

THE INFLUENCE OF THE MORPHOLOGICAL CHARACTERISTICS ON THE EFFICIENCY OF THE TECHNICAL ELEMENTS PERFORMANCE IN KICKBOXING DISCIPLINES FULL CONTACT AND LOW KICK IN REAL FIGHTS

Edin Krupalija¹, Stipe Blažević² and Aldvin Torlaković³

¹ Euro-football marketing, Wien, Austria

² Faculty of economics, University of Rijeka, Croatia

³ Faculty of sport and physical education, Sarajevo, Bosnia & Herzegovina

Original scientific paper

Abstract

Research is made on sample of 78 examinees, participants on the Balkan's championship in kickboxing from Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro and Serbia, aged from 18 to 33 years, that took place in Tešanj (B&H) in 2007. On the championship, in each category participated one competitor who is the winner of the national championship at the country he represents coming from different weight categories. For this research we applied the system with the 42 variables, from which 37 are technical elements variables, 4 are morphological characteristic variables and 2 are independent variables that signify the age of the examinees and their victories on the championship. This research was carried out with the goal of establishing the influence of the morphological characteristics on the efficiency of the technical elements performance in kickboxing disciplines Full Contact and Low Kick. Morphological characteristics had the status of the logical predictors while recorded actions had the status of the logical criterions. Given variables were estimated by the three competent assessors with the special protocol. All fights were recorded with two digital cameras covering from two angles. With multiple regressive analyses the relations between morphological characteristics and technical elements were established.

Key words: kickboxing, morphology, technical elements

Introduction

Kickboxing is relatively young sport that originated from the karate and which structure contains the elements of the boxing, karate, tae kwon do sport, and which also includes various sports' branches-disciplines: Semi Contact, Light Contact, Full Contact, Low Kick, Thai Kickboxing, Musical Forms and Aero Kickboxing (WAKO). Kickboxing that we meet and watch today requests bigger technical-tactical, psychological and conditional forms from the competitors (Kapo 1999). Segments with which the fighter applies his good sport form in kickboxing disciplines- Full Contact and Low Kick are definitely the technical elements and morphological characteristics (Kapo 1999) in accordance with his age i.e. level of experience he possesses. Trainers help the fighters by guiding and tutoring them how to use their strong sides and how to hide the weak sides on the competition (Kapo 1999). Trainer of the kickboxing disciplines Full Contact and Low Kick have to possess a great amount of theoretical and practical knowledge in order to refine the techniques of his fighters. Even better knowledge of the basic and specific structure of the training process is needed for extreme work quality and top results achievement, and based on that, trainers could educate and refine the technical elements of the fighters that could have influence, both positively and negatively, on the realization of the complex motoric structures in the kickboxing disciplines Full Contact and Low Kick. This should be done in order to overcome the current practice in which the trainer prior to the fight advises the competitor to engage in the melee if he fights the

taller opponent, or to keep the distance with directs if he fights the shorter opponent. As the kickboxing is relatively a young sport, there are a small number of researches related to the situational efficiency in Full Contact and Low Kick disciplines at the moment, so we must say that this work is almost pioneering. However I will mention the authors, who have done researches related to the situational efficiency in martial arts (Kuleš 1985, Jovanović 1988, Kapo 1999, Kapo and associates 2003, Kajmović and associates 2004, Kapo 2006, Kapo 2008). Authors of this work relied on those researches. The goal of his research is to establish the connection between technical elements, morphological characteristics and age of the competitors in kickboxing disciplines Full Contact and Low Kick in real fight i.e. competition, where the competitor often relies on the subconscious activity mechanism and his own instinctive reaction which are opposite to the learned techniques-tactics. They react in accordance with the situation because every fight and every opponent is different.

Methods

Data processing methods

The establishment of the relations between morphological characteristics and technical elements is executed by the regressive analysis. Regressive analysis is used for the determination of the relations between two sets of variables, but in cases with more predictors and just one criterion.

That is the way to estimate the influence of the predictors on that criterion. In accordance with the goal of work, morphological measures were placed into predictor's position, and every recorded action was defined individually as a criterion. This way could be established which recorded action is significantly influenced by the morphological dimensionality (Bonacin et al., 2005).

Examinee sample

Examinee sample for this research consists of 78 top competitors in kickboxing disciplines- Full Contact and Low Kick, and only semifinalists and finalists are taken into account, 17 in Full Contact and 15 in Low Kick, all of them males from all weight categories from XIII Amateur Balkan's Championship in Kickboxing that took place in Tešanj (B&H) on 1st and 2nd of September in 2007. This competition is enlisted in the official championship calendar of World Kickboxing Federation-WAKO (World Association of Kickboxing Organizations).

characteristics of kicks and punches in kickboxing disciplines Full Contact and Low Kick, Age and Victory.

