Proceedings of the 2nd International Conference on Biological Engineering and Medical Science (ICBioMed 2022), Part I
DOI: 10.54254/2753-8818/3/20220353

Research on the Importance and Methods of Core Strength Training for Track and Field Athletes

Boyu Deng

School of foreign languages, Xi'an Tieyi High school, Xi'an, Shannxi Province, China, 710061

dengboyu01@163.com

Abstract. Nowadays, more and more people do not pay attention to core training when exercising, and only pay attention to the training of large muscle groups and anaerobic endurance training. Core training is actually one of the most important aspects of training. Therefore, this study explores the importance and methods of core strength training for track and field athletes. From reading the literature, this study found that core strength plays an important role in athletic performance. Using different core strength training methods can give us different core training effects.

Keywords: posture, body balance, track and field, core strength training

1. Introduction

The core muscles include the deep transverse abdominis, the pelvic floor muscles at the base of the pelvis, the diaphragm at the base of the rib cage, and the surrounding multifidus muscles. Core strength is an important factor for athletes in track and field competition, and it is related to whether they can fully develop their potential. Moreover, core strength training has long been widely used in the fields of fitness and rehabilitation, and is now also known as an indispensable training content in track and field competitions. Core strength training can exercise the stability of a person's upper spine and pelvis, so that the correct posture can be maintained during exercise. It must be known that the core strength is the "source power" of the whole body, which can strengthen the sudden force of the whole body and effectively enhance the balance and control ability. For this reason, it can be seen that core strength is very important in the entire track and field training program. In particular, track and field is a powerful and competitive sport. Core strength is required to reduce ability consumption in sports, which can help alleviate fatigue and energy conservation. All these are are needed in athletic training. Therefore, this study illustrates the importance of core strength training and presents a specific approach to core strength training. This study makes an attempt at proper core strength training.

2. The importance of core strength training for track and field athletes

2.1. Helps control and integrate the strength of each muscle

The activities of athletic sports are preceded by warming up, moving all the joints and requiring whole-body movement. Core strength can be integrated into the process of exercise by integrating the

© 2026 The Authors. This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (https://creativecommons.org/licenses/by/4.0/).

DOI: 10.54254/2753-8818/3/20220353

contraction force of each muscle group in the body, which is delivered to each body link, forming a perfect movement system and improving the role of sports technology. For example, the sport of the long jump in track and field, requires the technique of jumping and vacating, which requires power to be exerted in the jump in order to jump farther. On the surface, it is the force of the feet. In fact, it needs to rely on the power of the swing of the hands, that is, the power of the core muscles, and efficiently transmitted that power to the whole body for jumping, so that the action of the power to the sand[1].

2.2. Body control, balance and special skills

In sports training, athletes should pay attention to the science, not blind training and exercise. Scientific training can promote the stability of the entire body and to achieve the best state of sports[2]. The mastery of core strength is directly related to the quality of movement of the entire sports technology. The core strength can assist in training the correct correction of the posture of the movement. For example, in the process of high jump pole competition, the movements on the pole need to be completed by running, jumping, air, backflip and other movements. These are the core strengths required for efficient completion, and only in this way can athletes achieve better results. At the same time, these can effectively help us control our balance and stability during exercise[3].

2.3. Physical exertion

Duce physical exertion during training, thus effective improve efficiency. In physical education, track and field are the leading sports, and core strength is an important and indispensable part of track and field physical training. Athletics are relatively complex movements that require many joints and muscles to work together, and they also require attention to the coherence of the movements in order to dominate well. And they also help them to maintain the correct posture, control the body's center of gravity, slow down the body's center of gravity changes significantly, so as to effectively reduce physical exertion. Correctly guide the training movements to reduce force errors, promote efficient work and effectively improve sports performance[4].

2.4. Body injuries and relieve fatigue

Core strength can help people reduce the load on the body during sports training, especially to protect the vulnerable parts, such as shoulder, waist, knee and other training. Therefore, the body posture and order of force should be properly guided, so that the body can do effective prevention. Athletes are often injured because of poor balance control, but also because of insufficient core strength. These can easily lead to difficulty in maintaining balance in the limbs and cause muscle damage. For example, in the action of hurdles, it is necessary to cross the hurdles. At this time, the body needs to remain stable, but this requires strong core strength support. Otherwise, the legs are easily strained, the center of gravity is unstable, and the cross-legs cannot be lifted to a certain height, which will lead to stepping on obstacles, while the legs are not relaxed, and the whole movement is stiff. If the center of gravity is not a steady state, then hurdling is impossible[5].

