



Features of technical improvement of wrestlers at the initial training stage

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Abstract. The level of modern judo development puts forward increased requirements for the general preparation of athletes and its individual components at all stages of long-term training. Special attention is paid to the improvement of the training process at the stage of initial training, which makes it possible to identify promising directions that determine the effectiveness of training wrestlers in techniques. The purpose of the study is to determine the effectiveness of the application of the game method of training in the process of technical improvement of judokas at the stage of initial training. The dynamics of indicators were studied, which ranged from 10% to 66.6% for general physical fitness, from 12.6% to 27.8% for special physical fitness, 12.9-37.5% for technical training, and 13.3% for general physical fitness, for which a pedagogical experiment was used, testing indicators of general and special physical and technical fitness as well as assessment of the level of general physical fitness. Thirty judokas, aged 10-12, took part in the study. Of them, 15 were part of the experimental group, and 15 were part of the control group. An experimental training programme with the use of special educational games was proposed, which contributed to the development of the necessary specialised qualities and the mastery of the basic techniques of judo. The games were divided into several groups depending on the task (games with “touching the opponent”, “blocking grip”, and “attacking grip”). The positive influence of game exercise complexes in studying and improving the technique of judo techniques was revealed, which contributed to the significant optimisation of general and special physical fitness and the general physical performance of athletes' bodies. A comparative analysis of the dynamics of the studied indicators allowed to state that the athletes of the experimental group, who used an experimental training programme using special educational games, had better results compared to the control group. The practical value of the research lies in the recommendation of the introduction of experimental game methods for improving technical training in judo in the system of multi-year sports improvement, namely, at the stage of initial training

Keywords: judo; training process; physical preparation; motor qualities; working capacity

Introduction

The expediency of improving the educational and training process in many types of wrestling, in particular judo, is determined by the need for further modernisation of the training of the sports reserve, the development of judo on the international sports arena, changes in the requirements

for the preparation and proper level of health of judoka wrestlers, and changes in the material and economic working conditions. One of the most important factors determining the success of athletes is a high-quality training method at all stages of the multi-year sports process. Often,

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some components of training and competitive activities, most often significant at the level of the highest sportsmanship, are not given sufficient attention at the stages of initial, preliminary basic, specialised basic training, and the stage of preparation for higher achievements. Therefore, when building a training system and creating an appropriate functional foundation at these stages, it is necessary to focus on those components that ensure success at the level of the highest sports achievements.

The systematic process of developing technical mastery in sports wrestling from the beginning of sports to reaching the level of higher achievements should be based on the basic principles of general didactics adapted to judo as well as on a number of special principles of sports training (Principles of judo, n.d.). According to the researcher V. Manolaki (2020), it is reliance on these principles that determines the effectiveness of the process of multi-year improvement of athletes in relation to both the process of developing sportsmanship as a whole as well as to individual aspects of preparedness (technical, physical, psychological, tactical) or individual movement qualities of athletes in sports wrestling. Since 2010, ideas about the peculiarities of sports training in wrestling have changed significantly. This is connected with the successful performances of Ukrainian wrestlers at international competitions, changes in the Olympic selection systems, and the rapid development of scientific research in modern sports, as O.R. Zadorozhna *et al.* (2023) noted in their article. The active developments of specialists such as M. Chobotko (2018) in the field of sports training indicate that in the system of multi-year improvement, the systematic preparation of sports reserves at the stage of initial training at the level of modern requirements is an essential reserve for increasing its effectiveness. From the point of view of a systemic approach, the training process is multifaceted and long-lasting and is also characterised by modern high sports and technical requirements, so an athlete needs years of persistent, purposeful training to achieve high results at the further stages of multi-year sports training.

