

# STAGES OF THE ANNUAL TRAINING CYCLE – THE BASIS FOR IMPROVING PHYSICAL QUALITIES TO ENSURE THE PERFORMANCE OF MIDDLE-DISTANCE RUNNERS AT THE STAGE OF SPECIALIZED BASIC PREPARATION

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**Abstract.** *Introduction.* The groups of exercises of different predominant orientations being the foundation for physical quality formation (general and special endurance, speed, speed-strength qualities, agility, flexibility) at the stage of specialized basic training were developed. It is based on the annual training macrocycle of middle-distance runners of this stage, which includes 2 macrocycles: fall-winter and spring-summer, 6 main periods, and 16 stages of preparation involving 18 mesocycles and 52 microcycles. *The objective of the study* was to improve the methodology of physical quality formation in middle-distance runners through the use of training means of different predominant orientations on the basis of solving the set tasks of the main stages of preparation of the third year of training of the specialized basic preparation stage. *Methods of study:* analysis of scientific and methodological literature and generalization of best practices (questionnaires, interviews) of endurance running coaches (middle and long distances), protocols, and calendar of competitions. *Results of the study.* Taking into account the calendar of competitions and the annual training macrocycle of a group of skilled middle-distance runners of the third year of training at the stage of specialized basic preparation, the tasks of the annual cycle stages were developed. The tasks of the 16 stages of the annual cycle are based on exercises of different predominant orientations, methods of their usage with account for the five zones of intensity. In the process of preparation, it will help to determine the structure and content of training of middle-distance runners at the stage of the specialized basic preparation and bring them to the peak of sports form during the major competitions. *Conclusions.* The training process of middle-distance runners should include exercises of different predominant orientations aimed at developing general and special endurance, speed, speed-strength qualities, static and dynamic balance, agility, and flexibility. This will allow them to successfully perform large volumes of special work, better tolerate loads, faster recover, get fit in due time, and demonstrate physical, technical, tactical, and mental fitness to achieve high sports results in extreme conditions of competitive activity.

**Keywords:** track and field, middle distance running, stage of specialized basic training, intensity zone, exercises, physical qualities, functional capabilities, annual cycle stages, periodization system, tasks of the annual cycle stages.

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## ЕТАПИ РІЧНОГО ЦИКЛУ ПІДГОТОВКИ – ОСНОВА ВДОСКОНАЛЕННЯ ФІЗИЧНИХ ЯКОСТЕЙ ДЛЯ ЗАБЕЗПЕЧЕННЯ РЕЗУЛЬТАТИВНОСТІ БІГУНІВ НА СЕРЕДНІ ДИСТАНЦІЇ НА ЕТАПІ СПЕЦІАЛІЗОВАНОЇ БАЗОВОЇ ПІДГОТОВКИ

**Анотація.** *Вступ.* Розроблено групи вправ різної переважної спрямованості, які є основою формування фізичних якостей (загальної витривалості, спеціальної витривалості, швидкості, швидкісно-силових якостей, спритності, гнучкості) на етапі спеціалізованої базової підготовки. В основу покладено річний тренувальний макроцикл бігунів на середні дистанції цього етапу, який включає: 2 макроцикли, осінньо-зимовий і весняно-літній, 6 основних періодів і 16 етапів підготовки, в яких 18 мезоциклів і 52 мікроцикли. Мета дослідження – удосконалення методики формування фізичних якостей бігунів на середні дистанції шляхом застосування тренувальних засобів різної переважної спрямованості на основі розв'язання поставлених завдань основних етапів підготовки третього року тренувань етапу спеціалізованої базової підготовки. *Методи дослідження:* аналіз науково-методичної літератури та узагальнення передового досвіду (анкетування, інтерв'ю) тренерів із бігу на витривалість (середні та довгі дистанції), протоколи та календар змагань. *Результати дослідження.* Беручи до уваги календар змагань та річний тренувальний макроцикл групи кваліфікованих бігунів на середні дистанції третього року тренувань на етапі спеціалізованої базової підготовки, нами було розроблено завдання етапів річного циклу. В основу завдань 16 етапів річного циклу покладено вправи різної переважної спрямованості, методи їх застосування з урахуванням п'яти зон інтенсивності. У процесі підготовки це допоможе визначити структуру та зміст тренування бігунів на середні дистанції на етапі спеціалізованої базової підготовки та підвести їх до піку спортивної форми в період основних змагань сезону. *Висновки.* Тренувальний процес бігунів на середні дистанції повинен включати вправи різної переважної спрямованості, націлені на розвиток загальної витривалості, спеціальної витривалості, швидкості, швидкісно-силових якостей, статичної та динамічної рівноваги, спритності та гнучкості. Це дозволить успішно виконувати великі обсяги спеціальної роботи, легше переносити навантаження, швидше відновлюватися, досягти високої спортивної форми в потрібний час та проявити свою фізичну, технічну, тактичну, психологічну підготовленість для досягнення високих спортивних результатів в екстремальних умовах змагальної діяльності.

