ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 10,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

TYPES OF DETERMINING THE PHYSICAL DEVELOPMENT OF MIDDLE-DISTANCE RUNNERS

Qoylibayev Bayrambay Dalibayevich

Acting Associate Professor of the Department of Theory

and Methods of Physical Education of KSU, Doctor of Philosophy (PhD)

qoylibaevbayram@gmail.com

Annotation: This article reveals the results of a comparative analysis with the data provided by leading scientists to determine the physical development of middle-distance runners and the effects of physical development, step length, frequency, and running speed.

Keywords: Physical development, athlete, medium distance running, anthropometric indicators, step length, step frequency and running speed.

Аннотация: В этой статье описаны результаты сравнительного анализа с данными, предоставленными ведущими учеными, для опрееделения фиизического развития бегунов на средние дистанции и их влияние на физическое развитие, частоту шагов и скорость бега.

Ключевые слова: Физическое развитие, спортсмен, бег на средние дистанции, антропометрические показатели, длина шага, частота шагов и скорость бега.

Relevance: Physical education and sports serve as a fundamental tool in educating our youth - the future of our nation - to be patriotic, involved in state development, and socially responsible. From this perspective, one of our main tasks is developing physical education and sports, solving problems in this field, training competitive specialists in physical education and sports, and continuously improving their knowledge and expertise. In this regard, the Resolution of the President of the Republic of Uzbekistan № PD-3031 dated on June 3, 2017, "On Measures for Further Development of Physical Education and Mass Sports" outlines the tasks of developing mass sports and purposefully training capable athletes through multi-year preparation stages after selection.

As we all know, these decrees and resolutions need to be implemented and put into practice. The physical development of middle and long-distance runners is certainly considered one of the important factors. Additionally, their body structure should have well-formed indicators such as height, weight, arm and leg length, and functional indicators including lung capacity, heart rate, arterial blood pressure, and other physiological parameters. These indicators are considered key factors that enable middle and long-distance runners to achieve high-performance results in sports.

Furthermore, these factors contribute to achieving high sports results in middle and long-distance running. Physical development of middle and long-distance runners is directly related

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 10,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

to stride length and frequency, as well as speed. Therefore, these indicators should be taken into account when selecting middle and long-distance runners. Moreover, considering physical development and functional indicators, like other factors, when planning training loads for them is currently one of the urgent theoretical and practical issues in the field.

The physical development of middle-distance runners is characterized by ongoing growth and development processes due to the young age of athletes' organisms. This is marked by steady and uniform growth conditions in specific organs and systems, and simultaneously coincides with sexual maturation and its completion. In this regard, changes in body structure are clearly visible in the sexual and individual characteristics of the organism. At this age, vertical growth slows down, and the body begins to develop more in width. The physical differences between adolescent boys and girls reach their maximum. Young males surpass girls in height growth and body weight. Adolescent boys are (on average) 10-12 cm taller and 5-8 kg heavier than girls, with their muscle mass being 13 percent higher relative to total body mass, while their subcutaneous fat tissue mass is 10 percent lower compared to girls.

Additionally, adolescent males have a slightly shorter torso, while their arms and legs are longer compared to girls. The final stage of human organism development begins from 18-20 years and continues until 25-28 years of age. [2, 75-76.].

In medical practice, children between 15 and 18 years of age are considered adolescents. From a biological perspective, this period extends from the beginning of sexual maturity until its completion. This period is characterized by differences in maturation processes and development between boys and girls, and furthermore, by significant individual variations in organism development. During adolescence, the hormonal restructuring and formation of male and female sex characteristics in the organism reaches its completion. Sexual differences become clearly visible in all aspects of life functions. The distinctive features of male body structure include broad shoulders, chest cavity, and narrow pelvis. Girls' physique is characterized by fullness, with hip circumference distinctly different from shoulder width circumference. Adolescents' bones become somewhat thicker and stronger, though the ossification process hasn't completely stopped. The spinal column becomes more stable, while the chest cavity continues to develop rapidly. During this time, they are less susceptible to deformation, and can even withstand and endure considerable weight-bearing loads and stresses. [3, 79-80];.

At this time, muscle structure development is essentially complete.

- In girls, muscle mass formation is completed by age 15, while in boys it approaches adult indicators by age 18. In this case, boys' muscle strength is approximately 30 percent greater than that of girls.

Muscle endurance continues to increase until ages 20-30. The growth and developmental conditions during pre-puberty and puberty can sometimes potentially have adverse effects on adolescent health. This is where medical challenges of this period arise. This is because different body organs and systems do not develop uniformly at the same time. The maturation of certain organs may advance ahead of overall development, while others may lag behind, resulting in temporary disruption of the organism's optimal functioning. According to

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 10,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

physiologists, this situation is most commonly observed in the cardiovascular system function, and as V.I. Dubrovsky demonstrated in his research, this occurs when heart growth either outpaces or lags behind the development of the vascular system. In most cases, these functional disruptions cease after the organism's formation is complete.

