THE MOTORIC ABILITIES AND THE MORPHOLOGICAL CHARACTERISTICS IN THE PREDICTION OF THE SPORTS RESULTS IN KARATE

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Abstract
Karate as a sports discipline has settled specific requirements in terms of defining all the relevant characteristics, abilities and features that are important for karate as a sport. Only the knowledge of the relevant anthropological dimensions of this spots, one can define a battery of the measuring instruments and test the most important dimensions of this sport. This paper deals with the influence of the motoric abilities and the morphological characteristics on the sports results in karate and , especially, on the Montenegrin national team that won numerous competitions all around the world. The program of the research anticipated the definition of the optimal number of factors by means of the analysis of the main components on the basis of seven anthropometric characteristics and on the sample of forty examinees.

Key words*: karate, motoric abilities, morphological characteristics, the eurofit of the testing batteries, foreseeing.*

INTRODUCTION

A proper diagnostics of the sportsmen is a fundamental condition for a successful training process. Since this process is extremely complicated, we think that it should be assigned to the appropriate institutions, capable of completing the research in a proper way. The estimation of the trainers is a part of the technologically- training process, the measuring is a part of the estimation and the testing is a part of the quantitative measuring. The tests and other measuring instruments need to have the appropriate metric characteristics and validity. The trainers are given the opportunity not only to acquire the experience, but also to acquire certain knowledge, since they are familiar with all the methods and rules of the sport.

THE SUBJECT, OBJECTIVE AND THE AIMS OF THE RESEARCH

The subject of the research se the motoric abilities as well as the morphological characteristics in the foreseeing of the sports result within the karatists. The objective of the research has been confined into the karate, and it would be stated as a written statement to all the authorities and Ministries as well as the sports organizations. According to previously mentioned he authors have defined the following aims of the research:

- to show all the basic estimative parameters of the examinees according to their motoric abilities.
- to establish the foreseeing of the motoric abilities and the morphological characteristics related to the sports result.

THE HYPOTHESIS OF THE RESEARCH

We have, according to the previous experiences, the basis of the problem, subject and aim of the research, established the following hypothesis:

H01: There is a significant relationship between the motoric abilities and the morphological characteristics within the foreseeing the results in karate.
A01: There is no significant relationship between the motoric abilities and the morphological characteristics within the foreseeing the results in karate.

THE APPLIED METHODOLOGY

The sample of the examinees
The research has been carried out on the sample of the forty examinees, belonging to the young male Montenegrin population that practices karate, aged between 22 and 24. The research has been divided into three parts. These are the part C1 testing the motoric abilities (the explosive power, static force of the fist, the repetitive force and the static force) within the following testing: the long jump, dynamometry of a fist, lying into sitting position in 30 seconds and standing a knuckle. The part C2 has been consisted of the estimation of the motoric abilities (such as equilibrium, elasticity, speed of the alternative movements and endurance of an examinee) within the following tests: flamingo, hand tapping, bowing with reaching the sitting position, club- swinging running 10x5 as well as a persistent club-swinging running. The pert C3 contains the research of the morphological characteristics of the examinees.

The sample of the measuring instruments:

The sample of the measuring instruments estimating the motor abilities
The committee for the development of sports, established by the European Union, has formulated the starting points for the surveillance of the physical development and the motoric abilities of the children and young population. A methodology of testing the motoric abilities within the children

and youngsters has been established on the grounds of the numerous researches. The fact that even eighteen countries have been carried out the same researches resulted in the comparison of the results all around Europe. The tests have been carried out in the closed space and the appropriate order of the testing phases was crucial. There is no warming- up before the testing and the order is the following one:

1. the balance test, called "flamingo";
2. the speed test of the alternative movements "taping by a fist";
3. the elasticity of the body and its joins "bowing with the reaching the sitting position";
4. testing of the explosive power of the lower extremities "the long jump from a standing position";
5. testing of the static force of the dominant hand "dynamometry of a fist";
6. the testing of the repetitive force of the belly muscles and joints of a hip "lying into sitting position";
7. the testing of the static force of the upper extremities "standing a knuckle";
8. the testing of the speed of the running with changing the directions "club-swinging running 10x 5";
9. the testing of the maximal aerobic endurance "persistent club- swinging running".

