ТЕОРІЯ І МЕТОДИКА ПІДГОТОВКИ СПОРТСМЕНІВ

https://doi.org/10.32540/2071-1476-2025-2-159

УДК 796.81.015.132

PECULIARITIES OF PHYSICAL DEVELOPMENT AND PHYSICAL FITNESS OF WRESTLERS AT THE STAGE OF SPECIALIZED BASIC TRAINING

Lukina Olena [ABCDE], Kusovska Olha [BCDE], Makhinko Mykola [ABDE], Shatskykh Volodymyr
Educational and Scientific Institute «Prydniprovsk State Academy of Physical Culture and Sport» of the Ukrainian State University of Science and Technologies

Лукіна Олена Володимирівна
Lukina Olena
Навчально-науковий інститут «Придніпровська державна академія фізичної культури і спорту» Українського державного університету науки і технологій, м. Дніпро, вул. Набережна Перемоги, 10, 49094, Україна
Educational and Scientific Institute «Prydniprovsk State Academy of Physical Culture and Sport» of the Ukrainian State University of Science and Technologies, Dnipro, Naberezhna Peremohy Street, 10, 49094, Ukraine
e-mail: alpha5@i.ua
https://orcid.org/0000-0002-3085-7975

Кусовська Ольга Станіславівна
Kusovska Olha
Навчально-науковий інститут «Придніпровська державна академія фізичної культури і спорту» Українського державного університету науки і технологій, м. Дніпро, вул. Набережна Перемоги, 10, 49094, Україна
Educational and Scientific Institute «Prydniprovsk State Academy of Physical Culture and Sport» of the Ukrainian State University of Science and Technologies, Dnipro, Naberezhna Peremohy Street, 10, 49094, Ukraine
e-mail: lekajudo@gmail.com
https://orcid.org/0009-0003-6451-625X

Махінько Микола Павлович
Makhinko Mykola
Навчально-науковий інститут «Придніпровська державна академія фізичної культури і спорту» Українського державного університету науки і технологій, м. Дніпро, вул. Набережна Перемоги, 10, 49094, Україна
Educational and Scientific Institute «Prydniprovsk State Academy of Physical Culture and Sport» of the Ukrainian State University of Science and Technologies, Dnipro, Naberezhna Peremohy Street, 10, 49094, Ukraine
e-mail: makhinko46@gmail.com
https://orcid.org/0009-0005-7330-857X

Шацьких Володимир Володимирович
Shatskykh Volodymyr
Навчально-науковий інститут «Придніпровська державна академія фізичної культури і спорту» Українського державного університету науки і технологій, м. Дніпро, вул. Набережна Перемоги, 10, 49094, Україна
Educational and Scientific Institute «Prydniprovsk State Academy of Physical Culture and Sport» of the Ukrainian State University of Science and Technologies, Dnipro, Naberezhna Peremohy Street, 10, 49094, Ukraine
e-mail: shatskykh.infiz@gmail.com
https://orcid.org/0009-0000-5333-7529

Внесок авторів: A – дизайн дослідження; B – збір даних; C – статистичний аналіз; D – підготовка рукопису; E – збір коштів.

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Annotation

Introduction. The article analyzes the physical development, general and special physical fitness of Greco-Roman wrestlers at the stage of specialized basic training. It is established that the results obtained are one of the leading components of training and competition processes. It is noted that when building training and competition processes of junior wrestlers, it is necessary to take into account the level of physical fitness in order to maintain the pace of competitive wrestling throughout the entire fight, as well as to perform effective and productive technical and tactical actions. **The purpose of the study** is to determine the level of physical development of qualified wrestlers of Greco-Roman style at the stage of specialized basic training. **Research methods**: theoretical analysis and generalization of data from scientific and methodological literature and the Internet (sources were studied in accordance with the research problem); anthropometric methods, index method (determined the level of physical development of wrestlers); pedagogical methods for studying general and special physical fitness of wrestlers aged 16-17 years (conducted testing of the physical fitness of wrestlers); methods of mathematical statistics (aimed at calculating the total and average values of indicators and their effectiveness). **Research results**. The results of the study showed that the indicators of physical development and physical fitness of fighters at the stage of specialized basic training were within the normal range. However, the test results are pulling on the crossbar (V = 15,2 %), 10 partner throws (dummy) deflection (V = 21,45 %), partner throws (dummy) 20 s (V = 18,03 %), angle retention 90^0 from the position of the hang (V = 19,07 %), holding the position of overrun protection (V = 17,53 %), as well as the number of completed technical actions for the 3rd period (V = 16,02 %) have rather high coefficients of variation. This indicates that the level of development of the fighters' power, speed-strength qualities, special endurance and technical preparedness is heterogeneous and requires more focused pedagogical influence. **Conclusions.** Greco-Roman style wrestlers at the stage of specialized basic training differ significantly in their level of preparedness, and the level of development of their strength, speed-strength qualities and special endurance is insufficient to maintain the pace of fighting throughout the fight, as well as the performance of effective and efficient technical and tactic action. Therefore, fighters of 16-17 years old have significant reserves of preparedness and this requires a targeted pedagogical impact.