Some authors note that when forming a school of judo techniques, not only traditional teaching methods but also innovative methods are important in the learning process. V. Melnyk & A. Dyachenko (2018) suggest using exercise ball exercises when learning throws. It is shown that the developed set of exercises with an exercise ball contributed to the effective and correct execution of a set of techniques, in particular sparring for off-balance, throwing and landing the opponent, interaction during the work of body parts of athletes, etc. As M. Chobotko (2018) notes in his research, at the initial stage of learning techniques, one of the leading physical qualities is dexterity, which is effectively developed through games. It is this game technique that allows you to develop spatial orientation, coordination of movements, and interaction with objects and other athletes during games. In the article by scientists O. Bekas *et al.* (2019), they examine the issue of changes in the training process of 10-12-year-old judokas in the context of a differentiated approach that is based on the constitutional characteristics of athletes, taking into account the sensitive periods of development of individual movement qualities. The peculiarities of the body structure of young athletes and specific somatotypes were studied, which formed the

basis of the distribution of young judokas by somatotypes in order to create differentiated training programs. This made it possible to differentiate the level of development of general and special physical qualities and manage the training process of young judokas. In this regard, it is relevant to solve a scientific and practical task related to the further improvement of the content of technical training for athletes in the second year of training at the initial training stage in judo using the game method, which was the goal of this study.

Materials and Methods

Thirty young judokas, in their second year of training at the stage of initial training, were involved in the study; 15 of them were part of the experimental group and 15 were part of the control group. All of them are pupils of the Municipal Institution "Regional Specialised Children's and Youth Sports School of the Olympic Reserve in Freestyle Wrestling and Judo" of Zaporizhzhia Regional Council, Zaporizhzhia, Ukraine. The age of athletes at the time of the beginning of the study was 10-12 years. The athletes had no contraindications to judo classes and had an appropriate state of health. All participants and their parents gave written consent to conduct the study and were informed about the purpose and methodology of the study, as well as the possibility of withdrawing consent at any time for any reason. The requirements of the Declaration of Helsinki (2013) were followed. During September 2021 to February 2022, an experimental training programme using special educational games was introduced into the educational and training process of judokas in their second year of training at the stage of initial training.

The experimental programme contained game-oriented training tasks that contributed to the development of the necessary specialised qualities and the mastery of the basic techniques of judo. The games were divided into several groups depending on the tasks. The first group included games involving "touching the opponent". These game exercises provide an opportunity to play various options for manoeuvring on a minimal area and the trajectory of entrances into attacking tackles. The second group included games with a "blocking grip", which involve playing a release from blocking grips and stops, which is one of the main obstacles to making a reception. The third group includes games with "attacking grip", in which practical skills and skills in the technique of different types of grips are formed. It is the capture that is the most important tactical and strategic part of the match, where judokas show significant muscle tension, especially the muscles of the hands. Therefore, the exercises that were included in the games were used as training tools for speed and strength. The difference in the application of the programme for both groups of athletes was the use of the above-mentioned games during the entire training session in the experimental group and in the control group only in the preparatory part of the training. Classes in both groups were held 3 times per week with a duration of 90 minutes. The effectiveness of the application of the game method of training in the process of technical training of judokas of the second year of training at the stage of initial training was determined by the results of tests for determining the level of general and special physical and technical readiness recommended by

the curriculum of the Children's and Youth Sports School (Aleksiev *et al.*, 2019) and wrestling specialists (Kamaiev *et al.*, 2019; Gheorghiu, 2023).

The speed and strength qualities of the athletes were determined using the "long jump from a standing position" and "dynamometry of the right and left hands". To assess the strength and endurance of the muscles of the arms and shoulder girdle, the tests "pull-ups", "flexion and extension of the arms in the supine position", and "rope climbing" were used. In the course of the study, the dynamics of the development of coordination abilities were also analysed, which were measured using the test "forward somersault in a group from acceleration", which was evaluated in points. The assessment of the level of general physical capacity was determined by the index of the Harvard step test (*IHST*). The test consisted of climbing a step 35 cm high with a frequency of 30 times per minute (each climb was performed for 4 counts). The duration of the test (*t*) is 3 min. After exercising in a sitting position, the subject's heart rate was measured after an interval of 1 min-1 min 30 s (P_1), 2 min-2 min 30 s (P_2), and 3 min-3 min 30 s (P_3) during the recovery period. The *IHST* was calculated according to the formula:

$$IHST = (t \times 100) / (P_1 + P_2 + P_3) \times 2. \quad (1)$$

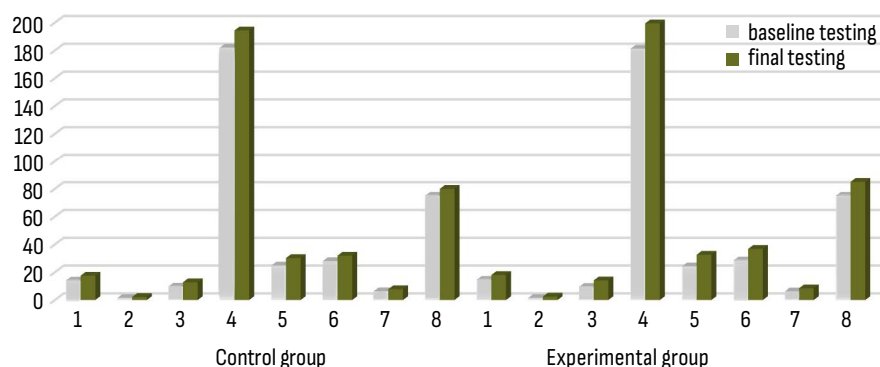


Figure 1. Dynamics of indicators of general physical training and physical capacity of wrestlers

Note: 1 – flexion and extension of the arms in the supine position, number of times; 2 – rope climbing, number of times; 3 – pull-ups, number of times; 4 – long jump from a standing position, cm; 5 – dynamometry of the right hand, kg; 6 – dynamometry of the left hand, kg; 7 – forward somersault in a group from acceleration, points; 8 – *IHST*

Source: made by the authors

However, at the end of the experiment, the level of physical qualities in both groups increased, but significantly more in the experimental group. The level of speed and strength qualities improved in the experimental group by 10% and in the control group by 7.2%. The level of muscle strength development (dynamometry of the right and left hands) also increased and amounted to 34.7% and 29.5% in the experimental group, and 21.1% and 13.9% in the control group. According to the assessment of the strength and endurance of the muscles of the arms and shoulder girdle, it was established that positive changes occurred in both groups, but the best result was in the experimental group: the result in the pull-ups in the experimental group improved by 50%; flexion and extension of the arms in the supine position improved by

The value of the index was evaluated according to the following functional classes: low (less than 55); below average (56-64); average (65-79); above average (80-89); excellent (more than 90) (Krutsevych *et al.*, 2011). To measure the dynamics of indicators of special physical qualities of wrestlers in the control and experimental groups, the following exercises were used: "Getting up in the 'bridge' from a standing position for 30 s", "Sharp lifting of the legs in 15 s", "Running with legs around the head to the left and right in 15 s". To analyse the level of technical preparation of wrestlers in the training process, the following indicators were evaluated: fighting activity; turns on an unresisting opponent; turns on rubber; throwing a training dummy with deflection; performing techniques on an opponent who does not resist; effectiveness of techniques.

Results

To determine the effectiveness of the experimental training programme with the use of special educational games, the dynamics of indicators of general, special physical, and technical preparedness, as well as the general physical work capacity of judokas during the study period, were determined. At the beginning of the study, there was no probable difference between the indicators of the general physical fitness of the wrestlers in the experimental and control groups (Fig. 1).

24.14%; rope climbing improved by 66.67%; and in the control group by 33.3%, 25%, and 46.67%. It was established that the performance quality of the forward somersault in a group from acceleration to assess the dynamics of the development of coordination abilities increased, but in the experimental group it was significantly higher – by 35.5% – and in the control group by only 23.8%. When analysing the results of the testing of general physical working capacity (*IHST*), it was found that this indicator is higher in the experimental group than in the control group. Although the *IHST* indicators in both groups at the beginning of the experiment were the same, at the end of the study, the level of general physical performance in the experimental group improved by 13.33% and in the control group by only 6.67%.

To increase the level of technical preparation, specific exercises were used in the training process of wrestlers, which were included as elements of educational games, with the help of which it is possible to effectively influence the improvement of the functioning of the athlete's body

systems in relation to the requirements of the chosen sport. Analysis of the dynamics of indicators of special physical fitness revealed that at the end of the study, the judokas observed an improvement in these indicators according to the results of all the proposed tests (Table 1).