The sample of the instruments for estimation of the morphological characteristics

We used the following variables for the estimation of the morphological characteristics:

1. body height
2. body weight
3. cutaneous pleat of the brachium- triceps
4. cutaneous pleat of the backing
5. cutaneous pleat on the hip
6. cutaneous pleat of the shank
7. cutaneous pleat of the brachium- biceps

THE RESULTS OF THE RESEARCH

The analyses of the structure of the karate players according to their morphological characteristics and the sports results

According to the formerly established program of the research, it was concluded that, on the sample of 40 karat players, the optimal number of factors should be distinguished, by means of the analysis of the most important components and on the basis of seven anthropometric characteristics and the sport result (abbreviation: sp.res.). The objective of the research is to define the relationship between the features, to esteem the contribution to some features, to apply the complementary analyses and, finally, to show the results using the pictures and diagrams. We will show the coordinates of the anthropometric characteristics in order identify their position within the isolated structure.

The columns in the table 4 mean: in.- inertia., F factor coordinate, cor. It should be pointed out that all the results were multiplied with 1000. We have analyzed the structure of the four separated factors (by means of the method of the major components), on the basis of the seven anthropometric characteristics as well as the sports result (sp.res.), on the sample of the karate players.

Table 1
The structure of the 4 separated factors of the morphological characteristics of the karate players

			1 - factor			2 - factor			3 - factor			4 – factor		
	J1	qlt	krd	cor	ctr	krd	cor	ctr	krd	cor	ctr	krd	cor	Ctr
1	b. h.	819	-731	535	254	437	191	103	-189	36	25	242	58	58
2	b.w.	895	-640	410	195	453	205	110	-511	261	184	138	19	19
3	c.p. b.	765	494	244	116	418	174	94	-376	141	100	454	206	204
4	c.p. back.	793	577	333	158	619	383	206	-228	52	37	-161	26	26
5	c.p. of hip	721	599	358	170	550	302	163	44	2	1	-242	58	58
6	c.p. s.	759	-194	38	18	646	417	224	551	304	215	19	0	0
7	c.p.b.	747	-425	181	86	397	158	85	278	77	54	-575	331	328
8	sp.res.	884	68	5	2	164	27	14	738	544	384	555	308	306
					1000			1000			1000			

The whole seven anthropometric characteristics of the karate players and their results have been reduced into four separated factors. We have noticed a significant contribution that gave the factors per some anthropometric characteristics within all seven characteristics and the sports results.

*The higher values of the communalities have been noticed within: body weight (b.w.) 895, body height (b.h.) 819, cutaneous pleat of the backing (c.p.b.) 793, cutaneous pleat of the brachium (c.p.b.)- triceps 765, cutaneous pleat of the shank (c.p.s.)759, cutaneous pleat of the brachium (c.p.b.) 747 and the cutaneous pleat on the hip (c.p.h.)721. All the anthropometric characteristics contribute the formation of the structure of each factor.

*The structure 1 of the separated factor consists of two anthropometric characteristics: body height

with the significant contribution of the factors (cor) 535 and body weight 410. The latent contribution is given by the cutaneous pleat of the hip: 359 as well as the cutaneous pleat of the backing: 333. The body height is related to the body weight. This relationship is being inversely proportionate within the cutaneous pleats on the hip and backing.

* The structure 2 of the separated factors consists of the cutaneous pleat of the shank with the contribution of the factor 417. The latent contribution to the structure is given by cutaneous pleat on the backing -384 as well as the hip cutaneous pleat – 303. The cutaneous pleat of the shank is connected with those on the backing and hip.

* The structure 3 of the separated factors consists of the sports results with a significant contribution (cor) 545. the latent contribution is given by the cutaneous pleat of the shank – 304. The sports results have been related to the cutaneous pleat of the shank.

* The structure 4 of the separated factors consist of the cutaneous pleat of the brachium – biceps with a significant contribution of the factors 331 and the sports results 309. The relationship between the cutaneous pleat of the brachium – biceps is reversely proportionate with the sports results.

