

## MODELING OF PHYSICAL FITNESS OF YOUNG KARATYST ON THE PRE BASIC TRAINING

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**Annotation.** *Purpose:* to develop a program of physical fitness for the correction of the pre basic training on the basis of model performance. *Material:* 57 young karate sportsmen of 9-11 years old took part in the research. *Results:* the level of general and special physical preparedness of young karate 9-11 years old was determined. Classes in the control group occurred in the existing program for your sports school Muay Thai (Thailand boxing). For the experimental group has developed a program of selective development of general and special physical qualities of model-based training sessions. Special program contains 6 direction: 1. Development of static and dynamic balance; 2. Development of vestibular stability (precision movements after rotation); 3. Development rate movements; 4. The development of the capacity for rapid restructuring movements; 5. Development capabilities to differentiate power and spatial parameters of movement; 6. Development of the ability to perform jumping movements of rotation. Development of special physical qualities continued to work to improve engineering complex shock motions on the place and with movement. *Conclusions:* the use of selective development of special physical qualities based models of training sessions has a significant performance advantage over the control group.

**Keywords:** modeling , young, karate sportsmen, physical, training, special.

### Introduction

It has been determined that in process of physical training it is necessary to solve the tasks, which are specific and characteristic for the given kind of sports [7, 8, 9]. In many works it has been proved that for junior karatekas to participate in competitions it is necessary to have certain level of special physical skills, ensuring qualified technical fitness [2, 4, 10]. Special physical qualities facilitate development of static and dynamic balance, accuracy of movements after rotations, maximal frequency of movements, reconstruction of motion functioning and coordination of movements, complexly coordinated kicks and blows. In karate there exists constant threat of knockout, that is why it is necessary to have high level of special physical fitness ensuring participation of sportsmen in competitions without any harm for personal health [1, 3, 10].

Many authors note that it is necessary to build system of sportsmen's training on the base of model characteristics of training and competition functioning [14-16, 18-20]. At the same time there are no model characteristics of junior karatekas' physical and technical fitness.

In our opinion correction of training process at stage of preliminary basic trainings of junior karatekas, based on model characteristics of training process, will facilitate quick forming of special movements' technique and its realization in competition functioning. That is why building of model characteristics of karatekas' general and special physical fitness at stage of preliminary basic training is an up-to-date and urgent problem.

### Purpose, tasks of the work, material and methods

*The purpose of this work* was working out of correction program for junior karatekas' physical fitness at stage of preliminary basic training on the base of model characteristics.

The research involved junior karatekas of 9-11 years old age, who were divided into 2 groups: experimental group (EG) – 30 persons and control group (CG) – 27 persons. CG karatekas were trained by traditional program for specialized CJSS – muai-thai (Thailand boxing), while EG sportsmen were trained by worked out by us program. Scope of training hours in both groups was equal (see table 1).

Table 1.

*Distribution of training hours for kinds of training (CG and EG)*

Kinds of training	Hours
Theoretical preparation	14
General physical training	106
Special physical training	142
Technical training	113
Tactic training	65
Integral training	88
Coache's and refereeing practice	10
Participation in competitions	As per plan
Medial examinations	As per schedule
Total	542

In our research we used the following methods: analysis and generalization of scientific literature, pedagogic observation, pedagogic experiment, testing, mathematical methods of research.

**Results of the research**

When working out of models of EG trainings we introduced certain corrections, oriented on development of special skills, characteristic for elements of karate technique. With working out of experimental program we considered specific motion abilities of a karateka:

- ability to keep static and dynamic balance;
- ability to reproduce movements with high accuracy after rotation that is ensured by good vestibular stability;
- ability to fulfill movements with high frequency (specific integral complexly coordinated and speed endurance);
- ability to quickly re-adjust and change movements (high mobility of nervous processes);
- ability to differentiate power and space-time parameters of movements;
- ability to fulfill complexly coordinated actions (jumps with rotations and etc.).

Important role of such motion psycho-motor abilities of karatekas for efficiency of sport functioning was proved by results of correlation and factor analysis [17].

