Developing endurance in middle-distance runners aged 15-16

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Abstract

This study addresses the issue of developing speed endurance in middle-distance runners aged 15–16 within the framework of long-term athletic training. The research highlights the importance of a scientifically grounded and systematic approach to training young athletes, considering their age-related physiological and functional characteristics. Special attention is given to the role of general endurance as a foundation for speed endurance development, as well as to the optimal combination and alternation of training methods, particularly interval training.

The study identifies existing shortcomings in current coaching practices, including the overemphasis on forced training and insufficient attention to comprehensive physical development. Based on the analysis of scientific and methodological literature, as well as practical observations, the research proposes optimizing training tools and methods aimed at improving speed endurance in 800 -meter runners. The findings emphasize the necessity of integrating medical-pedagogical control, recovery strategies, and individualized load management into the training process.

The results of the study can be applied in children's and youth sports schools, specialized athletic programs, and coaching practice to enhance the effectiveness of training and support the long-term athletic development of middle-distance runners.

Key words: middle-distance running, speed endurance, interval training, young athletes, 800 meters, training methodology, aerobic capacity, anaerobic capacity, long-term training, physical development, youth sports.

Introduction

The challenge of developing endurance from childhood is a critical issue in physical education and sports training. Endurance training for athletic purposes should contribute to the widespread improvement of the younger generation's health, which is especially important given the prevalence of hypokinesia in school-aged children, exacerbated by accelerated physical development.

Running is an effective and accessible means of physical improvement for all ages, promoting better health and harmonious development.

However, the issue of sports training for young runners has been a source of debate and disagreement among coaches and researchers for many years. The main controversies pertain to the initial, foundational stages of athletic training during childhood and adolescence, and it is these stages that are paramount for achieving high athletic results.

It is well known that achieving high athletic results in most sports, especially those involving prolonged cyclical locomotor activity, is impossible without a high level of endurance development.

In the athletic training of male and female middle-distance runners, various methods for developing their speed endurance within the annual training cycle are of great importance. The unique feature of these methods is the introduction of diverse options for utilizing means and methods to develop speed endurance into the athletes' training process. Currently, young coaches, eager to prove themselves quickly, neglect the well-rounded development of their athletes, instead forcing their athletic conditioning. At the regional level, it is often noticeable that some athletes have a weak musculoskeletal system and poor technical, functional, and physical fitness. There is also a low motivation among athletes to achieve high results specifically in middle- and long-distance running.

Therefore, this situation is a cause for concern, and we believe that the main culprit is a lack of modern training methodologies, as well as practical and instructional recommendations for developing speed endurance in middle -distance runners and for their athletic training as a whole. The issue of developing speed endurance in athletes has been covered quite extensively in domestic literature; aspects such as defining the nature and content of middle-distance runner training, developing their physical qualities, general and special endurance, and the mechanisms of energy supply and work capacity under intense muscular activity have all been well-studied.

At the same time, however, the application, combination, and alternation of variously

focused methodologies for developing their speed endurance remains an under-researched topic. A review of the literature revealed that while there is a sufficient number of sources that address the development of speed endurance in runners, there is a lack of variously oriented methodologies for developing this physical quality in the 15-16 age group.

Athletics is a comprehensive sport that includes many different disciplines. It's not for nothing that it's considered the queen of sports, and even the expression "Faster, Higher, Stronger" can be attributed to it for the most part. At the very first ancient Greek Olympic Games, track and field was the main sporting event. From that time to the present day, it has remained the most popular and principal sport.

The 800-meter run is one of the most difficult distances in track and field and places exceptionally high demands on an athlete's body. To achieve high athletic results in this event, one must possess excellent running technique, a high level of speed, as well as both speed endurance and special endurance.

The foundation for developing speed endurance is general endurance, which is developed through various exercises performed for a long duration and under a heavy load. An analysis of scientific and methodological literature shows that developing speed endurance requires performing exercises at high speed, and the total length of the distance segments or accelerations must be greater than the distance in which the runner specializes.

Special endurance is endurance in relation to a specific activity (for example, there is the special endurance of a speed skater, cyclist, boxer, wrestler, etc.). The specificity of this type of endurance is determined by the nature of the exercises inherent to a particular sport. Within the special endurance of an 800m runner, it is common to distinguish the following types: strength, speed, and coordination endurance.

Achievements related to this type of endurance require high aerobic and maximal anaerobic performance. It is important to remember that aerobic performance is the foundation for developing anaerobic capacity.