Keywords: general and special physical fitness, Greco-Roman style wrestlers, stage of specialized basic training.

ОСОБЛИВОСТІ ФІЗИЧНОГО РОЗВИТКУ ТА ФІЗИЧНОЇ ПІДГОТОВЛЕНОСТІ БОРЦІВ НА ЕТАПІ СПЕЦІАЛІЗОВАНОЇ БАЗОВОЇ ПІДГОТОВКИ

Анотація

Вступ. У статті проведено аналіз фізичного розвитку, загальної та спеціальної фізичної підготовленості борців греко-римського стилю на етапі спеціалізованої базової підготовки. Встановлено, що отримані результати є одним з провідних компонентів тренувального та змагального процесів. Відзначено, що при побудові тренувального та змагального процесів борців-юніорів необхідно враховувати рівень фізичної підготовленості для того, щоб зберігати темп ведення змагальної боротьби протягом всієї сутички, а також виконання ефективних і результативних техніко-тактичних дій. **Мета дослідження –** визначити рівень фізичного розвитку, загальної і спеціальної фізичної підготовленості кваліфікованих борців греко-римського стилю на етапі спеціалізованої базової підготовки. **Матеріали і методи дослідження:** теоретичний аналіз і узагальнення даних наукової та методичної літератури і мережі «Інтернет» (вивчали джерела відповідно до проблеми дослідження); антропометричні методи, метод індексів (визначали рівень фізичного розвитку борців); педагогічні методи дослідження загальної та спеціальної підготовленості борців 16-17 років (проводили тестування фізичної підготовленості борців); методи математичної статистики (спрямовані на підрахунок загальних та середніх значень показників та їх ефективність). **Результати**. результати дослідження показали, що показники фізичного розвитку і фізичної підготовленості борців на етапі спеціалізованої базової підготовки знаходились у межах норми (коефіцієнти варіації в основному складали менше 20 %). Однак, результати тестів підтягування на поперечині (V = 15,2 %), 10 кидків партнера (манекену) прогином (V = 21,45 %), кидки партнера (манекена) 20 с (V = 18,03 %), утримання кута 90^0 із положення вису (V = 19,07 %), утримання положення захист від накату (V = 17,53 %), а також кількість виконаних технічних дій за 3 період (V = 16,02 %) мають досить високі показники коефіцієнта варіації. Це свідчить про те, що рівень розвитку у борців силових, швидкісно-силових якостей, спеціальної витривалості і технічної підготовленості не є однорідним і вимагає більш акцентованого педагогічного впливу. **Висновки.** Борці греко-римського стилю

на етапі спеціалізованої базової підготовки суттєво різняться за рівнем підготовленості, а рівень розвитку їх силових, швидкісно-силових якостей і спеціальної витривалості недостатній, для того, щоб зберігати темп ведення боротьби протягом всієї сутички, а також виконання ефективних і результативних техніко-тактичних дій. Тому борці 16-17 років мають суттєві резерви підготовленості, і це потребує цілеспрямованого педагогічного впливу.

Ключові слова: загальна і спеціальна фізична підготовленість, борці греко-римського стилю, етап спеціалізованої базової підготовки.

Introduction

Olympic martial arts, in particular their most famous types – Greco-Roman and freestyle wrestling, combine various techniques of confrontation, including wrestling in a standing position and on the ground. A distinctive feature of Greco-Roman wrestling is the execution of various throwing techniques with the permission to perform a grab of the opponent in the upper part of the body, not below the waist [1, 2, 3]. As noted by V. Andriytsev [4], O. Lukina, V. Voronyi [5], O. Light, K. Cicioglu [6], the level of development of modern wrestling places high demands on various aspects of wrestlers' preparedness at almost all stages of long-term training. In the studies of O. Omelchenko, S. Afanasiev [7], O. Lukina, S. Strelchuk [8], D. Barbado, A. Lopez-Valenciano [9], special attention is paid to the problem of improving the general and special physical preparedness of wrestlers, which is one of the main factors in achieving the highest possible results in competitive activities, including Greco-Roman wrestling.

Z. Kozina, O. Pustomelnik [10], D. Berinchyk [11] and other experts [12] believe that the stage of specialized basic training plays an important role in the training of junior wrestlers, at which comprehensive prerequisites are created for intense specialized training, which ensures a high level of sportsmanship in competitive fights.

Analysis of the literature data allowed us to establish the presence of a significant number of scientific studies aimed at solving the problem of general and special physical fitness of athletes in various sports [7, 13]. C. McGowan, D. Pyne D [13] and I. Abdullayev [15] insist on a significant increase in the total volume of training sessions to increase the special physical fitness of wrestlers. Other authors [4, 10, 11] emphasize an increase in the volume of special physical training in the total volume of educational and training work and an increase in competitive practice. There is also an approach that is associated with the organization of a system of training and competitive loads, medical and biological means of recovery and the expansion of auxiliary training means [12].

