

## DEVELOPMENT OF SPECIAL ENDURANCE OF AIKIDOISTS AT THE TRAINING STAGE OF AIKIDO TRAINING

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The authors revealed the problem of insufficient intensity of performing basic aikido techniques in Aikido examinations due to the insufficient level of development of special endurance of aikidoists. The article considers the potential of the development of endurance in the physical education of aikidoists at the training stage of aikido training. Recommendations on the development of endurance to improve the effectiveness of aikido techniques performance are offered. As a result of the experiment it was established that the effectiveness of technical and physical training of aikidoists engaged in the training on the method of development of special endurance has increased.

**Keywords:** *aikido, endurance, improving the effectiveness of techniques performance.*

**Relevance.** The appropriate level of endurance in athletes in all martial arts allows them to perform movements and techniques without loss of intensity or effectiveness. Unfortunately, aikido instructors and their club supervisors do not pay proper attention to the development of endurance in classes, arguing that aikido practitioners should develop endurance in their free time. There are also no specific techniques for developing endurance for aikido practitioners. Aikido masters advise jogging in the morning, which they believe is enough, but when passing the next belt exam, the examiner suffices only for the first part of the exam on improving technical proficiency, and then their intensity and effectiveness of techniques drops sharply.

In this regard, it will be advisable to include in the training process of aikidoists exercises for the development of general and special endurance. This will ensure not only a faster recovery of the athlete, but will also contribute to improved performance and efficiency of technique performance.

In Japanese martial arts, sparring is called “randori”. In most aikido styles, “randori” is a type of training in which one aikido player defends himself against several attackers [5]. Performing counter techniques requires a wide scope of special expertise for understanding which technique one should apply, as well as a high level of flexibility to adjust to the attacker’s strength, then to occupy his point of gravity and finish the technique [1,2,3]. But when a training session, exam, or “randori” takes too long, an aikido athlete requires stamina to reduce or eliminate the loss of effectiveness and intensity when performing aikido techniques.

The characteristic feature of “randori” is the constantly changing intensity of technical maneuvers

and a large number of opponents. Stamina in this aikido practice depends not only on the overall energy reserves of the aikidoist, but also on how quickly his physical capacities are restored. It is also worth noting that due to the high flexibility, the technique becomes more energy-efficient, which means fewer efforts are spent and, therefore, the intensity of performing techniques increases [2].

**Organization and methods of research.** The analysis of the next belt examinations and demonstration performances at aikido festivals has revealed that the physical preparation of aikidoists performing on the 5—3 kyu program requires improvement.

To determine the optimal regime of the training process aimed at the development of general and special endurance, we conducted an experiment that lasted twelve weeks. The study was conducted on the basis of the club “Anshinkai Dojo”, Elektrostal (Moscow region).

Boys aged 12—14 took part in the pedagogical experiment. A number of motor tests to determine the level of development of general and special endurance were conducted on aikido athletes. According to test results, two groups were formed (15 boys — control group and 15 boys — experimental group), relatively homogeneous in composition and level of fitness.

The control group was trained according to the Aikido program, accepted in sports schools of the given specialization, and the experimental group was trained according to a special method developed by the authors for the development of special and general endurance. Both groups trained 4 times a week for 2 hours each. The experimental methodology involved the aikido athletes of the experimental group

performing specially designed exercises at the end of each training session. In all, there were seven tasks in one series of exercises. Rest intervals were 1 minute between series. At the beginning of the experiment, the number of series was three, and by the end of the experiment, the participants were easily completing four or five series of exercises. After circular training, aikido players of the experimental group performed sets of exercises aimed at developing the flexibility of the muscular corset and mobility of the joint-ligament apparatus, due to the fact that the development of this physical quality allows for more energy-efficient movement, resulting in lower force exertion during the technical techniques performance [3].

Tasks performed by aikidoists:

1. Plank (30 sec)
2. "Invisible chair" (30 sec)
3. Push-ups (30 sec)
4. Mae-ukemi and ushiro-ukemi (30 sec)
5. Striking with the bokken (shomen)
6. Torso lifts (30 sec)
7. High safe landing (30 sec)

In order to further improve technical proficiency, aikido practitioners must systematically and repeatedly perform the compulsory program techniques to improve technical proficiency in the martial art of aikido [4]. In order to identify the impact of the experimental technique on the speed and overall endurance of aikidoists training stage tests were conducted (Table 1—4).

### The results of the study and their discussion.

The above tables show the data that demonstrate changes in the indicators of general and special endurance in athletes of the control and experimental groups before and after the pedagogical experiment.

At the end of the experiment, aikido athletes of both groups were tested to examine the increase in the studied indicators (Table 5).

