

СОВЕРШЕНСТВОВАНИЕ ФИЗИЧЕСКОЙ ПОДГОТОВКИ СТУДЕНТОВ, ЗАНИМАЮЩИХСЯ В СПОРТИВНОЙ СЕКЦИИ «НАСТОЛЬНЫЙ ТЕННИС»

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Аннотация. В статье представлена программа физической подготовки для студентов, занимающихся в спортивной секции по настольному теннису, которая реализовывалась в течение 8 недель. В тренировочном плане разработанной программы приоритет отдавался физическим упражнениям непосредственно близким к технической работе теннисиста, тем самым укрепляя физическую и техническую связь.

Ключевые слова: студенты, настольный теннис, физическая подготовка.

IMPROVING THE PHYSICAL FITNESS OF STUDENTS INVOLVED IN THE TABLE TENNIS SPORTS SECTION

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Abstract. This article presents a physical training program for students enrolled in a table tennis section, implemented over an 8-week period. The training plan for the developed program prioritized exercises directly related to the technical work of a tennis player, thereby strengthening the physical and technical connection.

Keywords: students, table tennis, physical training.

Introduction. In modern table tennis, competitive success depends not only on technical mastery, but also on the ability to repeatedly execute high-speed strokes and footwork under time pressure, maintain postural stability, and sustain decision-making quality during prolonged rallies. These requirements place specific demands on the energy systems, neuromuscular coordination, reactive strength, and movement efficiency of athletes. For college table tennis specialty students, training time is often limited by academic workload; therefore, physical training must be purposefully optimized to increase transfer to technical performance while preventing excessive fatigue and injury risk.

Contemporary approaches emphasize sport-specific conditioning, individualized load control, and periodized integration of strength, speed, agility, and endurance. Within table tennis, the most practical direction is to combine explosive lower-limb strength, multidirectional acceleration — deceleration ability, core stability, and repeated-sprint capacity with technical drills performed under controlled fatigue. Such an approach is theoretically supported by specificity and overload principles, as well as by the concept of «physical-technical coupling», where physical qualities are developed in conditions resembling the competitive motor pattern [1].

Purpose of the study — to evaluate the effectiveness of an optimized physical training program on improving specific physical fitness and technical performance indicators in college table tennis specialty students.

Methods and organization of the study. The study involved 24 table tennis specialty students (age 18–21) from a sports program. Participants were randomly assigned into a control group (CG, $n=12$) and an experimental group (EG, $n=12$). The CG followed the standard curriculum physical preparation (general strength and endurance sessions 2 times per week) combined with regular table tennis practice. The EG completed an optimized physical training intervention for 8 weeks (3 sessions per week, 40–60 min), integrated with table tennis practice. The optimized program included: neuromuscular activation and movement preparation (10–12 min); explosive strength and reactive work (jump squats, lateral bounds, medicine-ball rotational throws; 12–18 min); multidirectional speed and agility (5–10–5 shuttle, reactive step drills with visual cues; 10–15 min); core stability and braking mechanics (anti-rotation, unilateral stability; 8–10 min); sport-specific repeated-effort intervals performed with short technical series (e.g., 20–30 s footwork + 30–40 s multiball; 10–12 min). Training load was monitored using session-RPE (0–10 scale) and weekly volume tracking; progression followed a 3:1 loading pattern (3 weeks progressive, 1 week relative deload).

Assessment was conducted pre- and post-intervention using the following indicators: 30 m sprint (s), 5–10–5 shuttle run (s), countermovement jump (CMJ, cm), Y-balance composite score (%), and repeated lateral shuffle test (6×15 m, total time in s). Technical performance was assessed by (a) multiball accuracy under time constraint (hits to target zones, %), and (b) footwork–stroke consistency test (number of successful sequences in 60 s).

Methods used: analysis of scientific and methodological literature, pedagogical testing, training load monitoring, and mathematical-statistical processing (mean $\pm$ SD; within- and between-group comparisons).

Research results and their discussion. Before the intervention, there were no meaningful differences between groups in the main indicators ($p>0.05$). After 8 weeks, both groups improved due to regular practice; however, the EG demonstrated more pronounced gains in speed–agility, explosive power, balance, and repeated-effort capacity, which corresponded to higher improvements in technical performance under time pressure.

The data in Table 1 indicate that the optimized program produced larger improvements particularly in agility (5–10–5), explosive power (CMJ), dynamic stability (Y-balance), and repeated lateral movement capacity, which are directly associated with table tennis footwork and readiness for rapid stroke execution. The program's emphasis on braking mechanics and unilateral stability likely contributed to better balance outcomes, while the coupling of repeated-effort intervals with technical series supported endurance relevant to rally patterns.

Table 1

Changes in specific physical fitness indicators in the CG and EG (n = 24)

Indicator	Control group (CG, n = 12) Pre	CG Post	Experimental group (EG, n = 12) Pre	EG Post
30 m sprint (s)	4,62	4,55	4,63	4,42
5–10–5 shuttle (s)	5,21	5,1	5,22	4,92
CMJ (cm)	34,1	35,8	34,0	38,6
Y-balance composite (%)	91,4	92,6	91,2	95,1
Repeated lateral shuffle 6×15 m (s)	33,8	33,1	34,0	31,7

As shown in Table 2, technical performance increased more in the EG than in the CG. This suggests that improvements in explosive lateral movement, reactive strength, and fatigue resistance enhanced the ability to maintain stroke quality in fast-paced sequences. Importantly, the EG's training design prioritized transfer: physical drills were selected to mirror table tennis movement patterns and were often completed in close temporal proximity to technical work, thereby strengthening physical–technical coupling.

Table 2

Changes in technical performance indicators in the CG and EG (n=24)

Indicator	Control group (CG) Pre	CG Post	Experimental group (EG) Pre	EG Post
Multiball accuracy to target zones (%)	71,5	74,2	71,3	79,6
Footwork–stroke consistency (successful sequences in 60 s)	18,2	19,6	18,1	23,4

Conclusion. The optimized physical training program implemented for 8 weeks resulted in greater improvements in sport-specific physical fitness and technical performance compared to standard training in college table tennis specialty students. The most meaningful changes were observed in agility, explosive power, dynamic balance, repeated lateral movement capacity, and technical performance under time constraints. These findings support the practical value of integrating periodized, sport-specific physical training with load monitoring and physical-technical coupling to improve athletic performance in table tennis students.

BIBLIOGRAPHIC LIST

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