As noted by martial arts specialists V. Andriytsev [4], O. Lukina, V. Voronyi [5], S. Latyshev [16] and Yu. Tropin [17], the current level of development of Greco-Roman wrestling is characterized by the presence of significant competition, as a result of which the requirements for the manifestation of physical and moral-volitional qualities of athletes are increasing, which is the basis of a high level of technical preparedness, which allows performing effective technical and tactical techniques in competition conditions. Highlighting the problem of high-quality general and special physical training of Greco-Roman wrestlers at the stage of specialized basic training is relevant for modern wrestling.

Hypothesis. It is assumed that the analysis of the level of physical development, general and special physical fitness of junior wrestlers will contribute to improving the results of competitive activities.

The purpose of the work is to determine the level of physical development, general and special physical fitness of qualified Greco-Roman wrestlers at the stage of specialized basic training.

Research material and methods

Participants: Testing of physical development and physical fitness of qualified Greco-Roman wrestlers at the stage of specialized basic training was conducted. Qualification of athletes – I sports category and Candidate Master of Sports. Number – 30 Greco-Roman wrestlers aged 16-17.

Procedure: to determine the level of physical development, general and special physical fitness of wrestlers, an ascertaining experiment was conducted on the basis of the Prydniprovsk State Academy of Physical Culture and Sport at the Department of Boxing, Wrestling and Weightlifting, Dynamo Youth Sports School, and the Children's Sports School of the Dnipro City Sports Complex (Dnipro).

To determine the level of physical development, the following indicators were studied: body length and weight, vital lung capacity, dynamometry, Quetelet index, vital index, strength index [3, 16, 17]. The level of general physical fitness was determined using tests presented in the Greco-Roman wrestling curriculum [3]. Tests for special physical fitness were recommended by wrestling specialists [3, 4, 12, 16]; the level of special endurance of wrestlers was determined using the V.F. Boyko test [4].

Statistical analysis: the research methods were: theoretical analysis and generalization of data from scientific and methodological literature (sources were studied in accordance with the research problem); pedagogical testing method (used for a logical and consistent approach to organizing

and obtaining research results); mathematical statistics methods (aimed at calculating the general and average values of indicators and their effectiveness).

For the mathematical analysis of indicators of physical development, general and special physical fitness of qualified Greco-Roman wrestlers, standard statistical methods and calculations were used using the application package «MS Excel 2007» and «Statistica-9.0».

Research Results

Table 1 presents anthropometric data and physical development indicators of Greco-Roman wrestlers.

Analysis of the physical development indicators of Greco-Roman wrestlers at the stage of specialized basic training allowed us to establish that these indicators of all athletes are within the normal range for a given age [3, 12]. For most indicators of physical development, the group of wrestlers can be considered homogeneous because the coefficient of variation is within 10%. The highest coefficient of variation is observed for body mass (V = 22.53%) and vital capacity (V = 20.47%). This is significantly higher than other indicators and is associated with the specifics of this type of martial arts – the presence of weight categories in Greco-Roman wrestling, which for this stage of training range from 41 to 110 kg. The wrestlers who participated in our study were of medium weight categories (up to 60 kg, up to 66 kg and up to 74 kg).

The average values of the indicators and parameters of statistical processing of the data of the study of the general fitness of wrestlers are presented in Table 2.

The results of the assessment of speed qualities in the 60 m high jump test, speed-strength qualities in the standing long jump and standing high jump tests, general endurance in the 800 m running test and strength qualities in the pull-up test on the horizontal bar have small values of the coefficient of variation, and range from 3.96% to 15.20%. When determining the level of development of the main physical qualities of Greco-Roman wrestlers at the stage of specialized basic training, it was found that the level of development of strength qualities in 34% of athletes is below average. This is due to two factors – the presence of weight categories in wrestlers and the level of their fitness.

To determine the level of special physical fitness of wrestlers, tests were selected that are proposed in the Greco-Roman and freestyle wrestling curriculum, as well as used in other types of martial arts. The results of special physical fitness testing and their statistical indicators are presented in Table 3.

Analysis of the test results shows that the coefficient of variation of special physical fitness is in the range from 5.43% to 19.07% (except for one indicator – 10 throws of a partner (dummy) with a deflection (V= 21.45%)). As is known, if the coefficient of variation is less than 20%, this indicates the relative homogeneity of the group in terms of special physical fitness indicators.