Table 1. Dynamics of indicators of special physical qualities of wrestlers in the control and experimental groups at the beginning and end of the experiment

Special exercises	Group	Start of the experiment	End of the experiment	%
Getting up in the "bridge" from a standing position for 30 s, number of times	E	6.1 ± 0.12	7.8 ± 0.25*	27.8
	C	6.5 ± 0.41	7.5 ± 0.38	15.4
Sharp lifting of the legs in 15 s, number of times	E	12.1 ± 0.56	15.4 ± 1.23*	27.3
	C	12 ± 0.54	14.8 ± 1.57*	23.3
Running with legs around the head to the left in 15 s, number of times	E	5.2 ± 0.71	6.4 ± 0.74	23.1
	C	5.2 ± 0.71	6.2 ± 0.88	19.2
Running with legs around the head to the right in 15 s, number of times	E	5.15 ± 0.62	5.8 ± 1.02	12.6
	C	5.1 ± 0.60	5.7 ± 0.98	11.8

Notes: E – experimental group; C – control group; * – the difference between indicators is probable at $p < 0.05$

Source: made by the author

In the experimental group, the indicators that characterise the specific qualities of wrestlers improved by 12.6–27.8%, and in the control group, they were somewhat lower, from 11.8% to 23.3%. Technical preparation is the basis of the skill of wrestlers, determining in many ways their ability to achieve victory over their opponents. With the correct organisation of the training process for wrestlers, not only

their physical fitness but, to an even greater extent, their technical skill should steadily increase. It should be noted that when the level of development of general and special physical fitness of young wrestlers in the experimental and control groups improved, the level of technical fitness also increased, but a higher level was observed, again, in the experimental group (Table 2).

Table 2. Dynamics of indicators of technical readiness of wrestlers in the control and experimental groups at the beginning and at the end of the study

Indicators of technical readiness	Group	Start of the experiment	End of the experiment	%
Fighting activity	E	12.7 ± 1.55	15 ± 1.60	18.1
	C	12.8 ± 1.31	13.7 ± 1.44	7.0
Turns on an unresisting opponent, 30 s	E	11 ± 0.95	13.5 ± 1.23	22.7
	C	12 ± 0.89	13.2 ± 0.87	10.0
Turns on rubber, 30 s	E	10 ± 1.02	11.5 ± 1.11	15.0
	C	10 ± 0.63	10.8 ± 0.65	8.0
Throwing a training dummy with deflection, 30 s	E	8 ± 0.51	11 ± 0.86*	37.5
	C	9 ± 0.67	10.8 ± 0.85	20.0
Performing techniques on an opponent who does not resist, 30 s	E	9 ± 0.65	11.5 ± 1.02*	27.8
	C	9 ± 0.72	10.8 ± 0.79	20.0
Effectiveness of techniques, points	E	3.1 ± 0.21	4.5 ± 0.36*	12.9
	C	3.15 ± 0.32	3.4 ± 0.51	7.9

Notes: E – experimental group; C – control group; * – the difference between indicators is probable at $p < 0.05$

Source: made by the authors

In the test "performing techniques on an opponent who does not resist" in the experimental group, the indicators increased by 27.8% and in the control group by 20%. In the test of "throwing a training dummy with deflection", the indicator increased by 37.5% in the experimental group and by 20% in the control group. In the "effectiveness of techniques" test, the indicator in the experimental group increased by 12.9% and in the control group by 7.9%. In the "fighting activity" test, the indicator in the experimental group increased by 18.1% and in the control group by 7%. Summarising the results of the study, it should be noted that

the use of special educational games in the training process contributed to the pronounced optimisation of the levels of general and special physical and technical preparedness of judokas at the stage of initial training. When managing the training process, the principle of multiple repetition in special training games and the use of constant control and correction of the quality of the performance of these exercises are the basis of training and improving the techniques of young wrestlers. The effectiveness of the proposed programme for improving the techniques of wrestlers is evidenced by the fact that the level of indicators of physical

fitness, general physical working capacity, and technical fitness in the experimental group is significantly higher than in the control group of athletes.

Discussion

The conducted research was based on the fundamental principles of the theory of sport, where technical training in judo should be considered as a whole system in the aspect of long-term training, and at each stage relevant tasks should be solved (Principles of judo, n.d.). From the point of view of a systemic approach, the training process is multifaceted and long-lasting, since modern sports and technical requirements are so great that an athlete needs years of persistent, purposeful training to achieve high results (Izzo *et al.*, 2022). According to the results of the analysis of the problem of improving the level of technical preparation of judokas, it was shown the need for further improvement of the training process at the stage of initial preparation in connection with the complication of the leading technical elements in competitive practice, the introduction of modern methods of training athletes, which are aimed at improving the level of integral preparation and contribute to increasing a qualitatively higher level of technical and tactical skill of athletes in the later stages of long-term training, which coincides with the data of research by scientists Yu. Tropin & J. Kovalenko (2018) and E. Franchini *et al.* (2019). The opinion of the authors V. Nikolaev & P. Chizhaev (2019) was confirmed: the use of complexes of physical exercises of various orientations, as well as specialised mobile games, has a positive effect on technical readiness in the educational and training process. In particular, they increase the effectiveness of the formation of motor skills during the study of technical actions in judo at the stage of initial training.