Methods for the situational-motor variables assessment

Real (situational) qualities of expressed motor and sports techniques-tactics are the most objective in the authentic conditions of performance during the competitions or by applying the situational and motoric tasks. Therefore, the observation technique is used for this research.

In the observation technique, for the registration of the basic data about examinees and their activities, we used appropriate mensural instruments that needed a special protocol (observation list), whose shape and structure formulation were based on the problems, subjects and goals of research. Observation for this research has been executed with the help of the technical aids (DVD snapshots and DVD players) for the sake of higher objectivity in the process of gathering data by competent persons.

Results with the discussion

Table 1 - Regression Summary for VAR01

	BETA	BETA Err.	B	B Err.	t(59)	p-level
Intercpt			2,21	0,77	2,89	0,01
VAR39	0,24	0,18	0,24	0,18	1,33	0,19
VAR40	-0,37	0,13	-0,43	0,16	-2,73	0,01
VAR41	-0,16	0,15	-0,30	0,29	-1,05	0,30
VAR42	0,22	0,20	0,31	0,29	1,07	0,29

(R= .40181703 R_c= .16145692 Adjusted R_c= .10460655 F(4,59)=2.8400 p<.03196 Std.Error of estimate: .82096)

This means that the contribution to the criterion explanation is significant. Correlation coefficient of the set of predictors and criterions is 0.4018, significance is around 96.3%, and important one from the individual predictors is that whose beta is negative -0,37. Results of this research show that competitors with a bigger weight have lower frequency of the left directs to the head (LIJDIRGL).

Table 2 - Regression Summary for VAR12

	BETA	BETA Err.	B	B Err.	t(59)	p-level
Intercpt			0,50	0,66	0,76	0,45
VAR39	0,24	0,18	0,21	0,16	1,33	0,19
VAR40	-0,23	0,13	-0,24	0,14	-1,74	0,09
VAR41	0,53	0,15	0,89	0,25	3,58	0,00
VAR42	-0,34	0,20	-0,43	0,25	-1,71	0,09

(R= .46613875 R²= .21728534 Adjusted R²= .16421994 F(4,59)=4.0947 p<.00538 Std.Error of estimate: .70624)

The significance of the whole variable is 99,5, and individual significance is asserted by the arm length with the beta coefficient 0,53, significance 0,00. (DESAPEST)Right uppercut to the abdomen will be placed often by those with the bigger arm length.

Variables for the morphological characteristics registration		
1	MORVISIN	Height
2	MORFTEZI	Weight
3	MORFDRK	Arm length
4	MORFDNG	Leg length
Variables - Punches application during competition activity		
5	LIJDIRGL	Left direct to the head
6	LIJDIRST	Left direct to the abdomen
7	DESDIRGL	Right direct to the head
8	DESDIRST	Right direct to the abdomen
9	LIJKROGL	Left cross to the head
10	LIJKROST	Left cross to the abdomen
11	DESKROGL	Right cross to the head
12	DESKROST	Right cross to the abdomen
13	LIJAJEGL	Left uppercut to the head
14	LIJAJEST	Left uppercut to the abdomen
15	DESAPEGL	Right uppercut to the head
16	DESAPEST	Right uppercut to the abdomen
17	DESRUKOKR	Right punch from turn
Variables - Kicks application during competition activity		
18	LIJNNAPR	Left kick forward
19	DESNNAPR	Right kick forward
20	LIJBNAPR	Left side kick forward
21	DESBAPR	Right side kick forward
22	LIJKAKAT	Left kakato geri
23	DESKAKAT	Right kakato geri
24	LIJNKRUD	Left low rotary kick
25	DESNKRUD	Right low rotary kick
26	LIJUDNOGTJ	Left kick to the body
27	DESUDNOGTJ	Right kick to the body
28	LIJVKRUD	Left high rotary kick
29	DESVKRUD	Right high rotary kick
30	LIJUSGER	Left kick backward ushiro geri
31	DESUSIRG	Right kick backward ushiro
32	DESUSMAV	Right ushiro mavashi geri
Variables - Defense techniques application during activity		
33	LIJBLRRU	Left hand block from punches
34	DESBLLRU	Right hand block from punches
35	LIJBLRNU	Left hand block from kicks
36	DESBLLRNU	Right hand block from kicks
37	LIJBLNNU	Left foot block from kicks
38	DESBLLNNU	Right foot block from kicks
39	ESKIVAZEL	Evasion to the left
40	ESKIVAZED	Evasion to the right
41	IZMICANJ	Dodging
Independent variable		
42	STDOB	Age