We have noticed a significant contribution of many factors within: the cutaneous pleat of the backing- the factors 1 (333) and 2 (384), the cutaneous pleat on the hip – the factors 1 (359) and 2 (303), the cutaneous pleat of the shank- the factors 2 (417) and 3 (304) and the sports result of the factor 3 (545) and the factor 4 (309).

We have concluded, by means of the analysis carried on the sample of forty karate players, that 34 (85 %) karate players have contributed the formation of the structure no.4. There was, also, a minor contribution of 5 karate players (12, 50%) and a low contribution (with no importance) of 1 karate player.

The research has showed that there is a significant coherence between the anthropometric characteristics with some factors: with two of them within one karate player, with one factor 22 karate players, the latent coherence has been noticed within 13 players and there have been 4 players without coherence. It should be pointed out that there was one player separated from the others.

The Analysis of the Structure of the Karate Players According to Their Motoric Abilities and the Sports Results

According to the formerly established program of the research of the motoric abilities with the karate players, we have planned to classify the motoric abilities according to a hierarchy on the sample of 40 karate players in order to define the optimal number of factors, by means of the factors analysis as well as on the basis of 9 established motoric abilities and the sports results (sp.r.).

The objective of the research was to define the relationship between some motoric abilities, to contribute the marking to the factor and vice versa, to apply the complementary analysis and show the results on the tables and pictures. The coordinates of the marking will have to be shown, in order to show their position within the separated structure.

The table 5 shows the columns with the following abbreviations: iner.-inertia; F- coordinate of the factors; con. contribution of the factors to the marking, ctr. contribution marking to the factors. It should be pointed out that all the results have been multiplied by 1000.

This chapter will show 3 separated factors and define their structure on the basis 9 motoric abilities and the sports result. The separate unity contains 9 motoric abilities, and its results have been reduced into 3 separate factors:

* The inertia 193 is at the highest point within the test "taping by a fist", meaning that it separates other motoric abilities, and the next would be within the tests: "lying into sitting position" (l. into sit.) 144, "bowing with the reaching the sitting position" (b. into s.) 138, "continuous swinging running 10 x 15" (sw. rn.) 78, "jump forward" (jp. fw.) 74, "dynamometry of a hand" (dn.fst.) 70, sports results (sp.r.) 67 and the test "flamingo" (flamin.) 35.
* The structure 1 of the separated factors consists of 4 motoric tests: "lying into sitting" (l. into s.) with the contribution of the factor (cor) 919, "continuous swinging running" (sw.rn) 875, "flamingo" 748, and "the dynamometry of a hand" (din.of h.) 427, the latent contribution to the structure give the tests "standing a knuckle" (st.a kn.) 352, and "bowing with reaching the sitting position" (b.into s.) 234, the test "lying into sitting is connected to continuous singing running". The connection between "lying into sitting" and vice versa is reversely proportioned to the tests "flamingo, "dynamometry of a hand", "standing a knuckle" and "bowing into sitting position".

* The structure 2 of the separated factor consists the sports results with the contribution of the factor (cor.) 879 and the following 4 motoric tests: "bowing into sitting" 751, "jump forward" 565, "dynamometry of a hand" 539, "standing a knuckle" 507, . The sports result is connected to the tests "jump forward from a standing position" and "standing a knuckle". This relationship has been reversely proportioned with the tests "bowing with reaching the sitting position" and "the dynamometry of a hand".

* The structure 3 of the separated factor consists of the 2 motoric tests: "tapping by a hand" with the significant contribution of the factor (cor) 916 and "running with swings 10 x 5" 877. The latent contribution to the structure give the tests "jump forward from a standing position" 351 as well as the "flamingo" 224. The test "tapping by a hand" is strongly connected with the test "running with swings 10 x 5 meters". The relationship of the test "tapping by a hand" is being reversely proportioned with the tests "jump forward" and "flamingo".

* We have noticed the contribution of many factors within the test "flamingo", especially the factors 1 (748), factor 2 (29), factor 3 (224); the test "bowing with reaching sitting position": the factors 1 (234), factor 2 (751); the test "jump forward": the factor 1 (86), factor 2 (565), the factor 3 (36); the test "standing a knuckle": the factor 1 (352), factor 2 (507) and factor 3 (143).

