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Elaboration of a specific test to evaluate the execution time of the punch techniques of karate

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Introduction:

The analysis of the karate matches put in evidence that the rapid execution of the punch techniques is a factor of great importance to excel in this sport.
That's way we started an experimentation of a standardised procedure of a specific field test that we called SOP Test (speed of punch). It permits an exact measure of the real duration of the technique and of its speed.

Methods :

The instrument we used for this measure is a computer system that gathers and integrates the signal coming from two photocells placed in two different modes (Fig. 1a and 1b). The first one permits to value the technique Gyaku Zuki performed from a long distance (150 cm), the second one permits to value the techniques Gyaku Zuki and Kizami performed from a short distance (100 cm).
The experimentation was carried out on a group of 24 karateka, 12 amateurs (age 22±4, weight 71±5, height 173±6, practise years 10±2), and 12 professionals (age 24±3, weight 71±9, height 179±7, practise years 16±4).
To value the reliability of the tests, each athlete had to perform four times the three established techniques (we considered the lower time) and this trial was repeated in the two following days.
To study the validity of the test and verify its capacity to discriminate between athletes of different level we did a cross comparison between the professional group and the amateurs one in the three techniques.
The objectivity is granted with a precise standard procedure.

Fig. 1a

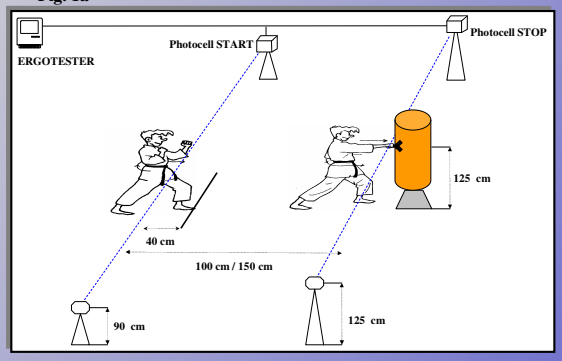
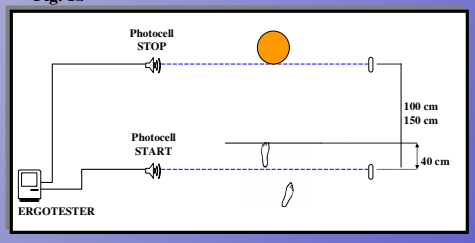


Fig. 1b



Results:

The results of the study of the reliability (test-retest correlation) pointed out the r values included between 0,82 e 0,93 for all the parameters considered in the two groups (Tab.1) with p<0,01.
The transversal comparison (study of the validity) pointed out contrasting result. In fact in the tests executed on the short distance is evident the greater rapidity of the professional athletes, who had better results than amateurs (Tab.2) with differences of 15% for the Gyaku Zuki (p<0,05) and of 17% for the Kizami (p<0,05).
The test executed on the long distance, instead, pointed out a clear and strange superiority of the amateurs, with a difference of 16% (p<0,001).

Tab.2	Giaku Zuki 150cm	Giaku Zuki 100cm	Kizami Zuki 100cm
M Best PRO (sec)	0,51 (2,94m/s)	0,23 (4,35m/s)	0,19 (5,26m/s)
M Best DIL (sec)	0,44 (3,41 m/s)	0,27 (3,70m/s)	0,23 (4,35m/s)
PRO-DIL	0,07	-0,04	-0,04
Diff.%	16%	-15%	-17%
Anova	p<0,001	P<0,05	P<0,05

Tab.1	PRO (M)	DIL (M)
Giaku Zuki 150cm	r = 0.93 (p<0.01)	r = 0.82 (p<0.01)
Giaku Zuki 100cm	r = 0.94 (p<0.01)	r = 0.83 (p<0.01)
Kizami Zuki 100cm	r = 0.93 (p<0.01)	r = 0.82 (p<0.01)

Conclusions:

The results of the experimentation permit us to point out in the SOP Test, interesting reliability characteristics, demonstrated by the high correlation test-retest.
The test put in evidence the better rapidity of execution of the professionals in the performance of harm technique on short distance.
The better rapidity of execution of the amateurs of the Gyaku Zuki on the long distance is probably due to the technical-tactical characteristics of the professional team we studied: these athletes use normally leg techniques on the long distance.
Also for this reason we are improving a test to value the speed of the kick techniques (SOK), which will be the aim of our next study.

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