

Research on Special Physical Training of Track and Field Sprinters

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ABSTRACT. *Sprint is a sport in track and field sports. Compared with middle and long distance running, sprint requires athletes to complete the specified distance in the shortest time, which is a kind of extreme intensity sport. To improve the athletic ability of the sprinters, the coach should pay attention to the special physical training of the sprinters while strengthening the training of the sprinting technique. This paper first introduces the technical characteristics of sprinting and then expounds the principles and methods of special physical training for sprinters.*

KEYWORDS: *Track and field, Sprint, Special physical ability, Physical training*

1. Introduction

Sprint is an ancient sport. It is one of the running events in track and field. Sprint requires the athletes to run the prescribed distance in the shortest time. It is a kind of speed athletic event. From the perspective of sports physiology, sprint is based on anaerobic metabolism, non lactic acid function and lactic acid function as the main body, which is closely related to athletes' organ function level, energy material reserve and metabolism level [1]. From the perspective of kinematics and biomechanics, there are three main factors that affect sprinters: first, the strength, speed, direction and angle of the athlete's advance; second, the strength, speed and amplitude of the swing of the athletes' arms and legs; third, the coordination and cooperation of the whole body muscles and bones when the athletes run. Understanding the technical characteristics of sprint is helpful to understand the principles and methods of sprinters' special physical training.

2. Physical Training and Specific Physical Training for Sprinters

Physical ability is the ability of the human body in life and sports, which includes the body shape and adaptation changes, as well as the basic qualities such as strength, speed, endurance, flexibility and agility [2]. Physical training in sports is divided into general physical training and special physical training. Among them, general physical training refers to the physical training of coaches in order to

strengthen the physical fitness of athletes, improve the function of various organ systems of athletes, develop athletes' sports quality in an all-round way, improve athletes' body shape, and lay a solid foundation for their special sports performance. And special physical training refers to the training that coaches use to directly improve the performance of athletes' special sports and the specialized physical training closely related to athletes' special sports [3]. Sprint is a kind of physical speed sports. The special physical training of sprinters can maximize the development and improvement of sprinters' sports quality, so as to ensure the effective use of their sprint specific techniques in actual combat, complete the whole competition process with high quality and create excellent results.

3. Principles and Methods of Special Physical Training for Sprinters

3.1 Training Principles

Special physical training for sprinters is a systematic and complex process. In order to ensure the quality of training, coaches must follow five principles:

(1)The principle of consciousness. Coaches should educate and guide athletes to participate in special physical training consciously and actively. The formation of athletes' consciousness has a great relationship with their understanding of the value of special physical training. Therefore, coaches should strengthen the theoretical education of special physical training for athletes, and let them deeply understand the important role of special physical training for their healthy development and improvement of sprint athletic ability.

(2) The principle of gradualism. The coach should guide the athletes' special physical training according to the thinking from shallow to deep, from weak to strong. The essence of the gradualism principle is to affirm the long-term and systematic nature of special physical training for sprinters, and require coaches to formulate different training programs at different stages, so as to gradually improve the special physical fitness of athletes.

(3)The principle of individuality. Coaches should affirm the individual differences of different athletes in physical ability, sprint sports foundation, learning ability and practical ability, and then arrange different training programs for them according to their individual differences. It requires coaches to fully explore the individual characteristics of athletes, and then combine their personal characteristics with special physical training to fully stimulate their potential [4].

(4)The principle of specialization. The coach should scientifically and rationally arrange the training content and methods according to the sprinter's body shape, physical characteristics, technical movement structure, and the muscles involved in the exercise.

(5)The restorative principle. The improvement of special physical ability is achieved through the cycle process of load→ fatigue→recovery→improvement.

Sprint is an extreme intensity sport. During the special physical training, athletes tend to feel tired. In order to let the athletes recover as soon as possible, the coach should follow the principle of recovery when instructing the athletes special physical training, and rationally arrange the interval rest time.

3.2 Training Methods

Special physical training content for sprinters includes special strength training, special speed training, special endurance training, special flexibility training and special sensitivity training.

(1)Special strength training. The purpose of special strength training for sprinters is to improve the athletes' ability to achieve a high level of muscle strength when they complete special sprint technical movements. Special strength training helps to improve the running speed of sprinters [5]. Special strength training for sprinters includes maximum strength training, extreme strength training and fast strength training. Training methods include barbell weights, deep jump exercises, weight-bearing arm swings, resistance leg swings, water running, and sit-ups. Sprint special strength training includes arm muscles, hip joint muscles, front thigh muscles, back calf muscles, ankle joint muscles and forefoot muscles.

(2)Special speed training. Sprint requires high speed quality of athletes. In the competition, the special speed level of sprinters directly affects the level of special performance. Coaches can use short distance combined running, variable speed running, traction combination running, variable speed running, relaxing stride running, high leg raising running in water, standing standing and squatting start, chasing running, regular and fixed distance uphill and downhill running.

(3) Special endurance training. The coach should guide the sprinters in special endurance training in running distance and intensity. For example, in the distance of running section, athletes are required to run 1000 meters, 1500 meters and 2000 meters; in terms of intensity, athletes are required to run 50 meters, 60 meters, 80 meters and 100 meters many times within the specified time, or require athletes to carry out 50 meters, 100 meters, 200 meters with load on their legs. The basic requirement of special endurance training is to do more running exercises that exceed special distance and special intensity to improve special endurance.

(4) Special flexibility training. Sprinters' shoulder joints, elbow joints, hip joints, knee joints and ankle joints need to have good flexibility. Therefore, coaches should pay attention to special flexibility training for sprinters. The coach can develop the special flexibility of sprinters by jumping, stretching, arm swinging and leg swinging. Coaches can also let sprinters learn to practice some gymnastics or yoga movements to enhance the flexibility of joints and ligaments related to sprint specific technical movements.

(5) Special sensitivity is the ability of sprinters to change body movement quickly, accurately and coordinately [6]. The common method to develop the special sensitivity of sprinters is to arrange some exercises similar to the sprint in terms of

movement strength and speed, such as starting with listening to signals, variable speed running and changing direction running.

4. Conclusion

Sprint is a spectator sport on the track and field. If a sprinter wants to achieve excellent results in the competition, he should not only do more sprinting technical training in daily training, but also pay more attention to sprint specific physical training. According to the technical characteristics of sprinting, coaches need to follow certain principles when guiding sprinters in special physical training. During training, it is necessary to combine the athlete's physical fitness, sprint foundation, learning ability and practical ability, and adopt a variety of strategies to guide athletes in special strength training, special speed training, special endurance training, special flexibility training and special sensitivity training. .

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References

- [1] Zhang Chuang, Luo sangciren (2010). Research on special physical fitness structure of sprinters [J]. *Intelligence*, no.35, pp.308-400.
- [2] Yu wuchong (2020). The importance of physical training in track and field sprint [J]. *Sports fashion*, no.7, pp.41-42.
- [3] Ling Hongbing (2018). Analysis of Sprinters' physical training methods [J]. *Sports supplies and technology*, no. 21, pp.202-203.
- [4] Li Jing, Zhang Le, Bao Wuyun (2016). Methods and means of physical training for sprinters [J]. *Contemporary sports science and technology*, vol.6, no.26, pp. 42-43.
- [5] Bai Xueying (2017). Research on physical training methods of adolescent sprinters [J]. *Journal of Three Gorges University (Humanities and Social Sciences)*, no.A1, pp. 275-276.
- [6] Zhang Zechang (2017). On the importance of track and field (Sprint) physical training [J]. *Sporting goods and technology*, no.18, pp.171-172.