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Morpho-functional indicators of schoolchildren engaged in boxing

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Abstract. This article analyzes certain morpho-functional indicators of 13–18-year-old adolescents who systematically practice boxing. The research results revealed significant differences between athletes (observation group) and non-athletes (control group) in body height, body weight, chest circumference, vital lung capacity, heart rate, and muscle strength. The findings scientifically confirm that boxing training has a highly positive impact on the physical and functional development of adolescents’ organisms.

Keywords: boxing, adolescents, morpho-functional indicators, physical development, respiratory system.

1. INTRODUCTION

Today, strengthening the health of adolescents and raising a physically healthy generation is of paramount importance. Particularly, the age period of 13–18 years is characterized by intensive growth and developmental processes within the organism. During this phase, regular sports training exerts a significant influence on the morphological and functional systems of the body.

Boxing is distinguished by its high physical load, speed, and endurance requirements. Therefore, studying the morpho-functional status of adolescent boxers is crucial for the scientifically grounded organization of sports training. Concurrently, taking into account the age-specific physiological characteristics, individual developmental levels, and adaptive capacities of adolescents is essential during training planning. This is because excessive or incorrectly planned physical loads can lead to overstrain of functional systems in a growing body.

In boxing, high-intensity exercises place substantial demands especially on the cardiovascular and respiratory systems. Consequently, systemic evaluation of athletes' morpho-functional parameters serves as a key factor in maintaining health and enhancing athletic performance. This study aims to identify the regularities of morphological and functional development in adolescents, providing a scientific basis for optimizing sports training according to age.

2. MATERIAL AND METHODS

The research was conducted under the environmental conditions of the Andijan region, involving a total of 300 boys aged 13–18 years. The participants were divided into two groups: the experimental (observation) group consisted of 150 schoolboys regularly engaged in boxing, while the control group comprised 150 peers who did not participate in regular sports.

The following methods were utilized during the research:

• Anthropometric methods: assessment of body height, body weight, and chest circumference.

• Spirometric methods: evaluation of vital lung capacity (VLC).

• Physiological methods: measurement of heart rate (HR) and systolic/diastolic arterial blood pressure at rest.

• Dynamometric methods: measurement of hand muscle strength.

The gathered digital data were processed using mathematical and statistical methods to evaluate their statistical significance and reliability.

3. RESULTS AND DISCUSSION

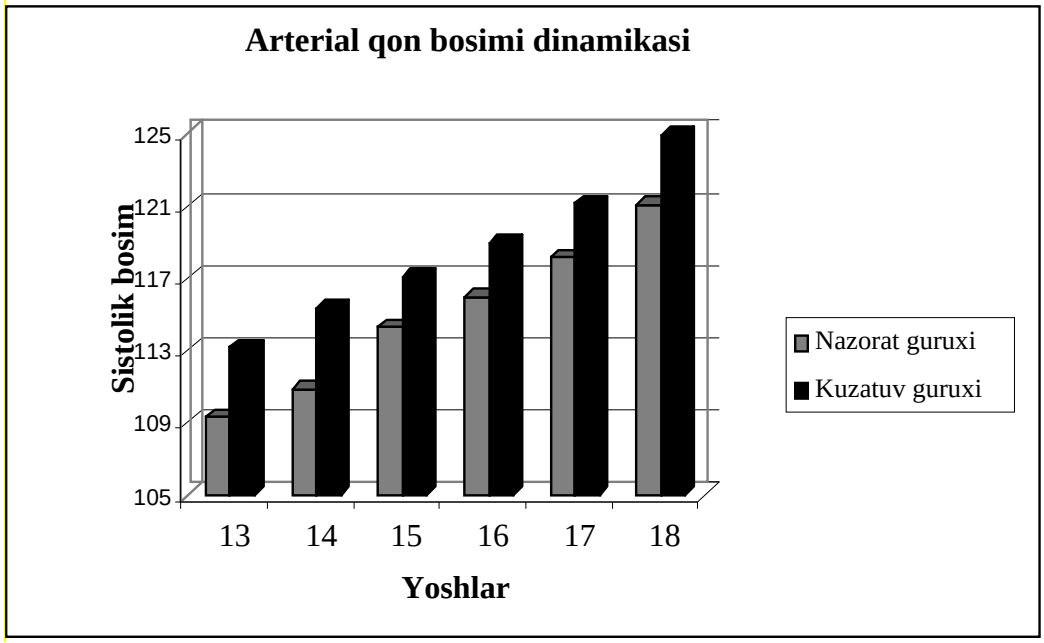
According to the research results, the growth and body weight parameters of the schoolchildren engaged in boxing developed more harmoniously and stably compared to the control group. The higher values of chest circumference observed in athletes indicate an advanced

