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Training methodology for youth judo athletes (ages 10–14) in line with modern international competition requirements

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Abstract. *The relevance of the study is determined by the need to improve the training system of junior judo athletes under conditions of increasing competition at international tournaments and rising demands for athletes' physical, technical, and psychological readiness. The age period of 10–14 years is considered the most sensitive for the development of basic motor and technical-tactical skills; however, it is also characterized by a high risk of overloads and premature specialization, which requires a scientifically grounded training methodology. The* ***purpose of the article*** *is to develop and scientifically substantiate a comprehensive methodology for training junior judo athletes (aged 10–14) in accordance with modern international requirements. The* ***research methodology*** *is based on the analysis and synthesis of scientific and methodological sources, pedagogical observation of the training process, a comparative analysis of the experience of leading international judo schools, and pedagogical modeling to determine the optimal ratio of general and specialized training. The* ***research results*** *enabled the establishment that the effectiveness of the training process for judo athletes aged 10–14 is ensured by a comprehensive approach that combines various areas of preparation. A*

methodology is proposed that provides for an optimal ratio of general physical training (55–60%), specialized technical-tactical training (25–30%), and tactical work (10–15%). It is based on the dominance of the general physical block, which creates a solid foundation for further athletic progress and injury prevention. This approach includes the gradual complication of specialized and tactical tasks to form stable motor patterns and the ability to apply techniques in competitive conditions. A distinctive feature of the methodology is the integration of traditional pedagogical approaches with modern technologies for monitoring athletes' physical condition and providing psychological support, which aligns with the international experience of leading judo schools (Japan, France, Brazil, Germany). It was found that such a combination ensures the harmonious development of physical, technical, and psychological components of preparation, forming the basis for steady improvement in performance at subsequent stages of sports development. The ***conclusions*** *confirm that the proposed methodology enhances the performance of young judo athletes, contributes to the prevention of overloads, strengthens psychological resilience, and ensures a smooth transition to subsequent stages of sports training in line with international requirements. Prospects for further research lie in improving the individualization of the training process, studying gender aspects of preparation, and analyzing the long-term results of implementing the methodology in the practice of sports schools.*

Keywords: *sports training, long-term preparation, physical development, technical-tactical skills, psychological resilience, training individualization, international experience.*

Методика підготовки дзюдоїстів юнацького віку (10–14 років) з урахуванням сучасних вимог міжнародних змагань

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Анотація. *Актуальність дослідження зумовлено необхідністю удосконалення системи підготовки дзюдоїстів юнацького віку в умовах зростання конкуренції на міжнародних змаганнях та підвищення вимог до фізичної, технічної й психологічної готовності спортсменів. Віковий період 10–14 років визначено як найчутливіший до розвитку базових рухових і техніко-тактичних навичок, який характеризується високим ризиком перевантажень та передчасної спеціалізації, що потребує застосування науково обґрунтованої методики тренувального процесу.* ***Мета статті*** *полягає у розробленні та науковому обґрунтуванні комплексної методики підготовки дзюдоїстів юнацького віку (10–14 років) з урахуванням сучасних міжнародних вимог.* ***Методологія дослідження*** *ґрунтується на використанні аналізу та узагальнення науково-методичних джерел, педагогічного спостереження за тренувальним процесом, порівняльного аналізу досвіду провідних міжнародних шкіл дзюдо та педагогічного моделювання для визначення оптимального співвідношення загальної й спеціальної підготовки.* ***Результати*** *дослідження дали змогу встановити, що ефективність тренувального процесу у дзюдоїстів 10–14 років забезпечується комплексним підходом, що поєднує різні напрями підготовки. Запропоновано методику, що передбачає оптимальне співвідношення загальної фізичної підготовки (55–60 %), спеціальної технічної підготовки (25–30 %) та елементів тактичної роботи (10–15 %). Вона ґрунтується на домінуванні загальнофізичного блоку, що створює міцне підґрунтя для подальшого спортивного зростання та профілактики травматизму, та*