Special speed-strength qualities were assessed in the tests of flexion-extension of the arms in a supine position for 20 s (V = 8.41%), pull-ups on the crossbar for 20 s (V = 17.27%), lifting the torso from a supine position for 20 s (V = 12.01%), climbing a rope 5 m (V = 7.92%), 10 throws of a partner (dummy) with a deflection (V = 21.45%), 10 throws of a partner (dummy) with a turn (V = 9.43%), throws of a partner (dummy) for 20 s (V = 18.03%). The indicators of the tests, where the coefficient of variation is more than 17%, indicate a different level of development of special speed-strength qualities. Also, it is worth paying attention to the rather high coefficient of variation in tests related to the technique of performing techniques for a certain number of times or a certain period of time. This also indicates that the level of speed-strength readiness is not uniform and requires a more emphasized pedagogical influence.

The coordination abilities and special flexibility of the wrestlers were assessed using the tests of head-on flips on the wrestling bridge and in the opposite direction 10 times (V = 18.53%), running with a side step around the hands 10 times (V = 17.35%), 10 forward somersaults (V = 5.43%), and jumps with rotations to the right

Table 1

Indicators of physical development of Greco-Roman wrestlers at the stage of specialized basic training (n = 30)

Indicators	$\bar{o}$	S	m	V, %
Body length, cm	172,18	5,87	0,11	5,19
Body weight, kg	66,53	13,19	2,43	22,53
VE, ml	3892,50	735,81	123,91	20,47
Dynamometry, kg	48,50	3,97	0,92	8,94
Quetelet index, $g \cdot cm^{-1}$	386,39	28,54	5,28	7,38
Vital index, $ml \cdot kg^{-1}$	58,50	3,76	0,71	6,41
Power index, %	74,28	5,32	0,82	7,05

Table 2

Indicators of general physical fitness of Greco-Roman wrestlers at the stage of specialized basic training (n = 30)

Indicators	$\bar{o}$	S	m	V, %
60 m race, s	9,68	0,52	0,10	5,40
Long jump from a standing position, cm	240,73	9,54	1,74	3,96
High jump from a standing position, cm	49,93	4,77	0,87	9,55
800 m run, s	182,07	10,89	1,99	5,98
Pull-ups on the crossbar, number of times	20,03	3,05	0,56	15,20

and left (V = 6.52% and V = 7.44%, respectively). The tests of flips on the wrestling bridge and running around the hands are specialized for wrestlers, therefore they have close coefficients of variation, although somewhat increased, which indicates a different level of preparedness of the athletes. The coefficients of variation are small in the tests of somersaults and jumps with rotations, due to the fact that they are more general and standard for athletes and therefore the level of coordination preparedness of the wrestlers is almost the same.

Special strength qualities were assessed by tests of maintaining an angle of 900 from a hanging position (V = 19.07%), maintaining a rollover protection position (V = 17.53%). From the indicators of the coefficients of variation, it is clear that the level of strength training of wrestlers is quite heterogeneous.

As can be seen when comparing the indicators, the coefficients of variation that assess the special physical capabilities of Greco-Roman wrestlers are higher than when assessing general physical qualities.

Table 3

Indicators of special physical fitness of Greco-Roman wrestlers at the stage of specialized basic training (n = 30)

Indicators	$\bar{\tilde{o}}$	S	m	V, %
Flexion-extension of arms in a prone position for 20 seconds, number of times	25,93	2,18	0,40	8,41
Pull-ups on the crossbar in 20 seconds, number of times	12,07	2,08	0,38	17,27
Lifting the torso from a supine position in 20 seconds, number of times	20,27	2,43	0,44	12,01
Rope climbing 5 m, s	10,39	0,82	0,15	7,92
10 throws of the partner (dummy) with deflection, s	30,56	6,56	1,20	21,45
10 throws of the partner (dummy) with a turn, s	29,33	2,77	0,50	9,43
Partner (dummy) throws 20 sec, number of times	6,70	1,21	0,22	18,03
Head-to-toe flips to wrestling bridge and back 10 times, s	25,80	4,78	0,87	18,53
Running with a side step around the hands 10 times, s	18,21	3,16	0,58	17,35
10 forward somersaults, s	12,39	0,67	0,12	5,43
Jumps with right turns, degrees	388,50	25,32	4,62	6,52
Jumps with left turns, degrees	397,93	29,62	5,41	7,44
Maintaining a 90 degree angle from a hanging position, s	17,57	3,35	0,61	19,07
Hold position of rollover protection, s	50,15	8,79	1,61	17,53

Table 4

Indicators of special endurance of Greco-Roman wrestlers at the stage of specialized basic training (n = 30)

Number of exercises performed	$\bar{\tilde{o}}$	S	m	V, %
For 1 period	30,27	3,19	0,58	10,55
For 2 period	25,17	3,60	0,66	14,31
For 3 period	22,20	3,56	0,65	16,02
Total for all periods	77,63	10,14	1,85	13,06
Endurance factor	0,78	0,05	0,01	6,64

In our opinion, this may be due to some differences in the level of special training and different levels of qualification of wrestlers of this group.

