

report transmission). Support terms. Faculty team: training 2-3 PE faculty in each college (3-day training: 1 day of sustainability theory, 1 day of orienteering training, 1 day of hands-on coaching); provision of resources: allocation of funds for maps, compasses and first aid kits; collaborate with local outdoor activity centers to organize places for orienteering; Policy support: Include orientation in the «Learner Mental Health Promotion Program» to ensure long-term implementation.

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## RESEARCH INTO PHYSICAL FITNESS METHODS FOR COLLEGE FOOTBALL PLAYERS

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**Abstract.** In the system of talent development in football, physical training is the basis that determines the competitive level of athletes, technical performance and sustainability of a sports career. In this article, football players among college students are considered as the subject of research. The scientific methods of specialized physical training are systematically studied, integrating their dual characteristics of «Academic training and training» with the real requirements of modern football. Using a literature review, theoretical analysis and case analysis methods, the study focuses on optimizing four main qualities: strength, speed, endurance and dexterity, and offers a training system suitable for students, «Stage-specific, differentiated by position and self-modeled depending on the situation». The article also emphasizes the importance of injury prevention, training monitoring and recovery management, which makes it possible to provide theoretical recommendations and practical recommendations to increase the comprehensive competitiveness and sustainable development potential of football players among college students.

**Keywords:** football players; training, physical fitness; specialization; injury prevention; training monitoring.

## ИССЛЕДОВАНИЕ МЕТОДОВ ФИЗИЧЕСКОЙ ПОДГОТОВКИ ФУТБОЛИСТОВ КОЛЛЕДЖА

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**Аннотация.** В системе развития талантов в футболе физическая подготовка является основной, определяющей соревновательный уровень спортсменов, техническое исполнение и устойчивость спортивной карьеры. В данной статье в качестве объекта исследования рассматриваются игроки футбола среди учащихся колледжей. Систематически изучаются научные методы специализированной физической подготовки, интегрируя их двойственные характеристики «Академического обучения и тренировок» с реальными требованиями современного футбола. Используя обзор литературы, теоретический анализ и методы анализа конкретных случаев, исследование фокусируется на оптимизации четырёх основных качеств: силы, скорости, выносливости и ловкости, и предлагает подходящую для учащихся тренировочную систему, «Специфическую для этапа, дифференцированную по позиции и само моделированную в зависимости от ситуации». В статье также подчёркивается важность профилактики травматизма, мониторинга тренировок и управления восстановлением, что позволяет предоставить теоретические рекомендации и практические рекомендации для повышения всесторонней конкурентоспособности и потенциала устойчивого развития игроков футбола среди учащихся колледжей.

**Ключевые слова:** игроки футбола; тренировка, физическая подготовка; специализация; профилактика травматизма; мониторинг тренировок.

With the rapid development of college football, college football gradually became an important reserve for professional football. College football players, as a special group that unites «students» and «athletes,» face unique challenges: on the one hand, they need to meet the special physical requirements of modern football, such as explosive power for throws, the ability to sprint multiple times in transitions, and hull stability for physical opposition; on the other hand, they have to juggle academic tasks, resulting in fragmented training time, irregular training cycles, and limited recovery resources. Compared to professional athletes who systematically train full-time, college football players tend to have weaker muscle strength, higher frequency of muscle imbalance (e.g., predominance of quadriceps over hamstrings), and lack of awareness of injury prevention [1].

The traditional fitness model, which often relies on general fitness measures such as 12-minute runs and basic resistance exercises, does not account for football-specific movements, resulting in ineffective implementation of the training effect and an increased risk of overexertion injuries. For example, excessive long-distance running can improve aerobic endurance but reduce explosiveness, while improper strength training can result in knee or lower back injuries. Therefore, the study of physical training methods that combine science, relevance and practicality has become critical for solving current problems in college football training [1, 2].

