2'. 28''**	**37''. 5**
3	**1 X 200**	**2'. 07''**		
4	**1X 400**	**4'. 24''**	**2'. 20''**	**35''**
4	**1 X 200**	**2'. 04''**		
5	**1 X 400**	**5'. 06''**	**2'. 52''**	**43''**
5	**1 X 200**	**2'. 54''**		
6	**1 X 400**	**4'. 48''**	**2'. 38''**	**39''. 5**
6	**1 X 200**	**2'. 10''**		