Experimental program contains six blocks of training means, oriented on development of special physical skills and training to basic elements of karate techniques.

In first block we used exercises, oriented on development of static and dynamic balance. Great attention was paid to correct fulfillment of blow (kick) phase of movements and keeping balance after blow (kick).

Second block of trainings was oriented on development of movements' with rotation accuracy.

In third block of trainings, exercises were oriented on increasing of movements' frequency with preservation their technical and qualitative characteristics, i.e. on forming of specific endurance. Main scope of exercises included exercises, fulfilled in series and with change of direction that facilitated development of coordination and orientation – series of side kicks with motion in different certain directions.

The forth block of trainings was oriented on development of space and time parameters of movements that is the basis and facilitates kick and blow techniques in middle and upper levels.

In sixth block main attention was paid to complex jumps as well as fulfillment of double kicks (blows) in torso and double kicks (blows) in upper level.

The purpose of pedagogic experiment was comparing of results of our program and program of CJSS. Pedagogic experiment was carried out during one academic year (August 2009- June 2010).

Morphological-functional indicators of junior karatekas were evaluated as per commonly used methodic [5, 6], while SPF and GPF – by standards of physical fitness (Thae-quan do and aikido) [11, 12, 13].

In table 2 we present maximal indicators of physical condition of 9-11 years old karatekas.

Limitation of indicators of junior karatekas' physical condition is based on data of coaches' questioning, which witness that the rest morphological-functional indicators are of no significance in practice.

Analyzing results of studying of GPF we found positive shifts in all indicators in both groups, but rate of increment of physical skills' levels were different (see table 3).

Table 2.

*Some initial indicators of physical condition of 9-11 years old karatekas*

Indicators	EG (n=30)			CG (n=27)		
	M	σ	m	M	σ	m
Length of body (cm)	142.7	5.31	1.01	141.31	5.06	0.97
Mass of body (kg)	28.88	3.56	0.76	29.03	2.19	0.41
VCL (l)	2007.16	117.17	19.93	1986.7	121.3	21.45

Table 3.

*GPF indicators of junior karatekas before and after experiment*

Tests	Stage	EG (n=30)	CG (n=27)	t
30 meter run from low start (sec.)	Before	5.77±0.02	5.75±0.02	–
	After	5.48±0.04*	5.46±0.04*	3.6
Long jump from the spot (cm)	Before	163.9±1.3	164.4±1.0	–
	After	174.0±1.1*	168.4±1.1	4.0
High jump (cm)	Before	40.0±0.7	37.0±0.6	–
	After	45.8±0.7*	43.1±0.9*	2.45

Tests	Stage	EG (n=30)	CG (n=27)	t
Cross split (degrees)	Before	167.1±1.3	168.1±1.5	–
	After	175.2±1.1*	174.9±0.9*	0.21
Side split to the right (degrees)	Before	148.5±2.4	148.7±1.9	–
	After	157.8±2.2*	161.1±2.0*	1.13
Side split to the left(degrees)	Before	152.5±2.4	154.7±2.0	–
	After	163.3±1.8*	167.3±1.9*	1.53
6-minutes run (min)	Before	1032.2±7.6	1038.3±6.6	–
	After	1195.4±11.1*	1181.6±13.1*	0.81
Shuttle run 4x9 meters, (sec.)	Before	11.17±0.06	11.02±0.07	–
	After	10.93±0.06*	10.90±0.07*	6.39
Run on the spot for 10 sec (q-ty)	Before	36.4±0.4	36.6±0.4	–
	After	45.1±0.3*	43.4±0.1*	17.0
Jumps on the spot for 10 sec. (q-ty)	Before	17.3±0.2	17.4±0.2	–
	After	20.0±0.1*	18.5±0.2*	2.14
Jump with rotation to the right (degrees)	Before	318.7±7.1	318.9±7.6	–
	After	415.1±8.9*	386.1±6.0	2.71
Jump with rotation to the left (degrees)	Before	323.9±6.1	321.7±7.1*	–
	After	428.1±4.8*	371.1±6.8*	6.86
Right hand dynamometry (kg)	Before	15.03±0.2	15.00±0.2	–
	After	18.7±0.1*	16.56±0.3*	21.4
Left hand dynamometry (kg)	Before	14.40±0.2	14.26±0.2	–
	After	17.90±0.2*	16.70±0.1*	17.1
Reflex metering, (sec)	Before	0.190±0.003	0.190±0.002	–
	After	0.184±0.002	0.187±0.002	10.7