**Ключові слова:** легка атлетика, біг на середні дистанції, етап спеціалізованої базової підготовки, зона інтенсивності, вправи, фізичні якості, функціональні можливості, етапи річного циклу, система періодизації, завдання етапів річного циклу.

**Introduction.** While considering the stages of the annual training cycle of middle-distance runners, the groups of exercises of different predominant orientations have been developed, which are the basis of physical quality formation (general and special endurance, speed, speed-strength qualities, agility, flexibility) at the stage of specialized basic long-term development. The tasks are developed for each

stage of the annual training cycle. Their fulfillment by skilled athletes enhances the possibility to form the “improved” aerobic, aerobic-anaerobic, and anaerobic energy systems at the stage of specialized basic training, thus enabling to lay an aerobic-anaerobic functional base to successfully withstand high volumes of special work, better tolerate loads, and faster recover in the process of intensification of training potential

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accumulation for successful competitive activity and high result achievement in middle distance running [2; 4; 5; 17].

The system of the training process organization for middle-distance runners is based on the annual training macrocycle of the stage of the specialized basic long-term development, which includes 2 macrocycles – fall-winter and spring-summer, 6 main periods, and 16 stages of preparation involving 18 mesocycles and 52 microcycles [3; 17].

**The objective of the study** was to improve the methodology of physical quality formation in middle-distance runners through the use of training means of different predominant orientations on the basis of solving the set tasks of the main stages of preparation of the third year of training of the specialized basic preparation stage.

#### **Tasks of the study:**

1. To determine the main training means aimed at the development of functional systems (cardiovascular, respiratory, muscular), which have a greater impact on the achievement of sports results;

2. To develop tasks of stages of the annual training cycle of the specialized basic preparation stage of middle-distance runners that determine a way to improve the main components of athlete's physical qualities.

**Methods of study:** analysis of scientific and methodological literature and generalization of best practices (questionnaires, interviews) of endurance running coaches (middle and long distances), protocols, and calendar of competitions.

**Results of the study.** Taking into account the analysis of scientific and methodical literature, recommendations, and remarks of leading endurance running coaches (middle and long distances) obtained during the questioning and interviews, the main training means, which influence the achievement of sports results to a greater extent are determined.

When selecting exercises of different predominant orientations, the most common classification envisaging five intensity or power zones (aerobically restorative, aerobically developing, mixed aerobic-anaerobic, anaerobic glycolytic, anaerobic alactate), which affect the improvement of physical qualities (general and special endurance, speed, speed-strength qualities, agility, flexibility), development of the body functional systems, and achievement of sports result according to the modern methods of their application was used [3; 5].

Aerobically restorative is the first intensity zone. Duration of work varies from 15 minutes to 3 hours, HR constitutes up to 150  $\text{bt}\cdot\text{min}^{-1}$ . Training in this zone represents a universal means of active recovery and fat metabolism activation. The main method is prolonged work at a steady pace.

Aerobically developing is the second intensity zone. HR constitutes up to 175  $\text{bt}\cdot\text{min}^{-1}$ . Due to functional capacity improvement, the speed corresponding to the anaerobic threshold increases resulting in an increase in the upper limit of running speed, which limits this zone, in which training exercises are aimed at enhancing the body aerobic capacity.

Mixed aerobic-anaerobic is the third intensity zone. HR constitutes up to 190  $\text{bt}\cdot\text{min}^{-1}$ , whereas work duration – up to 60 minutes. Along with the maximum intensification of the mechanisms that regulate aerobic metabolism, there is a significant activation of anaerobic glycolytic mechanisms of energy production.

Anaerobic-glycolytic is the fourth intensity zone, which is characterized by the borderline work duration during the first repetition up to 3 minutes, and in total in one session – up to 10–15 minutes. This zone corresponds to the load in middle-distance running competitions, with a total volume of training means of 2–5%. It is also characterized by an increase in HR up to 195  $\text{bt}\cdot\text{min}^{-1}$ .