передбачає поетапне ускладнення спеціальних і тактичних завдань для формування стійких рухових стереотипів і здатності до застосування техніки у змагальних умовах. Особливістю методики є інтеграція традиційних педагогічних методів з сучасними технологіями моніторингу фізичного стану спортсменів і засобами психологічної підтримки, що відповідає міжнародному досвіду провідних шкіл дзюдо (Японія, Франція, Бразилія, Німеччина). Виявлено, що таке поєднання забезпечує гармонійний розвиток фізичних, технічних та психологічних компонентів підготовки й формує основу для стабільного підвищення результативності на наступних етапах спортивного вдосконалення. ***Висновки****. Запропонована методика є основою для підвищення результативності юних дзюдоїстів, сприяє профілактиці перевантажень, формує психологічну стійкість і забезпечує плавний перехід до наступних етапів спортивної підготовки відповідно до міжнародних вимог. Перспективи подальших досліджень полягають у вдосконаленні індивідуалізації тренувального процесу, вивченні гендерних аспектів підготовки та аналізі довготривалих результатів впровадження методики у практику спортивних шкіл.*

Ключові слова: *спортивна підготовка, багаторічний тренувальний процес, фізичний розвиток, техніко-тактичні навички, психологічна стійкість, індивідуалізація навантажень, міжнародний досвід.*

Problem statement. Training of youth judoists is becoming increasingly relevant in the context of growing competition in the international arena and the constant updating of requirements for the technical, physical, and psychological readiness of athletes. The development of an optimal training methodology for children aged 10–14 years requires consideration of the intensive physical and psycho-emotional development processes, which in turn influence the selection of training tools and methods. At the same time, a crucial scientific task is to establish

the structure of long-term training, which will ensure a harmonious combination of general physical fitness development with the formation of basic technical and tactical skills. At the practical level, the problem is to create models of the training process that will contribute to achieving a high level of performance in youth competitions, serve as the basis for further sports improvement, and meet international standards, ensuring the implementation of leading world trends in the national judo school. In this context, the task is not only to adapt traditional training methods but also to apply innovative practices, particularly the use of digital technologies for load control, individualization methods, and psychophysiological monitoring, which underscores the significance of the study from both scientific and practical perspectives in sports training.

Analysis of recent studies and publications. Analysis of studies on the training methodology for young athletes (10–14 years) allows us to distinguish four areas that determine the educational, physiological, methodological, and applied-practical aspects of their development.

The first area is devoted to work with an emphasis on educational and pedagogical factors of training. Researchers N. H. Dolbysheva and co-authors [1] substantiate the importance of national-patriotic education at the stage of initial training of judoists. Authors Yu. V. Chernikov and A. V. Symonik [2] analyze the impact of a typical program of organizing the training process on the level of physical fitness, which can be a guideline for younger age groups. Scientists I. Kryventsova, G. Ogar, and O. Panina [3] investigate the impact of strength training on the training process, emphasizing the development of fundamental motor qualities. This direction highlights the need for further research on integrating educational components into the training programs for young judokas.

The second direction encompasses research on the physiological and somatic factors influencing athletes' development. O. Bekas and co-authors [4] propose modeling the physical fitness of children aged 10–12 years based on somatotyping.

J. Simenko [5] emphasizes the risks of premature performance of young athletes in older age groups, which have short-term results but are detrimental to long-term development. Scientists D. Detanico, R. L. Kons, D. H. Fukuda & A. S. Teixeira [6] demonstrate that somatic maturation, growth, and training experience directly impact the physical performance of young judokas. L. S. da Silva and co-authors [7] in a systematic review summarize training protocols, emphasizing the importance of correlating physiological factors and specific training influences. This direction highlights the need for further research that combines somatic characteristics with the development of individualized training programs.

Training and methodological practices are considered in the third direction of research. S. Ciaccioni and co-authors [8] analyze the importance of generational practice in judo, emphasizing the different stages of sports development. A. G.Yaneva & V. Lukanova [9], based on an expert survey, emphasize the need to create specialized methods for children aged 7–10 years, which ensure an effective initial stage of sports training. R. L. Kons and co-authors [10] consider coaching practices of strength and conditioning training, identifying the most effective models for young athletes. Scientists I. Harat, R. Kislev-Cohen & D. H. Fukuda [11] investigate the strength and anaerobic characteristics of judoists of different ages and levels of competitiveness, revealing patterns of the transition from youth to adult sports. R. Huang and co-authors [12] studied the effect of strength training protocols on the development of explosive lower limb strength in young athletes. This direction demonstrates the feasibility of further research in improving methods that integrate physiological, technical, and age-related aspects of training.

The fourth direction encompasses applied and practical studies that focus on integrating the physical, psychological, and educational components of the training process. S. Schoof and co-authors [13] prove that dynamic balance and psychological skills are directly related to international results of young athletes. S. Ciaccioni and co-authors [14] propose a model of an educational program for

coaches within the framework of a European partnership, focused on sustainability and long-term effectiveness. I. M. Engwerda, R. Lidor & M. T. Elferink-Gemser [15] analyze the performance of young judokas in light and heavy weight categories, emphasizing the need for differentiated practice. This direction confirms the feasibility of further research in developing comprehensive monitoring systems that take into account not only physical parameters but also psychological resilience and pedagogical mechanisms to support athletes.