Notes: \* – ( $p < 0.05 - 0.001$ );  $t_{kp} = 2.0$ ;  $p < 0.05$

Materials of the research witness that in both groups the most significant changes were in such physical qualities as speed-power, endurance, frequency of movements, strength, coordination, but with different quantitative increment.

The highest increment in EG was in tests “jumps with rotation to the right and to the left” (see fig.1).

Significant increment in EG is observed in such indicators as: high jump from the spot - by 21.3%, run on the spot for 10 sec. – by 20%, right hand dynamometry – by 13.3%, left hand dynamometry – by 17.4%. 6 minute run – by 15.8%.

Insignificant but confident rates of increment were determined in such indicators: 30 meters run (5%), long jump from the spot (6.1%), cross split (1.8%), side split to the right and to the left (7% and 6.3%), shuttle run 4x9 meters (2.4%), jumps on the spot for 10 sec (10.2%), reflex metering (1.6%).

In control group rates of increment of GPF indicators in most cases were a little lower than indicators in EG.

For example the highest rates of GPF indicators' increment were in such tests: high jump from the spot (21.2%). Right and hand dynamometry (17.1% and 17.6%), jumps with rotation to the left and to the right (15.3% and 15.4%). Rather expressed trend to increment was in CG in 6 minutes run (distance 150.4 meters) – by 14.5%.

Less significant but confident were rates of increment in such indicators of CG: 30 meters run (5%), long jumps from the spot (5,6%), side split to the left and to the right (8,4% and 8,1%), jumps on the spot for 10 sec. (8,5%).

When analyzing GPF testing results we determined that all indicators had positive trend to changes. By data of materials of the research (see table 4) we can see that both in EG and CG most of indicators had statistically confident changes. Alongside with it in CG these changes were not very significant.

In EG the highest increment is observed in tests for static balance on right and left legs (see fig.2) by 30.83 and 29.95 sec as well as dynamic balance by right and left legs – by 36.26 and 37.12 sec.