Often, the main part of a workout uses only the repetition method, where runs are performed after a one-minute break, or the integral (complex) method. In these cases, the load intensity is not regulated, and the degree of functional strain is determined only by the type of workout and sometimes by the athlete's well-being. Special, pre-planned recovery procedures are not utilized. As a result, only general endurance is developed, rather than the speed endurance specific to middle- and long-distance running.

The subject of the study:is the set of tools and methods used in the process of developing speed endurance, including a range of medical-pedagogical and recovery measures used to monitor endurance development in 800m runners aged 15–16.

Object of study: The development of speed endurance in 800m runners aged 15–16 through the use of the interval training method.

The aim of the study is to optimize the tools and methods used to develop speed endurance in 800m runners aged 15–16.

An athlete's most active and successful period in track and field lasts 10–15 years.

Results and discussion

The long-term training process is divided into stages: preliminary training (initial training groups at youth sports schools, ages 9–11), initial specialization (training groups, ages 12–15), advanced specialization (sports improvement groups, ages 16–18), and sports mastery (elite sports mastery groups, ages 19 and older).

The age boundaries for these stages, as well as the objectives, tools, and training methods for various groups of track and field disciplines, have only minor differences and can therefore be used as a basis for planning and structuring the long-term training of athletes in various specializations.

Developing reserve athletes in track and field is a critical task for all physical education and sports organizations. This training is mainly conducted in children's and youth sports schools, specialized children's and youth sports schools of the Olympic reserve, colleges of the Olympic reserve, and specialized sports classes within general education schools.

The experience of training many outstanding track and field athletes shows that through a systematic, multi-year training process starting at age 9-11, high results can be achieved as early as adolescence (16-17 years old).

In order to successfully develop athletic reserves in Children's and Youth Sports Schools, Specialized Children's and Youth Sports Schools of the Olympic Reserve, and

Olympic Reserve Colleges it is essential to first organize a systematic, multi-year educational, training, and developmental process for children and youth (ages 9-19). This process must be based on the principles of a young person's growth, the development of physical, moral, and volitional qualities, and the mastery of a wide range of motor skills without forcing the training. Such a process will allow the most talented athletes to reach an international-class level of achievement by the age of 18-19. High athletic achievements at this age are generally justifiable. The main problem lies in how they were achieved.

The most active and successful period of an athlete's career in track and field lasts 10-15 years.

The multi-year training process is divided into stages: preliminary training (initial training groups of the CYSS - ages 9-11), initial specialization (training groups - ages 12-15), advanced specialization (athletic improvement groups - ages 16-18), and athletic mastery (highest athletic mastery groups - age 19 and older).

The age boundaries for these stages, as well as the objectives, means, and methods of training for various groups of track and field events, have only minor differences and can therefore be used as a basis for planning and structuring the long-term training of athletes across different specializations.

The first three stages of training correspond to the age of participants in Youth Sports Schools, Specialized Youth Sports Schools of the Olympic Reserve and Colleges of Olympic Reserve The fourth stage pertains more to adult athletes, although a number of its objectives and methods are already used when working with older youth and junior athletes. In practice, it is quite difficult to strictly adhere to the age composition of training groups, which can be attributed to athletes' varying natural gifts and physical fitness levels, as well as their biological (not chronological) age. It takes at least 7–9 years to achieve top results. Only exceptionally talented students manage to complete the training process in a shorter timeframe. However, there are many examples of talents fading quickly due to a rushed, improperly structured training process.

Widely known instances of achieving outstanding results at an early age (victories at the Olympic Games, setting world records) are, nevertheless, more the exception to the rule and are associated with the great talent of individual track and field athletes rather than with general patterns in the development of track and field.

The starting age for track and field can be set at 9-11 years. However, this does not mean that a child has no connection to physical education and sports before this time. Physical education classes in kindergarten and school, activities within the family, extracurriculars, and games all help build the necessary foundation for well-rounded development.

In the process of long-term training, young men and women pass through a series of age-related stages. Most periodization models involve dividing them into three groups. For instance, the classification used in pedagogy and developmental psychology divides schoolchildren into groups based on the psychological and pedagogical characteristics of the younger generation. Physiological periodization is based on the structure, development, and formation of the body's systems and their functions. The division into age groups stipulated by track and field competition rules, the training stages, and the grouping in sports schools all reflect a system for training and competition that has developed empirically and has, to a certain extent, proven its practical worth.

There are significant differences in identifying the age ranges for the most effective natural development of endurance, flexibility, speed, and strength. Summarizing the data from various studies, the following age periods can be considered the most effective for athletes in terms of the rate of improvement in physical qualities.

