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Discussion on the Core Strength Training Method for 100-Meter Event in Track and Field Sports

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Abstract: In track and field sports, the 100-meter race is an extremely intense sport that requires effective training of athletes' core strength. From the perspective of adolescents, in order to enhance core strength, it is necessary to effectively fix the pelvic position in the process of exercise, so that the core stability, balance, and coordination of athletes can be improved. The training process of the 100-meter event is mainly an anaerobic metabolic exercise, it is necessary to ensure that athletes maintain a high level of physical readiness during the exercises and concentrate highly on their core strength, so that they can achieve excellent results. This paper analyzes the core strength training for the 100-meter event in track and field sports, discusses its importance, and puts forward specific training methods, hoping to provide guidelines for relevant researchers.

Keywords: Track and field sports; 100-meter event; Core strength; Training methods

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1. Introduction

In the 100-meter event, core strength training for athletes contributes to enhancing the acceleration during the start and facilitating efficient power transfer, ultimately improving mid-race speed. Moreover, the training can stabilize the core in the back sprint stage, so as to comprehensively improve the athletes' performance in the 100-meter race.

2. Concept of core strength

Based on relevant research theories, it is known that the core area mainly refers to the pelvis, hip joint, and spine, which is a crucial linkage between the upper and lower limbs of the human body. It serves as a pivotal connection that facilitates coordination and functionality in both the upper and lower parts of the body. The core area primarily denotes the region below the rib cage and above the pelvis in the human body, constituting a vital entity formed by the hip joint, lumbar spine, and pelvis. In the actual movement of the human body, ensuring the stability of the core is essential for overall operational stability. By establishing an effective fulcrum, the muscles of the limbs can be fully developed, facilitating the efficient transfer of force between the upper and lower limbs. This, in turn, ensures stability in the body's center of gravity and allows for the regulated

control of movement speed. Maintaining a stable core enables the human body to sustain a proper posture and effectively generate power when needed. To effectively enhance core strength during exercise, it is crucial to comprehensively strengthen various components of the human body, including connective tissues, muscles, and ligaments. Achieving a balance and collaboration among these different parts is important to ensuring the stability of the core, so as to enhance the core strength in the human body [1].

3. Importance of core strength training for 100-meter event in track and field sports

With the rapid development of science and technology, training methods of 100-meter event in track and field sports are enriched, which also intensifies the competition among athletes on the 100-meter track. For the 100-meter event, the athlete's physical fitness has a decisive impact on their performance. In the past training process, the athletes focus more on the enhancement of their leg strength while neglecting the enhancement of the core muscle strength, leading to the lack of core strength. In order to effectively improve the athletic ability of athletes, it is necessary to enhance their leg strength as well as train their core strength. In the 100-meter event of track and field sports, carrying out core strength training can further optimize the coordination of various body parts, enhance their balance strength, and ensure the athlete can exert their full power effectively [2].

(1) Strengthening the power transmission in the movement

In the 100-meter event, a number of joints and muscle groups are involved in the movement. By strengthening the core strength of the movement, athletes can fully integrate the movement of the joints and muscle strength forming a complete "power chain." During the 100-meter race, the athlete's core area can ensure that the force generated by the leg's whiplash stomping is effectively transmitted to the upper limbs during movement. Additionally, it aids in the effective establishment of a fulcrum for muscle contraction, leading to a substantial enhancement of the athlete's limb muscle power. During athlete's movement, the core area of the muscle group strength is relatively weak compared to the leg muscle group. A compensatory contraction phenomenon occurs in the core area of the muscle group, resulting in disjointed and stiff movement, which has a serious impact on the transmission of its power and fails to form a complete power chain. Therefore, when the athlete's core strength is relatively weak, the athlete is prone to problems in power generation. Hence, it is necessary to comprehensively enhance the core strength of athletes, so that they can effectively conduct power during movement [3].

(2) Maintaining correct sports posture

The core area can effectively link the upper and lower limbs. Analyzing from the perspective of the core muscle groups, including the pelvic floor muscles, transversus abdominis muscles, internal oblique muscles, etc., the stability of the body can be effectively controlled through appropriate body posture. In the 100-meter event, strong core strength can effectively enhance the athlete's core muscles and effectively fix the position of the pelvis, so that the swaying of the front and back of the pelvis is reduced, thus maintaining the correct posture and ensuring the full play of the leg strength.

(3) Improving the efficiency of movement

The core part of the human body has obvious muscle groups, and it tends to exert force continuously during exercise, so it is necessary to ensure that some energy is reserved in the body. In the process of a 100-meter race, enhancing the core strength can provide a strong fulcrum for the athlete's force, and ensure a more relaxed state when exerting force. At the same time, enhancement of the athlete's core strength can facilitate the relaxation of idle leg muscles during short-term acceleration, laying a solid foundation for subsequent ground contact, so as to reduce overall energy consumption. In addition, it can also relax the muscles, which can provide sufficient contraction force for the athlete's subsequent force,

thus significantly improving the efficiency of the movement. By ensuring the stability of the athlete's body, it can effectively consolidate their movement techniques and ensure that they fully combine core strength and technical strength, thus comprehensively enhancing the athletes' sports level [4].