Variables sample

Variables sample consists of technical elements Variables taken from Kapo (2006) that are presented in kickboxing disciplines during 17 fights in Full Contact and 15 fights in Low Kick (criterion variables): Morphological characteristics, Technical

Table 3 - Regression Summary for VAR24

	BETA	BETA Err.	B	B Err.	t(59)	p-level
Intercpt			3,61	0,73	4,92	0,00
VAR39	-0,28	0,18	-0,28	0,18	-1,56	0,12
VAR40	-0,02	0,13	-0,02	0,15	-0,12	0,90
VAR41	-0,16	0,15	-0,29	0,28	-1,06	0,29
VAR42	-0,08	0,20	-0,11	0,28	-0,38	0,71

(R= .43797908 R²= .19182568 Adjusted R²= .13703420 F(4,59)=3.5010 p<.01244 Std.Error of estimate: .78790)

Variable 24 (LIJVKRUD) is significant together with all predictor variables, but it does not contain especially isolated individual criterion variables.

Table 4 - Regression Summary for VAR43

	BETA	BETA Err.	B	B Err.	t(59)	p-level
Intercpt			4,97	0,53	9,41	0,00
VAR39	0,04	0,14	0,03	0,13	0,25	0,80
VAR40	-0,73	0,11	-0,74	0,11	-6,84	0,00
VAR41	-0,14	0,12	-0,23	0,20	-1,18	0,24
VAR42	0,19	0,16	0,24	0,20	1,19	0,24

(R= .69357523 R²= .48104659 Adjusted R²= .44586331 F(4,59)=13.673 p<.00000 Std.Error of estimate: .56704)

The connection between the set of morphological measures and age (STDOB) is significant and maximum. Variable VAR40 (WEIGHT) with the beta coefficient -0,73 stands out from the individual variables, which shows that among top quality fighters occurs the reduction of the weight while the age increases. The result clearly points out to the organism adaption to the long-term techniques training, motoric stereotype and tactics acquirement. Techniques and skills refinement are improved through the experience, but the consequence is the loss of the muscle mass, or precisely, reduced need for the muscle mass.

Table 5 - Regression Summary for VAR08

	BETA	BETA Err.	B	B Err.	t(59)	p-level
Intercpt			0,98	0,67	1,46	0,15
VAR39	-0,18	0,19	-0,16	0,16	-0,98	0,33
VAR40	0,31	0,14	0,31	0,14	2,25	0,03
VAR41	0,27	0,16	0,44	0,25	1,74	0,09
VAR42	-0,26	0,21	-0,32	0,25	-1,27	0,21

(R= .37543346 R²= .14095028 Adjusted R²= .08270962 F(4,59)=2.4201 p<.05835 Std.Error of estimate: .71610)

Variable 08 (DESKROST) is very near significance, but individual variable VAR40 (WEIGHT) is especially significant. It says that if the weight is bigger, the frequency variable of the right cross to the abdomen is lower. Variable 15 (DESNAPR) is very near significance, but individual variable VAR40 (WEIGHT) is especially significant. It says that if the weight is bigger, the frequency variable of the right kick forward is lower.

Table 6 - Regression Summary for VAR15

	BETA	BETA Err.	B	B Err.	t(59)	p-level
Intercpt			1,13	0,74	1,54	0,13
VAR39	0,09	0,19	0,08	0,18	0,48	0,64
VAR40	-0,32	0,14	-0,35	0,15	-2,32	0,02
VAR41	-0,13	0,16	-0,23	0,28	-0,83	0,41
VAR42	0,33	0,21	0,44	0,28	1,57	0,12

(R= .37177923 R²= .13821980 Adjusted R²= .07979402 F(4,59)=2.3657 p<.06307 Std.Error of estimate: .79106)

Conclusion

Regarding all analyses, significant relations were shown by the regression of the variables VAR01-LIJDIRGL (p=0.03), VAR12-DESAPEST (p=0.05), VAR24-LIJVKRUD (p=0.01) and VAR43-STDOB (p=0.00), while variables VAR08 (p=0.06) and VAR15 (p=0.06) existed on the border of significance.

We may conclude that morphological dimensions in general do not have significant influence on actions performing in fight, although some important relations can be registered. But in case of connection between the morphological measures and age, results are presenting a great statistical significance. They clearly point out that the cumulative effects of the training, regarding older competitors, are not longer going in order of losing adipose tissue, but in a way of rationalization the energy, because they are accomplishing the motoric stereotype and automating technical elements.