Anaerobic-alactate is the fifth zone of intensity characterized by the maximum tension of the musculoskeletal system during the shortest period of time [3; 5].

Taking into account the calendar of competitions and the annual training macrocycle of a group of skilled middle-distance runners of the third year of training at the stage of specialized basic preparation, the tasks of the annual cycle stages were developed. The tasks of the 16 stages of the annual cycle are based on exercises of different predominant orientations, methods of their usage with account for the five zones of intensity. In the process of preparation, it will help to determine the structure and content of training of middle-distance runners at the stage of the specialized basic preparation and bring them to the peak of sports form during the major competitions [4; 10; 11; 12; 13].

The main tasks during the general preparatory stage of training are the increase of the general physical and functional fitness levels, development of the general endurance due to running exercises of aerobic character, such as cross-country, 200 to 2000 m running performed in the first (aerobically restorative) and second (aerobically developing) zones of intensity using continuous, repeated, and interval methods. Much attention is also paid to the development of strength capacities, agility, flexibility, and increasing knowledge in the field of theory and methodology of the chosen type [3; 5; 17; 18; 19].

The special preparatory stage is characterized by the development of general running endurance (aerobic-anaerobic productivity) and special endurance (anaerobic productivity) as a result of such exercises as cross-country, fartlek, 200 to 2000 m running performed in the first (aerobically restorative), second (aerobically developing), and third (aerobic-anaerobic) intensity zones using continuous, repeated, interval, and variable methods. Attention is also paid to the development of speed qualities (short segments with maximum running speed), speed-strength qualities (jumping exercises, running, hops, bouncing, half squat and squat with weight, uphill jumping and running, distance throwing of lightweight implements), general strength endurance, agility, flexibility. An increase in athletes' mental toughness to intensive training loads and improvement of coordination structure of running movements occurs [3; 5; 8; 9; 20].

During the preparatory period, middle-distance runners usually train on cross-country terrain: in fields, forests, mountainous terrain, beaches, and athletics stadiums.

At the stage of early competitions, much attention is focused on the development of speed and special endurance through such exercises as cross-country running, shuttlecock, and 100 to 600 m running, performed by continuous, repeated, repeated combined, interval, variable, and competitive methods at competitive speed and 92–95% of the maximum. Exercises at this stage are performed in the first (aerobically restorative), second (aerobically developing),

third (aerobic-anaerobic), fourth (anaerobic glycolytic), and fifth (anaerobic alactate) intensity zones. Jumping exercises, foot-to-foot jumps, hops, jumping over a number of barriers, jumping to a height of 80–100 cm, jumping from a height of 80–100 cm, distance throwing lightweight implements are used to develop speed-strength qualities. At this stage, it is important to develop elements of tactics, as well as participate in early competitions to build the competition form [6; 7; 14].

The stage of major competitions is marked by further development and maintenance of speed and special endurance, speed-strength capacities. At this stage, the volume of training sessions decreases, but their intensity and complexity increase. The exercises of high-speed running character from 10 to 600 m with the maximum tension of the musculoskeletal system are performed, by means of repeated, repeated combined, variable, interval, and competitive methods at the competitive speed and a sufficient rest interval and 92–95% of the maximum speed, but after 1–3 minutes of rest between exercises. In general, running exercises at this stage of the annual cycle are performed in the third (aerobic-anaerobic), fourth (anaerobic-glycolytic), and fifth (anaerobic-alactate) intensity zones. Speed-strength capacities at this stage are developed through jumping exercises: foot-to-foot jumps, jumping running, hops, various jumping exercises for a certain distance of up to 100 meters against the clock [15; 18; 19].

The main thing at this stage of the annual training cycle is to improve the mental toughness of athletes in competitions, participate in qualifying competitions, enter the state of the best sports form, and stability of results [3; 5; 17].

At the stage of direct preparation for the major competitions, it is important to restore the work capacity after qualifying competitions, further improve special physical fitness and technical and tactical skills. The athlete must have a high psychological readiness to perform at the major competitions of the season. At this stage, competitive activity is modeled in order to prepare for the start and conditions are provided for the use of all aspects of fitness for their transformation into the best result at the major competitions [1; 8; 9; 16].

The main training means at this stage of runners/preparation are running exercises performed in the third (aerobic-anaerobic), fourth (anaerobic-glycolytic), and fifth (anaerobic-alactate) intensity zones, segments from 10 to 800 m at competitive speed and sufficient rest interval, and 92–95% of the maximum speed after 1–3 minutes of rest between exercises [3; 5; 6; 7].