Identification of previously unresolved parts of the general problem. Despite significant achievements in training young athletes, several issues remain unresolved. The features of the combination of physical, technical, and psychological development during the critical age period of 10–14 years are insufficiently studied, and there are no systematic studies on the optimal ratio of general and specialized training. Domestic empirical material also remains limited, which complicates the development of effective methods; in particular, international experience adapted to national conditions is not adequately taken into account. It creates gaps in the scientific understanding and practical implementation of modern training models. The proposed study aims to overcome these limitations by analyzing the age characteristics of athletes' preparedness, examining international trends, and developing a methodology that takes into account the modern requirements and realities of the national judo school. Such practice allows for expanding the empirical base, specifying the optimal structure of the training process, and developing practical recommendations that will ensure increased training efficiency and facilitate the integration of Ukrainian athletes into the global sports space.

Formulation of the article's goals (task setting). The purpose of this article is to develop and scientifically substantiate a methodology for training young judoists (10–14 years old) in accordance with the modern requirements of international competitions.

To achieve the goal of the study, the following tasks were formulated:

1. To determine the age-related features of the physical, mental and technical-tactical development of judoists 10–14 years old and to analyze modern international practices of their training.

2. To substantiate the optimal structure of combining general and special training of young athletes, taking into account the identified problems and limitations in the national context.

3. To develop and propose a methodology for training youth judoists that meets modern international requirements and ensures increased efficiency of the training process.

Presentation of the main material of the study. In the training of young athletes, one of the primary tasks is to consider age-related features of development, as the effectiveness of the entire training process system depends on their accurate definition. Judoists aged 10–14 are characterized by active bodily growth, intensive development of motor skills and the psycho-emotional sphere, which create the prerequisites for the formation of stable technical and tactical skills. At the same time, it is during this period that increased vulnerability to overloads and the risk of premature specialization arise, which necessitates the need for scientifically based practice in organizing training activities (table 1).

Table 1

Age-related features of the fitness of judokas aged 10–14

Aspect of development	Characteristics	Impact on the training process
Physical development	Intensive growth, increase in strength, endurance and flexibility	Need for a gradual increase in loads, development of basic physical qualities
Mental development	Formation of concentration of attention, increase in emotional stability, and motivational sensitivity	Need for individualization, use of elements of the game and competitive motivation
Technical and tactical training	Active mastery of basic techniques and combinations, development of spatial and temporal concepts	Direction of training on consolidating basic technical

Aspect of development	Characteristics	Impact on the training process
		actions and the initial formation of tactical thinking

Source: formed by the author based on [2; 3, p. 15–16; 4, p. 90–91; 6, p. 426–427; 9, p. 732]

In the practical activities of coaches, it is essential to consider these age characteristics to establish an effective development trajectory for young judokas. Physical development at the age of 10–14 is characterized by unevenness and jumpiness, which requires special methods of load regulation. Excessive intensity can lead to fatigue or disruption of the musculoskeletal system, while optimally dosed exercises contribute to laying the foundations of strength, speed, and flexibility. Mental development at this age leads to increased sensitivity to emotional factors; in practice, this means that the training process should combine elements of competition with a supportive, favorable psychological climate to avoid premature burnout and foster internal motivation. Technical and tactical training is based on intensive mastery of elementary techniques and simple combinations, and it is at this age that the most favorable conditions are created for consolidating motor stereotypes. The practice of leading sports schools demonstrates that systematic repetition of basic actions in variable conditions enhances the stability of technical skills and, at the same time, lays the foundation for the development of tactical thinking [5]. In modern conditions, the use of methods such as biomechanical analysis, video surveillance, and psychophysiological monitoring enables coaches to adjust the training program promptly, adapting it to the individual capabilities of the athlete as much as possible. Thus, the coordination of physical, mental and technical-tactical development in the training process of young judokas becomes not only a pedagogical task, but also the main condition for competitiveness at the international level. In modern sports, the importance of studying and adapting international experience in training young athletes is increasing as a guideline for the development of national martial arts schools. The practices of leading countries

in the world in organizing the training process are based on a combination of many years of preparation, early involvement in the sports education system and the use of modern control and analysis technologies. The focus is not only on technical and tactical training, but also on harmonious physical development, the formation of psychological resilience, and the development of motivation for a sustained involvement in sports (table 2).