Researcher I. Gheorghiu (2023) determines that the basis for achieving a high level of performance indicators among wrestlers, in particular in judo, is the development of technical and tactical skills with the simultaneous improvement of special psychomotor training. It is shown that the use of compatible means taken from all styles of wrestling and aimed at optimising motor qualities stimulates the development of technical training necessary for judo fighters. A number of authors, like R. Walaszek *et al.* (2017) and J. Jaworski *et al.* (2023), determine the positive impact of the developed sets of exercises aimed at developing the ability to maintain body balance on the components of the technical preparedness of athletes practicing judo. Maintaining the postural stability of an athlete's body during competitive matches is considered an important factor in achieving success. It was found that purposeful training of athletes' body balance effectively affects the speed at which judokas perform complex coordination throws. Scientists S.I. Karaulova *et al.* (2022), in their work, investigated the effectiveness of judo classes on the development of strength abilities. It was determined that the means of developing the strength of judokas are physical exercises, the performance of which requires more muscle tension than under normal conditions of their functioning: exercises with weights – the weight of one's own body, the resistance of a partner. Particularly effective means of combating on the ground floor include maintaining balance, opponents' coups, etc. Based on the results of previous research by

modern authors, which was given, this article used most of the exercises that became the basis of the experimental game methodology.

According to a number of experts, in particular N. Boychenko & M. Chobotko (2019) and M.P.V.C. Pereira *et al.* (2021), using the game method promotes an increase in the emotional state and expands the range of ideas, observation, and intelligence of young wrestlers. In the course of the game, many situational tasks arise, during which judokas must use a significant number of various techniques and variably perform techniques in interaction with a partner, which are combined into technical and tactical elements of struggle. The article experimentally proves the opinion of the mentioned scientists: by introducing game methods into the educational process of young judokas, their level of technical preparation and skill has increased significantly, in particular among the wrestlers of the experimental group. However, the use of the game method even only during the preparatory part of the lesson in the control group was able to demonstrate positive dynamics.

Among the total number of studies, a problematic circle of questions related to teaching judo techniques, taking into account the level of development of physical qualities, coordination abilities, functional capabilities of the wrestlers' bodies, and means and methods of the training process, stands out. Scientists B. Adel *et al.* (2019) studied the impact of competitive judo activity in youth athletes on changes in blood parameters. It was determined that under the influence of the competition, the number of blood cells effectively increases, and these changes are due to the adaptation of athletes to the efforts associated with the competitive activity of judokas. In the article by R.L. Kons & D. Detanico (2022), the authors investigated the effect of the use of maximum intensity training tools on the functional state of the physiological, perceptual, and functional reactions of the body of highly qualified athletes specialising in judo. The obtained experimental data confirmed the performance of the athletes' bodies during high-intensity exercises. The obtained experimental data also complement the information of O. Bekas *et al.* (2019) and E. Franchini *et al.* (2019) that in order to improve the level of technical preparation in judo, it is necessary to use a comprehensive approach based on the introduction into the training process of combined exercises of different orientations, taking into account the sensitive periods of the development of individual movement qualities. The data obtained in this article can become the basis for drawing up an optimal training programme at various stages of the annual training cycle.

Thus, in their works, the scientists came to the conclusion that, thanks to the combination of the development of technical and physical training, individual techniques are improved and the level of physical fitness increases in accordance with the individual characteristics of athletes. This conceptual position was confirmed by the conducted research, which made it possible to justify the need to further search for ways to improve the technical skills of wrestlers at the stage of initial training. It is shown that the use of an experimental training programme with the use of special educational games contributed to an increase in the level of special physical fitness of the judokas who participated in the study.