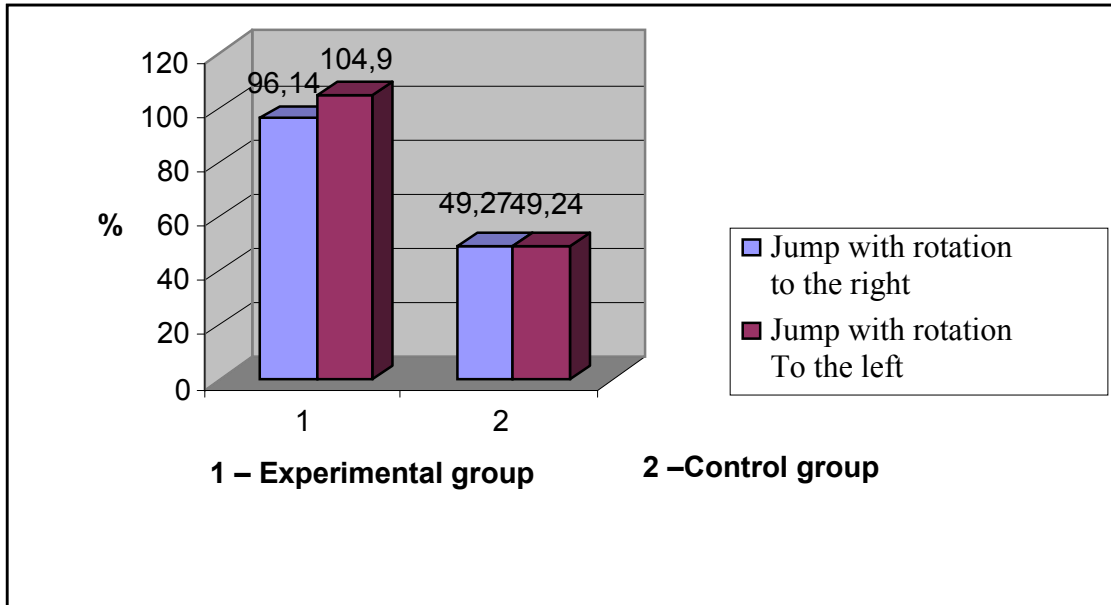


Fig. 1. Level of increment of jump with rotation indicators

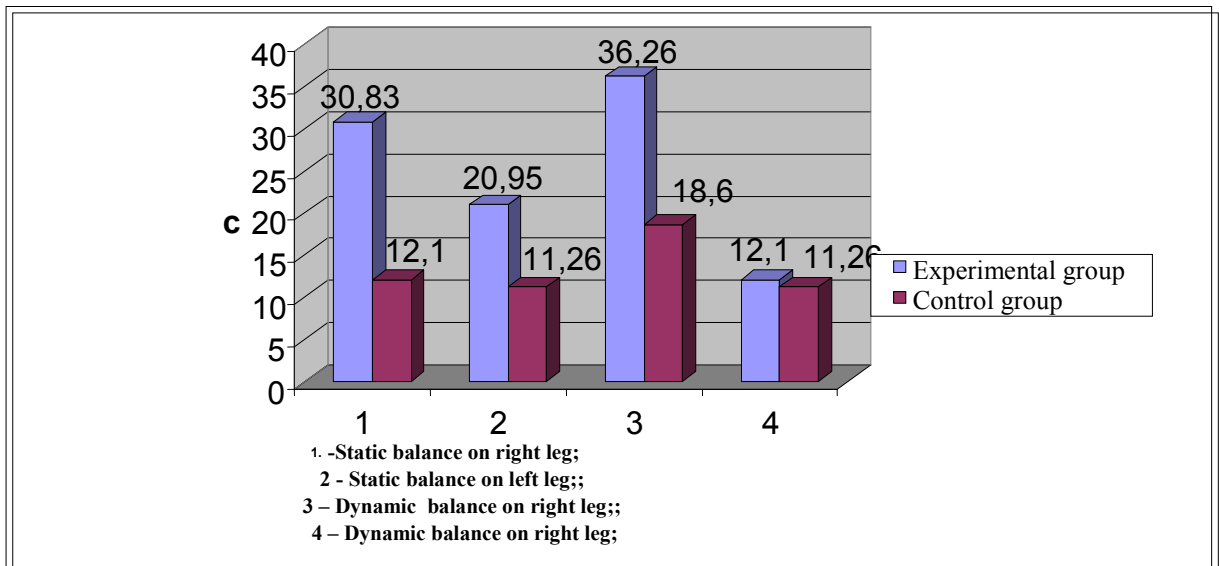


Fig.2. Indicators of static and dynamic balance

Expressed rates of increment of EG indicators were registered in the following tests: 5 side right and left kicks in upper level - (22.5% and 21.3%), right and left side kicks in middle level (17.2% and 19.3%), two blows in chest and abdomen (11.7% and 12.2%).

Table 4.

GPF indicators of junior karatekas before and after experiment

Tests	Stage	EG (n=30)	CG (n=27)	t
Static balance on right leg (sec.)	Before	12.67±0.24	12.71±0.23	–
	After	43.5±1.89*	24.81±0.94*	8.9
Static balance on left leg (sec.)	Before	22.98±1.05	22.93±0.88	–
	After	43.93±1.52*	34.19±1.09*	5.4
Dynamic balance on right leg (sec.)	Before	8.55±0.24	8.75±0.27	–
	After	44.81±1.55*	27.25±1.16*	4.69

