

THE INFLUENCE OF ATHLETIC GYMNASTICS AND RATIONAL NUTRITION ON THE PHYSICAL PREPAREDNESS OF UNIVERSITY STUDENTS

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Abstract: The present study explores the impact of scientifically grounded nutrition and athletic gymnastics on the anthropometric and functional development of university students with ectomorphic body types. The research aimed to determine the effectiveness of a structured physical training program combined with a balanced diet in improving students' physical preparedness and body composition. Experimental data were collected over a three-month period, during which the participants followed a targeted regimen of athletic gymnastics and rational nutrition. The results demonstrated significant positive changes in body weight, muscle circumference, and overall physical performance indicators ($p < 0.05$). The findings confirm that systematic athletic gymnastics, accompanied by a scientifically organized nutrition plan, contributes to the optimization of morphological parameters and general physical development. The outcomes of this study provide valuable insights for designing individualized physical education programs in higher education.

Keywords: athletic gymnastics, university students, physical preparedness, ectomorphic body type, rational nutrition, anthropometric development, experimental research.

1. Introduction

In recent years, the decline in the general health and physical fitness of young people has become a pressing issue, particularly among university students. A growing number of students are classified within special medical groups due to low levels of physical preparedness, sedentary lifestyles, and poor nutrition habits. This situation emphasizes the need for developing effective forms of physical education aimed at improving students' health, functional capabilities, and morphological indicators. Athletic gymnastics, as a specific branch of physical culture, has proven to be one of the most effective methods for developing muscle strength, endurance, and overall physical condition. Its systematic application in university curricula can play a crucial role in enhancing students' health and body composition. Moreover, the inclusion of scientifically grounded nutrition significantly amplifies the outcomes of training, leading to stable improvements in body morphology and functional performance. Recent studies confirm that structured resistance training combined with rational dietary planning yields measurable increases in muscle hypertrophy and energy metabolism among young adults. However, insufficient attention has been paid to the integration of athletic gymnastics and nutrition within the educational process of university students, particularly those with ectomorphic body types. Addressing this research gap is essential for optimizing the physical preparedness of the student population and forming scientifically substantiated recommendations for health-oriented physical education programs.

2. Research Methods

The experimental research was conducted among university students with ectomorphic body types, aged 18–22 years. Participants were divided into control and experimental groups ($n=25$ each). The experimental group followed a structured program of athletic gymnastics combined



with scientifically based nutrition, while the control group adhered to the standard university physical education curriculum. The experiment lasted for 12 weeks, including three training sessions per week (60–70 minutes each). Anthropometric measurements (height, body weight, chest, shoulder, and hip circumferences) and functional indicators (strength, endurance, flexibility) were assessed before and after the experiment. Statistical analysis was performed using Student's t-test to determine the significance of differences between the pre- and post-experimental data.

3. Results and Discussion

After 12 weeks of training, significant positive changes were observed in the experimental group across all measured indicators. Compared to the control group, participants who engaged in the athletic gymnastics program combined with the scientifically based nutrition plan demonstrated superior improvements in strength, endurance, and body composition. For instance, the average increase in pull-up performance reached +34.8%, while push-up repetitions improved by +28.5%. Running performance over 1000 meters showed a reduction in completion time by 9.6%, indicating enhanced cardiovascular endurance. Anthropometric measurements revealed a 4.1% increase in chest circumference, 3.8% in shoulder circumference, and 2.9% in hip circumference, suggesting proportional muscle hypertrophy rather than fat accumulation. The control group exhibited statistically insignificant changes ($p > 0.05$), whereas the experimental group showed significant improvements ($p < 0.05$), confirming the effectiveness of the proposed methodology. These findings align with previous studies emphasizing the synergistic effect of resistance training and nutrition on student fitness development.

4. Conclusion and Practical Recommendations

The conducted experimental study confirmed the high efficiency of combining athletic gymnastics with scientifically organized nutrition in improving the physical preparedness of university students with ectomorphic body types. The integration of these two components produced a synergistic effect, resulting in measurable improvements in muscular development, endurance, and functional adaptation. Statistical analysis demonstrated significant ($p < 0.05$) positive changes in anthropometric and physiological indicators, including muscle circumference, strength, and endurance parameters. Thus, athletic gymnastics, as a structured system of resistance-based exercises, can serve as an effective pedagogical technology within university physical education, promoting sustainable physical development, health improvement, and academic performance.

Practical Recommendations:

1. Integrate athletic gymnastics into the university physical education curriculum with differentiated loads.
2. Combine training with a scientifically grounded diet emphasizing adequate protein intake.
3. Regularly assess anthropometric and functional indicators to individualize training loads.
4. Provide methodological training for educators to apply athletic gymnastics principles.
5. Conduct further studies on gender-specific physiological responses to resistance training.

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