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Motor skills in the structure of motor fitness of 9-year-old boys engaged in kyokushinkai karate

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Dictionary:

Technique – noun a way of performing an action [46].

Motor – adjective relating to muscle activity, especially voluntary muscle activity, and the consequent body movements [46].

Self-defence – noun fighting techniques used for defending oneself against physical attack, especially unarmed combat techniques such as those used in many of the martial arts [46].

Skill – noun an ability to do perform an action well, acquired by training [46].

Coordination – noun the ability to use two or more parts of the body at the same time to carry out a movement or task [46].

Performance – noun the level at which a player or athlete is carrying out their activity, either in relation to others or in relation to personal goals or standards [46].

Innovative agonology (INNOAGON) – is an applied science dedicated to promotion, prevention, and therapy related to all dimensions of health and the optimization of activities that increase the ability to survive (from micro to macro scales) [39, 41].

Abstract:

Background and Study Aim: Most of the techniques and motor actions in combat sports are strictly determined by the rules of the competition, which dictate the content of the competition activity. In kyokushin karate, striking with the limbs (if with the legs, in the sports jargon and in everyday language 'kicks') are among the sharp means of fighting. Similarly, during self-defense, the importance of the quality of this category of techniques goes beyond the area of application within sports. The purpose of this research was the knowledge about the contribution of motor skills to the structure of motor fitness of 9-year-old boys engaged in kyokushinkai karate.

Material and Methods: Thirty-two boys, 9 years old, took part in the research. The children and their parents were informed about all peculiarities of the research and gave their consent to participate in the experiment. Participants were informed they could withdraw from the study at any time without giving a reason. All procedures were performed in accordance with the Declaration of Helsinki. The following research methods were used: study and analysis of scientific and methodological literature, pedagogical observation, timing of learning tasks, pedagogical experiment, mathematical statistics, and mathematical planning of the experiment. The algorithmic instructions method was used in the learning process.

Results: The coordinates of centroids allowed us to interpret the canonical functions in terms of their role in the division into classes. The centroid of the A1B1 group (−7.824) is located at the negative pole, the centroids for the A2B2 (4.829) and A2B1 (4.193) groups are located at the positive pole, and the A1B2 group (−1.198) is located between them. The higher the value of the first function, the higher the probability of success in the second and fourth groups. The centroid of group A2B1 (4.151) is located on the positive pole of the second function, and the centroid of group A1B2 (−4.588) is located on the negative pole. The centroids of groups A1B1 (1.977) and A2B2 (−1.539) are located between them. An increase in the value of the second canonical function will improve the learning performance of the second group. The classification results show that 100% of the data were classified correctly.

Conclusions: The analysis and structure of coefficients of the discriminant function indicate that in the process of the formation of the motor skill kick 'kin geri', priority is given to training results, anthropometric data, preliminary power training, coordination, and flexibility. The first canonical function is almost twice as informative (66.0%) as the second function (28.4%). The

effectiveness of training according to the algorithmic type assignment program depends on the mode of performing orthogonal variants of the standard intermittent exercise.

Keywords: anthropometric indicators, coordination, discriminant analysis, 'kin geri', pedagogical experiment, self-defence

Struggle – according to Tadeusz Kotarbiński – as any activity that is at least a two-subject one (premising that a team can be a subject) where at least one of subjects hinders the other. Jarosław Rudniański notices that when discussing techniques of struggle, Kotarbiński generally uses the words 'rule', 'directive', 'ploy', 'trick', 'principle', 'postulate' or 'method' interchangeably [47, p. 23].

1. Introduction

Struggle technique (or in combination 'technique', with the synonym 'struggle') is a key term in agonology (general theory of struggle as defined by Tadeusz Kotarbiński [1]) understood much more broadly than in the area of sport science – see dictionary. Most of the techniques and motor actions in combat sports are strictly determined by the rules of the competition, which dictate the content of the competition activity [2]. This allows most of the 'technical arsenal' to be formed in the form of sufficiently stable motor skills, supported by an appropriate level of motor abilities, physical development, technical skill, and psychological preparedness [3-5]. The training process should be correlated exclusively with the capabilities of those who are engaged: mental, physical, psychological, and functional [6-8].