Table 2
The structure of 3 separated factors of the motoric abilities of the karate players

			1 - factor			2 - factor			3 - factor		
	I1	inr	1F	cor	ctr	2F	cor	ctr	3F	cor	ctr
1	flamin	35	-289	748	71	-57	29	3	-158	224	25
2	Tap. h.	193	-72	8	4	217	76	46	754	916	564
3	Bow.into sit.	138	-322	234	88	-577	751	324	-83	16	7
4	Jump.	74	-143	86	17	367	564	131	-289	350	83
5	Dyma. of a hand.	70	-309	426	81	-347	538	117	-89	36	8
6	Lying, into sit.	144	652	919	360	-112	27	12	-158	54	25
7	Stand. a knuck.	87	-313	351	83	376	506	137	-199	142	39
8	r.w. swings	78	103	42	9	-143	81	20	469	877	218
9	Cont. r. sw.t	114	567	874	273	-160	70	25	-144	56	21
10	Sp. res	67	126	73	13	436	879	185	-102	48	10
		1000			1000			1000			1000

CONCLUSION

According to the formerly established subject and the objective of the research and the methodology and the hypothesis, we have carried out a research of the motoric abilities and the morphological characteristics of the examined population with a sports achievement.

The results have shown that there is no statistically significant relation between the motoric abilities and the morphological characteristics with the sports results for all the examinees which means that the alternative hypothesis A 01 is accepted.

We have concluded that the karate players show better results in the subcutaneous fatty tissue with the mild results within the cutaneous pleats of the brachium- triceps, shank, backing and hip. The results show that there are lower results within the cutaneous pleat of the biceps. The results of the karate players related to the body height and weight are significantly lower. The karate players have lower anthropometric characteristics showing that they are relevant for the foreseeing of the karate sports results.

The karate players' results of flexibility are lower, under the average ones, and average for the speed of the alternative movements. They are not very enduring (below the average score and under it), they are very enduring in terms of speed (excellent and under average score), they are very good at keeping balance (excellent, over average score and average). We expected the better scores, since the examinees have won many national and international trophies. The best result it that related to the balance, which was expected because of the fact that karate is a sport that requires balance as well as an excellent concentration of a player, especially during the performance of "kata".

The further analysis led us to the conclusion that the results of clutching a fist are under the average scores while the results of the explosive strength of the lower limbs are average. The values of the repetitive force of the belly muscles are average and above the average level and the static force showing the results over the average scores. We have especially noticed that, speaking of the explosive force of the lower limbs, the karate players didn't show good results. We are all very much aware of the fact that the explosive force is

of the greatest importance for all the karate players and that is why we think that the results must be better than these ones. The explosive force and the estimation of the jump forward as well as the repetitive force estimated by the test lying into sitting position don't contribute a lot the foreseeing the sports results.

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MOTORIČKE SPOSOBNOSTI I MORFOLOŠKE KARAKTERISTIKE U PREDIKCIJI SPORTSKOG REZULTATA U KARATEU

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Sažetak

Karate kao sportska disciplina postavlja specifične zahteve u pogledu dijagnostikovanja svih relevantnih karakteristika, sposobnosti i osobina dominantnih za karate sport. Samo poznavajući relevantne antropološke dimenzije karate sporta, može se izabrati baterija mernih instrumenata i testirati one dimenzije od kojih najviše zavisi rezultat u karate sportu. U ovom radu je prezentovan uticaj motoričkih sposobnosti i morfoloških karakteristika na sportski rezultat u karateu i to prvenstveno misleći na vrhunske karatiste, reprezentativce Crne Gore i osvajače mnogih odličja sa evropskih i svjetskih nadmetanja. Prema ranije utvrđenom programu istraživanja strukture antropometrijskih karakteristika predviđeno je da se na uzorku od 40 karatista, izdvoji optimalan broj faktora, metodom faktorske analize glavnih komponenata, na osnovu 7 posmatranih antropometrijskih karakteristika i sportskog rezultata.

Ključne riječi: *karate, motoričke sposobnosti, morfološke karakteristike, eurofit baterija testova, predikcija.*

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