One of the most important indicators of a wrestler's special physical fitness is special endurance. Table 4 presents the measurement data and mathematical processing of the results of the test to determine the level of special endurance of wrestlers. This test was specially developed taking into account the requirements of modern competitive activity. The test performance methodology and standardization of the testing procedure are described and published in the scientific and methodological literature on wrestling [4].

Analyzing the indicators of special endurance (Table 4), we see that the number of repetitions of standard exercises (technical actions) performed from period to period decreases: in the second period in relation to the first by 5.1 techniques, or by 16.8%; in the third period in relation to the second by almost 3 techniques, or by 11.8%. If in the first period the wrestlers performed on average almost 39% of all work, then in the second – 32.4%, and in the third already 28.6%. Thus, from the first to the third period, the amount of work performed decreases by almost 10%. This undoubtedly indicates the increasing fatigue of athletes as they perform the exercises of the special test.

It should be noted that the coefficient of variation of the number of performed test exercises in the first period is 10.5%, and in the second and third it increases to 14.3% and 16%, respectively. This indicates a noticeable difference in the special endurance of wrestlers at the stage of specialized basic training.

Thus, the studies have shown that the selected group of athletes is homogeneous in terms of the level of physical development, general and special physical fitness. The measured indicators of wrestlers generally correspond to the normal distribution law, and the data sets

can be processed by standard methods of mathematical statistics.

The greatest variability is observed in the indicators of special physical fitness, among which strength, speed-strength qualities and special endurance should be distinguished, which indicates noticeable differences in the special physical fitness of Greco-Roman style wrestlers at the stage of specialized basic training. Wrestlers of this group have significant reserves of preparedness and, as a result, strength, speed-strength qualities and special endurance, which are closely related to the style of conducting a competitive duel, require targeted development in accordance with the requirements of modern competitive activity.

The obtained quantitative data can be used to construct indicative scales of indicators of special physical preparedness of Greco-Roman style wrestlers at the stage of specialized basic training.

Thus, according to medical examinations, the level of physical development and physical preparedness, the selected group of athletes was quite suitable for conducting a formative pedagogical experiment.

Discussion

The results of the study, obtained during the ascertaining experiment, allowed us to establish that in terms of physical development indicators, wrestlers aged 16-17 are within the normal range for this age. These results are consistent with previous studies by V. Andriytsev [4] and S. Latyshev [16], which state a sufficient level of physical development of wrestlers at this age.

It was established that in terms of general physical fitness, wrestlers are mainly at an average level of development of physical qualities. However, the level of development of strength qualities in 34% of athletes is below average, which is associated with two factors – the presence of weight categories in wrestlers and the level of their fitness. These results confirm the opinion of Yu. Tropin [17] and E. Demirkan, M. Kutlu [18] about the need for emphasized development of strength qualities of wrestlers of different martial arts styles.

Regarding the special physical fitness of Greco-Roman wrestlers, it can be stated that the level of development of speed-strength, strength qualities and special endurance is quite heterogeneous, taking into account the indicators of the coefficients of variation. When distributing athletes by level, it was found that 15% of them were at a low level, 33% – below average. In our opinion, this may be due to some differences in the level of special fitness and different levels of qualification of wrestlers of this group.

Studies confirm the opinion of V. Voronyi, O. Lukina [19], G. Korobeynikova, S. Latysheva [20] and E. Durukan, G. Gokhan Aydin [21] that a more targeted influence on the development of special physical qualities is necessary, which are closely related to the technical and tactical fitness of wrestlers and affect the manifestation of the individual style of conducting a competitive duel.

Thus, Greco-Roman wrestlers at the stage of specialized basic training differ significantly in terms of their level of preparedness, and the level of development of their strength, speed-strength qualities and special endurance is insufficient to maintain the pace of the fight throughout the fight, as well as to perform effective and productive technical and tactical actions. Therefore, wrestlers aged 16-17 have significant reserves of preparedness and this requires targeted pedagogical influence.

Conclusions

The level of physical development, general, special physical fitness and indicators of competitive activity of qualified wrestlers at the stage of specialized basic training were studied. The obtained data corresponded to the normal distribution law, and the data sets were processed by standard methods of mathematical statistics.

The indicators of physical development and physical fitness of all athletes of the group were within the normal range for this stage of training. The coefficients of variation of physical development indicators were from 3.07% to 8.89% (excluding the weight of wrestlers and vital capacity); general physical fitness from 3.96% to 15.2%; special physical fitness was in the range from 5.43% to 19.07% (except for the 10-throw deflection test – 21.45%); special endurance from 6.64% to 16.02%; competitive activity from 5.86% to 15.68% (also except for one indicator – performance in the stand – 26.23%). So, basically the coefficients of variation were less than 20%. This confirms the fact of the relative homogeneity of the group according to all measured indicators. The relatively greater variability of the indicators of special preparedness and competitive activity indicates noticeable differences in special preparedness and the ability to realize their potential in a fight, and the wrestlers of this group have significant reserves of preparedness. The results of the conducted study reveal the need to improve the training process of Greco-Roman wrestlers at the stage of specialized basic training, taking into account the data of the ascertaining experiment. In general, the considered data on the analysis of the level of physical development, general and special physical preparedness of Greco-Roman wrestlers can be integrated into scientific developments of training and competitive processes for the preparation of qualified wrestlers of different martial arts styles to ensure successful competitive activity.

