

THE NEED TO DEVELOP STRENGTH ENDURANCE IN THE 400-METER RUNNING

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Annotation

The article discusses the factors affecting the development of strength endurance in 400-meter runners. Examples and methods of training sprinters and runners at a distance of 400 meters are given.

Key words: athletics, sprinters, 400 meters run, strength endurance.

Introduction

In recent years, very good results have been observed at international competitions in the 400 meters. If in the 70s of the twentieth century, athletes from the USA dominated the distance of this sprint, then at the end of the twentieth and beginning of the twenty-first century, athletes from Great Britain, Grenada, Poland, Russia, Saudi Arabia, Jamaica and other countries appeared in the finals of the Olympic Games and World Championships. As the biography of the world's best athletes shows, only those athletes who at the age of 16-18 have undergone good versatile (basic) training, and then specialized training for 4-5 years, can achieve high results [1]. Early narrow specialization does not bring the desired results. The best sprinters in the world have well-developed muscles. 400m runners stand out among sprinters with relatively high strength [2, 3].

Let us analyze the importance of using strength training among the best runners in the world and the Republic of Uzbekistan in the 400m race. must run 100 meters in 10.20-10.30 seconds, and 200 meters in 20.50-20.70 seconds and triple jump from a place of 9.40-9.80 meters. This means that athletes will not achieve anything without high speed, good performance in strength training and special endurance. In literary sources, the methodology for the development of special endurance is quite well developed, and coaches are intensively introducing it into practice [6, 7, 8]. If we talk about running technique, then its contribution to the overall result is in the range of 9-12%. To increase the speed in any element of movement, it is necessary to take into account the maximum speed and maximum force [9, 10].



The results of practical work show that an increase in strength is achieved more easily than speed. It is safe to say that long sprint coaches do not pay enough attention to strength training planning [11, 12, 13].

Strength is the ability of a person to overcome external influences or resist them due to their own muscular efforts. The development and improvement of strength is directly dependent on the development of speed and vice versa [14, 15]. Therefore, work on one quality in a certain way affects the development of another. Indicators of strength and power abilities are influenced by specific factors, the contribution of which may vary in different cases [16, 17].

These are: biochemical indicators, actual muscle efforts, biomechanical characteristics, personal-psychic factors, central nervous indicators, physiological factors, as well as possible environmental factors that may change depending on the circumstances [18, 19].

Actually, the strength abilities of a sprinter are always considered in various combinations: strength endurance, strength agility and speed-strength abilities [20]. Strength endurance is characterized by muscular efforts that resist external influences on the sprinter for a long time. At the same time, depending on the work of the muscles, strength endurance can be static and dynamic. This characteristic is most important for a long sprint - 200-400 meters.

Ideas about running 400 meters are associated with the manifestation of speed endurance, i.e., the manifestation of maximum speed capabilities over a period of approximately 45 seconds. Success in this sport lies in the appropriate combination of strength, speed and endurance with a rational distribution of effort, where their combination is determined by the strength endurance, which helps maintain running speed and, ultimately, determines the athletic performance in a long sprint.

A study of the effect of sprinter fatigue in the 400-meter run showed a progressive decrease in the level of strength indicators. For this, a test was used - measuring the height of the jump after jumping from an elevation of 39 cm after running different distances. Comparison of the results of running at a speed of a distance of 400 meters with the indicators of the above test made it possible to identify a deterioration in strength indicators due to fatigue after running in various segments: a) after running 300 meters, the performance fell by 16%, b) after 400 m - by 25%.

Since the strength component progressively decreases during the 400-meter run, which seems to be a consequence of metabolic changes or a decrease in the number of working muscle units, strength endurance is most likely the predominant



component that determines success in the 400-meter run. Therefore, the ability of an athlete to resist force fatigue helps to maintain running speed for a longer time.

Thus, it can be considered that the factor of strength endurance is decisive in the performance of a 400-meter run. Athletes with a higher level of specific sprint speed-strength qualities - explosive strength, reactive strength and especially strength endurance, will undoubtedly have an advantage in the 400-meter run.

In practical work, 400-meter runners include in the training program special means of strength training: jumping, strength training, special exercises for the development of the strength components of the sprint, as well as general physical training exercises. For sports exercises lasting approximately one minute, the combination of strength and endurance is achieved by the following components: endurance and special strength endurance, maximum strength and explosive strength, explosive strength at maximum running speed, specific strength.

For sprinting, a relatively large increase in power output in non-specific movements (intramuscular coordination) may be accompanied by small changes in sprint performance. Research on neural adaptation in response to resistance training indicates that intermuscular coordination is an important component in ensuring the translation of strength properties into athletic skills (movement technique). While specific strength training is important, general strength training is potentially beneficial in increasing body mass (reducing the risk of soft tissue injury) as well as developing basic stability. Hypertrophy and general strength training can improve athletic performance, but optimal training transfer also requires specific exercise programs.

Future research in runners should include valid assessments of power transfer (e.g., squats, squat jumps, deep jumps) across a range of applied speeds (maximum power ↔ power velocity ↔ speed-strength properties ↔ reactive forces of maximum movement speed) to learn how to manage the appropriate power development programs (prescribing the exercises with appropriate load and speed) over a long period of training (more than 6 months) for optimal use in the running skill used.

Conclusions

The preparation of 400-meter runners is a labor-intensive process, where an important place is given to strength training, while athletes in this form experience significant power loads. The correct construction of strength training will increase strength and dramatically improve the result in sprinting. By increasing then special (primarily strength) endurance, you can achieve results in a long sprint.



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