4. Design of core strength training for 100-meter event in track and field sports

(1) Principles of core strength training

For the relevant institutions, it is necessary to combine the physical and mental development of the athletes, rationally organize the core strength training activities, and carry out training activities according to the specific training stage of the athletes. First of all, the basic training of the 100-meter race mainly adopts the automatic training method, emphasizing the development of a profound awareness of the strength in the spine and ensuring complete stability of the pelvis. In the actual training process, it is necessary to reasonably arrange training activities such as the yoga ball and balance ball activities, so as to improve the athlete's body balance and effectively transfer the power to ensure the coordination of the athlete's body. Secondly, it is necessary to effectively train the athletes' core maximum strength to improve the athletes' 100-meter running skills, so as to enhance the athletes' waist and hips swinging power in the process of 100 meters running, strengthen the elasticity and extension of waist and hips, as well as thigh muscles and ligaments, and to fully ensure the flexibility of different joints of the athletes' core area. Lastly, in the special training process of 100-meter race, emphasis is put on the core speed, explosive force, core strength, etc. to strengthen the training and improve the athlete's hip swing amplitude, speed, etc. According to the characteristics of the 100-meter race, the core strength of the athletes is fully trained to ensure the relevance of the training activities [5].

(2) Planning of core strength training

Firstly, the training program for muscle strength is included. During basic warm-up training, the self-weight training method should be adopted and supplemented with relevant equipment, so as to perform simple training. In the actual training process, the basic warm-up training time is 1 month, training for 1–2 times a week. Secondly, it is necessary to effectively increase the training volume when increasing the training intensity, which is controlled in 60–80% of the athlete's body load, with a frequency of twice a week for 14–30 days. Furthermore, there is a need to effectively ensure the relevance of training and adopt special training methods, at least one training activity should be carried out in a week. Other than that, in the development of targeted training programs, in order for athletes to improve their running skill and physical quality, training activities should be carried out at least twice a week. For example, when activities of core training are carried out, the central spine should be trained. During the actual training process, the pelvis should be parallel to the floor and the torso should be contracted so that the abdomen is close to the spine. In addition, the athlete needs to contract the back so that the spine and trunk can maintain a 50% relaxed state. Lastly, a training program should be developed to prevent injuries to the athlete. Pain in the joints and muscles will exert an impact on their athletic ability. In the actual training, focus should be put on the athlete's recovery training arrangements to prevent the occurrence of injuries. It should be carried out at least twice a week, and the athlete's joints can be strengthened after specific training, so that the athlete's weak points can be effectively improved.

5. Core strength training methods for 100-meter event in track and field sports

In the 100-meter event of track and field sports, when training the athletes' core strength, it is necessary to

fully stretch the different body parts of the athletes before training to prevent injuries during sports. Through appropriate training, their training level can be effectively improved. From the perspective of the coaches, before carrying out training activities on the core strength of the athletes, it is necessary to take the physical condition of the athletes into consideration when formulating the training plan. The training volume of the athlete is reasonably increased as the training difficulty increases, and the physical condition of the athlete should be observed to make appropriate adjustments to their work and rest. During the actual training period, the general training force of the sport should be emphasized. For sprinters, it is not only necessary to strengthen the core waist and abdominal muscles, but also need to focus on other aspects of strength training, so that the upper and lower limb strength is coordinated to comprehensively enhance the athlete's core strength, thus achieving better results in the 100-meter race [6].

5.1. Static training

To effectively improve the core strength of sprinters, static training should be carried out effectively and provide guidance for their training activities. Through the effective adoption of static training methods, the athlete's body stability and muscle group force can be strengthened. In the adoption of static training methods, the core strength of the athletes is effectively improved to ensure their breathing rhythm. In the pre-training process, athletes should be instructed to use both hands and feet together for support, and subsequently use a single support, so as to gradually enhance the difficulty of the training. Relevant fitness equipment is used to create a positive training atmosphere, so that athletes can stimulate their central nervous system during training and carry out effective exercise. It can also comprehensively enhance the athlete's body muscles, so that the stability of their bodies can be improved.

5.2. Self-weight training

When the athlete's physical quality and training level is significantly improved, the self-weight training method should be adopted. The training difficulty is gradually increased, integrating with the actual training level of the athlete, different special projects are adopted to effectively use the single branch training method. To improve athletes' physical stability, coaches should follow the principle of gradual progress in training and effectively control the training difficulty and frequency. In different special programs, core training should also be divided into overall and local core training. In the actual training, the core training should ensure that the overall training activities are effectively carried out, in order to enhance the flexibility of the athlete's muscles, improve the training effect, and strengthen the athlete's core strength.