In accordance with the result, we can logically conclude that experienced fighters need training process that will include strength training in order to increase their muscle volume. Results of the conducted research show that real fight imposes different solutions from those considered logical in techniques-tactics learning process. They also show that right uppercut to the abdomen (DESAPEST) will be placed often by the competitors with the bigger arm length value, while the trainers rule says that left and right direct to the head will be placed by those with the bigger arm length value.

On the other hand, regarding left and right direct to the head, results show that the competitors with the bigger weight also have lower frequency of performing left directs to the head (LIJDIRGL). Variable 24 (LIJVKRUD) or left high rotary kick is significant with all predictor variables, but there are not especially isolated individual criterion variables. Trainers practice shows that left high rotary kick is mostly connected to the leg length. These parameters can be used as the initial impulse for further researches about situational efficiency in kickboxing disciplines Full Contact and Low Kick.

Literature

- Bonacin, D. (2010). *Introduction to quantity methods* (In Croatian). Travnik: Edukacijski fakultet.
- Jovanović, S. (1988). *The influence of the basic psycho-motoric factors on the specific abilities expression regarding karate athletes for solving the simulated typical tasks of sports fight*. Dissertation. Belgrade: Faculty of physical education.
- Kajmović H., Rađo, I., & Kapo, S. (2004). Determination of differences based on the indicators of situational efficiency between male and female seniors on the Balkan's championship in judo, Sarajevo 2001. and 2002. *Homo sporticus*, 7(1), 14-20.
- Kapo, S. (1999). *The influence of the basic-motoric abilities on the performing efficiency of the competitive techniques-tactics in karate*. Master thesis. Sarajevo: Faculty for PE.
- Kapo, S., Rađo, I., & Kajmović, H. (2003). Canonical relations of the basic-motoric abilities on the performing efficiency of the competitive techniques-tactics in karate. *Sportski logos*, 1(2).
- Kapo, S. (2006). *Structural analysis and model of K-1 top level fighters*. Dissertation (In Bosnian). Sarajevo: Faculty of sports and physical education.
- Kapo, S., Bonacin, D., Rađo, I., Kajmović, H., & Cikatić, B. (2008). Situation developing profile of the K-1 Grand-prix tournament winners. *Acta Kinesiologica*, 2(2), 37-44.
- Kuleš, B. (1985). Connectivity of the anthropometric measures and successes in karate fights. *Kinesiology*, 17(2).
- * * * (2011). WAKO – World Association of Kickboxing Organizations, Available: www.wakoweb.com/en/InfoPage.aspx?Ctn=82046.

UTJECAJ MORFOLOŠKIH ZNAČAJKI NA UČINKOVITOST IZVOĐENJA TEHNIČKIH ELEMENATA U KICKBOKSING DISCIPLINAMA FULL KONTAKT I LOW KICK U STVARNIM BORBAMA

Sažetak

Istraživanje je izvršeno na uzorku od 78 ispitanika, sudionika Balkanskog prvenstva u kickboksingu iz Albanije, Bosne i Hercegovine, Bugarske, Hrvatske, Makedonije, crne Gore i Srbije, uzrasta 18 do 33 godine, što se održalo u Tešnju (BiH) 2007.g. Na prvenstvu, u svakoj je kategoriji nastupio po jedan natjecatelj koji je bio pobjednik nacionalnog prvenstva u zemlji koju predstavlja. Za ovo istraživanje primjenjen je skup od 42 varijable, od čega 37 varijabli tehničkih elemenata, 4 morfološke značajke i 2 nezavisne varijable koje označavaju uzrast ispitanika i njihove pobjede na prvenstvu. Istraživanje je provedeno s ciljem utvrđivanja utjecaja morfoloških značajki na učinkovitost izvođenja tehničkih elemenata kickboksing disciplina Full Contact i Low Kick. Morfološke značajke su imale status logičkih prediktora dok su snimljene akcije imale status logičkih kriterija. Zadane varijable tehnike su utvrđene procjenom tri kompetentna procjenitelja po posebnom protokolu. Sve su borbe bile snimljene digitalnim kamerama koje su pokrivala borilište iz dva ugla. Multiplom regresijskom analizom utvrđene su relacije morfoloških značajki i tehničkih elemenata.

Ključne riječi: kickboksing, morfologija, tehnički elementi

Received: August 15, 2010

Accepted: June 02. 2011

Correspondence to:

Edin Krupalija, MSc.

Euro-football marketing, Wien, Austria

Phone:

E-mail: edinkrupalija@hotmail.com