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# METHODOLOGY FOR DEVELOPING OPTIMAL RUN-UP PARAMETERS FOR YOUNG LONG JUMPERS

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## ABOUT ARTICLE

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**Abstract:** This article focuses on determining the optimal run-up characteristics for young long jumpers. The methodology is primarily developed based on the training principles of highly qualified athletes. The purpose of the study is to develop a method for determining the run-up length of young long jumpers. The main objective was to calculate optimal run-up parameters for the long jump, which made it possible to achieve high athletic performance. The research methods and organization included theoretical analysis and synthesis of literature sources, pedagogical assessments, a pedagogical experiment, and mathematical and statistical methods. The study involved young long jumpers aged 13–17 years. The results of a total of 24 athletes from the athletics sports school of the Chirchik Olympic and Paralympic Reserve Training Center were identified and reprocessed.

**Introduction.** This study is aimed at improving the training process of young athletes under the conditions of modern development trends in athletics. The reforms being implemented in the sports system of Uzbekistan, particularly the state policy focused on the development of children's and youth sports, require the introduction of new scientific approaches in this field. In this regard, the issue of optimizing run-up parameters in the long jump is of particular relevance. The results of the study are expected to contribute to increasing the effectiveness of sports training.

First of all, special importance is attached to Resolution No. PQ-221, adopted on July 8, 2025, titled “On Measures for the Comprehensive Preparation of Uzbekistan’s Athletes for the XXXIV Summer Olympic and XVIII Paralympic Games”. This resolution outlines tasks such as classifying sports disciplines into priority, promising, and developing categories, identifying talented young athletes, and improving mechanisms for their stage-by-stage preparation.

In long jump performance, the optimal length of the run-up and the accuracy of reaching the take-off board depend on the athlete’s ability to adequately assess changing conditions and maintain the stability of run-up parameters, especially during the final strides. These characteristics have mainly been studied in highly qualified long jumpers, and the findings have been transferred to the training of young athletes. However, additional scientific research is required to determine precise run-up parameters specifically for young long jumpers.

Purpose of the Study

The purpose of this study is to develop a method for determining the run-up length in young long jumpers.

Objectives of the Study

The objectives of the study are as follows:

- to determine the optimal run-up length in young long jumpers;
- to develop a method for identifying the run-up length in young long jumpers.

Research Methods

The following research methods were applied in the study: theoretical analysis and generalization of scientific literature, control tests, pedagogical experiments, and methods of mathematical statistics. The study was conducted in 2025 and involved 24 athletes from a sports school.

**Results and Discussion.** In long jump performance, run-up speed and step accuracy play a crucial role. According to our data, the accuracy of determining the run-up distance increased with age (Table 1). Thirteen-year-old jumpers deviated from the ideal take-off point by an average of 15.4 cm. At the age of 15, this indicator decreased to 10.5 cm, and by the age of 17 it reached 5.2 cm. Statistically significant changes were identified at the ages of 16 and 17 (at the 5% significance level).

**Table 1**

Age dynamics of run-up parameters in long jump among young athletes (six attempts)

Age (years) Number of athletes Take-off accuracy (cm) Standard deviation Coefficient of variation (%) Percentage of jump distance Reproducibility coefficient Percentage of unsuccessful attempts

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 13 | 15 | 15.4 | 8.3 | 53.9 | 3.0 | 0.74 | 32.2 |
| 14 | 13 | 13.7 | 7.2 | 52.6 | 2.5 | 0.83 | 29.5 |
| 15 | 16 | 10.5 | 4.7 | 44.8 | 1.8 | 0.82 | 24.0 |
| 16 | 14 | 7.3 | 2.2 | 30.1 | 1.2 | 0.85 | 21.4 |
| 17 | 15 | 5.2 | 1.4 | 26.9 | 0.8 | 0.88 | 21.1 |

Note: Statistically significant age-related changes in the results are indicated.