For female middle-distance runners aged 17-20 years, the Vital Lung Capacity (VLC) averages from 3200 ml to 4200 ml, while for males it ranges from 4000 ml to 4900 ml. Their maximum lung ventilation increases and reaches 81 and 75 ml per minute. The total and relative lung capacity indicators continue to increase. Thus, adult athletes are characterized by greater additional capabilities of lungs and respiratory organs. Many scientists have conducted research to study the physical development or morphological indicators of middle-distance runners in the athlete training system. According to data provided by V.D. Syachin, the height of middle-distance runners aged 18-20 years averaged 176.87 ± 4.51 cm, while body weight was shown to be 66.61 ± 5.1 kg. Regarding chest circumference, middle-distance runners showed measurements of 92.84 ± 2.71. According to his data, leg length was 95.37 ± 3.49 cm. Thigh circumference was shown to be 53.71 ± 2.35 cm. When we comparatively analyzed these data with the athletes involved in our research, among the 24 middle-distance runners studied, the average height was observed to be 173.9 ± 2.38 cm. Body weight was determined to average 60.3 ± 3.49 kg in the study.

The torso length was found to be 90.5 ± 2.23 cm in the study. The next experiment on leg length showed it to be 83.9 ± 2.40 cm. In the research conducted to determine leg length, our athletes showed longer torso length compared to leg length than other athletes. This indicates a connection with the athlete's origin, geographical location, and climatic conditions. Chest width was observed to be 90.5 ± 2.38 cm.

The results obtained by us regarding physical development are presented in Table 1.

Table 1
The dynamics of physical development of the subjects in the experimental group before the study.

№	Indicators S. N	Body length (cm)	Body weight (kg)	Waist length (cm)	Leg length (cm)	When breathing (cm)	Expiration (cm)	At rest (cm)
1	B.A.	178	64	96	82	97	94	96
2	K.J.	174	63	90	84	93	88	90
3	S.A.	172	61	87	85	91	86	88
4	A.B.	173	56	89	84	93	87	90
5	A.R.	177	58	91	86	96	91	92
6	S.J.	175	67	95	80	97	91	93
7	J.A.	172	57	90	82	93	87	90

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23

American Academic publishers, volume 05, issue 10,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

8	A.K.	170	56	89	81	91	86	89
9	B.S.	176	62	93	83	94	88	91
10	A.P.	176	64	92	84	95	89	92
11	O.R.	173	59	90	83	92	86	89
12	R.N.	171	56	89	92	90	84	87
13	U.A.	173	61	91	82	94	94	96
14	A.G.	176	62	90	86	93	88	90
15	T.S	171	58	89	82	90	86	88
16	M.N.	170	55	87	83	88	87	90
17	J.T.	176	60	91	85	92	91	92
18	N.I.	172	58	89	83	91	91	93
19	B.A.	177	60	92	85	96	87	90
20	A.S.	172	60	91	84	93	86	89
21	D.S.	174	58	88	86	92	88	91
22	J.K.	177	64	91	86	96	89	92
23	K.D.	175	68	91	82	93	86	89
24	S.B.	174	62	89	85	93	84	87
Average scores		**173,9± 2,38**	**60,3± 3,49**	**90,5± 2,23**	**83,9± 2,40**	**93,0± 2,31**	**88,0± 2,72**	**90,5± 2,38**

When comparing our results with V.D. Syachin's data, while we were 3 cm behind in height, there was a 6 kg difference in body weight, and no significant difference was found in chest width. During the research, main differences were observed in leg length. A 10-12 cm difference was found compared to leg length data provided by V.D. Syachin. In the study determining torso development, while their measurement was 81.5 cm, our athletes showed 90.5 ± 2.23 cm. The main difference in the study is distinguished by up to 9.0 cm in torso length. Comparative analysis of research results shows that our athletes' physical development differed from other athletes in height and torso length. This indicates that 800-meter runners have a lower center of gravity compared to other athletes. This has great significance in sports, affecting stride length frequency, and running speed. Because in 800m running, high sports performance is directly related to physical development - aspiring athletes in 800m running maintain an average speed of 7.15 m/s throughout the distance, with stride lengths of 165-172

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 10,2025
Journal: https://www.academicpublishers.org/journals/index.php/ijai

cm. Step frequency equals 4.10-4.05 m per minute. After the start, when running speed averages 7.20 m/s, stride length is 165-173 cm, and step frequency equals 4.10-4.05 per minute. When entering the final stretch, at a running speed of 7.20 m/s, average stride length is 168-175 cm. Step frequency is 4.12-4.06 per minute. Of course, the athlete's physical development, like other factors, contributes to improving sports results.

