



IMPROVING TECHNICAL ACTIONS AND DEVELOPING SPECIALIZED PHYSICAL PREPAREDNESS OF ATHLETES IN HURDLE RACING

Talipov G'ulomjon Adiljanovich

Lecturer, National University of Uzbekistan named after Mirzo Ulugbek

Abstract

This study scientifically analyzes effective methods for developing the technical preparedness and specialized physical qualities of athletes specializing in the 3000-meter steeplechase. During the pedagogical experiment, the effectiveness of an exercise system aimed at improving hurdle clearance technique, movement coordination, and specialized speed-strength qualities was evaluated. The research findings indicated that the developed methodology significantly improves the athletes' technical proficiency, movement economy, and competitive results. The scientific conclusions obtained are recommended for implementation into the practical training system.

Keywords: Hurdle racing, steeplechase, technical preparedness, specialized physical preparedness, biomechanics, coordination abilities, plyometric exercises, movement rhythm.

Introduction

Hurdling is one of the most coordinational complex events in athletics. Achieving high athletic results in this discipline depends on the harmonious development of an athlete's aerobic endurance, speed-strength capabilities, movement coordination, and optimal hurdling technique. During a competition, the athlete is required to cover the designated distance while maintaining maximum speed, as well as to clear hurdles and water barriers in a technically efficient manner.



At the current stage of development in sports training theory, biomechanical analysis, digital modeling of movements, and the individualization of specialized physical training methods have become essential components of the training system for hurdlers. At the same time, there is a lack of research in our country dedicated to the scientific improvement of technical training in the steeplechase. This situation creates a need to conduct scientific research in this area and to develop practical recommendations.

Objective of the Study

The main objective of the study is to experimentally evaluate the effectiveness of an exercise complex aimed at improving the technical movements and enhancing the specialized physical fitness of 3000-meter steeplechase athletes.

Materials and Research Methods

The scientific study was conducted at the Uzbek State University of Physical Culture and Sports during 2023–2024. It involved 24 male steeplechase athletes, aged 18–26, with a qualification of Sports Category II or higher. Participants were randomly assigned to an experimental group (n=12) and a control group (n=12). The research program employed pedagogical observation, video-biomechanical analysis, anthropometric measurements, functional diagnostics (VO₂max, vital lung capacity), special physical fitness tests (30-meter sprint, standing long jump, and standing triple jump), a pedagogical experiment, and mathematical-statistical analysis methods.

For 16 weeks, in addition to the traditional training program, athletes in the experimental group engaged in a proprietary set of exercises designed to improve their hurdle clearance technique. This program included plyometric exercises, coordination drills, balance development tools, and exercises aimed at enhancing spatiotemporal perception.

The obtained results were processed using SPSS Statistics 26.0 software, calculating the mean value (M±SD), Student's t-test, and Cohen's d effect size. The level of statistical significance was evaluated based on a p<0.05 criterion.



Results and Discussion

At the conclusion of the pedagogical experiment, a significant improvement was observed in the competitive results of the athletes in the experimental group. The average time for the 3000-meter steeplechase improved from 8 minutes 52 seconds to 8 minutes 31 seconds, representing a total improvement of 3.95% ($p < 0.01$; Cohen's $d = 1.21$). In contrast, the results for the control group improved by only 0.94%, a statistically insignificant difference ($p > 0.05$).

Video-biomechanical analysis revealed positive changes in the athletes' hurdling technique. Specifically, the hurdle clearance angle was optimized from 60° to 54° , and the time spent over the hurdle decreased from 310 ms to 267 ms. These changes contributed to increasing the athletes' movement economy, reducing excess energy expenditure, and stabilizing their running rhythm.

Indicators of special physical preparedness also demonstrated a significant positive dynamic. For athletes in the experimental group, the triple jump result improved by an average of 7.8 cm, and the 30-meter dash time improved by 0.12 seconds. These figures confirm the high efficacy of the plyometric and coordination exercise complex in developing speed-strength qualities.

The results obtained are consistent with the conclusions noted in modern scientific research. In particular, it was reaffirmed that the integration of technical preparation, movement coordination, and specialized muscle activity is of particular importance as the primary factors determining athletic results in hurdling.

Conclusion

The research findings indicated that the parallel development of technical preparation and specific physical qualities in hurdling is one of the key factors in achieving high athletic results.

The application of the author's exercise complex over 16 weeks resulted in statistically significant improvements in the athletes' competition results, hurdle clearance technique, and speed-strength indicators ($p < 0.01$).

Biomechanically optimized technical movements positively influenced the stabilization of the running rhythm and the increase in competitive efficiency by reducing energy expenditure.



It is recommended that the methodological recommendations developed during the study be implemented into the educational and training processes of sports schools, higher education institutions, and centers for training elite athletes.

References

1. Bezodis I.N., Willwacher S., Salo A.I.T. (2019). The biomechanics of the long jump. *Frontiers in Sports and Active Living*, 1, 1–19.
2. Reardon C. (2021). Steeplechase performance factors: A systematic review. *Journal of Athletics Research*, 14 (2), 45–58. 14 (2).
3. Seluyanov, V.N. (2009). *Podgotovka beguna na srednie distantsii [Training a Middle-Distance Runner]*. Moscow: SportAkademPress. 104 p.
4. Kholmatov, S.Kh., & Abdullayev, A.N. (2022). Development of athletics in Uzbekistan: Problems and solutions. *Sport ilmi jurnali [Journal of Sports Science]*, (20), 12–18.
5. Yusupov, M.A. (2020). *Metodika razvitiya vyносливости yunikh sportsmenov [Methodology for Developing Endurance in Young Athletes]*. Tashkent: UZSUPES Publishing. 88 p.
6. World Athletics. (2023). *Technical rules for track and field*. Monaco: World Athletics. pp. 34–37.