Analysis of the coefficients of variation shows that the level of run-up accuracy was highly variable (26.9–53.9%). This indicator decreased with age, reaching 26.9% by the age of 17. The percentage of distance lost due to incorrect take-off and flight actions ranged from 0.8% to 3.0% depending on age. This value decreased with increasing age, as more skilled long jumpers were able to perform the run-up speed and take-off force more quickly and accurately, resulting in longer jumps.

The reproducibility coefficient of run-up speed and take-off accuracy gradually increased with age and ranged from 0.74 to 0.88 across the analyzed age groups. A high percentage of unsuccessful attempts (67.8–78.9%) significantly reduced long jump performance. This can be explained by the fact that in initial competitions only three attempts are allowed, and one of them is usually unsuccessful.

The reproducibility of run-up speed in long jumpers was determined based on run-up time, while the run-up length remained stable. The results showed that this indicator was unstable (r = 0.64–0.75), particularly among 13–14-year-old athletes. Instability in run-up speed and corresponding step parameters, especially during the final strides, led to a significant decrease in run-up velocity and an increase in muscular tension, ultimately resulting in a loss of jump distance.

The findings of our study indicate that the majority of young jumpers (64.4%) do not possess an optimal run-up length, with most of them using a relatively short run-up. Based on the analysis of run-up time, jump distance, maximal run-up speed, and variations in run-up speed, we arrived at this conclusion.

We determined jump distances in young long jumpers according to the number of run-up steps (ranging from 15 to 22). At the age of 13, athletes achieved the best result in the long jump (5.12 m) using 19 run-up steps; at the age of 14, 20 steps (5.55 m); at the ages of 15 and 16, 21 steps (5.92 m and 6.24 m, respectively); and at the age of 17, 22 run-up steps (6.42 m) (Table 2). According to our data, as age increases, the number of run-up steps that ensures higher long jump performance also increases (from 19 to 22 steps).

**Table 2**

Jump Distance as Affected by the Number of Run-Up Steps in Young Long Jumpers

| Age (years) | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|
| Jump distance (m) | | | | | | | | |
| 13 | 4.61 | 4.86 | 4.92 | 5.03 | 5.12 | 5.10 | 5.05 | – |
| 14 | 4.91 | 5.03 | 5.24 | 5.38 | 5.50 | 5.55 | 5.53 | 5.47 |
| 15 | – | 5.30 | 5.50 | 5.71 | 5.82 | 5.87 | 5.92 | 5.90 |
| 16 | – | – | 5.85 | 6.01 | 6.07 | 6.15 | 6.24 | 6.17 |
| 17 | – | – | – | 6.10 | 6.15 | 6.27 | 6.34 | 6.42 |

Analysis of individual run-up length indicators shows that the number of run-up steps does not always correspond strictly to age-related norms. Therefore, it is necessary to take into account athletes' speed abilities and, above all, their level of sports proficiency. The integration of age-related capabilities with technical skill level allows for a more accurate determination of the optimal number of run-up steps that ensure high athletic performance.

Analysis of the length of the final four run-up steps demonstrated that the fourth, third, and second steps (counting from the take-off board) were approximately equal in length. Their average values were 197.5 cm at the age of 13, 202.2 cm at 14, 206.0 cm at 15, 210.7 cm at 16, and 214.8 cm at 17. This pattern leads to an increase in running cadence during the final step of the run-up.

The results of the study indicate that sprint time over 30 meters from a high start in motion is strongly associated with jump distance ($r = 0.825–0.877$). With increasing age, the influence of this indicator on athletic performance became more pronounced.

According to the data obtained, the most optimal run-up speed in the long jump corresponds to 93–95% of maximal speed, which athletes reach at approximately the 4th second of the run. Most jumpers apply a gradual acceleration strategy, which allows for greater movement stability. In young long jumpers, this approach typically involved 19 run-up steps, enabling full mobilization of force before take-off. Thus, the optimal run-up duration should range between 4 and 5 seconds.