Conflict of interest

The authors declare that there is no conflict of interest.

Література

1. Ulupınar S, Özbay S, Gençoğlu C, İnce İ. Performance Differences Between Greco-Roman and Freestyle Wrestlers: A Systematic Review and Meta-Analysis. The Journal of Strength and Conditioning Research. 2021;35(11):3270-3279. Доступно: https://doi.org/10.1519/JSC.0000000000004129
2. Basar S, Duzgun I, Guzel NA, Cicioğlu I, Çelik B. Differences in strength, flexibility and stability in freestyle and Greco-Roman wrestlers. J Back Musculoskelet Rehabil. 2014;27(3):321-30. Доступно: https://doi.org/10.3233/BMR-130451.
3. Греко-римська боротьба: Навчальна програма для дитячо-юнацьких спортивних шкіл, спеціалізованих дитячо-юнацьких спортивних шкіл олімпійського резерву, шкіл вищої спортивної майстерності та спеціалізованих навчальних закладів спортивного профілю. К., 2010. 60 с.
4. Андрійцев В. Удосконалення техніко-тактичних дій борців вільного стилю на етапі спеціалізованої базової підготовки: автореф. дис. на соискание учен. степени канд. физ. воспитания и спорта: спец. 24.00.01. «Олімпійський і професійний спорт». Київ., 2016. 22 с.
5. Лукіна О, Вороний В. Особливості змагальної діяльності борців греко-римського стилю. Спортивний вісник Придніпров'я. 2019. № 2. С. 21-29. Доступно: http://infiz.dp.ua/misc-documents/2019-02/2019-02-03.pdf
6. Light O, Cicioglu K, Gul M, Alpay B. Development of the wrestling competition analysis form according to the latest competition rules. *International Journal of Wrestling Science*. 2017; 7 (1-2): 41-45. Доступно: https://doi.org/10.1080/21615667.2017.1422815
7. Omelchenko O, Afanasiev S, Savchenko V, Mikitchik O, Lukina O, Solodka O, Mischak O. Preparation of athletes in cyclic sports taking into account the functional state of the external respiratory system and cardiovascular system. *Pedagogy of physical culture and sports (Pedagogics, psychology, medical-biological problems of physical training and sports),* 2020;24(2):93-99. Доступно: https://doi.org/10.15561/26649837.2020.0207
8. Лукіна О, Стрельчук С, Чикольба Г, Новіков В, Кусовська О. Фізичний розвиток, фізична та техніко-тактична підготовленість тхеквондистів кадетів на етапі спеціалізованої базової підготовки. *Спортивний вісник Придніпров'я*. Дніпро, 2021. № 1. С. 72-83. Доступно: DOI: 10.32540/2071-1476-2021-1-072
9. Barbado D, Lopez-Valenciano A, Juan-Recio C, Montero-Carretero C, van Dieën JH, Vera-Garcia FJ. Trunk stability, trunk strength and sport performance level in judo. PLoS ONE. 2016;11(5):0156267. Доступно: https://doi.org/10.1371/journal.pone.0156267.