For endurance development: aerobic capabilities (general endurance) - from 10 to 12 and 17 to 18 years of age; special endurance (sprinting) - from 14 to 16 years of age; anaerobic capabilities (special endurance for middle- and long-distance runners) - from 15 to 19 years of age;

- Speed: movement tempo - from 9 to 12 and 14 to 16 years of age; single movement speed - from 9 to 13 years of age; reaction time - from 9 to 19 years of age;
- Speed-strength abilities - from 9 to 10 and 14 to 17 years of age;
- Absolute strength - from 14 to 17 years of age;
- Flexibility - from 7 to 10 and 13 to 14 years of age;
- Agility - from 7 to 10 and 16 to 17 years of age.

These developmental dynamics largely

determine the objectives for each stage of long-term training and are key to building the specialized physical foundation necessary for achieving and maintaining high results throughout several years of active athletic careers.

Preliminary Training Stage. The preliminary training stage for track and field athletes begins at 9-10 years of age and concludes by 11 -12. This period of a child's motor development is characterized by improved performance in physical exercises that require instruction and the integrated application of various physical abilities.

The main objectives for initial training groups are: strengthening health, improving all-around physical fitness (AFP), mastering the basic motor skills of race walking, running, and hurdling, standing and running jumps, and all types of throws (primarily from a standing position, with the exception of ball and javelin throwing); and cultivating moral and volitional qualities.

Based on their AFP and mastery of fundamental track and field movements, children can be selected for training in the five main groups of track and field: sprinting and hurdles, endurance running and race walking, jumping, throwing, and combined events.

Research findings: Thus, the main objective of this stage is the comprehensive physical and technical preparation of children based on track and field events, followed by their selection for specialization in specific event groups. The only exceptions may be pole vault, race walking, and javelin throwing, for which children's specific abilities should be determined quite precisely even at this age.

Specialization should be narrow only in its goal but broad in its use of methods; this will help avoid accelerated training, which initially leads to rapid progress but then to a gradual stagnation of athletic achievements (as early as age 18-19).

This stage should provide a well-rounded physical and technical foundation for participants, incorporating a wide range of track and field disciplines. The primary training methods for young athletes at this stage are: track and field exercises; exercises from other sports that contribute to general physical preparedness (GPP), willpower development, and increased engagement in training sessions (active games, gymnastics, acrobatics, etc.); competitive exercises, primarily from the combined events program; and theoretical instruction.

At this age, children typically start training not with the goal of becoming champions or winning, but primarily to enjoy the training sessions or competitions. The significant dropout rate from beginner groups is often due to the monotony and repetitiveness of the sessions. Therefore, in beginner groups, exercises aimed at boosting engagement—such as active and sports games, as well as gymnastics and acrobatics—should take up to 20% of the total training time. These exercises will also simultaneously address general physical conditioning goals. General physical conditioning and technique training should comprise approximately 60% of the volume. The remaining 20% is allocated to sport-specific physical conditioning, competition participation, testing and control exercises, and performing basic track and field exercises with training objectives. In the first year, it is recommended for beginner groups to train three times a week for 90 minutes; in the second year, three times a week for 100 minutes; and in the third year, four times a week for 100-120 minutes.

At this age, it is also necessary to get children into the habit of performing a specialized morning track and field warm-up routine that includes running.

During the training process, the coach must systematically conduct tests and control exercises, which are quite diverse at the initial training stage. The dynamics of the test results will serve as one of the criteria for selecting athletes for specific track and field disciplines. Testing should be conducted 2-4 times a year: the initial test at the beginning of the preparatory period in September-October, the second in mid-December, the third in May before the summer competition series begins, and the fourth at the end of the competitive season (July -early August).

An important objective of training in beginner groups is to teach young athletes how to withstand significant physical and mental loads. This is achieved through a system of competitions and especially through the use of circuit training complexes. Another crucial objective is to teach the fundamentals of efficient technique in track and field events and to develop a strong foundation of movement skills. This training should always be group-based, without excessive individualization.

In their early school years, children have the ability to master the technique of complex movements. They grasp new exercises well but

most often focus on the most memorable details. Children find it difficult to analyze their own movements. New conditioned reflexes form quickly in them, but are harder to differentiate. Therefore, when teaching track and field techniques, it is preferable to use a holistic method. This allows young track and field athletes to grasp the core of the exercise. The attention span of children aged 9-12 is very poorly developed. A sustained interest in an exercise that cannot be performed immediately arises only if the training is engaging, supported by visual aids, and evaluated by the teacher-coach.

