



Physiological responses to water exercise: A comparison between swimming and deep water running

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Introduction

Water exercise has grown more and more popular in recent years. Besides traditional sport activities such as swimming, water polo, etc. and traditional fitness activities such as water running and water aerobics, new water activities have emerged, e.g. water bike and aquastep. These are sometimes used as an alternative training methods in specific periods of the year's training plan.

The aim of this paper is to evaluate the physiological responses in a group of swimmers from the Italian Master division (over 35-40 years) to two different water exercise techniques.

Methods

Ten swimmers were chosen from the Italian Master division. They typically trained three times a week and had been previously trained in deep water running. They were asked to perform three kinds of exercises: T1 = 10 minutes continuous at 60-70% of H.R. max; T2 = 1'30" repeated 10 times at 80-85% of H.R. max, 30" of rest; and T3 = 1'30" at full-out effort. All the exercises were performed with two different techniques: S = swimming and DWR = deep water running, six exercises altogether. Every exercise was performed on a different day with a rest of 3 days in between. The subjects were equipped with a heart rate monitor (Polar Vintage, by M & M) in order to measure the heart rate (beats per minute) throughout the exercise. We have taken into consideration here the mean values (T1 and T2), and the peak value (T3) registered during the exercise for every subject. Moreover, capillary blood was taken from the finger tip. Blood lactate (mM) was analysed by Lactate-Pro, a portable blood lactate test meter based on an amperometric method using an enzymatic reaction. Lactate was measured after the performance in T1, after the 5th and the 10th trial in T2, five minutes after the end of T3. Furthermore, every athlete was asked to self-assess their fatigue at the end of every exercise by means of the Borg rating of perceived exertion (RPE) Scale. They have been previously trained at using the Borg Scale.

Non-parametric statistics (Wilcoxon test) were calculated in order to identify if any significant differences between the swimming and the water running performances could be found.

Results

Only five swimmers (3 females and 2 males, average age, height and weight respectively 41.60±2.61, 170.0±10.32, 65.40±16.04) completed all the six exercises and the results are reported here (tab. 1, 2, 3).



	Lactate mM		H.R.		RPE	
	S*	DWR*	S*	DWR*	S*	DWR*
median	4.40	3.10	125.0	123.0	2.0	2.0

Table 1: Median values of T1. (*) Not significant differences (Wilcoxon test).



	Lactate mM				H.R.		RPE	
	5 th tr.** S	10 th tr.***	5 th tr.** DWR	10 th tr.***	S****	DWR****	S*	DWR*
median	6.0	7.2	3.8	3.6	161.0	139.5	6.0	5.0

Table 2: Median values of T2. (*) Not significant and (**), (***), (****) significant differences (Wilcoxon test).

	Lactate mM		H.R.		RPE	
	S*	DWR*	S*	DWR*	S*	DWR*
median	7.80	6.10	165.0	155.0	9.0	8.0

Table 3: Median values of T3. (*) Not significant differences (Wilcoxon test).



Discussion/Conclusion

From tables 1, 2 and 3, we can observe that there were no significant differences in lactate, heart rate and RPE values for exercises T1 and T3 when comparing swimming and running. However we found a significant difference both in lactate and heart rate values for the exercise T2.

More research in this area, with a higher number of subjects, is needed in order to better understand the physiological responses to water exercise performed under different conditions (level of immersion into the water, body position, limbs movement, etc). It appears that in particular periods of the year's training plan, different water activities, because of their various physiological responses, can be suggested to athletes as alternative methods to their usual training activities.

References

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