The run-up duration in long jump was found to be 4.3–4.5 seconds at the ages of 13–14 and 4.5–4.9 seconds at the ages of 15–17. These indicators significantly affected jump distance and allowed for effective control of run-up duration during training and competition.

Proposed Method for Determining Optimal Run-Up Length

We propose the following method for determining optimal run-up length in the long jump. First, a 30-meter sprint test from a high start in motion is conducted to determine

athletes' speed capabilities. Based on these results, the optimal run-up length is identified using Table 3.

Flags are then placed at intervals of 2.5–3.0 meters, with the midpoint of the track aligned with the end of the marked segment from the take-off board. The athlete runs the segment in reverse direction using a gradual acceleration strategy. At the end of the run-up, the athlete takes off between the flags, while the run-up begins from the take-off board.

**Table 3**

Optimal Run-Up Length in Long Jump Depending on Athletes' Speed Capabilities

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 30 m sprint from high start (s) | 4.4 | 4.3 | 4.2 | 4.1 | 4.0 | 3.9 | 3.8 | 3.7 | 3.6 |
| Run-up length (m) | 30.0 | 31.2 | 32.4 | 33.7 | 35.0 | 36.4 | 37.8 | 39.2 | 40.7 |

Once the run-up length is determined, the athlete performs the approach in the standard direction, during which the length is refined and adjusted. This approach allows for effective optimization of run-up parameters in the long jump.

Pedagogical Experiment

A six-month pedagogical experiment was conducted to evaluate the effectiveness of applying optimal run-up characteristics in long jump training. The study involved two groups of 13–14-year-old athletes with approximately equal age, physical, and technical preparedness. Each group consisted of 12 participants, totaling 24 young long jumpers.

In the experimental group, run-up parameters were adjusted according to the proposed methodology, individual run-up lengths were selected, and the dynamics of run-up speed development were determined. The pedagogical experiment revealed a significant increase in jump distance in the experimental group (9.8%, $p < 0.01$). Run-up length increased by 1.6 m, the percentage of successful attempts rose to 79.1%, and overall performance consistency improved. In contrast, changes observed in the control group were less pronounced.

**Results.** The percentage of jump distance lost due to inaccurate take-off averaged between 0.8% and 3.0%, depending on age, and decreased as athletes matured. A low success rate (67.8–78.9%) had a significant negative impact on performance outcomes. The majority of young jumpers (64.4%) did not possess run-up lengths appropriate to their capabilities, with most using excessively short approaches.

Using the proposed method—measuring 30-meter sprint time from a high start and determining corresponding run-up length—athletes in the experimental group demonstrated a statistically significant improvement in long jump performance (9.8%, $p < 0.01$). Run-up

length increased by 1.6 meters, the percentage of successful attempts reached 79.1%, and take-off accuracy improved considerably. These changes were less evident in the control group.

**Conclusion.** The proposed methodological approach optimizes run-up technique parameters essential for young long jumpers, particularly by regulating rhythm and step frequency during the acceleration phase. This ensures accurate arrival at the take-off point, promotes stability in placing the take-off foot on the board, and optimizes jump amplitude and take-off angle. As a result, the approach creates favorable conditions for achieving high athletic performance during both training and competition.