Kyokushinkai karate is a complex coordination sport. It includes work with feet and hands, various combinations of movements in sequences, and movement with strikes and blocks. The main task of teaching striking techniques to young karateka is to provide their motor experience with the necessary new knowledge, motor skills, and abilities [9-11].

It is important to determine the role of motor skills in the structure of motor fitness of children and adolescents for planning the training process. The formation of motor skills and the development of motor abilities in the scientific literature is considered a holistic process [12, 5]. Based on factor analysis, it was found that the level of exercise training determines the variation in test results, and the formation of motor skills is a priority in the educational process of children and adolescents [13, 14].

The use of mathematical statistics methods is important for obtaining new information about children's education and training. The effectiveness of using multivariate statistics to analyse the learning process of schoolchildren is indicated by numerous data [13, 14, 12]. Thus, the expediency of using discriminant analysis in the classification of exercise modes has been established [15, 5], and structural analysis of motor fitness of children and adolescents [16, 5, 11].

However, the integral processes of motor skills formation and development of motor abilities in school-age children remain poorly studied.

The purpose of this research was the knowledge about the contribution of motor skills to the structure of motor fitness of 9-year-old boys engaged in kyokushinkai karate.

2. Materials and Methods

Participants

Thirty two 9-year-old boys took part in the research. The children and their parents were informed about the features of the study and agreed to participate in the experiment. Participants were informed they could withdraw from the study at any

time without giving a reason. All procedures were performed in accordance with the Declaration of Helsinki

Study Design

The following research methods were used in the study: study and analysis of scientific and methodological literature, pedagogical observation, timing of educational tasks, pedagogical experiment, mathematical statistics, and mathematical planning of the experiment. The algorithmic order method was used in the training process [12]. The program of training the technique of kicking 'kin geri' consisted of a sequential series of training tasks [11].

To achieve the set purpose, the influence of different variants of standard-interrupted exercise on the quality of performance of the technique of a kick 'kin geri' and the level of motor fitness of 9-year-old boys was studied. Exercises were changed according to the experiment type 22 planning matrix presented in Table 1. The influence of the number of approaches and the rest interval between approaches on the level of motor fitness of 9-year-old boys was studied. The levels of the chosen factors were established on the basis of the analysis of scientific sources and previous research [16, 10, 5].

Table 1. The experiment type 22 planning matrix.

Experiment number	Variations of standard intermittent exercise	Number of approaches	Rest interval
1	A1B1	A1 minimal 2	B1 min 60 s
2	A2B1	A2 maximal 4	B1 min 60 s
3	A1B2	A1 minimal 2	B2 maximal 120 s
4	A2B2	A2 maximal 4	B2 maximal 120 s

The study used motor tests that allowed us to assess the level of development [17, 5]:

1. Anthropometric indicators: body weight, body length, chest circumference, and vital capacity of the lungs;

2. Strength abilities: static strength – dynamometry of the right and left hands; dynamic strength – bending and extension of arms in mixed hanging on a rope; explosive muscle strength: standing long jump;

3. Flexibility: tilt of the torso from a sitting position;

4. Speed: speed in integral movements – 30 m run from a high start; speed and power abilities – standing long jump; general body motility, resistance to changes of pace – shuttle run 4x9 m and shuttle run with 'tag'; frequency of single movement – performing side kicks at speed on rackets with a partner during 'snake' run;

5. General endurance: 300 m run;

6. Coordination: ability to coordinate movements – exercises for combining movements of the arms, torso, legs; ability to differentiate spatial and temporal indicators of movements – shuttle run 4x9 m and tag; ability to maintain stability of

a posture – stand on one leg with closed eyes; ability to maintain vestibular stability – walking in a straight line after 5 revolutions;

7. The level of special coordination fitness: a comprehensive test that includes both general motor actions and karate elements;

8. A step-by-step assessment of the level of mastery of the technique of performing exercises in a series of 1–6 training tasks.