This study clarifies the main aspects and factors of the influence of physical training of college football players in college sports, establishes a correlation model between specialized physical training, technical indicators and injury risk, and also expands the theoretical system of training in college football. It also provides a theoretical framework for applying the principles of athletic training in the conditions characteristic of college football. Practical relevance: This study, aimed at solving problems such as unified training methods, insufficient compliance with the player's position and high injury rates in college football, offers effective specialized training programs [2]. By testing the effectiveness of these programs in improving core performance (e.g., multiple sprint ability, speed of change of direction), it provides practical guidance to coaches and athletes in college football, helping to optimize training performance and reduce injury risk.

Purpose of the study. Developing a specialized training system that takes into account the characteristics of college students, which will help them achieve the coordinated development of academic performance, physical fitness and competitive skills, and, ultimately, will contribute to the quality development of college football.

**Material and research methods.** Analysis and generalisation of scientific literature, pedagogical observation, survey.

**Results and their discussion.** Based on the analysis of scientific and literary sources, we identified the main parameters and specialized training methods for college football players.

1. Strength training: emphasis on explosive strength and functionality, functional stability and differentiation of positions. Strength lies at the heart of all football movements, with requirements focused on «generation of explosive force», «functional support» and «needs specific to the position» [3]. For example, attackers require explosive leg strength for kicks, midfielders – stability in the hole to control the ball and transfers, and defenders – upper body strength for physical countermeasures. Fundamentals of basic strength: For the development of basic strength without the detriment of joint health, it is worth using the «progressive overload» model of low and medium intensity. For the lower limbs, you should use squats with a cube (12-15 repetitions in a row, 3-4 rows), reverse lunges (10-12 repetitions on each leg in a row, 3 rows) and gluteal bridges (15-20 repetitions in a row, 3 rows) to work out the quadriceps, hamstrings and gluteal muscles. For body training, bars are used (45–60 seconds per approach, 3 approaches), side bars (30–45 seconds per each side in approach, 3 approaches) and «dog-birds» (10–12 repetitions per each side in approach, 3 approaches) to improve body stability. For the upper part of the body – push-ups (10–15 repetitions per approach, 3–4 approaches) and pull-ups of the expander (12–15 repetitions per approach, 3 approaches) to strengthen the muscles of the chest, shoulders and back. This phase lasts 4–6 weeks and is aimed at muscle hypertrophy and neuromuscular adaptation.

Specialized explosive force: Football-specific moves are combined to develop workouts that mimic moves, improving the conversion of force into game performance. Examples: Stump jumping with a run-up (6-8 reps/approach, 3-4 sets): simulates the force of pushing off the ground during a throw, gradually increasing the height of the stand from 30 to 50 cm. Deadlift on one leg with vertical jumps (8-10 reps per leg/approach, 3 sets): improves one-way support and explosive force to change direction. Rotational medball throws (10-12 reps per side/approach, 3 sets): Improves body rotational force for throws and awnings. Plyometric push-ups (8-10 repetitions approach, 3 approaches): increase the explosive power of the upper body to perform head impacts. Position-specific strength training: Forwards/wingers: Pay special attention to lower body blasting and hip flexibility with squat jumps, side jumps and high knee lifts. Midfielders: Special attention is paid to hull stability and strength in different directions, using rotary medball throws and walking with side expanders. Defenders: special attention is paid to the strength of the upper and lower parts of the body for confrontation, using resistance push-ups and pushing sleds (light weight, short distance) [3, 4].

2. Speed training: emphasis on reaction, acceleration and multidirectional movements. Football requires not only maximum speed on the straight, but also a quick reaction, starting acceleration and a sharp change of direction. Eighty percent of high-speed collisions occur up to 10 meters, making reaction-acceleration-change-of-direction training critical. Reaction and start training: Starting exercises using signals: sound (whistles) or visual (flag waving) signals are used for athletes to run 5-10 meters with a frequency of 10-12 repetitions in the approach and a rest of 30-45 seconds. This improves the rate of neural response and muscle activation. Mirror exercises with a partner: two players stand facing each other at a distance of 3-4 meters, mirroring sharp starts, stops and changes of direction to improve reaction and coordination.