Monitoring exercise technique must begin with the warm-up and general developmental exercises. The focus of observation should be the athlete's posture—a relaxed position of the shoulders and forearms, and foot placement on the ground with a top-down motion, strictly in the direction of movement, without turning the foot outward or inward.

Accelerations performed at the end of the warm-up are particularly important. During these, it is necessary to monitor the freedom and ease of movement, posture, and foot placement.

When performing foundational exercises, young athletes must focus primarily on mastering the fundamental—or leading—elements of a movement. As an athlete develops and their fitness level increases, their technique changes, becoming more individualized. Therefore, it is essential to teach young athletes the correct fundamentals of technique, upon which they can continue to build and refine their skills.

The ability to perform movements freely and in a relaxed manner plays a major role in an athlete's technical training. Coaches, especially during the initial training stage, must teach children how to relax—while standing, sitting, and lying down—and then while in motion when running, jumping, throwing, and walking.

Children aged 9–11 have a better window for developing speed, particularly movement frequency and running pace, than children aged 12–13. Therefore, during training sessions, it is necessary to focus on developing these specific components of quickness: movement frequency and running pace.

The capacity for quick movements is genetically inherent in humans. By the age of 12-13, the speed and mobility of nervous processes have almost reached adult levels. Therefore, an important factor in realizing this genetic potential for speed—and consequently, in achieving athletic results in relevant sports—is the development of its core components. In the early stages, this involves developing the frequency and tempo of movements; then at 14-16 years old, speed-strength qualities and muscular strength; and at 15-17 years old, special endurance. The most effective means for developing speed in beginner training groups are active and sports games, fast running at controlled speeds, relay races, jumps and jumping exercises, and throwing stones and light objects.

At the initial training stage, the development of strength and speed-strength qualities is crucial. From ages 9-11, children's strength qualities can be improved through general developmental exercises. This universal approach is effective for the first one and a half to two years. In subsequent periods, strength and speed -strength qualities must be developed in a more specialized manner. Exercises designed to build strength should be performed with minimal strain, avoiding overexertion and maximum muscle tension. To develop strength, acrobatic exercises, gymnastic exercises on apparatus, and exercises with light weights (from one-third to one-half of one's own body weight) are recommended.

In beginner training groups, developing agility of movement is of great importance, especially in game-based and cross-country training exercises, as well as in sessions dedicated to teaching and refining track and field techniques. Mastering new ways of performing exercises enhances the ability to coordinate movements, i.e., develops agility. To achieve this, exercises are performed under unusual conditions, with a modified starting position, and with a change in the method of execution (for example, jumping backward, jumping from a variable run-up, throwing with the non-dominant hand, and performing new movements in mid-air).

Important components of agility are a "sense of balance," a "sense of timing," and a "sense of the apparatus," which compels the instructor to develop these abilities in children from the very beginning of their track and field training.

In parallel with developing agility, it is necessary to develop flexibility in children. At 7 -8 years of age, children have good flexibility and joint mobility. By ages 11-13, these qualities diminish, especially in children with greater strength. To cultivate flexibility, one should primarily use hurdle running, strive for a wide range of motion when performing most specialized and basic exercises, and include special

flexibility exercises in training sessions, especially during the warm-up. These can include exercises with objects, at the gymnastics wall, and acrobatic stretching exercises (splits, half-splits, bridges, strength exercises in a hurdler's stretch position, and various bends while sitting and standing). Exercises for developing flexibility should be performed systematically and included in both morning exercises and the main training workout.

The development of endurance takes on particular importance during the initial training stage. It is in endurance exercises that young track and field athletes face the challenge of overcoming significant physical and mental stress. Endurance exercises enhance the physical performance of track and field athletes, which in turn helps them handle significant training volumes in running, jumping, throwing, combined events, and race walking.

The development of children's aerobic abilities is of great importance, leading to an enhancement of the oxygen transport system's functions (oxygen consumption, increased pulmonary ventilation, increased muscle capillarization, oxygen utilization, economization of cardiac activity, and strengthening of the heart muscle).

The aerobic threshold for children aged 9–11 can be determined by heart rate data during prolonged running: up to 170–175 bpm for boys and 175–180 bpm for girls. These figures are somewhat higher than those for adult athletes, as children's heart rate zones are higher than adults'.

To develop general endurance (aerobic capacity) during the initial training stage, long-distance cross-country runs, sports games, skiing, swimming, road running, and long hiking trips in mountainous areas are used.