It is no less important to perform combined exercises for the competitive distance, taking into account the tactics of running, as well as running with speed switching for starting acceleration and taking up an advantageous position and training finishing acceleration. At this stage, variable, interval, repeated, repeated combined, and competitive methods are used; a control run is conducted to determine the athlete's fitness, and attention is paid to flexibility and agility exercises [3; 5].

At the stage of the major competitions, the means of training middle-distance runners are focused on achieving a high level of fitness, mobilization and manifestation of physical, technical, tactical, mental capabilities, which are aimed at obtaining the best sports results in the major competitions

of the macrocycle. Exercises accentuate the development of speed and special endurance, speed, flexibility, and agility to improve the coordination structure of running movements [15; 18; 19; 20].

At the stage of late competitions, work capacity is restored after the major competitions of the macrocycle. Exercises at this stage are aimed at maintaining special fitness and technical and tactical skills [5; 8; 9].

Training of middle distance runners during the competitive period usually takes place in an athletics stadium or athletics arena.

The transitional period is characterized by work capacity restoration after the competitive period; physical fitness level is maintained by means of active conditioning exercises and sports games. An in-depth medical examination and rehabilitation after injuries are of crucial importance at this stage [3; 5; 17].

**Discussion.** Based on the analysis of the performances of national middle distance runners and the generalization of best practices, it was found that from 2008 to 2024 in many qualifying competitions (Ukrainian Championships and others) runners failed to achieve qualification scores that would allow them to qualify for the Olympic Games or World Championships. The reasons for this are a large volume of running exercises of predominantly aerobic orientation and the absence of exercises of different predominant orientations in the individual training plan of athletes that would actively influence the development of physical qualities components (speed, speed-strength, agility, flexibility). There is a problem in managing the competition form of middle distance runners, which was not achieved during the period of major qualifying competitions [4; 5; 10; 11; 12; 13].

Therefore, in our opinion, the modern training process of middle-distance runners at the stage of specialized basic preparation should include exercises of different predominant orientations to develop general and special endurance, speed, speed-strength qualities, static and dynamic balance, agility, and flexibility. In the process of training runners, an individual approach to each athlete should be developed, and running exercises must be performed with account for the intensity zones [2; 3; 4; 5].

To solve the issues of managing the competition form of middle distance runners, it is necessary to establish control over the condition of the athlete, monitor how middle distance runners perform and tolerate physical loads, and recover after them. It is no less important to develop tasks of the annual training cycle stages, which determine a way to improve the main components of athletes' physical qualities and form the primary objective of each stage of the annual training cycle at the stage of specialized basic preparation of middle distance runners [3; 17].

**Conclusions.** The training process of middle-distance runners should include exercises of different predominant orientations aimed at developing general and special endurance, speed, speed-strength qualities, static and dynamic balance, agility, and flexibility. They should be performed by continuous, interval, variable, repetitive, repetitive combined, and competitive methods with account for the intensity zones. The vast majority of running exercises for middle-distance runners should be executed at high intensity,

which contributes to improving the athlete's work capacity and achieving high sports results to a greater extent.

On the basis of the annual training macrocycle of the stage of specialized basic preparation of middle-distance runners of the third year of training the tasks of the annual cycle stages that determine a way to improve the main components of physical qualities and the objective of the training process of each stage of the annual cycle were developed. The improvement of the methodology of physical quality formation in middle-distance runners is achieved through the use of the selected training means of different predominant orientations with account for the intensity zones and different methods of exercise performance, which correspond to the main tasks of the given stage of the annual training cycle.

Thus, all selected exercises of different predominant orientations with account for the intensity zones, method of application, and developed tasks of the annual cycle stages of

middle-distance runners are directed at improving the main components of physical qualities and increasing aerobic, aerobic-anaerobic, and anaerobic energy systems. This will allow them to successfully perform large volumes of special work, better tolerate loads, faster recover, get fit in due time, and demonstrate physical, technical, tactical, and mental fitness to achieve high sports results in extreme conditions of competitive activity.

**Prospects for further studies.** They consist in the introduction of training exercises for middle-distance runners into the training process by using them in the annual training macrocycle of the third year of training at the stage of specialized basic preparation for the development of functional capabilities, components of physical qualities, and achievement of high sports results.

**Conflict of interest.** The authors declare that there is no conflict of interests.

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