Resistance training at the start: expanders are used on the partner's belt to provide light resistance while running 3-5 meters, increasing the initial acceleration. Multidirectional speed training: T-shaped dexterity exercises: cones in the shape of the letter T are placed (10 m vertically, 5 m horizontally) [4]. Athletes run forward, step sideways to one cone, return to the center, then step to another cone and retreat back. It is performed by 6-8 repetitions in the approach, 3 approaches. Z-shaped shuttle run with gears: cones in the shape of the letter Z are placed (each segment is 5-7 m). Athletes run the route, taking and passing the ball at each cone to combine technical and speed training. Horse racing exercises: running 7-10 m, jump 45 degrees left/right, acceleration 5 m and repetition. Emphasis on a low center of gravity, fast leg work and hip mobility.

3. Endurance training: priority is given to repeated sprint movements and tactical endurance. Football matches involve multiple high-intensity jerks (sprints, grabs, passes), interspersed with

low-intensity recovery (jogging, walking). Thus, the main requirement is «repeated sprinting ability (PSS)» - the ability to perform consecutive sprints with a minimum decrease in performance. Interval training for PSS: 30-second sprint + 1 minute jogging: 10-12 sets with an intensity of 80-85% of the maximum heart rate (MCHS). This mimics the «sprint attack, jog-defense» rhythm. 15-second sprint at breaking point + 45-second walk: 8-10 sets with emphasis on maximum effort and quick recovery. 60-second medium-intensity run + 30-second sprint: 6-8 sets with a gradual increase in sprint intensity to 90% of the MFSS.

Tactical Endurance Training: Small Games (SSG). Conduct games 3 by 3, 4 by 4 or 5 by 5 on shortened fields (for example, 40 by 30 m for 4 by 4). Use rules such as «2 minutes of continuous play + 1 minute of rest» or «6 consecutive passes must be completed before scoring a goal» to achieve technical stability in fatigue conditions. Conditional scrums: Add restrictions such as «no faceoffs» or «limited touches (2-3 per player)» to increase intensity of movement and tactical decision-making under exertion.

Position-specific endurance exercises. For extreme attackers, multiple sprint exercises are performed along the sideline (15 m sprint, 5 m backward, repeat 8-10 times). Shuttle runs between penalty areas (100 m) with ball control are used for central midfielders [5].

4. Agility training: integration of technology and tactical awareness. Agility in football is a combination of physical agility (speed, coordination) and cognitive agility (tactical judgment, reaction). Training should be scenario-based to allow split-second decisions during movement. Integration of technique and dexterity: Cone obstacle courses with ball control: 3-4 cones are set in a triangle or square (at a distance of 5-7 m from each other). Athletes go around the cones using various techniques (inside/outside of the foot, rolling the sole), then throw or pass. The exercise is performed for 10-12 seconds, 8-10 repetitions in the approach. Agility Ladder + Dribbling: Lateral moves are performed by lifting knees high or strides in and out of stairs while dribbling, improving leg coordination and ball control.

Transmission-reception-direction change exercises: Athletes receive a pass from the coach, turn 180 degrees and pass the ball to another coach, then run to the cone - all within 5 seconds. Repeat 10-12 times per approach. Cognitive flexibility training: Multivariable response exercises. 3-4 cones are placed around the athlete. The trainer points to the cone and the athlete must make a run to touch it and then return to the starting position. Technical elements are added (for example, «touch cone A and pass to a teammate»). Game simulation scenarios. Game situations are simulated (for example, «the midfielder receives the ball under pressure from two defenders»). Athletes work out quick decisions: beat the ball, pass to the attacker or pass to the defender. Video-based reaction training: show short clips of match scenarios (such as an opponent's counterattack) and then prompt athletes to immediately perform the appropriate movement (such as going backwards, snatching) [3, 4, 5].

Key support strategies for effective training:

1. injury prevention: eliminating muscle imbalance and improving the quality of warm-up. College football players are susceptible to injuries such as hamstring strains, knee dislocations and ankle injuries due to muscle imbalances, insufficient warmups and overtraining. A comprehensive injury prevention system is needed.

Pre-training and warm-up (15-20 minutes): dynamic stretching: high knees (30 s), leg swings on the buttocks (30 s), side slides (10 m each way), walking lunges (10 steps per leg) and circular arm movements (forward/backward, 15 s). Muscle activation: gluteal bridges (15 reps), «shells» (12 reps per side), abduction of the thigh with an expander (15 reps per side) and sliding the shoulder blades along the wall (10 reps) to activate lightly loaded muscles (eg, gluteal, posterior thigh).