Statistical analysis

Data were collected and systematized using EXCEL (Microsoft Excel 2016, Microsoft Corp., Redmond, WA, USA). Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp., USA. Discriminant analysis was used to determine the significance of differences between groups in terms of the totality of all variables. The grouping variable was the number of participants in the experimental groups.

The most important information relates to the values of the F-test and significance levels, since they tell us for which variables the difference in the groups is significant. In addition, the smaller the λ-Wilks, the more important the independent variable is for the discriminant function.

The information concerning results is based on the following indicators: frequency (n); mean (M); standard deviation (SD); degrees of freedom (df); result of the analysis of variance (F); significance level (Sig.).

3. Results

The analysis revealed a significant influence of orthogonal variants of standard-interrupted exercise on the motor fitness of 9-year-old children. Statistically significant differences in test results between groups (A1B1, A2B1, A1B2, A2B2) are observed in the technical level of exercises of 1-6 series of training tasks ($p = 0.012$; $p = 0.001$), and also in results of the 'standing long jump' ($p = 0.023$), 'shuttle run 4x9 m' ($p = 0.018$), and 'stand on one leg with closed eyes' ($p = 0.034$). Differences in the results of other tests were statistically insignificant (Tables 2, 3).

Table 2. Group statistics 9-year-old boys practicing kyokushinkai karate (n = 32).

No	Variable (indicator)	A1B1		A2B1		A1B2		A2B2	
		M	SD	M	SD	M	SD	M	SD
	level of exercise mastery								
1	Series 1 (score)	8.15	0.40	9.32	0.54	8.65	0.70	9.49	0.47
2	Series 2 (score)	7.99	0.43	8.48	0.46	7.37	0.56	8.03	0.44
3	Series 3 (score)	9.01	0.71	9.45	0.50	8.36	0.35	8.93	0.77
4	Series 4 (score)	7.56	0.48	8.87	0.50	7.47	0.74	8.24	0.65
5	Series 5 (score)	8.38	0.56	9.34	0.67	7.73	0.60	9.05	0.72
6	Series 6 (score)	9.24	0.47	9.91	0.18	8.79	0.68	9.56	0.42
	anthropometric indicators								
7	Body weight (kg)	28.69	2.51	33.38	7.56	29.13	4.57	34.00	8.06
8	Body length (cm)	132.13	4.42	133.38	6.74	129.25	4.77	132.50	4.00
9	Chest circumference (cm)	63.75	2.38	67.63	7.05	64.13	3.68	68.88	7.85
10	Vital capacity of the lungs (cm3)	1398.75	170.41	1613.75	292.91	1505.00	172.96	1665.00	168.52
	strength abilities								
11	Dynamometry of the right hand (kg)	13.50	2.67	12.78	1.73	11.88	2.59	13.75	2.43
12	Dynamometry of the left hand (kg)	12.75	3.49	11.56	2.47	10.63	2.72	11.13	2.30
13	Bending and extension of arms in mixed hanging on a rope (number of times)	10.38	3.02	11.88	3.68	11.88	2.23	11.13	3.23
14	Standing long jump (cm)	132.75	10.77	143.88	9.31	141.63	9.27	149.00	10.35
	flexibility								
15	Tilt of the torso from a sitting position (cm)	−0.25	5.15	5.75	3.37	1.75	7.44	4.63	6.78
	speed abilities								
16	Run 30 meters (s)	5.95	0.30	5.81	0.47	6.08	0.34	5.64	0.31
17	Shuttle run 4x9 meters (s)	13.19	0.73	12.31	0.62	12.60	0.76	12.18	0.37
	endurance								
18	Run 300 meters (s)	75.38	9.30	80.13	9.19	80.63	8.12	78.13	12.15
	coordination skills								
19	Exercises for combining movements of the arms, torso, legs (points)	9.25	0.38	9.63	0.35	9.38	0.44	9.63	0.44
20	Stand on one leg with closed eyes (s)	4.75	1.67	8.25	2.60	6.88	1.73	7.75	3.24
21	Walking in a straight line after 5 revolutions, deviation in (cm)	100.75	8.41	91.38	10.66	99.63	6.09	94.00	16.92
22	Tag	5.63	1.77	5.25	1.16	5.50	1.51	6.00	2.14
23	Performing side kicks at speed	1.79	0.14	1.75	0.07	1.74	0.08	1.77	0.12
24	Complex test	22.52	0.83	22.16	0.70	22.57	0.79	21.64	1.34

Wilks' λ is significant by the F-test for all independent variables (Table 3).

