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SELECTION OF LONG JUMP ATHLETES PARTICIPATING IN GENERAL SECONDARY SCHOOL SPORTS SECTIONS BASED ON AGE-SPECIFIC PHYSICAL DEVELOPMENT

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ABOUT ARTICLE

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Abstract: This article investigates the scientific principles underpinning the selection of young long jumpers, with particular emphasis on chronological and biological age, physical development, motor performance, and the Relative Age Effect (RAE). Specific attention is devoted to speed, explosive strength, jumping capacity, coordination, and anthropometric characteristics as key determinants of athletic potential. The study highlights that athletes within the same chronological age category may exhibit substantial differences in biological maturation and physical development, potentially influencing selection decisions and competitive outcomes. Furthermore, the RAE may confer temporary developmental and performance advantages on athletes born earlier within a given age-group cohort, thereby affecting the fairness and accuracy of talent identification.Accordingly, an effective and scientifically grounded selection framework should integrate age-related developmental characteristics, physical and anthropometric indicators, motor abilities, and individual performance trajectories rather than relying solely on current competitive results. The findings underscore the importance of early, systematic, and evidence-based talent

identification and provide a methodological basis for enhancing the objectivity, inclusiveness, and long-term effectiveness of athlete selection within school-based sports programmes.

Introduction. Today, within the modern system of sports training, the selection and orientation of athletes toward a specific sport represent one of the most relevant and strategically significant issues. This is particularly evident in athletics disciplines characterized by the predominance of speed-strength abilities, especially the long jump, where scientifically grounded talent identification and selection are regarded as key determinants of an athlete's future sporting excellence and potential for achieving high-performance results. Therefore, the selection process should not rely on random choice but rather be based on well-defined scientific criteria, physiological principles, and age-specific developmental characteristics.

The effectiveness of the sports selection process is largely associated with an athlete's individual morphological characteristics, functional capacities, and the level of development of physical qualities. In the long jump, in particular, the harmonious development of such components as speed, explosive power, coordination, and jumping technique plays a crucial role. The formation and development of these qualities undergo rapid and substantial changes throughout different stages of growth and maturation, which necessitates a thorough consideration of ontogenetic principles and age-related developmental patterns within the talent identification and selection process.

According to contemporary scientific approaches, athlete selection should be conducted not solely on the basis of chronological age but also by considering biological maturation status, functional preparedness, and indicators of locomotor system development [1; 2]. Athletes of the same chronological age may demonstrate substantial differences in biological development, which directly influence their physical capabilities and athletic performance potential. Furthermore, the ontogenetic dynamics of physical qualities constitute an important scientific foundation for sports talent identification and selection. Speed-strength abilities, in particular, undergo their most intensive phase of development between the ages of 12 and 16, and appropriately structured training during this period has a significant impact on future athletic achievements [3]. Therefore, the selection process should take into account not only current performance outcomes but also the athlete's prospective developmental potential.

In addition, contemporary approaches to sports selection should be based on comprehensive diagnostic systems that incorporate pedagogical observation, performance testing, biomechanical analysis, and the assessment of functional indicators. Such an integrated approach enables a more accurate evaluation of an athlete's individual capacities and facilitates the appropriate orientation of young athletes toward the sport best suited to their abilities. Overall, in sports such as the long jump, which require a complex combination of technical proficiency and speed-strength capabilities, the scientific validity of the selection process plays a decisive role in ensuring the sustainable development of athletes.

Consequently, the improvement of talent identification and orientation systems for young athletes remains one of the most important and relevant directions in contemporary sports science. Scientific research indicates that, in young athletes, physical characteristics—particularly key motor abilities such as speed, explosive power, and jumping ability—are directly and closely associated with their level of biological maturation [4; 5].

This suggests that athletes of the same chronological age may exhibit considerable differences in physical capabilities. Such variations are primarily explained by differences in developmental stage, hormonal activity, and the maturation process of the musculoskeletal system. From this perspective, the process of talent identification and sport-specific orientation among young athletes should take into account not only chronological age but also biological age and the level of functional preparedness.