Tests	Stage	EG (n=30)	CG (n=27)	t
Dynamic balance on left leg (sec.)	Before	9.90±0.59	10.04±0.37	–
	After	47.02±1.84*	30.72±1.19*	7.47
Five side kicks with ball of right foot in upper level (sec.)	Before	6.68±0.11	6.74±0.15	–
	After	8.18±0.12*	6.14±0.13*	14.57
Five side kicks with ball of left foot in upper level (sec.)	Before	6.99±0.16	7.04±0.13	–
	After	8.50±0.11*	6.53±0.14*	14.07
Five side kicks with ball of right foot in middle level (sec.) 10 sec., (q-ty)	Before	16.5±0.2	16.5±0.2	–
	After	19.3±0.2*	19.4±0.2*	0.1
Five side kicks with ball of left foot in middle level (sec.) 10 sec., (q-ty)	Before	15.8±0.2	15.5±0.2	–
	After	18.2±0.2*	18.5±0.2*	0.32
Double blow by arms: front arm blows in chest, rear arm blows in abdomen for 10 sec (q-ty)	Before	8.7±0.2	8.8±0.2	–
	After	10.2±0.1*	10.1±0.2*	0.45
The same, but 5 combinations (sec.)	Before	8.14±0.3	8.09±0.27	–
	After	7.36±0.17*	7.48±0.13*	0.7
Double blow and one kick in middle level, 5 combinations (sec.)	Before	15.14±0.09	15.09±0.1	–
	After	12.7±0.07*	12.9±0.09*	1.8
Attack-counter-attack (sec.)	Before	5.14±0.09	5.17±0.07	–
	After	4.16±0.07*	4.72±0.08*	56

Notes: \* – ( $p < 0.05 - 0.001$ );  $t_{kp} = 2.0$ ;  $p < 0.05$

Insignificant rates of increment of GPF in EG group were registered in one test “attack-counter-attack” (6.5%) that, probably is connected with high initial result. In control group rates of increment of GPF testing were lower than in experimental group (see table 4) excluding test “side kicks in middle level.

The highest increment of tests’ results was registered also in tests dynamic balance on right and left legs – by 15.8 and 20.6 sec. and static balance on right and left legs – by 12.1 and 11.26 sec. Rather expressed rates of indicators’ increment were observed in right and left side kicks in middle area for 10 sec (17.5% and 19.1%). The least rates of increment were registered in tests for accuracy of kicks after rotation, attack-counter-attack that witness about relatively high initial data.

The worked out models of trainings ensured, thus, significant increment of GPF and SPF indicators.

The highest scope of special exercises EG sportsmen fulfilled on specially prepared stages (involving, basic, pre-competition) and to less extent – in competition micro-cycles.

In annual macro-cycle we used the following schema:

1. Exercises, oriented on development of static and dynamic balance were used in preparatory micro-cycles. They were oriented on selective development of special physical skills.

2. Exercises for accuracy of movements after rotations were used in general and special-preparatory periods and were oriented on consolidation and perfection of movements’ technique.

3. Exercises for frequency of movements were used in special-preparatory period (about 30%) and in competition period (about 18%). They were oriented on fulfillment of series of side kicks on the sport and in motion.

4. Exercises for dynamic and space parameters of movements were fulfilled in general preparatory stages (about 40%) and on special stages (about 30%) and were oriented on perfection of technique of combined side kicks and blows in chest and abdomen.

5. Exercises for reconstruction of movements were used mainly in main and competition periods for perfection of attacks and counter attacks.

6. Exercises for complex jumps were used in main and special-preparatory periods. These exercises were oriented on perfection offside and rotating kicks in complex jumps.

All offered exercises were fulfilled considering certain amplitude of movements, accuracy, temp and rhythm. Alternation of load and rest during fulfillment of series of exercises were planned so that organism of junior sportsmen could recreate before fulfillment of the next series.

Thus, quantitative characteristic of GPF and SPF levels showed that application of trainings' models ensured achievement of the highest level of physical fitness in comparison with existing program of CJSS [10].

**Conclusions:**

1. Analysis of special literature, our researches permit to determine required direction of training process for optimization of system of junior karatekas' training.
2. Working out of model training programs shall be based on laws of organism systems' adaptation to physical loads.
3. Introduction of specially selected exercises permits to qualitatively influence on general and special physical fitness of junior karatekas.

The prospects of further researches imply working out of computer programs on the base of model characteristics of physical fitness on all stages of sportsmen's training.

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