Table 3. Tests of equality of group means 9-year-old boys practicing kyokushinkai karate (for each variable df1 = 3 and df2 = 28).

No	Indicators	Wilks' lambda	F	Sig.
1	Series 1 (score)	0.470	10.509	**0.000**
2	Series 2 (score)	0.560	7.341	**0.001**
3	Series 3 (score)	0.679	4.409	**0.012**
4	Series 4 (score)	0.498	9.401	**0.000**
5	Series 5 (score)	0.477	10.216	**0.000**
6	Series 6 (score)	0.535	8.125	**0.000**
7	Body weight, kg	0.849	1.654	0.200
8	Body length, cm	0.905	0.985	0.414
9	Chest circumference, cm	0.854	1.590	0.214
10	Vital capacity of the lungs, cm^3	0.782	2.594	0.072
11	Dynamometry of the right hand, kg	0.903	0.997	0.409
12	Dynamometry of the left hand, kg	0.916	0.851	0.478
13	Run 30 m, s	0.812	2.157	0.116
14	Run 300 m, s	0.952	0.473	0.704
15	Tilt of the torso from a sitting position, cm	0.845	1.711	0.188
16	Bending and extension of arms in mixed hanging on a rope, number of times	0.956	0.433	0.731
17	Standing long jump, cm	0.715	3.722	**0.023**
18	Shuttle run 4x9 meters, s	0.703	3.934	**0.018**
19	Exercises for combining movements of the arms, torso, legs, points	0.846	1.703	0.189
20	Stand on one leg with closed eyes, s	0.738	3.317	**0.034**
21	Walking in a straight line after 5 revolutions, deviation in cm	0.880	1.267	0.305
22	Tag	0.971	0.276	0.842
23	Performing side kicks at speed	0.958	0.408	0.749
24	Complex test	0.851	1.640	0.203

As a result of the discriminant analysis, three canonical functions were obtained for the four groups. The first function maximizes the difference between the values of the dependent variable. The second function maximizes the difference between the values

of the dependent variable by controlling the first function. And so on. The first function is the most powerful differentiating dimension. The second and third functions may also represent additional important aspects of differentiation. The obtained canonical functions explain 100% of the variations in the results and are informative for classifying the level of motor fitness of 9-year-old boys. The first canonical function has 66.0% of general discriminative possibilities (r1 = 0.984), whereas the second canonical function explains 28.4% of the variation of results (r2 = 0.963). The first canonical function is almost twice as informative (66.0%) as the second function (28.4%). The third explains the variation in the results by only 5.6% (r3 = 0.847) (Table 4).

Table 4. Eigenvalues 9-year-old boys practicing kyokushinkai karate (the first 3 of the canonical discriminant functions were used for the analysis).

Eigenvalues				
function	**eigenvalue**	**% of variance**	**cumulative %**	**canonical correlation**
1	29.585[a]	66.0	66.0	0.984
2	12.731[a]	28.4	94.4	0.963
3	2.533[a]	5.6	100.0	0.847

The value of λ = 0.001 for the first canonical function shows the residual discriminative ability after considering all canonical functions, the value of λ = 0.021 is the residual discriminative ability when considering only the second canonical function, and the value of λ = 0.283 is the residual discriminative ability when taking into account only the third canonical function (Table 5). Thus, the analysis of the Wilks' λ values demonstrates that the first canonical function is better at distinguishing objects. The overall discriminative ability of the canonical functions is reliable at a high level of statistical significance (p = 0.0001), whereas the statistical significance of the second canonical function (p = 0.028) and the statistical significance of the third canonical function is clearly low (p = 0.493). The division of 9-year-old boys into groups of karateka was successful. The most significant role in this division is played by the first two discriminant functions ($p<0.05$). The difference in classes by the third canonical function is not subject to meaningful interpretation. In principle, it can be excluded from the analysis, provided that the quality of the classification remains at an acceptable level. On the basis of the obtained $\chi 2$ values, we can conclude that the discriminant function is fit for purpose. The higher its value, the better the discriminant function distinguishes between groups.

