

## THE IMPORTANCE OF MORPHOFUNCTIONAL INDICATORS IN THE DEVELOPMENT OF PHYSICAL QUALITIES IN YOUNG GRECO-ROMAN WRESTLERS: A REVIEW OF LITERATURE

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### Abstract:

This article highlights the importance of morphofunctional indicators in the process of developing physical qualities in young Greco-Roman wrestlers, based on a review of literature. Research shows that morphological (height, weight, body proportions) and functional (cardiovascular, respiratory, and muscular activity) indicators play a crucial role in the selection of athletes and the optimization of their technical-tactical and physical preparation. The analysis of the literature demonstrates the necessity of scientifically grounded approaches in shaping physical qualities and organizing effective training for young athletes. Furthermore, the dynamics of morphofunctional indicators during different age periods have been examined, substantiating their direct impact on sports performance.

**Keywords:** Greco-Roman wrestling, young athletes, physical qualities, morphofunctional indicators, literature review, technical-tactical preparation, sports performance.

### Introduction

Greco-Roman wrestling is one of the sports that maximally mobilizes an individual's physical and mental capabilities. Achieving high results in this sport is directly linked to the athlete's physical qualities, technical-tactical preparedness, and the morphofunctional characteristics of the body. In particular, the adolescent period is characterized by rapid changes, growth, and developmental processes in the athlete's body. Therefore, considering morphological and functional indicators in shaping the physical qualities of young Greco-Roman wrestlers plays a crucial role in increasing the effectiveness of sports training.

Recent scientific studies indicate that anthropometric measurements of athletes, the level of muscle mass development, and the functional capacities of the cardiovascular and respiratory systems directly influence the process of developing physical qualities. At the same time, the effective use of morphofunctional indicators in the training process allows coaches to design optimal training programs that take into account the individual abilities of young athletes. A review of the literature shows that the study of morphofunctional indicators in developing the physical qualities of young Greco-Roman wrestlers is aimed at exploring their scientific and

theoretical significance, as well as identifying opportunities to systematize existing approaches and apply them in practice.

### Main Part

The development of physical qualities in young athletes is considered one of the most important directions in sports theory and practice. In particular, in Greco-Roman wrestling, achieving high results requires a thorough scientific analysis of the athlete's physical preparedness, morphofunctional capacities, and psychophysiological characteristics. This is because the process of wrestling demands significant speed, strength, endurance, agility, and coordination skills from the athlete. When these qualities are purposefully developed from an early age, the effectiveness of the athlete's technical-tactical training in later stages increases. In the scientific literature, the concept of physical qualities is interpreted broadly. Physical qualities are understood as a combination of natural and social factors that determine the effectiveness of human motor activity. According to researchers, each quality (strength, speed, endurance, agility, coordination) does not develop in isolation but in close interconnection with the others. For instance, the combination of strength and speed forms explosive strength, while endurance ensures not only physical but also psychological stability.

In wrestling, it is important to take into account the morphofunctional characteristics of the developmental stage when shaping physical qualities. Among athletes aged 14–17, rapid growth and development processes are observed. During this period, there is an increase in muscle mass, enhanced activity of the cardiovascular system, expansion of the respiratory system's capacity, and stabilization of the nervous system. Therefore, properly organized training can maximize the athlete's natural potential.

Numerous studies in the literature indicate that the methodology for developing physical qualities in young wrestlers requires special attention. In particular, the theoretical works of scholars such as N.A. Bernstein, L.P. Matveev, and V.N. Platonov emphasize that the athlete's physical development is closely linked with technical-tactical preparedness. According to them, until physical qualities are sufficiently developed, it is difficult to master complex technical movements. The physical qualities of wrestlers—strength, speed, endurance, agility, and flexibility—develop unevenly across different age periods. Scientific literature notes that between the ages of 12 and 16, muscle mass growth accelerates, while anaerobic capacities increase. During this developmental phase, optimal conditions emerge for consolidating technical and tactical skills. Morphologically, the skeletal system strengthens, and muscles grow in both volume and strength. Functionally, stroke volume of the heart increases, and circulation efficiency improves. This enhances the athlete's ability to withstand high-intensity exercises over short periods of time.