development of their respiratory system. Vital lung capacity parameters were significantly higher in the athletic group, which reflects the expansion of their aerobic capacity.

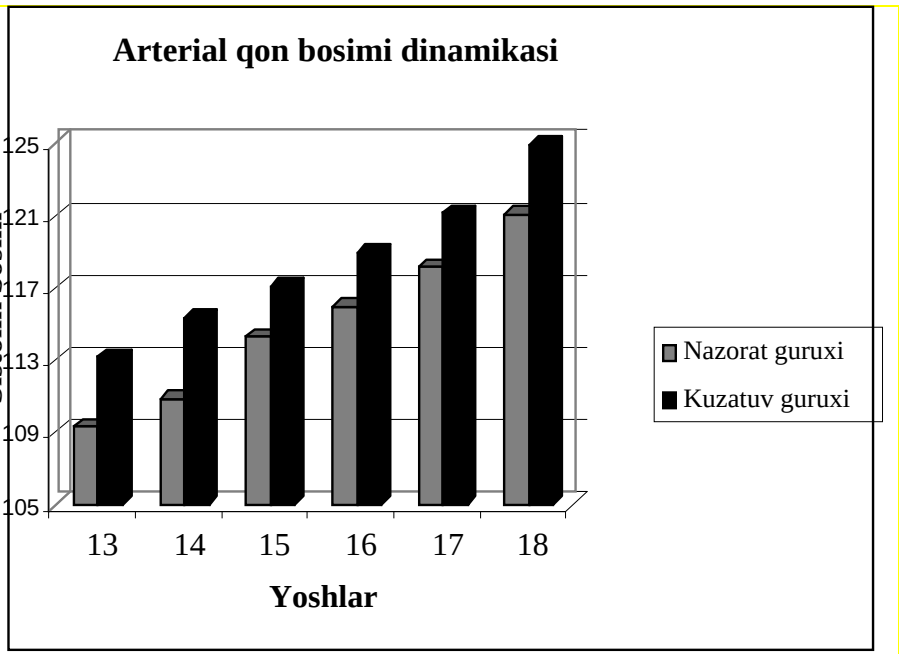
Furthermore, a relatively lower resting heart rate and arterial blood pressure values within optimal physiological ranges confirm the high adaptability and efficiency of the cardiovascular system in boxers. Hand dynamometry results demonstrated superior muscle strength in adolescent athletes.

Notably, differences between the experimental and control groups became most pronounced within the 15–16 age range. This trend indicates that sports training yields the highest functional efficiency and impact during this specific developmental period

DIASTOLIC BLOOD PRESSURE DYNAMICS



4. CONCLUSION



Based on the results of the conducted research, it can be concluded that systematic training in boxing exerts a highly positive influence on the morphological and functional development of adolescents. Boxing effectively enhances the adaptive capacities of the cardiovascular and respiratory systems, while simultaneously improving muscle strength and overall physical fitness. These outcomes hold substantial value for the scientific design of athletic training programs.

Moreover, the findings indicate that consistent boxing practice harmonizes the development of morphological and functional systems in the adolescent body. The observed positive changes scientifically validate the necessity of structuring sports training with strict consideration of age-specific and individual physiological traits. Based on these results, we recommend regular monitoring of adolescents' physical development parameters, implementing a gradual progression of training loads, and maintaining a health-oriented approach during sports sessions. This approach will not only boost athletes' functional capabilities but also establish a solid foundation for achieving sustainable, long-term athletic success.

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