Table 5. Wilks' lambda for results 9-year-old boys practicing kyokushinkai karate.

Test of function(s)	**Wilks' lambda**	**Chi-square**	**df**	**Sig.**
1 through 3	0.001	124.140	72	0.000
2 through 3	0.021	65.991	46	0.028
3	0.283	21.458	22	0.493

The first function (among structural coefficients) is most closely related to the results of training, with indicators of vital lung capacity, the ability to differentiate spatial and temporal indicators of movements, maintain static and dynamic stability of the posture, coordinate movements, speed and power indicators, and flexibility. The

second function is related to the training results and body length. The third function is related to anthropometric indicators (dynamometry of both arms, body weight, chest circumference), speed in integral movements, frequency of single movements, general endurance, general body motor skills, resistance to changes in pace, and levels of special coordination fitness (Table 6).

Table 6. Structure matrix for results 9-year-old boys practicing kyokushinkai karate.

Variable (indicator)	Function		
	1	2	3
Series 1 (score)	0.193*	0.021	0.092
Shuttle run 4x9 m (s)	−0.118*	0.022	−0.005
Standing long jump (cm)	0.111*	−0.044	0.058
Stand on one leg with closed eyes (s)	0.107*	0.002	−0.080
Vital capacity of the lungs (cm3)	0.096*	−0.001	0.054
Exercises for combining movements of the arms, torso, legs (points)	0.077*	0.022	0.023
Tilt of the torso from a sitting position (cm)	0.076*	0.031	−0.018
Walking in a straight line after 5 revolutions (deviation in cm)	−0.060*	−0.047	0.002
Series 2 (score)	0.061	0.227*	0.089
Series 5 (score)	0.122	0.209*	0.195
Series 6 (score)	0.099	0.208*	0.112
Series 3 (score)	0.036	0.183*	0.048
Series 4 (score)	0.142	0.179*	-0.035
Body length (cm)	0.020	0.078*	0.078
Run 30 m (s)	−0.060	−0.041	−0.203*
Dynamometry of the right hand (kg)	0.000	0.038	0.187*
Complex test	−0.059	−0.009	−0.168*
Bending and extension of arms in mixed hanging on a rope (number of times)	0.025	−0.013	−0.100*
Run 300 m (s)	0.027	−0.020	−0.099*
Tag	0.002	−0.021	0.097*
Chest circumference (cm)	0.069	0.025	0.095*
Performing side kicks at speed	−0.024	0.021	0.092*
Body weight (kg)	0.071	0.034	0.075*
Dynamometry of the left hand, kg	−0.036	0.059	0.060*

Note: Combined within-group correlations between discriminating variables and standardized canonical discriminant functions. Variables are ordered by the absolute value of the function correlation. * Largest absolute correlation between each variable and any discriminant function.

The analysis of regression (which contains non-standardized coefficients of the discriminant function) equations shows the importance of motor skills in the structure of motor fitness of 9-year-old boys practicing kyokushinkai karate (Table 7).

Table 7. Canonical Discriminant Function Coefficients. Unstandardized coefficients.