Table 2

Modern trends in the international practice of training young judokas

Country	Main practices	Features of implementation	Expected effect
Japan	Traditional technical and tactical school, combined with the education of discipline and respect	Early specialization, emphasis on practicing basic techniques	Formation of a highly technical culture and sustainable motivation
France	A combination of physical and technical training with a multi-level competition system	Introduction of youth leagues, control of loads by age groups	Even development and gradual adaptation to the competitive environment
Brazil	Integration of judo into educational programs and widespread use of game methods	Training in schools, emphasis on collective motivation	Mass involvement and socialization of children through sports
Germany	Use of digital technologies for monitoring training and health	Biomechanical analysis, testing of functional fitness	Personalization of loads and reduction of the risk of injuries

Source: formed by the author based on [5; 7; 8; 10, p. 575–576; 14]

In practical terms, such trends signify a shift in the training process from narrow specialization to the comprehensive development of young athletes. In Japan, the training system retains its traditional structure; however, discipline and consistency are what contribute to achieving high results in the international arena. The French model shows the effectiveness of creating multi-level youth leagues that ensure a gradual entry into the competitive environment without excessive psychological pressure [11; 12]. The Brazilian experience demonstrates the importance of the social dimension of sport, particularly when judo is utilized as a tool for integration and education, which simultaneously expands the personnel base

for national teams. German practice, focused on the technologization of the process, proves the advantages of individualizing training through the use of digital control tools, which allows optimizing the load and preventing injuries [7]. For modern Ukrainian practice, such international experience is especially valuable, as it creates an opportunity to combine the traditional school of wrestling with the latest tools for planning and monitoring the training process, which meets the requirements of the global sports environment.

The problem of the ratio of general and special training in the training of young judokas is central to the formation of their future sports skills. Excessive emphasis on specialization at an early age often leads to overload, injuries and a decrease in interest in classes. At the same time, an insufficient level of special training reduces the effectiveness of mastering basic technical and tactical skills. The optimal structure of the training process should take into account the patterns of growth and development of children aged 10–14 years, creating the prerequisites for a harmonious combination of the development of basic physical qualities with the mastery of the fundamental elements of judo (table 3).

Table 3

The ratio of general and special training in the training of judokas aged 10–14

Component	Main content	Part of the training process	Expected result
General physical training	Development of strength, speed, endurance, coordination, and flexibility	55–60%	Formation of a multifunctional base, reduction of the risk of injuries
Special technical training	Study and practice of basic techniques and their combinations	25–30%	Mastering fundamental technical actions, creation of motor stereotypes
Tactical training	Initial formation of tactical thinking, simple competitive situations	10–15%	Ability to apply techniques in changing conditions, development of flexibility of thinking

Source: formed by the author based on [1; 2; 3, p. 19–20; 11; 12; 13, p. 2492–2493; 15, p. 787–788]

The practical application of the proposed structure, which combines general and special training, reveals that the dominance of the general physical block in training young judokas aged 10–14 creates a reliable basis for further sports growth. During this age period, the body actively develops basic motor qualities, and their purposeful development contributes not only to increasing the efficiency of performing technical actions but also to preventing injuries, which is especially important in conditions of intensive growth of the musculoskeletal system [6, p. 426–427]. Special training, which accounts for 25–30% of the load, ensures the formation of stable motor stereotypes. Repeated repetition of basic throws, holds, and movements in various conditions allows for the consolidation of the technique at the subconscious level [12]. It lays the groundwork for transitioning to more complex tactical tasks. Allocating 10–15% of training time to working on tactical elements helps young athletes gradually learn to apply the acquired technical skills in simplified competitive conditions, while developing the ability to make quick decisions and increasing their psychological resilience in stressful situations [13, p. 2492–2493; 15, p. 787–788]. Modern practice demonstrates that this ratio is not static and should be adjusted according to the level of preparedness and individual characteristics of the athlete [1]. The use of functional diagnostics, video analysis and pedagogical testing technologies by the coach ensures the identification of weaknesses and the prompt transformation of the training process [10, p. 575–576]. In particular, if there is insufficient development of speed qualities, the number of exercises for explosive strength increases in general training, and with a deficit of technical confidence, more time is allocated to repeating basic elements.

