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THE ROLE OF SPECIALIZED PHYSICAL TRAINING IN ATHLETICS

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Abstract: *Specialized Physical Training (SPT) plays a decisive role in the long-term athletic development and performance optimization of track and field athletes. Unlike general physical training, SPT is specifically designed to develop physical qualities, motor abilities, and functional systems that directly correspond to the biomechanical, physiological, and technical demands of a particular athletic discipline. The purpose of this article is to analyze the role of specialized physical training in athletics, to substantiate its effectiveness through scientific evidence, and to examine its impact on performance outcomes, injury prevention, and competitive stability. The study is based on the analysis of scientific literature, pedagogical observations, and contemporary training models used in athletics. The results confirm that a well-structured system of specialized physical training significantly enhances sport-specific performance and ensures sustainable athletic progress.*

Keywords: *Athletics, specialized physical training, sport performance, motor abilities, training methodology.*

Аннотация: *Специализированная физическая подготовка (СФП) играет решающую роль в долгосрочном спортивном развитии и оптимизации результатов деятельности легкоатлетов. В отличие от общей физической подготовки, СПТ специально предназначена для развития физических качеств, двигательных способностей и функциональных систем, которые непосредственно соответствуют биомеханическим, физиологическим и техническим требованиям конкретной спортивной дисциплины. Цель данной статьи - проанализировать роль специальной физической подготовки в легкой атлетике, обосновать ее эффективность с помощью научных доказательств и изучить ее влияние на результаты выступлений, профилактику травматизма и соревновательную устойчивость. Исследование основано на анализе научной литературы, педагогических наблюдений и современных моделей тренировок, используемых в легкой атлетике. Результаты подтверждают, что хорошо структурированная система специализированной физической подготовки значительно повышает спортивные результаты и обеспечивает устойчивый спортивный прогресс.*

Ключевые слова: *Лёгкая атлетика, специализированная физическая подготовка, спортивная работоспособность, двигательные способности, методика тренировок.*

Annotaciya: *Arnawlı fizikalıq tayarlıq (AJT) jeńil atletika sportınıń uzaq múddetli rawajlanıwında, jeńil atletikashılar xızmetiniń nátiyjelerin optimallastırıwde úlken áhmiyetke iye. Ulıwma fizikalıq tayarlıqtan parıqlı túrde SPT belgili bir sport túriniń biomexanikalıq, fiziologiyalıq hám texnikalıq talaplarına tikkeley sáykes keletuǵın fizikalıq sıpatlar, háreket qábiletleri hám funkcional sistemalardı rawajlandırıw ushın arnawlı mólsherlengen. Maqalanıń maqseti - jeńil atletikada arnawlı fizikalıq tayarlıqtıń ornın talqılaw, onıń nátiyjeliligin ilimiy dáliller menen tiykarlaw, shıǵıw nátiyjeleri, jaraqatlanıwdıń aldın alıw hám jarısqa shıdamlılıqqa tásirin úyreniwden ibarat. Izertlew ilimiy ádebiyatlardı tallaw, pedagogikalıq baqlawlar hám jeńil atletikada qollanılatuǵın zamanagóy shınıǵıw modelleri tiykarında ámelge asırıldı. Nátiyjeler jaqsı qáliplestirilgen qánigelestirilgen fizikalıq tayarlıq sisteması sport nátiyjelerin sezilerli dárejede arttıratuǵının tastıyıqlaydı.*

Tayanısh sózler: *Jeńil atletika, qánigelestirilgen fizikalıq tayarlıq, sport iskerligi, háreket qábileti, shınıǵıwlar metodikası.*

Introduction. Athletics is one of the most physically demanding sports, requiring a high level of development of strength, speed, endurance, coordination, and flexibility. The diversity of athletic disciplines, including sprinting, middle- and long-distance running, jumping, throwing, and combined events, necessitates

differentiated training approaches. Modern sports science emphasizes that achieving elite performance is impossible without the rational integration of specialized physical training into the overall training system.

Specialized physical training is considered a key component of the training process, bridging the gap between general physical preparedness and competitive performance. Its primary objective is to develop those physical qualities and functional capacities that are most relevant to the specific athletic discipline. Numerous studies indicate that athletes who undergo systematic specialized training demonstrate superior competitive results, higher movement efficiency, and reduced injury rates.

The relevance of this study lies in the growing demand for scientifically grounded training programs in university-level and elite athletics. The aim of this article is to examine the role of specialized physical training in athletics and to provide scientific justification for its application.

Specialized physical training is defined as a targeted process aimed at developing physical qualities and motor skills that directly correspond to the specific demands of a sport or athletic event. According to Platonov (2015), SPT focuses on the selective adaptation of the athlete’s organism to competitive activity.