Early-maturing athletes generally demonstrate superior performance in physical qualities such as strength, speed, and coordination, which may provide them with a competitive advantage and enable higher performance outcomes in competitions. However, this advantage does not necessarily represent their long-term athletic potential in its entirety. It is precisely within this context that the Relative Age Effect (RAE) emerges as a significant scientific and practical issue in sports talent identification and selection [7]. According to the RAE phenomenon, within age-grouped selection systems, children born in the early months of a given year are more likely to possess physical and psychological advantages over their peers born later in the same year. The primary reason for this is that, during the ages of 10–14 years, even a difference of a few months can result in substantial variations in anthropometric characteristics and physical development. As a consequence, coaches and talent identification specialists often focus greater attention on athletes who appear physically more developed, stronger, and faster.

This increases the likelihood that relatively late-maturing athletes, despite possessing considerable long-term potential, may be overlooked during the selection process. Therefore, the Relative Age Effect is considered one of the key factors that can contribute to inaccurate talent identification and selection decisions within sports development systems. Furthermore, the influence of the RAE extends beyond physical advantages and also affects psychological factors. Early-maturing athletes often receive greater encouragement, recognition, and self-confidence due to their superior performance outcomes. In contrast, late-developing athletes may experience reduced motivation, lower self-esteem, and a higher risk of premature withdrawal from sport participation. Such outcomes can negatively affect the effectiveness of long-term athlete development programs.

Consequently, reducing the influence of the Relative Age Effect, implementing comprehensive evaluation approaches, and placing greater emphasis on individual developmental potential have become important scientific and practical objectives within modern sports talent identification and selection systems. Research conducted by Russian scholars has extensively examined issues related to the physical development and performance progression of young jumpers. For example, Tatarinov (2025) analyzed the development of athletic form and performance readiness in long jump athletes [6], while Balandin and Kazakov (2021) investigated the development of speed-strength characteristics and their role in the athlete selection process [8]. In addition, Bezuglov, E., Achkasov, E., Vakhidov, T., Malyakin, G., Kapralova, E., Kolesnichenko, V., Vinogradov, M., Zharikova, T., Emanov, A., and colleagues strengthened the scientific foundations of talent identification by examining sex-specific differences among young athletes and analyzing sprinting and long jump performance indicators [5].

Methodology. In this study, the researchers selected long jump athletes aged 10 to 15 years who were participating in athletics programs within general secondary school sports sections. The primary objective of the investigation was to identify the relationships among physical development characteristics, athletic performance outcomes, and the influence of the Relative Age Effect (RAE) in young athletes. The total sample consisted of 1,778 participants, all of whom were selected from the finalists of the nationally recognized “Shipovka Yunykh” competition, representing some of the most successful and promising young athletes at the national level [7].

This substantially enhances the reliability and practical significance of the findings, as the participants constituted a highly selective group that had already demonstrated superior

athletic performance. According to the study methodology, the participants were divided into three principal age categories: 10–11 years (n = 579), 12–13 years (n = 600), and 14–15 years (n = 599). Such classification enabled the researchers to compare age-specific stages of morphological and functional development and to examine how selection-related factors vary across different developmental periods.

This age range is particularly important because it encompasses a stage characterized by rapid growth and maturation processes, during which substantial differences in the development of physical qualities are commonly observed. Within each age category, male and female athletes were analyzed separately, allowing for the consideration of sex-specific differences. This approach is essential because biological maturation, muscle mass development, hormonal profiles, and physical performance capacities differ significantly between males and females. Consequently, conducting separate analyses by sex provides a more accurate basis for interpreting developmental characteristics and enhances the precision of talent identification and selection procedures.

As a selection criterion, athletes were required to demonstrate advanced performance results in the long jump event [1; 2]. In other words, the study did not include randomly selected participants; rather, it involved athletes who had achieved high performance levels within their respective age categories and had attained success in competitive events. This approach ensured that the selection framework closely reflected real-world sports practice and enabled scientific analysis based on a model of highly qualified young athletes.

Furthermore, the large sample size (1,778 athletes) enhanced the statistical reliability of the study and provided a sufficient basis for comparisons across different age and sex groups. Consequently, the investigation offered broader opportunities to identify age-related developmental dynamics, variations in athletic performance, and the key factors influencing the talent identification and selection process. During the study, the athletes' physical and anthropometric characteristics were assessed, including body height, body mass, and upper- and lower-limb lengths [2]. In addition, physical performance indicators such as speed, vertical jumping ability, and upper- and lower-body strength were recorded [1; 4]. To determine biological and chronological age, researchers considered participants' dates of birth as well as growth and maturation indicators [3].