Analyzing the increase in the indicators of special physical training, we see an increase in quantitative indicators in both groups in the control exercises. The experimental group's time performance on the running tests decreased, while the other indicators, where the largest number of repetitions must be performed in one minute, increased. This suggests that the experimental technique contributes to an increase in special and general endurance.

### Conclusions:

1. The training process in aikido at the training stage of training should be based on the involvement of new techniques aimed at increasing the level of endurance development. The proposed methods showed high efficiency in the subjects of the experimental group. According to the data of control tests, we see a marked increase in the performed bokken strokes of the experimental group by 7,53 strokes, while in the control group there was only 0,47 strokes increase.

Table 1

### The results of testing aikidoists of the control group before the experiment

Full name	Control exercises							
	Shuttle run 3×10	Running 1,5 km	Running 400 m	Push-ups (1 min)	Ukemi (1 min)	Striking with the bokken (shomen) (1 min)	Torso lifts (1 min)	Tobi- ukemi (1 min)
B-i	9,3	8,52	1,53	31	26	42	38	17
B-r	9,2	8,48	1,48	30	21	44	41	17
D-m	9,4	8,39	1,45	27	20	41	40	16
Z-m	8,7	8,25	1,42	33	33	51	50	20
K-v	8,9	8,27	1,49	29	25	44	45	19
K-d	8,2	8,02	1,57	32	26	49	38	18
M-s	9,4	8,35	1,49	27	24	43	34	19
M-m	8,9	7,55	1,38	37	34	52	51	24
M-i	9,4	8,53	1,58	28	25	43	40	21
R-m	9,3	8,52	1,56	36	26	45	39	18
F-m	8,5	8,27	1,48	31	28	51	53	20
Kh-e	8,8	8,39	1,53	26	27	48	43	19
Ch-i	8,7	8,45	1,58	31	25	47	42	19
Sh-n	8,4	8,35	1,50	32	34	53	45	24
Sh-d	9,6	8,58	1,59	28	27	43	32	17
<b>Average value</b>	<b>8,98</b>	<b>8,33</b>	<b>1,51</b>	<b>30,53</b>	<b>26,73</b>	<b>46,40</b>	<b>42,07</b>	<b>19,20</b>

Table 2

## The results of testing aikidoists of the control group before the experiment

Full name	Control exercises							
	Shuttle run 3×10	Running 1,5 km	Running 400 m	Push-ups (1 min)	Ukemi (1 min)	Striking with the bokken (shomen) (1 min)	Torso lifts (1 min)	Tobi- ukemi (1 min)
B-a	8,9	8,55	1,41	32	26	43	41	20
G-n	9,1	8,32	1,42	30	27	42	38	17
K-ya	9,4	9,01	1,49	29	20	50	38	17
K-m	8,7	8,44	1,42	31	31	48	40	21
K-v	8,9	8,51	1,48	28	24	49	45	21
K-n	8,4	8,24	1,54	33	26	50	41	20
M-v	9,4	8,35	1,47	29	22	47	34	19
N-v	9,5	8,39	1,52	37	31	44	39	16
P-m	9,4	8,42	1,57	28	30	47	40	18
P-a	9,3	8,37	1,59	34	25	49	40	19
S-t	8,5	8,04	1,49	29	29	52	53	20
Kh-m	8,8	8,27	1,55	25	24	49	42	21
Sh-g	8,7	7,56	1,33	37	33	52	51	24
Sch-a	8,4	7,59	1,45	29	34	51	50	23
Yu-e	9,6	8,35	1,44	26	28	48	46	17
<b>Average value</b>	<b>9,00</b>	<b>8,29</b>	<b>1,48</b>	<b>30,47</b>	<b>27,33</b>	<b>48,07</b>	<b>42,53</b>	<b>19,53</b>

Table 3

## The results of testing aikidoists of the control group before the experiment

Full name	Control exercises							
	Shuttle run 3×10	Running 1,5 km	Running 400 m	Push-ups (1 min)	Ukemi (1 min)	Striking with the bokken (shomen) (1 min)	Torso lifts (1 min)	Tobi-ukemi (1 min)
B-i	9,1	8,51	1,52	32	26	43	38	17
B-r	9,1	8,45	1,46	33	25	45	41	18
D-m	9,3	8,34	1,45	27	20	43	40	17
Z-m	8,7	8,24	1,42	33	33	51	50	20
K-v	8,8	8,29	1,46	29	25	44	45	19
K-d	8,2	7,59	1,48	32	26	49	38	18
M-s	9,2	8,31	1,47	27	24	44	37	19
M-m	8,9	7,55	1,37	37	34	52	51	24
M-i	9,1	8,5	1,54	28	25	44	40	21
R-m	9,3	8,45	1,54	36	26	45	39	18
F-m	8,5	8,27	1,48	31	28	51	53	20
Kh-e	8,8	8,39	1,53	26	28	48	43	19
Ch-i	8,7	8,44	1,55	31	26	47	42	19
Sh-n	8,4	8,35	1,50	32	34	53	45	24
Sh-d	9,6	8,52	1,56	28	27	44	36	17
<b>Average value</b>	<b>8,91</b>	<b>8,28</b>	<b>1,49</b>	<b>30,80</b>	<b>27,13</b>	<b>46,87</b>	<b>42,53</b>	<b>19,33</b>