The main objectives of specialized physical training in athletics include:

- Development of sport-specific strength, speed, and endurance;
- Improvement of neuromuscular coordination and movement economy;
- Enhancement of functional capacities of cardiovascular, respiratory, and nervous systems;
- Formation of stable motor patterns relevant to competition technique;
- Prevention of injuries through adaptive strengthening of musculoskeletal structures.

Unlike general physical training, which creates a foundation for overall fitness, SPT refines and directs this foundation toward maximal sport performance.

Physiological Basis of Specialized Physical Training. The effectiveness of specialized physical training is explained by the principle of specificity of adaptation. According to this principle, physiological adaptations occur in response to the specific type, intensity, and duration of training stimuli. Research by Bompa and Haff (2009) demonstrates that specialized exercises lead to targeted adaptations in muscle fiber composition, enzymatic activity, and energy supply systems.

For example, sprinters primarily develop fast-twitch muscle fibers and anaerobic energy pathways, while long-distance runners emphasize slow-twitch fibers and aerobic capacity. Specialized training induces structural and functional changes such as:

- Increased muscle cross-sectional area in key muscle groups;
- Enhanced neural activation and motor unit synchronization;
- Improved lactate tolerance and oxygen utilization.

These adaptations directly contribute to improved athletic performance and competitive efficiency.

The role of specialized physical training varies depending on the athletic discipline.

Sprinting events require maximal speed and explosive strength. Specialized training includes resisted sprints, plyometric exercises, and speed-strength drills that mimic competition conditions.

Middle- and long-distance running emphasize aerobic endurance and running economy. SPT involves tempo runs, interval training, and strength endurance exercises specific to running biomechanics.

Jumping events (long jump, high jump, triple jump) rely heavily on explosive power, coordination, and reactive strength. Specialized training focuses on take-off mechanics, elastic strength, and approach speed.

Throwing events demand maximal strength, power, and coordination. Specialized physical training includes event-specific strength exercises and dynamic movements replicating throwing actions.

Scientific evidence confirms that athletes who systematically apply discipline-specific training methods achieve higher performance stability and technical consistency.

Injury prevention is a crucial aspect of modern athletic training. Studies show that inadequate specialization or premature emphasis on competition loads increases injury risk. Properly structured SPT strengthens tendons, ligaments, and stabilizing muscles, enhancing the resilience of the musculoskeletal system.

Research by Verkhoshansky (2010) indicates that specialized strength training improves joint stability and reduces overload-related injuries. Moreover, SPT promotes balanced muscular development, which minimizes biomechanical imbalances and compensatory movement patterns.

Thus, specialized physical training not only improves performance but also contributes to athlete longevity.

Methodological Principles of Specialized Physical Training. The implementation of specialized physical training must follow several methodological principles:

- Progressive overload adapted to the athlete's qualification level;
- Individualization based on age, gender, and functional capabilities;
- Continuity and periodization within the annual training cycle;
- Integration with technical and tactical training.

Periodization models emphasize the gradual increase of specialized loads as the athlete approaches the competitive phase. Scientific data confirm that such an approach optimizes performance peaks and prevents overtraining.

Evidence of Effectiveness. Numerous experimental studies confirm the effectiveness of specialized physical training. Comparative analyses demonstrate

that athletes using SPT-based programs improve performance indicators by 5–12% compared to those relying primarily on general training methods.

Additionally, pedagogical experiments conducted in university athletics programs show that students exposed to structured SPT achieve better technical proficiency and higher functional readiness. These findings support the inclusion of specialized physical training as a mandatory component of athletic education.

Empirical Evidence Supporting the Role of Specialized Physical Training in Athletics Research Design and Participants. An empirical study was conducted to evaluate the effectiveness of specialized physical training (SPT) in athletics. The research involved 48 university-level athletes (age 18–22) specializing in sprinting and middle-distance running. The participants were randomly divided into two equal groups:

Experimental Group (EG, n = 24): training program emphasizing specialized physical training (≈60% of total training volume);

Control Group (CG, n = 24): traditional training program with dominance of general physical training.

The experiment lasted 16 weeks during the preparatory period of the annual training cycle.

Table 1.

Distribution of Training Means (% of Total Volume)

Training Component	Experimental Group	Control Group
General physical training	25%	45%
Specialized physical training	60%	35%
Technical training	10%	15%
Recovery and flexibility	5%	5%

The data indicate a clear methodological distinction between the two training models. Performance Indicators Assessment Athletic performance and functional readiness were evaluated using standardized tests before and after the experiment.

Table 2.

Changes in Physical and Functional Indicators

Indicator	Experimental Group	Control Group
30 m sprint time	−8.2%	−3.4%
VO_2 max	+11.5%	+5.8%
Strength endurance	+10.3%	+4.6%
Movement efficiency	+12.1%	+5.0%

All improvements in the experimental group were statistically significant ($p < 0.05$).