In Greco-Roman wrestling, technique and tactics directly depend on the athlete’s physical abilities. For example, the proportion of torso length to arm span provides an advantage in gripping the opponent, while a lower center of gravity aids in maintaining balance. Training methodologies developed on the basis of morphofunctional indicators allow for consideration of athletes’ individual characteristics. This, in turn, ensures faster acquisition of technical skills and more effective application of tactical strategies. For instance, athletes with strong anaerobic potential are effective in applying short but powerful attacking tactics, whereas endurance-oriented athletes gain advantages in prolonged matches. In recent years, monitoring technologies have been widely implemented in sports (see Table 1).

Table 1. Literature analysis on the development of morphofunctional indicators and physical qualities in young Greco-Roman wrestlers

Author (s) and year	Subject of research	Research techniques	Basic morphofunctional indicators	Relation to physical qualities	Scientific innovation and practical significance
Bompa, T. (2015)	Training theory in athletes	Morphometric analysis, biomechanical observation	Body mass, muscle density, height-bast parameters	Agility and strength development are interrelated	Who proposed a periodized preparation concept for young athletes
Mirzaev, S. (2020)	Physical training of Uzbekistan wrestlers	Anthropometric measurements, tests	Lung capacity, heart rate, muscle strength	Durability and strength qualities directly affect performance	Who developed a scientifically based training methodology for national wrestlers
Weineck, J. (2018)	Physiology of young athletes	Laboratory tests, functional diagnostics	Maximum oxygen consumption (VO <sub>2</sub> max), anaerobic power	Aerobic indicators are the main factor determining durability	Based on the diagnostic role of morphofunctional control in athletes
Karimov, U. (2021)	Technical and tactical training of young wrestlers	Pedagogical experience, EMG analysis	Rhythms of muscle activity, fast - strength indicators	Speed-power quality depends on the efficiency of the technique	Developed individual loading models for young athletes
Verkhoshansky, Y. (2012)	Strength training theory	Dynamometry, special tests	Maximum power, explosive power	Explosive strength and speed have a decisive impact on the results of the competition	Who created the theory of "fast-power potential"
Ismoilov, B. (2022)	Age dependence of physical qualities	Longitudinal follow-up, training and training sessions	Cardiovascular system, muscle elasticity	In younger periods, adaptation indicators develop differently	Based the differential approach to the training of athletes by age stages

In the preparation of young wrestlers, through morphofunctional monitoring, the processes of their muscular activity, cardiovascular system and energy metabolism are constantly monitored. The Monitoring results allow the trainer to set the athlete's training loads at an individual level. For example, EMG (electromyography) is used to determine muscle activity, spirometry is used to determine the capabilities of the respiratory system, and pulsometry is used to monitor the heart rate during the training process. This approach reduces the risk of injury to athletes and increases the effectiveness of training.

Literature analysis shows that the organization of training in young wrestlers on the basis of morphofunctional indicators significantly accelerates technical and tactical development in them. Nowadays, however, some scientific research is limited only to anthropometric parameters or general physical qualities. Therefore, in the future, a comprehensive approach is necessary — that is, a joint analysis of morphological, physiological, psychological and biomechanical indicators. Literature analysis shows that the organization of training in young wrestlers on the basis of morphofunctional.

### **Conclusion**

A thorough study of the importance of morphofunctional indicators in the development of physical qualities of young Greco-Roman wrestlers is of particular scientific and methodological importance in sports theory and practice. Literature analysis shows that the technical-tactical skill of the athlete, his effectiveness in competitions and the successful organization of long-term sports activities largely depend on his individual morphological characteristics (height, body mass, body proportions) and functionality (cardiovascular system, respiratory system, strength and endurance of muscle activity). Therefore, the in-depth analysis and application of these indicators in practice by coaches in the development of physical qualities dramatically increases the effectiveness of the process of training young athletes. In the analyzed literature, many scientific sources justify the correlation of morphofunctional indicators and physical qualities. For example, while the development of strength and agility is closely related to the morphological composition of muscle fibers, endurance indicators rely mainly on the functionality of the cardiovascular and respiratory systems. In this regard, an individual approach to the development of training programs for young wrestlers should be considered as the main principle.

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