2. A targeted increase in the total number of exercises aimed at the development of aikido endurance has a positive effect both on the quality of technical skills and on the level of their functional preparedness for training loads. According to the indicators of rolls (mae-ukemi

and ushiro-ukemi) in the experimental group, their number increased by 4.94, and in the control group by only 0.4. This allows us to conclude that the intensity and efficiency of movements was preserved in the aikido athletes of the experimental group.

Table 4

## The results of testing aikidoists of the experimental group after the experiment

Full name	Control exercises							
	Shuttle run 3×10	Running 1,5 km	Running 400 m	Push-ups (1 min)	Ukemi (1 min)	Striking with the bokken (shomen) (1 min)	Torso lifts (1 min)	Tobi-ukemi (1 min)
B-a	8,4	8,04	1,29	39	35	49	45	20
G-n	8,6	8,21	1,38	34	33	51	42	20
K-ya	8,7	8,31	1,39	33	36	54	40	20
K-m	8,3	8,23	1,34	37	33	51	45	21
K-v	8,4	8,36	1,44	35	30	56	47	21
K-n	8	8,14	1,23	36	26	57	44	20
M-v	8,4	8,22	1,27	33	22	59	40	20
N-v	8,5	8,19	1,43	37	31	59	46	20
P-m	8,4	8,19	1,44	31	30	55	44	20
P-a	8,5	8,30	1,51	36	31	56	45	21
S-t	8,2	7,56	1,35	35	32	57	55	20
Kh-m	8,8	8,01	1,43	38	30	54	48	21
Sh-g	7,9	7,49	1,23	47	42	65	59	24
Sch-a	8	7,56	1,31	36	39	57	53	24
Yu-e	8,5	8,18	1,34	34	34	54	47	19
<b>Average value</b>	<b>8,37</b>	<b>8,07</b>	<b>1,36</b>	<b>36,07</b>	<b>32,27</b>	<b>55,60</b>	<b>46,67</b>	<b>20,73</b>

Table 5

## Comparative analysis of the indicators of special physical training in aikidoists of the control and experimental group after the experiment

Control exercises	Test group		P
	CG	EG	
Shuttle run 3×10	8,91 ± 0,1	8,37 ± 0,07	P ≤ 0, 05
Running 1.5 km.	8,28 ± 0,08	8,07 ± 0,07	P ≤ 0, 05
Running 400 m	1,49 ± 0,01	1,36 ± 0,02	P ≤ 0, 05
Push-ups (1 min)	30,80 ± 0,85	36,07 ± 0,95	P ≤ 0, 05
Mae-ukemi and ushiro-ukemi (30 sec)	27,13 ± 1,00	32,27 ± 1,25	P ≤ 0, 05
Striking with the bokken (shomen) (1 min)	46,87 ± 0,91	55,6 ± 1,00	P ≤ 0, 05
Torso lifts (1 min)	42,53 ± 1,37	46,67 ± 1,38	P ≤ 0, 05
High safe landing (tobi-ukemi) (1 min)	19,33 ± 0,57	20,73 ± 0,37	P ≤ 0, 05

3. When applying circular training, aikido trainees increased the indicators of special endurance, which has a significant effect on the physical fitness of aikidoists. Due to this, in the future young aikidoists will be able to improve their technical skills and master more complicated techniques, maintaining the intensity and efficiency of the execution of techniques.

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## PHYSICAL CULTURE. SPORT. TOURISM. MOTOR RECREATION

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### Развитие специальной выносливости айкидоистов на тренировочном этапе подготовки

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Выявлена проблема недостаточной интенсивности выполнения базовой техники айкидо на технических экзаменах в связи с недостаточным уровнем развития специальной выносливости айкидоистов. В статье рассмотрена возможность развития выносливости в физическом воспитании айкидоистов на тренировочном этапе подготовки. Предложены рекомендации по развитию выносливости для повышения эффективности техники айкидоистов. В результате проведенного эксперимента установлено повышение эффективности технической и физической подготовки айкидоистов тренировочного этапа подготовки, занимающихся по методике развития специальной выносливости.

**Ключевые слова:** айкидо, выносливость, повышение эффективности технических действий.

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