**References:**


1. Каримов Ф. М. и др. БОШЛАНҒИЧ ИХТИСОСЛИК ГУРУҲИДАГИ УЗУНЛИККА САКРОВЧИ ҚИЗЛАРНИНГ ДЕПСИНИШ КУЧИНИ РИВОЖЛАНТИРИШ //Central Asian Research Journal for Interdisciplinary Studies (CARJIS). – 2021. – Т. 1. – №. 4. – С. 119-125.
2. Ch Z. F. YENGIL ATLETIKACHILARNI UZUNLIKKA SAKROVCHANLIGINI MAXSUS MASHQLAR YORDAMIDA RIVOJLANTIRISH //PEDAGOGS jurnali. – 2022. – Т. 18. – №. 1. – С. 183-185.
3. Karimov F. M. UZUNLIKKA SAKROVCHILARNI CHIDAMLIK SIFATINI RIVOJLANTIRISH ME'ZONLARI //Educational Research in Universal Sciences. – 2023. – Т. 2. – №. 1 SPECIAL. – С. 269-273.
4. G'aniboyev I. D. et al. UZUNLIKKA SAKROVCHILARNI TAYYORLASH SAMARADORLIGINI OSHIRISH //Educational Research in Universal Sciences. – 2023. – Т. 2. – №. 14. – С. 725-729.
5. G'aniboyev I. D. et al. YOSH YENGIL ATLETIKACHI SPORTCHILARNI UZUNLIKKA SAKRASH TURIGA SARALASHDA JISMONIY SIFATLARINI RIVOJLANTIRISH //Educational Research in Universal Sciences. – 2023. – Т. 2. – №. 14. – С. 736-741.
6. G'aniboyev I. D. et al. QISQA MASOFAGA YUGURISH TEXNIKASINI BOSHLANG'ICH TAYYORGARLIK BOSQICHI SPORTCHILARIGA O'RGATISH SAMARADORLIGI //Educational Research in Universal Sciences. – 2023. – Т. 2. – №. 14. – С. 730-735.
7. G'aniboyev I. D. et al. G'OVLAR OSHA YUGURUVCHILARNI MUSOBOQALARGA TAYYORLASH TIZIMINI TAKOMILLASHTIRISH //Educational Research in Universal Sciences. – 2023. – Т. 2. – №. 14. – С. 718-724.
8. Muxiddin o'g'li K. F. Modern Methods of Organizing Track and Long Jumpers at the Initial Preparatory Stage //Web of Semantics: Journal of Interdisciplinary Science. – 2024. – Т. 2. – №. 3. – С. 34-38.

9. KARIMOV F. BOSHLANG‘ICH TAYYORLOV BOSQICHIDAGI UZUNLIKKA SAKROVCHILARNI YILLIK MASHG‘ULOTLARINI REJALASHTIRISHDAGI MUAMMOLAR //News of the NUUz. – 2024. – T. 1. – №. 1.10. – C. 88-91.

10. Karimov F. PROBLEMS IN THE ORGANIZATION OF THE TRAINING PROCESS, THE USE OF TOOLS AND THE PLANNING OF TRAINING OF LONG JUMPERS IN THE INITIAL TRAINING STAGE //Mental Enlightenment Scientific-Methodological Journal. – 2024. – T. 5. – №. 08. – C. 141-147.

11. Karimov F. UZUNLIKKA SAKROVCHI SPORTCHILARNI ANATOMIK MORFOLOGIK XUSUSIYATLARI //Modern Science and Research. – 2024. – T. 3. – №. 12. – C. 632-637.

12. Karimov F. BOSHLANG‘ICH TAYYORGARLIK BOSQICHIDAGI UZUNLIKKA SAKROVCHILARNI INTERFAOL O‘YINLAR ORQALI JISMONIY TAYYORGARLIGINI RIVOJLANTIRISH //Modern Science and Research. – 2024. – T. 3. – №. 12. – C. 638-642.

13. G‘aniboyev I. D. et al. Uzunlikka sakrovchilarni tayyorlash samaradorligini oshirish //Educational Research in Universal Sciences. – 2023. – T. 2. – №. 14. – C. 725-729.

14. G‘aniboyev I. D. et al. Yosh yengil atletikachi sportchilarni uzunlikka sakrash turiga saralashda jismoniy sifatlarini rivojlantirish //Educational Research in Universal Sciences. – 2023. – T. 2. – №. 14. – C. 736-741.

15. G‘aniboyev I. D. et al. Qisqa masofaga yugurish texnikasini boshlang ‘ich tayyorgarlik bosqichi sportchilariga o ‘rgatish samaradorligi //Educational Research in Universal Sciences. – 2023. – T. 2. – №. 14. – C. 730-735.