References

22. Ulupınar, S., Özbay, S., Gençoğlu, C., & İnce, İ. (2021). Performance differences between Greco-Roman and freestyle wrestlers: A systematic review and meta-analysis. *The Journal of Strength and Conditioning Research, 35*(11), 3270–3279. Available at: https://doi.org/10.1519/JSC.0000000000004129
23. Basar, S., Duzgun, I., Guzel, N. A., Cicioğlu, I., & Çelik, B. (2014). Differences in strength, flexibility and stability in freestyle and Greco-Roman wrestlers. Journal of Back and Musculoskeletal Rehabilitation, *27*(3), 321–330. Available at: https://doi.org/10.3233/BMR-130451
24. Greco-Roman Wrestling: Curriculum for Children's and Youth Sports Schools, Specialized Children's and Youth Olympic Reserve Sports Schools, Schools of Higher Sports Mastery, and Specialized Educational Institutions of Sports Profile. (2010). Kyiv. 60 p.
25. Andriitsev, V. (2016). Improvement of technical and tactical actions of freestyle wrestlers at the stage of specialized basic training (Abstract of dissertation for the degree of Candidate of Physical Education and Sport, specialty 24.00.01 – Olympic and Professional Sport). Kyiv. 22 p.
26. Lukina, O, & Voronyi, V. (2019). Features of competitive activity of Greco-Roman style wrestlers. *Sports Bulletin of the Dnieper Region, 2*, 21–29. Available at: http://infiz.dp.ua/misc-documents/2019-02/2019-02-03.pdf
27. Light, O., Cicioglu, K., Gul, M., & Alpay, B. (2017). Development of the form of wrestling competition analysis according to the latest competition rules. *International Journal of Wrestling Science, 7*(1–2), 41–45. Available at: https://doi.org/10.1080/21615667.2017.1422815
28. Omelchenko, O., Afanasiev, S., Savchenko, V., Mikitchik, O., Lukina, O., Solodka, O., & Mischak, O. (2020). Preparation of athletes in cyclic sports taking into account the functional state of the external respiratory system and cardiovascular system. *Pedagogy of Physical Culture and Sports, 24*(2), 93–99. Available at: https://doi.org/10.15561/26649837.2020.0207
29. Lukina, O., Strelchuk, S., Chykolba, H., Novikov, V., & Kusovska, O. (2021). Physical development, physical and technical-tactical preparedness of cadet taekwondo athletes at the stage of specialized basic training. *Sports Bulletin of the Dnieper Region, 1*, 72–83. Available at: https://doi.org/10.32540/2071-1476-2021-1-072
30. Barbado, D., Lopez-Valenciano, A., Juan-Recio, C., Montero-Carretero, C., van Dieën, J. H., & Vera-Garcia, F. J. (2016). Trunk stability, trunk strength and sport performance level in judo. *PLoS ONE, 11*(5), e0156267. Available at: https://doi.org/10.1371/journal.pone.0156267

10. Kozina Z, Pustomelnik O, Boychuk Y, Kozin O, Sobko I, Polishchuk S, Shyyan O. Impact of the use of training programs for mixed martial arts qualified fighters with different fighting styles on the efficiency of competitive activity. Journal of Physical Education and Sport. 2025; Vol.25(issue 7),Art153,1375-1384. Доступно: https://doi.org/10.7752/jpes.2025.07153
11. Берінчик Д. Структура змагальної діяльності й особливості прояву спеціальної працездатності кваліфікованих боксерів: автореф. дис. на соискание учен. степени канд. физ. воспитания и спорта: спец. 24.00.01. «Олимпийский и профессиональный спорт». Київ, 2017. 29 с.
12. Вільна боротьба: Навчальна програма для дитячо-юнацьких спортивних шкіл, спеціалізованих дитячо-юнацьких шкіл олімпійського резерву, шкіл вищого спортивного профілю. Київ: АСБУ, 2012. 95 с.
13. Majeed A, Kaur R, Kaur S, Singh S. Analysis of Coordination Abilities, Balance and Reaction Times among Wrestlers from Varying Weight Categories. Journal of Propulsion Technology. 2025;46(3):258-264.
14. McGowan C, Pyne D, Thompson K, Rattray B. Warm-up strategies for sport and exercise: mechanisms and applications. Sports Med. 2015;45:1523-46. Доступно: https://doi.org/10.1007/s40279-015-0376-x.
15. Abdullayev I. Improvement of the special physical training model of Greco-roman junior wrestlers. Mental Enlightenment Scientific-Methodological Journal. 2023;Volume04,Issue02,9-20. Доступно: https://doi.org/10.37547/mesmj-V4-I2-02
16. Латишев С. Науково-методичні основи індивідуалізації підготовки борців: автореф. дис. на здобуття наук. ступеня докт. наук з фіз. виховання і спорту: спец. 24.00.01 – «Олімпійський і професійний спорт». Київ, 2014. 39 с.
17. Тропін Ю. Вдосконалення спеціальної фізичної та техніко-тактичної підготовки кваліфікованих спортсменів у греко-римській боротьбі з урахуванням різних стилів протиборства: автореф. дис. на здобуття наук. ступ. канд. наук з фізич. вих. та спорту: спец. 24.00.01 «Олімпійський і професійний спорт». Харків, 2016. 22 с.
18. Demirkan E, Kutlu M, Koz M, Ózal M, Favre M. Physical fitness differences between Freestyle and Greco-Roman junior wrestlers. Journal of Human Kinetics. 2014 Jun 28; 41: 245-251.
19. Voronyi V, Lukina O, Kovalenko N, Kusovska O, Chykolba H, Ungurean B. Expert assessment of technical preparedness indicators of qualified Greco-Roman style wrestlers at the stage of specialized basic training. *Спортивний вісник Придніпров'я.* Дніпро, 2021. № 1. С. 18-28. Доступно: DOI: 10.32540/2071-1476-2021-1-018
31. Kozina, Z., Pustomelnik, O., Boychuk, Y., Kozin, O., Sobko, I., Polishchuk, S., & Shyyan, O. (2025). Impact of the use of training programs for mixed martial arts qualified fighters with different fighting styles on the efficiency of competitive activity. *Journal of Physical Education and Sport, 25*(7), Article 153, 1375–1384. Available at: https://doi.org/10.7752/jpes.2025.07153
32. Berinchyk, D. (2017). Structure of competitive activity and features of manifestation of special working capacity of qualified boxers (Abstract of dissertation for the degree of Candidate of Physical Education and Sport, specialty 24.00.01 – Olympic and Professional Sport). Kyiv. 29 p.
33. Freestyle Wrestling: Curriculum for Children's and Youth Sports Schools, Specialized Children's and Youth Olympic Reserve Sports Schools, and Higher Sports Profile Schools. (2012). Kyiv: ASBU. 95 p.
34. Majeed, A., Kaur, R., Kaur, S., & Singh, S. (2025). Analysis of coordination abilities, balance and reaction times among wrestlers from varying weight categories. *Journal of Propulsion Technology, 46*(3), 258–264.
35. McGowan, C., Pyne, D., Thompson, K., & Rattray, B. (2015). Warm-up strategies for sport and exercise: mechanisms and applications. *Sports Medicine, 45*, 1523–1546. Available at: https://doi.org/10.1007/s40279-015-0376-x
36. Abdullayev, I. (2023). Improvement of the special physical training model of Greco-Roman junior wrestlers. *Mental Enlightenment Scientific-Methodological Journal, 4*(2), 9–20. Available at: https://doi.org/10.37547/mesmj-V4-I2-02
37. Latyshev, S. (2014). Scientific and methodological foundations of individualization of wrestlers' training (Abstract of dissertation for the degree of Doctor of Sciences in Physical Education and Sport, specialty 24.00.01 – Olympic and Professional Sport). Kyiv. 39 p.
38. Tropin, Yu. (2016). Improvement of special physical and technical and tactical training of qualified athletes in Greco-Roman wrestling considering different styles of confrontation (Abstract of dissertation for the degree of Candidate of Sciences in Physical Education and Sport, specialty 24.00.01 – Olympic and Professional Sport). Kharkiv. 22 p.
39. Demirkan, E., Kutlu, M., Koz, M., Ózal, M., & Favre, M. (2014). Physical fitness differences between freestyle and Greco-Roman junior wrestlers. *Journal of Human Kinetics, 41*, 245–251.
40. Voronyi, V., Lukina, O., Kovalenko, N., Kusovska, O., Chykolba, H., & Ungurean, B. (2021). Expert assessment of technical preparedness indicators of qualified Greco-Roman style wrestlers at the stage of specialized basic training. *Sports Bulletin of the Dnieper, 1*, 18–28. Available at: https://doi.org/10.32540/2071-1476-2021-1-018