5.3. Explosive force training

It should be made clear that explosive force training is different from other training. Through effective strengthening of explosive force training, it can enhance the training level and the performance of athletes in the 100-meter race. In the training of athletes' core strength, the coaches should pay more attention to and reasonably optimize the explosive force training, so as to ensure that the sprinters can fully grasp the relevant technical requirements. In the explosive force training process, the coaches should be guided by the athlete's muscle power control, and before the actual training, specific warm-up preparations are ensured for the subsequent high-intensity training. For example, coaches need to combine the athletes' physical state and quality level to make reasonable distribution of explosive force training tasks when guiding athletes to carry out back and forth training. In addition, in the training of athletes' explosive force, their physical condition should be observed to ensure that they can maintain appropriate rest rather than continuously carry out explosive force training activities, which require step-by-step training. These activities prevent athletes from having negative

emotions and mental fatigue in the training. For athletes, explosive force training activities are intense and immediate, training activities are carried out for a long time for effective improvement of the explosive force of athletes. First of all, when carrying out explosive force training activities, emphasis should be put on their speed enhancement to ensure that the athletes can quickly realize the stage goal, and improve their speed and explosive force. Secondly, it is also necessary to strengthen the athlete's strength exercise, fully integrating the athlete's speed and strength, so that their explosive force can be improved. Lastly, it is essential to promote long-term development, prevent short-term effects, and fully accumulate the results of their training, so that the effectiveness of explosive force training can be improved [7].

5.4. Toughness training

For the core strength training, the relevant training activities are challenging, there is a need to carry out toughness training activities in order to improve the core strength of athletes. For example, the athletes can stretch under pressure to effectively enhance the athletes' toughness and strengthen their willpower. This training encourages athletes to cultivate a resilient mindset, promoting a diligent work ethic, and instilling a never-give-up attitude and a positive outlook towards life. In addition, in the training of athletes' toughness, coaches should ensure that they have a strong teaching capability, so as to comprehensively improve the level of teaching.

5.5. Basic core strength training

The basic core strength training of athletes includes two types, namely, self-weight training and equipment training. The self-weight training method usually uses static training to effectively realize the training goal. Whereas the equipment training method mainly utilizes the relevant training equipment to effectively carry out instability training, and the equipment used includes suspension ropes, yoga balls, and elastic bands. For example, the coaches can guide the athletes to perform sit-ups training and carry out specific training on the fitness ball. After achieving the corresponding training goals, the training difficulty and training intensity should be increased, so as to fully improve the basic core strength of the athletes [8].

5.6. Specialized core strength training

The specialized core strength training, which mainly uses equipment means including suspension training, rope, and elastic band, etc., can effectively enhance the special core strength of athletes, specifically improving the athlete's back, waist, and hip, and other muscle groups. This training can effectively coordinate, convert, and transfer the core strength, so as to strengthen the athlete's core stability and fully exercise the athlete's small muscle mass. In the actual training process, the athlete's center of gravity should be kept in an unstable state and training activities should be carried out in this state. In the 100-meter event, the equipment training method should be adopted to effectively exercise the athlete's core strength, such as the hanging swings on a bar, using resistance bands for crotch running, split-leg squatting, and so on. After practicing for a period of time, the training load and difficulty should be increased appropriately, and resistance training should be adopted so that the athletes have a stronger control over their muscles, thus enhancing their muscle strength. In this way, the core muscles of the athletes can be effectively transferred to the center, so that the explosive force of the athletes can be improved and that their bodies have a strong recovery force.

5.7. Injury prevention training

Athletes who have not carried out 100-meter running training activities for an extended period are prone to hip and knee muscle damage, as well as challenges in aligning their movement direction. Therefore, when

enhancing core strength of athletes, it becomes crucial to effectively strengthen the muscles in these areas. For example, athletes carry out complete static training activities for their adductor muscle groups, at least 10–20 times, each time should reach more than 30 seconds. At the same time, athletes also need to rotate the hip to carry out effective stretching exercises, at least 30 seconds of stretching for each side, so as to comprehensively improve the training effect and effectively prevent athlete's injuries [9].

6. Conclusion

In summary, in the athletics 100-meter event, the core strength training of athletes is of great significance. Comprehensive improvement of the core strength of athletes can ensure the balance and stability of the body in the process of 100-meter race, maintain the standard sports posture, transmit the force better, and effectively prevent the athletes from sports injury during training. Therefore, it is necessary to pay more attention to the core strength training of the athletes, particularly basic and special core strength training, effectively improve the explosive force and toughness of the athletes, so as to enhance the core strength of the athletes and improve their performance in the 100-meter event.

Disclosure statement

The author declares no conflict of interest.

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