ELABORATION OF A CIRCUIT FOR THE TRAINING AND THE EVALUATION OF SPECIAL ENDURANCE IN KICK BOXING – K1 STYLE

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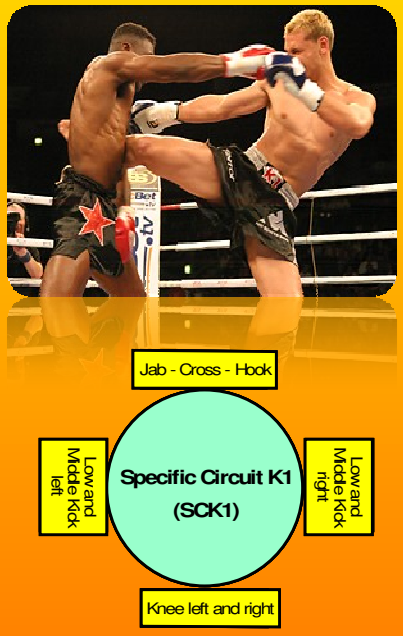
Introduction

Combat sports are considered as alternating aerobic-anaerobic activities, but some studies show that it is the anaerobic metabolism to have a key role in the performance.

In some of these disciplines, during the training or the competition the athletes may reach concentrations of blood lactate of about 15 mmol/l.

So, to excel in a combat sport such as Kick Boxing K1 Style are therefore necessary a good training and evaluation of speed endurance (anaerobic).

That's why we started the experimentation of a standard protocol of a specific test/training, which is named specific circuit – k1 (SCK1) similar to G.Lehmann test (1996).



Methods

SCK1 presents the same combat methods of K1 amateur category.

It consists in 3 series, each one of 2', with a pause of 1' between every round (amateur fight time) and in 4 places where the athlete perform the typical techniques of this discipline (with the PAO): 1) jab-cross-hook 2) Low kick right – Middle kick right; 3) knee left – knee right 4) Low kick left – Middle kick left.

The experimentation of this system of training was conducted over 20 athletes (age: 16/27; weight: 58/80 kg; height: 160/187 cm; years of experience: 2/9). They all practiced Kick Boxing K1 as competitive and they were divided into two groups: Experimental Group (EG) and Control Group (CG), each one of 10 athletes, with the same physical and technical characteristics.

Initially, the two groups were subjected to a series of tests (SCK1 and combat), surveying the performance (turns number for SCK1 and knocks number for Fight) and measuring the lactate in three moments (basal, after 3' and after 6' from the end of the circuit/combat) with Lactate Pro LT1710.

The reliability of the tests was proved by repeating them during two other sessions (correlation test-retest).

Afterwards, all the kick-boxer were subjected to a 4-weeks standard training (warm-up, general/specific exercises and sparring), but the athletes of the EG made also the SCK1.

At the end of the training period, all the tests were repeated to evaluate the effects of the training on the EG and the CG (with test-retest for reliability).

SCK1 circuit	turns number						concentration of blood lactate					
	1° Circuit		2° Circuit		3° Circuit		Basal		after 3'		after 6'	
CG	pre	post	pre	post	pre	post	pre	post	pre	post	pre	post
M	13,83	14,30	14,45	15,18	14,05	14,88	2,70	2,32	11,51	11,83	10,94	11,31
SD	1,38	1,86	1,91	1,83	2,66	2,51	0,75	0,71	1,41	1,94	1,46	1,88
diff%	3%		5%		6%		-14%		3%		3%	
p	n.s.		n.s.		n.s.		n.s.		n.s.		n.s.	
min	10,75		10,25		9		1,3		9,4		8,9	
MAX	17		17,25		17,5		4,1		14,7		15,2	

SCK1 circuit	turns number						concentration of blood lactate					
	1° Circuit		2° Circuit		3° Circuit		Basal		after 3'		after 6'	
EG	pre	post	pre	post	pre	post	pre	post	pre	post	pre	post
M	15,35	20,65	14,95	22,15	14,98	22,50	2,60	2,28	12,73	12,04	12,19	11,23
SD	1,33	1,94	1,10	1,53	2,15	2,14	0,67	0,59	1,39	1,87	1,60	1,60
diff%	35%		48%		50%		-12%		-5%		-8%	
p	<0,0001		<0,0001		<0,0001		n.s.		n.s.		n.s.	
min	13		13		9,25		1,3		9		9,6	
MAX	24		24		25,5		3,7		15,3		15,2	

fight CG	total knocks number (punches, kicks and knees)						concentration of blood lactate					
	1° Round		2° Round		3° Round		Basal		after 3'		after 6'	
	pre	post	pre	post	pre	post	pre	post	pre	post	pre	post
M	24,00	24,90	23,70	26,00	21,90	26,60	2,80	2,60	10,25	10,46	9,12	9,61
SD	5,52	8,08	8,00	6,91	6,89	8,26	0,75	0,63	1,67	1,59	1,87	1,70
diff%	4%		10%		21%		-7%		2%		5%	
p	n.s.		n.s.		n.s.		n.s.		n.s.		n.s.	
min	17		16		16		1,8		8,2		6,8	
MAX	43		42		46		3,9		13,6		13,1	

fight EG	total knocks number (punches, kicks and knees)						concentration of blood lactate					
	1° Round		2° Round		3° Round		Basal		after 3'		after 6'	
	pre	post	pre	post	pre	post	pre	post	pre	post	pre	post
M	23,00	34,70	22,90	36,00	23,60	34,20	2,03	2,07	10,59	9,92	9,41	8,50
SD	5,87	6,11	6,74	7,29	7,95	7,44	0,38	0,45	1,72	1,23	1,71	1,66
diff%	51%		57%		45%		2%		-6%		-10%	
p	<0,001		<0,001		<0,01		n.s.		n.s.		n.s.	
min	17		16		14		1,3		8,7		5,7	
MAX	47		51		53		3,1		13,6		12,6	

Results

The values of the correlation test-retest are very high for the rounds number (SCK1), the knocks number (Fight) and the lactate, with r value always bigger than 0.79. ($p<0.01$).

The longitudinal study on SCK1 showed a big improvement of the results scored by the EG in the 1st series (+35%; $p<0,0001$)), in the 2nd (+48%; $p<0,0001$)) and in the 3rd (+50%; $p<0,0001$), against non significant lactate variations (-5/-8%). On the other hand, in the three series, the CG improved only for 3%, 5% and 6%, with no significant lactate variations (+3%).

As interesting are the results of the combat test. In the test-match done after the training, the EG had an increase of the knocks number of 51%, ($p<0,001$), 57% ($p<0,001$) and 45% ($p<0,01$) in the three rounds, with no significant drops of lactate (-6/-10%), whereas the CG showed lower average increases (4%,10%, 21%; p=n.s.) and minimal variations of lactate (+2/+5%).

As seen in other experimentations, lactate formation during the combat is lower than that of the circuit on the average probably because, during the combat, pauses and "tactical" rests are more frequent. The average lactate produced by the EG in the circuit is about 12mm/l (min 9,6; max 15,3), while during the fight it is about 10mm/l (min8,7; max 13,6) .

Conclusions

The experimentation prove the usefulness of SCK1 as specific training exercise in Kick boxing - K1.

The introduction of this specific circuit in the training program of some of the athletes examined, in fact, had very positive effects on the increase of the attack rate during the training, with no increase of the lactate levels.

In conclusion, the suggested circuit may be considered an effective training and specific evaluation method at the disposal of the trainees of this discipline.

References

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