

GENERAL PHYSICAL PREPARATION OF MIDDLE-DISTANCE RUNNERS IN A TRAINING GROUP

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Abstract. *This thesis examines issues related to improving the general physical preparation of middle-distance track athletes in a training group. The effectiveness of the training methodology developed during the pedagogical experiment was evaluated based on the performance indicators of control and experimental groups. The research findings indicate that the systematic and targeted use of general physical preparation methods serves to significantly develop speed, general endurance, speed-strength, and motor coordination.*

Keywords: *track and field, middle-distance running, general physical preparation, speed, endurance, speed-strength, training process, functional preparation.*

Introduction

In the theory of modern sports training, general physical preparation is crucial for expanding an athlete's functional capabilities, ensuring the stable development of motor skills, and creating a solid physiological foundation for specialized physical training. Particularly in the preparation of middle-distance runners, general physical preparation enhances the effectiveness of competitive performance by increasing the functional reserves of the cardiovascular, respiratory, and neuromuscular systems.

A comparative analysis of general physical preparation indicators at the beginning and end of the pedagogical experiment allowed for an evaluation of the practical effectiveness of the developed training methodology. According to the data provided, a higher rate of improvement was observed in the experimental group across all key components of physical qualities compared to the control group.

Middle-distance running is one of the most complex disciplines in track and field, in which achieving high results depends on the harmonious development of aerobic and anaerobic energy systems, movement technique, and both general and specialized physical preparation.

During the study, the following tests were used to assess general physical preparation: the 100-meter dash, the 3000-meter run, a vertical jump measured with the "SPORK" device, 100-meter bounding, and the 3 kg medicine ball throw. These tests enabled a comprehensive assessment of speed, general endurance, speed-strength, and movement coordination.

In the field of world sports science, a number of fundamental research studies have been conducted on the issue of general physical preparation. V. N. Platonov notes: "General physical preparation creates the functional basis upon which specialized athletic performance is developed." [1].

This scientific conclusion substantiates that general physical preparation is the physiological foundation of specialized athletic skill.

Tudor Bompa puts forward the following idea: "General physical preparation increases the athlete's ability to tolerate greater specific training loads" [2].

This approach demonstrates that general physical preparedness is necessary for effectively performing high-volume specialized training.

Yuri Verkhoshansky emphasizes in his research: "Strength and explosive power are fundamental components of successful running performance"[3].

This idea indicates that speed-strength training plays a significant role in improving running technique and movement efficiency.

The theoretical views mentioned above are consistent with the results of this study, and the comprehensive growth of general physical fitness indicators in the experimental group serves as their practical confirmation.

Table 1

Dynamic Changes in General Physical Fitness Indicators of Middle-Distance Runners in the Experimental Group During the Study (n=14)

№	Control tests	Start of research $\bar{X} \pm \sigma$	V, %	End of the research $\bar{X} \pm \sigma$	V, %	Relative difference, %	t	P
1	100m run, sec	14,0 ± 0,49	3,50	12,7 ± 0,41	3,23	9,29	7,45	<0,001
2	3000m run, sec	742,5 ± 12,4	1,67	701,0 ± 10,8	1,54	5,59	5,28	<0,001
3	Standing vertical jump on the "SPORK" device, cm	18,7 ± 1,15	6,15	21,0 ± 1,00	4,76	12,30	5,04	<0,001
4	100 m bounding, reps	52,0 ± 2,40	4,62	49,8 ± 1,60	3,21	4,23	2,85	<0,01
5	3 kg medicine ball throw, cm	865 ± 28	3,24	936 ± 25	2,67	8,21	4,58	<0,001

According to the data from the table, statistically significant positive changes were observed across all tests in the experimental group. The highest increase was recorded in the high jump test on the "SPORK" apparatus (12.30%). Furthermore, the results of the 100-meter sprint (9.29%) and the 3 kg medicine ball throw (8.21%) indicate that the training methodology effectively developed speed and speed-strength preparedness. The 5.59% improvement in the 3000-meter run result confirms that general endurance and aerobic work capacity increased significantly.

A comparative analysis of the pedagogical experiment's results showed that the developed training methodology served to comprehensively enhance the general physical fitness of middle-distance track and field athletes in the training group. Although certain positive changes were also observed in the control group, the growth rates in the experimental group were higher across all control tests. This indicates that the applied training methods and workloads were scientifically planned and purposefully directed at developing general physical fitness.

In the 100-meter sprint test, the experimental group recorded a higher result than the control group.