Anaerobic capacity (the specialized endurance of sprinters, hurdlers, jumpers, throwers, and middle-distance runners) is developed through competitive exercises and serial execution of jumping, throwing, and other speed-strength exercises.

A major mistake many coaches make is an over-reliance on training methods that develop anaerobic capacity, as this almost always leads to forcing the body's development.

Competition Calendar. As mentioned above, children take up sports to have an interesting pastime, so competitions should play a significant role in the training process for track and field athletes right from the initial stages. It is precisely through competition that the participants' interests shift from engaging leisure to purposeful training aimed at achieving high athletic results.

Conclusion

In introductory training groups, it is advisable to begin the training year on September 1.

Competitions should be held in the following sequence: September - 2–3 cross-country starts; December - 2–3 all-around starts; April - 2–3 cross-country starts and 1–2 individual event starts; June and early July - 2–3 all-around starts and 2–3 individual event starts.</2>

Road and forest runs can be held in November and March. October, November, February, and March should be dedicated to focused training.</3>

Initial Sports Specialization Stage. The initial specialization stage for track and field athletes begins at age 12–13 and continues until age 15–16. At this age, young athletes train in the training groups of Children and Youth Sports Schools and Specialized Children and Youth Sports Schools of the Olympic Reserve, in Olympic Reserve Complexes, and in specialized classes. This period of a child's motor development is characterized by a particularly uneven increase in physical fitness indicators and the completion of puberty (at 12–13 years for girls, and 14–15 years for boys).

When transitioning from the preliminary training stage to the initial specialization stage, a coach must consider the athlete's level of physical development and fitness, their chronological and biological age, and their capacity for increasing training loads.

The goal of training at this stage is the all-around development of athletes within a group of track and field disciplines and a gradual transition to a chosen specialization. The main objectives of the initial specialization stage are comprehensive technical proficiency in a group of related track and field disciplines, the development of moral and volitional qualities, and the mastery of tactical fundamentals and a broad range of theoretical knowledge.

While addressing the main objectives of this stage, the coach-instructor gradually conducts further selection for specialization in individual track and field events. The primary criterion for this selection becomes the athletic results achieved by the young athletes in related track and field competitions.

References

Alabin, V. G. (2004). *Mnogoletnyaya podgotovka legkoatleta* [Long-term training of track and field athletes]. Minsk: Vysshaya shkola.

Boyko, V. V. (2011). *Tselenapravlennoye razvitiye dvigatelnykh sposobnostey cheloveka* [Targeted development of human motor abilities]. Moscow: Fizkultura i sport.

Verkhoshansky, Y. V. (2000). *Osnovy spetsialnoy fizicheskoy podgotovki sportsmenov* [Fundamentals of special physical training of athletes]. Moscow: Fizkultura i sport.

Voytsekhovsky, S. M. (2013). *Kniga trenera* [Coach's handbook]. Moscow: Fizkultura i sport.

Godik, M. A. (2002). *Kontrol trenirovochnykh i sorevnovatelnykh nagruzok* [Control of training and competitive loads]. Moscow: Fizkultura i sport.

Zheleznyak, Y. D., & Petrov, P. K. (2002). *Osnovy nauchno-metodicheskoy deyatelnosti v fizicheskoy kulture i sporte* [Fundamentals of scientific and methodological activity in physical culture and sport]. Moscow: Akademiya.

Zhilkin, A. I., Kuzmin, V. S., & Sidorchuk, E. V. (2007). *Legkaya atletika* [Track and field athletics]. Moscow: Akademiya.

Zatsiorsky, V. M. (2004). Perenos trenirovannosti — odna iz tsentralnykh problem teorii i praktiki fizicheskoy kultury [Transfer of training as one of the central problems of the theory and practice of physical culture]. *Teoriya i praktika fizicheskoy kultury*, (9), 652–658.

Zatsiorsky, V. M. (2007). *Fizicheskiye kachestva sportsmenov* [Physical qualities of athletes]. Moscow: Fizkultura i sport.

Qurbonov, X. (2026). Methodology for developing the sports form of middle-distance runners in the third year of the training stage. Eurasian Journal of Sport Science, 6 (1), 36–40. https://doi.org/10.65149/eajss.2026.v6i1.a008

Qurbonov, X. (2026). Mechanism for the gradual improvement of sports performance in middle distance runners in the third year of sports mastery enhancement. https://doi.org/10.65149/eajss.2026.v6i1.a020

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