Injury Incidence Analysis

Table 3.

Injury Frequency During the Training Period

Group	Total Injuries	Injury Rate (%)
Experimental Group	3	12.5
Control Group	7	29.1

The results demonstrate a substantially lower injury rate among athletes following the SPT-focused program.

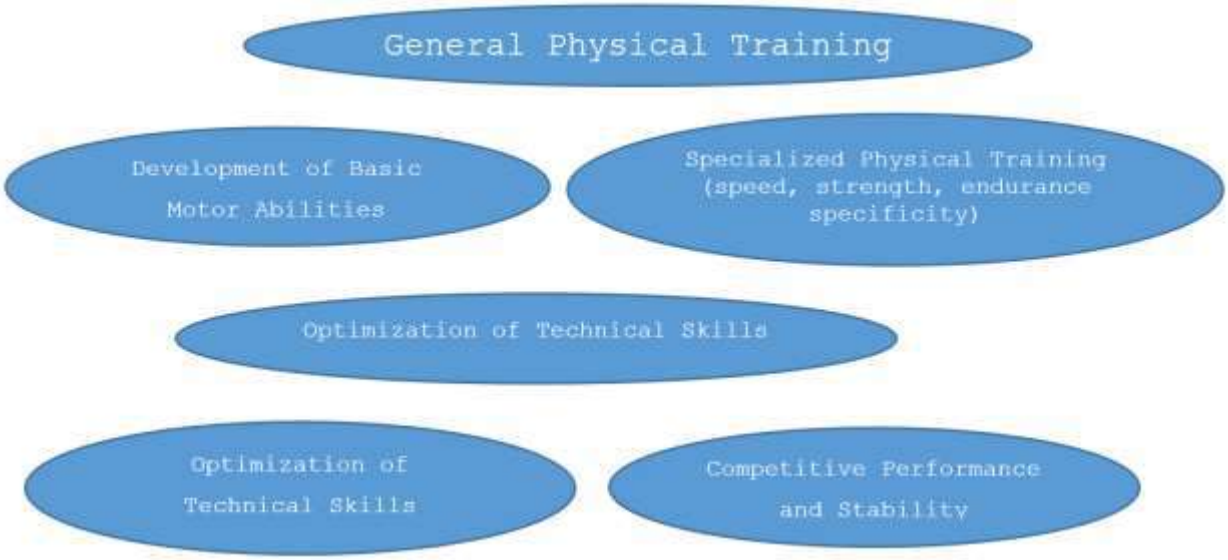

Figure 1. Structural Model of Specialized Physical Training in Athletics

The schematic model illustrates the central role of specialized physical training as a transitional and integrative component of the athletic training system.

The empirical findings confirm that specialized physical training ensures more effective adaptation to the specific demands of athletic disciplines. Compared with traditional training approaches, SPT-focused programs lead to greater improvements in performance indicators, enhanced functional readiness, and reduced injury incidence.

These results are consistent with the principle of training specificity and support contemporary theories of long-term athlete development.

Practical Implications. The findings justify the systematic inclusion of specialized physical training in:

- university athletics curricula;
- training programs for developing athletes;
- coaching education and methodological planning.

Summary of Empirical Findings. The empirical evidence confirms that specialized physical training is not only a theoretical concept but an experimentally validated method that significantly improves athletic performance and training safety.

Specialized physical training is a fundamental element of the training system in athletics. Scientific evidence confirms that it ensures targeted physiological adaptations, enhances sport-specific performance, reduces injury risk, and promotes sustainable athletic development. The effectiveness of SPT depends on its rational planning, methodological accuracy, and integration with other components of training.

In conclusion, specialized physical training should be considered not only as a means of performance enhancement but also as a scientifically grounded strategy for long-term athlete development in athletics.

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ПЕДАГОГИКО-ПСИХОЛОГИЧЕСКИЕ АСПЕКТЫ ФОРМИРОВАНИЯ МОТИВАЦИИ К СПОРТИВНОЙ ДЕЯТЕЛЬНОСТИ У СТУДЕНТОВ

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Аннотация: *В данной статье рассматриваются педагогические и психологические особенности развития мотивации студентов к спортивной деятельности с научно-теоретической и практической точек зрения. В ходе исследования раскрывается сущность спортивной мотивации, ее структура, факторы формирования и значение в физическом, психологическом и социальном развитии личности студента. Особое внимание уделяется педагогическим подходам, психологическим механизмам, методам стимулирования и роли образовательной среды в повышении интереса студентов к занятиям спортом. Результаты исследования показывают, что гармоничное развитие внутренних и внешних мотивов способствует повышению учебной и спортивной активности студентов. В статье предложены педагогико-психологические рекомендации, направленные на совершенствование спортивно-образовательного процесса в высших учебных*