No	Variable (indicator)	Function		
		1	2	3
1	Series 1 (score)	5.045	−5.186	2.624
2	Series 2 (score)	1.602	−0.507	1.530
3	Series 3 (score)	−2.673	6.231	−3.240
4	Series 4 (score)	2.841	−1.609	1.813
5	Series 5 (score)	0.354	−0.068	1.405
6	Series 6 (score)	−4.144	5.736	−1.017
7	Body weight (kg)	−0.258	0.453	−1.140
8	Body length (cm)	0.330	−0.163	0.201
9	Chest circumference (cm)	−0.301	0.561	0.369
10	Vital capacity of the lungs (cm3)	0.005	−0.007	0.007
11	Dynamometry of the right hand (kg)	1.323	−2.385	2.111
12	Dynamometry of the left hand (kg)	−0.309	0.547	−0.778
13	Run 30 m (s)	5.379	−12.888	8.092
14	Run 300 m (s)	0.052	0.347	−0.321
15	Tilt of the torso from a sitting position (cm)	0.539	−0.200	0.158
16	Bending and extension of arms in mixed hanging on a rope (number of times)	−0.770	1.203	−0.267
17	Standing long jump (cm)	0.174	0.269	0.236
18	Shuttle run 4x9 m (s)	−0.718	0.179	1.743
19	Exercises for combining movements of the arms, torso, legs, points	2.739	−3.605	0.425
20	Stand on one leg with closed eyes (s)	−0.062	0.436	−1.060
21	Walking in a straight line after 5 revolutions (deviation in cm)	−0.042	0.147	0.117
22	Tag	−1.301	0.240	1.349
23	Performing side kicks at speed	−16.226	−0.273	6.404
24	Complex test	−0.320	−2.141	1.470
	(Constant)	−80.206	94.507	−180.038

The centroid of group A1B1 (−7.824) is located at the negative pole, the centroids for groups A2B2 (4.829) and A2B1 (4.193) are located at the positive pole, and group A1B2 (−1.198) is located between them. In other words, the higher the value of the first function, the higher the probability of success in the second and fourth groups. The centroid of group A2B1 (4.151) is located on the positive pole of the second function, and the centroid of group A1B2 (−4.588) is located on the negative pole. The centroids of groups A1B1 (1.977) and A2B2 (−1.539) are located between them. An increase in the value of the second canonical function will improve the learning achievement of the second group. Analysis of group centroids and graphical representation of

classification results (Figure 1) confirmed the influence of orthogonal variants of standard-interrupted exercises on the motor fitness of 9-year-old boys (Table 8).

Table 8. Functions at group centroids (non-standardized canonical discriminant functions calculated in group averages).

Variant of exercise modes	Function		
	1	2	3
A1B1	−7.824	1.977	0.794
A2B1	4.193	4.151	−1.310
A1B2	−1.198	−4.588	−1.529
A2B2	4.829	−1.539	2.045