Results and discussion. The study employed a cross-sectional research design, in which the prevalence of the Relative Age Effect (RAE) and its influence on athletic performance were examined among athletes grouped according to age and sex at a single point in time [7;

1]. Such a design enabled researchers to compare differences across various age categories simultaneously and to identify trends associated with specific developmental stages. Cross-sectional approaches are particularly effective for detecting systematic differences within talent identification and selection systems when applied to large samples. Within the study, athletes were classified into birth quarters according to their dates of birth and subsequently categorized as early-born (born between January and March) or late-born (born between October and December). This classification represents one of the most widely used scientific approaches for investigating the Relative Age Effect, as it facilitates a more precise evaluation of how relative age influences athletic performance outcomes. Athletes born at the beginning of the selection year may possess developmental advantages over their peers within the same age category due to their relatively greater physical maturity [7].

Prior to testing, all participants completed standardized warm-up protocols and underwent training adaptations appropriate to the prevailing environmental and temperature conditions. These procedures were implemented to prepare the athletes for maximal physical exertion, reduce the risk of injury, and enhance the reliability of the test results. Proper pre-test warm-up is particularly important in assessments involving speed and jumping performance, where maximal neuromuscular activation is required. As part of the study, athletes participated in long jump and speed-performance assessments. Each test was performed three times, and the athlete's best result was selected for the primary statistical analysis.

This approach helped minimize random measurement errors and provided a more accurate representation of each athlete's maximal performance capacity. The use of the best-performance criterion is widely adopted in sports science research, particularly when evaluating maximal movement abilities such as explosive power and speed. Overall, this methodological approach enabled a scientifically rigorous analysis of the influence of the Relative Age Effect among young athletes, as well as the developmental differences observed in key physical performance characteristics.

Based on a comprehensive synthesis of the findings reported by the scholars reviewed above, it can be concluded that the methodological approach under consideration should be systematically implemented not only within the context of major and high-level sporting competitions but also, more broadly, within sports sections of general education schools. The school-based sports system constitutes a fundamental stage in the long-term development of young athletes, during which scientifically grounded talent identification, selection, and appropriate sports orientation play a critical role in determining their subsequent athletic

development and performance potential. Therefore, the integration of evidence-based selection and orientation methodologies at the initial stages of sports preparation may contribute significantly to the effective identification of promising athletes, the optimization of their training trajectories, and the sustainable development of their competitive performance.

Conclusion. The application of this methodological approach at the school level can substantially enhance the early identification of athletes, the comprehensive assessment of their individual abilities, and their appropriate orientation toward sports disciplines that correspond to their specific potential. Consequently, the talent identification and sports selection process can become more systematic, scientifically grounded, and effective. This, in turn, facilitates the timely recognition of young athletes' innate athletic potential at an early stage and contributes to the optimization of targeted training programs aimed at their long-term athletic development and competitive performance. Furthermore, this methodological approach provides empirical support for the conclusions advanced in previous scientific studies. In particular, it further substantiates the necessity of considering not only performance-based indicators in the process of sports talent identification and selection, but also the biological maturation status, functional capacities, and sex-specific morphological and physiological characteristics of young athletes. Such a comprehensive approach contributes to a more objective, scientifically substantiated, and individualized assessment of athletic potential during the selection process.

Furthermore, the implementation of such a systematic and multidimensional approach can reduce potential biases and inaccuracies in the sports talent identification and selection process, particularly by mitigating the influence of the Relative Age Effect (RAE). This approach may, therefore, help ensure that late-maturing young athletes who possess substantial long-term athletic potential are not overlooked or prematurely excluded from the talent development pathway. Overall, the systematic and scientifically grounded organization of the sports talent identification and selection process at the school level can contribute not only to the enhancement of athletic performance but also to the establishment of a sustainable and long-term talent development pathway. Such an approach provides a fundamental basis for developing a robust reserve of promising athletes and ensuring the continuity and effectiveness of the long-term athlete development system.

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