Neuromuscular preparation: quick exercises for the legs (training «ladder», 1 min), short sprints (3-5 m, 5 repetitions) and light passes to prepare for intensive training. Recovery after training (10-15 minutes): Massage roller: Pay special attention to the quadriceps, back of the thigh, calves and upper back (60 seconds for each muscle group) to relieve muscle tension and DOMS syndrome. Static stretching: Hold the pose for 20-30 seconds per muscle group, focusing on the back of the thigh, hip and chest flexors.

Active recovery: jogging low intensity (5-10 minutes) or swimming to improve blood flow and remove lactic acid. Corrective exercises for muscle imbalance: Strengthening the back of the thigh: bending the legs on the buttocks (10-12 repetitions in the approach, 3 sets), bending the legs

(8-10 repetitions in the approach, 3 sets). Ankle stability: single leg stand (30-60 seconds per leg), leg spread/extension with expander (15 reps per side). Body stability: exercise «Dead insects» (12 repetitions per side, 3 sets), press «Pallof» (10 repetitions per side, 3 sets).

2. monitoring training: balance of load and recovery. To avoid overtraining and conflict between academic and sports achievements, it is worth implementing a simple but effective monitoring system. Daily monitoring: Resting heart rate (HR): Measure pulse after waking up. If the heart rate is 5-10 bpm higher than the baseline, reduce the intensity of the workout or take a rest day.

Sleep quality. Smart bracelets are used to track sleep duration (target  $\geq 7$  hours) and deep sleep percentage (target  $\geq 25\%$ ). Insufficient sleep reduces training adaptation and increases the risk of injury. Subjective fatigue assessment (USP): using a scale of 1 to 10 (1 = vigor, 10 = fatigue) to assess physical and mental fatigue. Correct training if USP  $\geq 7$ . Weekly monitoring: Performance tests: 30 m sprint (acceleration score), yo-yo IR1 test (RSA score) and high jump (explosive force score). Track changes to adjust training load. Training volume analysis: the total training time, the duration of high-intensity training and the number of sprints/grabs are recorded. Provide progressive overload without exceeding the recovery potential.

3. periodization of training: adapt to academic cycles. Combine training cycles with the training schedule (semesters, exams) to avoid conflicts. Pre-season (8-10 weeks before competition): General preparation (weeks 1-4): Focus on base strength, aerobic endurance and flexibility. Low intensity, high volume. Specialized training (weeks 5-8): increase intensity, combine position-specific training and strength exercises. RSA and agility are improved.

Pre-competition period (weeks 9-10): reduce volume, maintain intensity. Simulate game conditions through training and tactical exercises. During the season (competitive period): game week: light training (technical exercises, recovery) 2-3 days before the matches; active recovery (jogging, stretching) 1 day before the match. Week without matches: maintain specialized training (strength, speed, dexterity) with moderate volume and intensity. Off-season (2-3 months post-competition): Active recovery (weeks 1-2): Low-intensity exercise (swimming, cycling) to relieve post-season fatigue. General fitness (weeks 3-8): Pay attention to weaknesses (e.g. upper body strength, flexibility) and cross training to avoid boredom. Transition (Weeks 9-12). Gradually, you need to introduce football training to prepare for pre-season training.

**Conclusion.** The physical fitness of college football players should go beyond traditional universal models and take a «specialized, position-differentiated and periodized» approach that takes into account their dual identities. By focusing on explosive strength, multi-directional speed, multiple sprint ability, and cognitive flexibility, as well as integrating injury prevention, load monitoring, and academic cycle alignment, coaches can optimize training effectiveness and reduce injury risk. This study presents the theoretical basis and practical training methods in college football, emphasizing that the effective development of physical fitness requires not only scientifically based training design, but also attention to the academic needs of athletes and their long-term health. Future research should explore the application of advanced technologies (e.g. GPS tracking, biomechanical analysis) in college football training to further enhance individualization and accuracy.

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