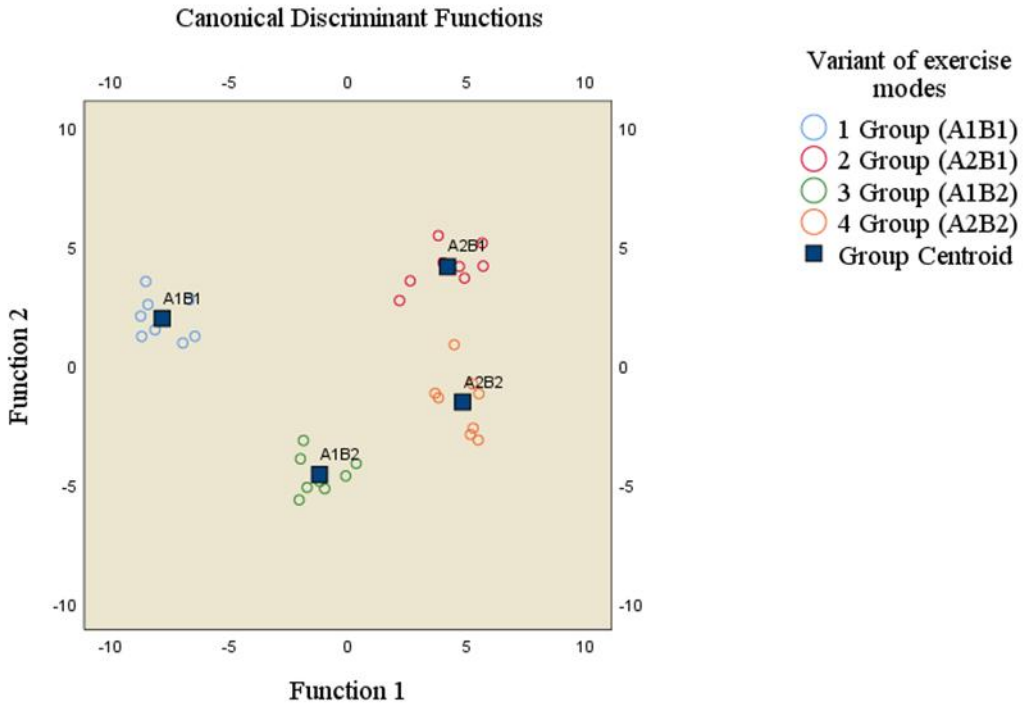

Figure 1. Graphic representation of classification results 9-year-old boys practicing kyokushinkai karate: 1 number of approaches 2, rest interval of 60 s; 2 number of approaches 4, rest interval of 60 s; 3 number of approaches 2, rest interval of 120 s; 4 number of approaches 4, rest interval of 120 s.

The results of classification confirm that 100% of the data were classified correctly (Table 9).

Table 9. Classification results (100% of original grouped cases correctly classified).

Criteria		Variant of exercise modes	Predicted group membership				Total
			A1B1	A2B1	A1B2	A2B2	
Original	Count	A1B1	8	0	0	0	8
		A2B1	0	8	0	0	8
		A1B2	0	0	8	0	8
		A2B2	0	0	0	8	8
	%	A1B1	100	0	0	0	100
		A2B1	0	100	0	0	100
		A1B2	0	0	100	0	100
		A2B2	0	0	0	100	100

4. Discussion

The discriminant analysis allowed us to interpret the difference between groups and classify objects according to the contribution of motor skills to the structure of motor fitness of 9-year-old boys engaged in kyokushinkai karate. These data confirm the effectiveness of using discriminant analysis to determine the structure of motor fitness [18-20] and the classification of fitness levels [21, 5, 22].

In a previous study [5], it was found that the results of learning the 'mae hiza geri chudan' kick in the structure of motor fitness in 8-year-old boys are an important element (91.9% impact). Our data demonstrate that the ability to perform the 'kin geri' kick technique in 9-year-old boys significantly depends on the results of training, anthropometric data, coordination abilities, speed and power indicators, and flexibility (66% influence).

The results obtained during the pedagogical experiment complement the knowledge about the importance of the influence of optimal load [9, 5] and the ability to control movements on the formation of motor skills [18, 11]. We confirm the opinion of the authors that the development of motor skills is a priority in the educational process [13, 14]. Optimization of physical exercise regimes is an important factor in increasing the effectiveness of programmed learning in the process of motor skill development [18, 11].

The knowledge that anthropometric and physiological variables can be important variables for categorizing athletes and identifying talent in the sports selection process has been expanded [21-23]. The results of previous studies on the development of motor abilities in boys karateka [24-26] and the need to include exercises to improve physical fitness in the training programs of movement techniques [15, 12, 27] were supplemented.

New data were obtained. We have created a discriminant model that classifies young athletes into one of four defined groups with the appropriate load (A1B1; A2B1; A1B2; A2B2) based on academic performance, anthropometric indicators, and data characterizing the level of motor ability development. Using the structure matrix, we determined which variables were most informative for student segmentation.

However, an important limitation of this model is the empirically confirmed argument that the results of general physical fitness tests are poorly correlated with TFVP results (28-37). This observation does not undermine the value of the methodological approach we used in this study. On the contrary, it can be an example of a complementary approach, which is the basic INNOAGON method [38-44], where struggle (and synonyms) is a key phenomenon explored by this new applied science.

5. Conclusions

The data obtained allow us to conclude that all tasks in the structure of the curriculum we have developed are related to the values of the first and second discriminant canonical functions. The analysis and structure of coefficients of the discriminant function indicate that in the process of formation of the motor skill 'kin geri' kick the priority is given to the results of training, anthropometric data, preliminary strength and coordination fitness, and flexibility. The effectiveness of training according to the program of algorithmic-type orders depends on the mode of performance of orthogonal variants of standard interrupted exercise.

Data Availability Statement: The data supporting this study's findings are available from the corresponding author upon reasonable request.

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