This is explained by speed ability, start reaction, neuromuscular coordination of movements, and the effective recruitment of muscle fibers during the acceleration phase. For middle-distance runners, the development of speed is crucial not only at the starting stage but also for executing tactical accelerations during the competition and for finishing the race at a high pace.

The significant positive dynamics observed in the 3000-meter run indicate a high level of development in general endurance. The reduction in the time taken to cover the distance signifies an increase in the efficiency of aerobic energy supply systems, improved oxygen uptake capacity, and an expansion of the functional capabilities of the cardiovascular and respiratory systems.

The highest relative increase was observed in the high jump test on the "SPORK" apparatus. This result demonstrates the high effectiveness of the speed-strength exercises, jumping elements, and plyometric methods used during the training process. The explosive power capabilities of the leg muscles served to improve the support phase in running technique, thereby increasing movement economy.

In the 100-meter bounding test, a decrease in the number of steps indicates improved movement efficiency, stride length, and movement biomechanics. These changes confirm an enhancement in motor coordination. Likewise, the improvement in the results of the 3 kg medicine ball throw indicates the development of the speed-strength capabilities of the shoulder girdle, torso, and upper body muscles.

Table 2

Comparative dynamics of general physical fitness indicators for middle-distance runners in the control and experimental groups at the end of the study (experimental group n=14, control group n=14)

№	Control tests	Start of research $\bar{X} \pm \sigma$	V, %	End of the research $\bar{X} \pm \sigma$	V, %	Relative difference, %	t	P
1	100m run, sec	$13,1 \pm 0,43$	3,28	$12,7 \pm 0,41$	3,23	3,05	2,53	<0,05
2	3000m run, sec	$731,5 \pm 10,2$	1,39	$701,0 \pm 10,8$	1,54	4,17	7,72	<0,001
3	Standing vertical jump on the "SPORK" device, cm	$19,6 \pm 1,20$	6,12	$21,0 \pm 1,00$	4,76	7,14	3,34	<0,01
4	100 m bounding, reps	$51,3 \pm 1,70$	3,31	$49,8 \pm 1,60$	3,21	2,92	2,40	<0,05
5	3 kg medicine ball throw, cm	890 ± 24	2,70	936 ± 25	2,67	4,92	4,96	<0,001

The data in the table shows that at the conclusion of the study, the experimental group demonstrated superior results compared to the control group across all control tests. Notably, the differences observed in the 3000-meter run ($P < 0.001$), the "SPORK" test ($P < 0.01$), and the 3 kg medicine ball throw ($P < 0.001$) confirm the high effectiveness of the training methodology.

Vladimir Issurin draws the following conclusion: "*Block periodization allows athletes to achieve higher adaptations through concentrated training loads.*"[4]. This approach demonstrates that the phased planning of training loads enhances functional adaptation.

Jack Daniels highlights: "*Running performance depends primarily on aerobic power, running economy and velocity at VO_{2max} .*" [5].

This view confirms that developing general endurance and economy of movement is one of the key factors in training middle-distance runners.

In her research, Véronique Billat notes the following: "*High-intensity interval training is an effective method for improving aerobic performance in middle-distance runners.*" [6].

The scientific conclusions of these scientists substantiate that interval training is an important tool in developing general and special endurance.

Conclusion. The results of the study showed that the developed training methodology was highly effective in the comprehensive improvement of the general physical preparedness of middle-distance track and field athletes in the training group. A statistically significant increase in speed, general endurance, speed-strength, and motor coordination was recorded in the experimental group. These results confirm that the scientifically-based planning of general physical training methods and their integration with specialized training are crucial for expanding athletes' functional capabilities and enhancing the effectiveness of their competitive performance.

References

1. Platonov V.N. *The General Theory of Athlete Preparation in Olympic Sport*. Kyiv: Olympic Literature, 2013. P. 184.
2. Bompa T.O., Buzzichelli C. *Periodization: Theory and Methodology of Training*. 6th ed. Human Kinetics, 2019. P. 41.
3. Verkhoshansky Y., Siff M. *Supertraining*. Ultimate Athlete Concepts, 2009. P. 54.
4. Issurin V.B. *Block Periodization: Breakthrough in Sport Training*. Ultimate Athlete Concepts, 2008. P. 73.
5. Daniels J. *Daniels' Running Formula*. 4th ed. Human Kinetics, 2021. P. 125.
6. Billat V.L. High-Intensity Interval Training for Performance in Endurance Sports. *Sports Medicine*. P. 32.