Conclusion. The pedagogical experiment results on determining physical development allowed us to reach the following conclusions:

- Analysis of scientific methodological literature showed that there isn't sufficient literature developed regarding the physical development status of 800m runners.

- In orienting middle-distance runners through multi-year training stages, it's necessary to properly establish the selection of capable athletes from participants. Because in the training system for middle and long-distance runners, stride length frequency and number of steps are of great importance for athletes with greater height, broad chest width, and longer legs compared to torso, enabling them to achieve high sports results.

When orienting middle-distance runners for 800-1500m, anthropometric indicators should be considered first. This means it's necessary to consider physical development like other factors when planning training loads in the athlete training system. Because these factors are directly related to planning. This ensures the effectiveness of training great athletes for our future.

References:

1. Ўзбекистон Республикаси Президентининг 2017 йил 3 июндаги “Жисмоний тарбия ва оммавий спортни янада ривожлантириш чора-тадбирлари тўғрисида”ги ПҚ-3031-сон Қарори.
2. Бондарчук, А.П. Управление тренировочным процессом спортсменов высокого класса / А. П. Бондарчук. – М. : Олимпия Пресс, 2007. – 272 с.
3. Ивочкин В.В., Травин Ю.Г., Королев Г.Н., Семаева Г.Н. Легкая атлетика: бег на средние и длинные дистанции, спортивная ходьба: Примерная программа спортивной подготовки для детско-юношеских спортывных школ, специализированных детско-юношеских школ олимпийского резерва. – М.: Советский спорт, 2009. - 108 с.
4. Полунин А.И. Школа бега Вячеслава Евстратова. Советский спорт. – М.: 2013 й. 135 с
5. Солиев И.Р. Қисқа масофаларга югуришда спортчиларни техник тайёргарлик даврида старт реакцияларини такомиллаштиришни таҳлил қилиш. // ФАН-СПОРТГА илмий – назарий журнал. Тошкент. 2018 йил 2 сон. 56-60 бетлар.
6. Солиев И.Р. Юқори малакали узоқ масофага югурувчи спортчи қизларни тайёргарлик машғулотлари ва мусобақа жараёнининг қиёсий таҳлили. // ЎзМУ ХАБАРЛАРИ. Тошкент. 2018 йил №1/1 2018й. 171-174 бетлар.
7. Хайдаров Б.Т., Легкая атлетика: программа для детского-юношеских спортивных школ, специализированных детско-юношеских школ олимпийского резерва. – Т.: ILMIY TEXNIKA AXBOROTI – PRESS NASHRIYOTI, 2017. – 148 с.

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 10,2025
Journal: https://www.academicpublishers.org/journals/index.php/ijai

8. Olimov M.S., O‘rta masofaga yuguruvchi sportchilarda jismoniy tayyorgarlik darajasini shakllanganlik darajasi. Fan sportga 2021/2. 15-18 bet.
9. Olimov M.S., Soliyev I.R., Haydarov B.Sh. / Darslik. Sport pedagogik mahoratini oshirish. – T.: 2017. – 318 b.
10. Olimov M.S., To‘xtaboyev N.T., Soliyev I.R., Ortiqov X.T. /O‘rta va uzoq masofalarga yugurish uslubiyati. O‘quv qo‘llanma. “Fan va texnoligiya”, –T.: 2016. 156 bet.
11. Olimov M.S., Yengil atletikachilarni ko‘p yillik tayyorgarlik bosqichlarida mashg‘ulot yuklamalarini taqsimlash va boshqarish texnologiyasi. Pedagogik mahorat 3 (79) 2021. 250-253 bet.
12. Shakirjanova K., Soliyev I., Olimov M., Baratov A., Akmanov B., Saydkulov Z., Pedagogical technologies and interactive methods as a factor of increasing special knowledge of students. Journal of Critical Reviews., 2020; 7(6): 42-46.doi:10.31838/jcr.07.06.10. http://www.jcreview.com/?mno=101674
13. Soliev I., Khaydrov B., Mirzatillayev I., Khujamkeldiyev G., Ziyayev F., Functional training level of runners student-athletes sprinters. // International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 05, 2020, http://www.psychosocial.com/article/PR201878/17061/
14. Otarbaeva, G. ., & Utegenov , J. . (2025). METHODOLOGY FOR DEVELOPING THE ROLE OF EQUILIBRIUM AND COORDINATION ABILITIES OF ACADEMIC ROWERS AT THE PRIMARY PREPARATION STAGE. Journal of Multidisciplinary Sciences and Innovations, 1(3), 135–141. Retrieved from https://inlibrary.uz/index.php/jmsi/article/view/102529