20. Коробейников Г, Латышев С, Латышев Н, Горащенко А, Коробейникова Л. Общие закономерности ведения соревновательного поединка и универсальные требования к технико-тактической подготовленности борцов высокой квалификации. Физическое воспитание студентов. 2016. № 1. С. 37-42. Доступно: https://dx.doi.org/10.15561/20755279.2016.0105
21. Durukan E, Gokhan Aydin G, Goktepe M, Cicek G, Guder F, Isik O. Comparison of the acute effects of static and dynamic stretching exercises on the balance performance of Turkish wrestlers. BMC Sports Science, Medicine and Rehabilitation. 2025;17:242. Доступно: https://doi.org/10.1186/s13102-025-01293-1
41. Korobeynikov, G., Latyshev, S., Latyshev, N., Gorashchenko, A., & Korobeynikova, L. (2016). General patterns of conducting a competitive fight and universal requirements for the technical and tactical preparedness of highly qualified wrestlers. *Physical Education of Students, 1*, 37–42. Available at: https://doi.org/10.15561/20755279.2016.0105
42. Durukan, E., Gokhan Aydin, G., Goktepe, M., Cicek, G., Guder, F., & Isik, O. (2025). Comparison of the acute effects of static and dynamic stretching exercises on the balance performance of Turkish wrestlers. *BMC Sports Science, Medicine and Rehabilitation, 17*, 242. Available at: https://doi.org/10.1186/s13102-025-01293-1

Отримано/Received: 31.05.2025
Прорецензовано/Reviewed: 26.06.2025
Прийнято/Accepted: 09.09.2025

Як цитувати статтю / How to Cite:

Лукина О, Кусовська О, Махінько М, Шацьких В. Особливості фізичного розвитку та фізичної підготовленості борців на етапі спеціалізованої базової підготовки. Спортивний вісник Придніпров'я. 30, Вересень 2025;(2):159-167. https://doi.org/10.32540/2071-1476-2025-2-159

Lukina O, Kusovska O, Makhinko M, Shatskykh V. Peculiarities of Physical Development and Physical Fitness of Wrestlers at the Stage of Specialized Basic Training. Спортивний вісник Придніпров'я. 2025 Вер 30;(2):159-167. https://doi.org/10.32540/2071-1476-2025-2-159