

Organization of a circuit for the evaluation of the special endurance in Sanda

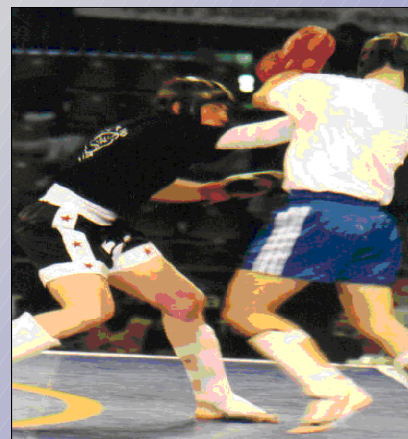
Villani R.^{1,2,3}, Distaso M.^{1,3}

¹ T.M.P.A. Combat Sport, Facoltà di Scienze Motorie, Università di Cassino; ² Istituto Universitario Scienze Motorie Roma, ³ Study and Research Center Combat Sport – CSEN Italia

Introduction

Sanda (sportive match of Kung Fu) is a discipline that uses both typical techniques of kick boxing (punches, kicks) and techniques of throwing like those of judo and wrestling. The special endurance is a fundamental ability to excel in this sport. In fact the aerobic metabolism, but most of all the anaerobic one, are highly employed, in alternate and complex way during the match.

The goal of the research was, therefore, to organize a specific test (SCS - Specific Circuit Sanda), valid, reliable and cheap to value the special endurance of the Sanda's athletes.



Methods

The experimentation of SCS was conducted on 20 athletes doing Sanda from several years, divided in two groups: 10 "amateurs" (age 19±2; weight 68±6; h 173±4; practice years 2±1) and 10 "professionals" (age 26±5; weight 68±8; h 170±5; pr. years 9±4). Both the groups had to do a specific circuit of 3 rounds, lasting 2 minutes each, with a rest of 1 minute between the rounds (according to the rules of the competitions). During these circuits the athletes had to perform, on the guard of his opponent, some standard combination of the techniques (the most used in the competition).

Each combination (two arms techniques, one leg technique, and one throwing) had to be performed at the highest intensity and the series had to be repeated until the end of the 2 minutes (Tab. 1).

At the end of each combination of the 4 techniques, the heart rate was registered (heart rate counter Polar – M32) and at the end of each round was registered the number of the combination executed.

To value the reliability of the SCS test each athlete had to repeat the trial after 7 days.

To study the validity of the test and to verify its capacity to discriminate between athletes of different level we did a transversal comparison between the professionals (national/international level) and the amateurs (middle level). The objectivity was granted through a precise standardization of the protocol.

Tab.1 - Type of techniques

	1° round	2° round	3° round
circuit's techniques	jab sx	hook sx	upper-cut sx
	cross dx	hook dx	upper-cut dx
	low kick	front kick	spinning back kick
	throwing technique	throwing technique	throwing technique
Time	2 min	2 min	2 min
Pause	1 min	1 min	1 min

Results

The study of the reliability of the SCS test (test and retest correlation) put in evidence r values both in amateurs and professionals higher than 0.95 for each round with r = 0.99 in the test-retest comparison between the values of the 3 rounds.

It shows that the SCS test is highly reliable (Tab. 2).

In the transversal comparison between the two groups resulted evident the higher specific endurance of the "professionals" that had results significantly higher than those of the "amateurs" (Tab. 3) with percentage differences between 24% and 29% (p<0,05). The higher endurance of the professionals is pointed out by the Graph. 1 that shows the trend of the mean heart rate of the two groups during the test.

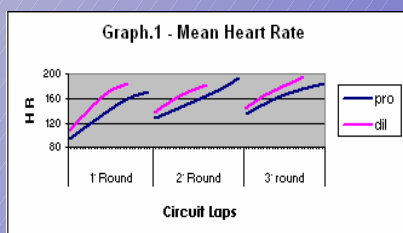
Tab.2 - Correlation Test-Retest (Tot. 3 rounds Laps)

Athletes	Tot.circuit laps Pro		Tot.circuit laps Ama	
	test	retest	test	retest
1	58	59	55	56
2	82	82	47	49
3	67	64	48	50
4	49	50	56	57
5	65	65	58	58
6	77	79	56	57
7	63	63	36	39
8	48	48	54	57
9	50	51	52	55
10	81	83	46	47
Mean	64	64,4	50,8	52,5
Correlation	0,99		0,99	

Conclusions

The SCS test is highly reliable in the evaluation of both the elites athletes and of the lower level athletes. Moreover the results obtained point out that the circuit had a good capacity to discriminate between athletes of different agonistic level. Therefore we think that SCS test can be considered a useful tool for a cheap evaluation of the special endurance of the practising Sanda.

Our next study will concern the measurement of the bloody lactate for a more precise evaluation of fatigue of athletes practising combat sport.



Tab.3 - Trasversal comparison Amateurs - Professional (1°test)

Athletes	1° round		2° round		3° round		Tot. Laps	
	ama	pro	ama	pro	ama	pro	ama	pro
1	19	21	18	20	18	17	55	58
2	17	29	17	25	13	28	47	82
3	19	25	14	20	15	22	48	67
4	21	15	17	17	18	17	56	49
5	18	23	19	19	21	23	58	65
6	19	27	19	30	18	20	56	77
7	12	23	12	21	12	19	36	63
8	20	19	18	14	16	15	54	48
9	18	16	17	17	17	17	52	50
10	19	28	13	28	14	25	46	81
Mean	18,2	22,6	16,4	21,1	16,2	20,3	50,8	64
diff.%	24%		29%		25%		26%	
Anova	p=0,020		p=0,017		p=0,018		p=0,010	

References:

- Fava M. (2004), Diploma Thesis in T.M.P.A. Combat Sport, Cassino University
 Lehmann G. (1996), Leistungsport, 4, 6-11
 Villani R., Gesuale D. (2003), 8th Annual Congress of the ECSS, 233, Salzburg