Conclusions

One of the factors in increasing the efficiency of the training process is the use of measures aimed at studying the peculiarities of the technical training of young wrestlers. It is the level of technical preparation in relation to the physical, tactical, and psychological capabilities of athletes that makes it possible to increase the number and variety of motor skills and to achieve high stability and rational variability of technical and tactical techniques in the process of competitive fighting. At the stage of initial training in judo sports, the game method of training is one of the leading ones; it takes on the character of a universal method of sports improvement for athletes aged 10-12 years. The game method is characterised by the complex nature of the activity, as its basis is a variety of moving actions, a constantly changing environment, and a high emotional factor of a competitive nature. In the practice of sports training for judokas, the game method was used when solving tasks of general, special physical, and technical training, which positively contributed to the development of the necessary specialised qualities and the mastery of the basic techniques of judo.

The use of an experimental training programme in the training process of wrestlers, the basis of which was special educational games, contributed to the significant optimisation of the physical fitness, general physical work capacity, and technical fitness of young judokas. The level of development of the basic physical qualities of young wrestlers in the experimental group improved by 10-66.6%, while

in the control group it improved by only 7.3-46.7%. The level of general physical working capacity in the experimental group improved by 13.3%, and in the control group by only 6.7%. Indicators characterising the special physical fitness of wrestlers in the experimental group improved by 12.6-27.8%, while in the control group they were slightly lower (11.8-23.3%). A comparative analysis of indicators of technical readiness states that the increase in the experimental group was from 12.9% to 37.5%, and in the control group only from 7% to 20%. Thus, in the athletes of the experimental group who used a training programme using special educational games, significantly higher values of the studied indicators were registered than in the representatives of the control group, in whom positive dynamics of results were also registered, but they were lower than in the experimental group of judokas. The test results obtained during the research give reason to recommend the use of the game method in the process of teaching judo techniques at the initial training stage. Prospects for further research are in the programming of educational and training sessions using the game method of learning.

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Conflict of Interest

None.

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Особливості технічного вдосконалення борців на етапі початкової підготовки

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Анотація. Рівень сучасного розвитку дзюдо висуває підвищені вимоги до загальної підготовленості спортсменів та її окремих компонентів на всіх етапах багаторічної підготовки. Особлива увага приділяється вдосконаленню тренувального процесу на етапі початкової підготовки, що дозволяє визначити перспективні напрямки, які обумовлюють ефективність навчання борців технічним прийомом. Мета дослідження – визначити ефективність застосування ігрового методу навчання у процесі технічного вдосконалення дзюдоїстів на етапі початкової підготовки. Вивчено динаміку показників, що складала від 10 % до 66,6 % загальної фізичної підготовленості, від 12,6 % до 27,8 % спеціальної фізичної підготовленості, від 12,9 % до 37,5 % технічної підготовки, 13,3 % – загальної фізичної працездатності, для чого було застосовано педагогічний експеримент, тестування показників загальної і спеціальної фізичної та технічної підготовленості, а також оцінка рівня загальної фізичної працездатності. У дослідженні брали участь 30 дзюдоїстів 10-12 років. З них 15 входили до складу експериментальної та 15 – контрольної груп. Запропоновано експериментальну тренувальну програму з використанням спеціально-навчальних ігор, що сприяли розвитку необхідних спеціалізованих якостей та оволодінню базовими технічними прийомами дзюдо. Ігри було розділено на декілька груп у залежності від завдання (ігри з «торканням суперника», «блокувальним захватом», «атакувальним захватом»). Виявлено позитивний вплив комплексів ігрових вправ під час вивчення та вдосконалення техніки прийомів дзюдо, що сприяло істотній оптимізації загальної та спеціальної фізичної підготовленості, загальної фізичної працездатності організмів спортсменів. Порівняльний аналіз динаміки досліджуваних показників дозволив констатувати, що спортсмени експериментальної групи, які застосовували експериментальну тренувальну програму з використанням спеціально-навчальних ігор, мали кращі результати в порівнянні з контрольною групою. Практична цінність дослідження полягає в рекомендації впровадження експериментальної ігрової методики вдосконалення технічної підготовки в дзюдо в системі багаторічного спортивного вдосконалення, на етапі початкової підготовки зокрема

Ключові слова: дзюдо; тренувальний процес; фізична підготовленість; рухові якості; працездатність