The training of young judokas within the national sports context faces several systemic problems that significantly limit the effectiveness of athletes' development and reduce their competitiveness at the international level [2]. One of the issues is the insufficient material and technical base, characterized by the lack of modern halls that meet international safety standards. Limited access to high-quality equipment

and specialized simulators also reduces the effectiveness of the training process [2]. A significant limitation is the shortage of personnel, as there are not enough qualified coaches who possess modern training methods and international experience. It leads to the use of outdated practices that do not meet the modern requirements for developing young athletes [8]. A significant issue is the lack of systematic monitoring of children's physical and psychophysiological states. Irregular medical examinations and a low level of integration of sports medicine into the training process create risks of overload, injuries and loss of interest in classes [6, p. 427–428; 13, p. 2493]. No less significant is the underestimation of psychological preparation: the lack of systematic work with sports psychologists makes it impossible to form stress resistance and the ability to adapt to the conditions of high-level competitions [15, p. 788]. Financial constraints mean that a significant portion of the costs associated with participating in competitions, training, and purchasing equipment falls on parents, thereby narrowing the social base for selecting talented children [5]. Another factor is the uneven development of regional schools: in large cities, the opportunities for training are significantly greater, while in provincial centers, the level of organization of the training process lags considerably behind [1]. It creates an imbalance in the development of the national judo school, reducing the chances of forming a vast reserve of athletes. A significant issue is the fragmentation of the multi-year training system. The lack of unified programs covering the entire path from primary education to the junior level creates a situation where the athlete's transition between stages occurs spontaneously, without proper continuity and consistency [9, p. 733]. It is accompanied by the loss of promising athletes at critical stages of their development. In addition, national competitions for youth age groups often do not meet modern international standards of organization, which complicates the adaptation of athletes to the level of world tournaments.

The development of a training methodology for youth judoists should be based on a combination of long-standing pedagogical principles and modern

international standards for organizing the training process. Its essence lies in building a system of classes that takes into account the age-related characteristics of athletes' development, from 10 to 14 years old, the gradualness of the load, the balance between general and specialized training, the integration of psychological support, and the use of innovative control technologies. The primary objective of this methodology is to establish a stable foundation for future sports improvement, ensuring competitiveness in international competitions and maintaining the health of young athletes (table 4).

Table 4

Methodology of training of youth judoists taking into account international requirements

Component	Main content	Practical means of implementation	Expected result
General physical training	Development of strength, speed, endurance and flexibility	Functional exercise complexes, outdoor games, and cross-country training	Formation of a physical base and prevention of injuries
Special technical and tactical training	Mastering basic throws, holds and combinations, development of tactical thinking	Variable training models, sparring with different partners, and video analysis of techniques	Confident mastery of basic techniques and their application in competitive conditions
Psychological training	Formation of stress resistance, competitive motivation, and self-control	Working with a psychologist, game simulation of situations, and concentration exercises	Ability to adapt in international tournaments
Medical support	Monitoring of physical condition, load control	Regular testing, use of digital trackers and biomonitoring	Individualization of training and prevention of overload
Organizational and competitive block	Gradual integration into the competition system, adaptation to international rules	Participation in national and regional leagues, training camps	Acquiring competitive experience and compliance with international standards

Source: author's development

The practical implementation of this methodology involves a cyclical training structure, where periods of general and specialized orientation alternate throughout the year, with a gradual increase in the share of technical and tactical work. The combination of classical training methods with innovative practices, particularly biomechanical analysis of technique, digital load control, and psychophysiological testing, ensures the individualization of training. Such a system not only enhances performance at the youth competition stage but also lays the groundwork for a gradual transition to the junior and adult levels, meeting international requirements for the long-term training of athletes.

Conclusions. The study demonstrates that practical training of youth judoists is based on a combination of age-related characteristics, including physical, psycho-emotional, and technical and tactical development, with an optimal ratio of general and specialized training. It is substantiated that the dominance of the general physical block, combined with the gradual complication of technical and tactical tasks, ensures the harmonious development of athletes, reduces the risk of injuries, and creates the basis for further sports growth. Analysis of international experience has shown the effectiveness of complex models that integrate many years of training, the use of innovative monitoring technologies and systemic psychological support. At the same time, the following problems within the national context have been identified: limited material and technical resources, personnel shortages, weak integration of sports medicine and psychology, and uneven development of regional schools. These factors hinder the full implementation of international standards and reduce the competitiveness of young athletes. The proposed training methodology, which combines physical, technical-tactical, psychological, and medical-biological components, contributes to increasing the effectiveness of youth competitions and creates the prerequisites for transitioning to higher levels of sportsmanship. Prospects for further research include improving the means of individualizing the training process using digital technologies, studying the gender characteristics of

training, and analyzing the long-term results of applying the methodology in the practice of national sports schools.

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