3. Appropriate ways to carry out core strength training in athletics

3.1. Slow motion training and maximal strength training

In most case, when carrying out the initial core training, athletes should be aware of the need to train in static movements in a stable state. Athletes need to let the static movement do support and then the training program, slowly train the athlete's core muscle groups, so as to enhance the core strength of these muscle groups, so as to achieve control of the body balance. In particular, it is worth noting that any training should follow the rules, step by step, and not hastily. Athletes need to gradually increase the intensity of static movements, tap their core strength potential, and effectively improve their physical fitness.

DOI: 10.54254/2753-8818/3/20220353

First of all, athletes need to increase muscle cross-section, increase creatine phosphate reserves in muscles, speed up ATP synthesis at work, and improve coordination between muscles and muscle fibers, thereby improving and perfecting motor skills.

The training intensity should be at least two-thirds of the personal maximum load. Ultimate loads are generally not recommended. It is more important to ensure the number of repetitions and time when training. At the same time, athletes should prevent trauma and reduce psychological load. Finally, it is best for athletes not to use loads lower than 40%, which increases slow muscle engagement in the work segment rather than stimulating maximum force.

3.2. Fast muscle training

Athletes in track and field should ensure their physical fitness, have enough strength to train, and need to meet the requirements of track and field training. The core explosive power training is carried out in the usual training process and needs to be carried out only when the athlete's body is in a stable state. The traditional explosive training path is basically the same. But the core explosive force is shot in sports equipment and needs to cooperate with the lower body. At the same time, the load is applied to provide force, and in the state of sudden detachment, the athlete can feel the acceleration of the equipment and lower limb objects. This can better enhance the development of the athlete's core explosiveness[6].

3.3. Unbalanced training

Athletics training requires athletes to perform freestyle strength exercises in an unstable state, which can more effectively achieve the goal of good training efficiency. In free training, in order to meet the actual situation of athletes, various weights can be added, such as dumbbells, handle weight-bearing fitness balls, etc. At the same time, athletes can be instructed to perform supine high dumbbell training, which can stimulate core strength and enhance muscle strength in the core area.

4. Precautions for core strength training

4.1. Free hand training

First of all, when practicing the two-point support in the prone position, it should be noted that the practitioner should turn both hands into a kneeling support state, and also build on the basis of the four-point support, and then form a two-point support with one hand and one leg, and do stretching and relaxation. At the same time to keep the hips do not tilt, the arms and body should be in a straight line. Secondly, in the exercise training of the supine bicycle, the athlete should pay attention to the movement. They need to practice lying flat on the mat with their hands behind their heads, using the abdominal curl to the highest point, and then doing a bicycle motion with both feet in the air, which can train their core strength. However, if you do not pay attention at this time, it is easy to strain the ligaments. Therefore, you need to strengthen the abdominal muscles and develop the flexibility of the hip joint. Finally, lift your head slightly, put your hands flat on one side of your body, straighten your legs, and make a "V" shape with your hands touching your calves. These are the details we need to pay attention to when practicing hand movements[7].

4.2. Use of training equipment

First of all, pay attention to the movement requirements when standing on the balance board: the other foot should be careful not to touch the ground, and keep the whole body balanced, which can effectively exercise the body's balance ability. This action is mainly to allow athletes to improve the perception ability of the nervous system and the stability of the overall core strength during training. Second, athletes can also do push-ups with a Swiss ball. At this point, the athlete can hold the center of gravity with both arms on the ground, keeping the whole body in a parallel line. This can effectively exercise arm strength, enhance coordination, improve core strength, and balance the strength of the body. The last move is the suspension exercise. Two feet off the ground, two hands grab the sling, and

DOI: 10.54254/2753-8818/3/20220353

the whole body is supported. At this time, the body presents a sloping straight line. This is mainly for positive body coordination. The above training requires athletes to pay attention to the control of core strength[8].

4.3. Integrated use of training equipment

First, in the Swiss ball in the solid ball left and right rotation, practice two legs to pay attention to is bent state hands holding the solid ball, arms present slightly curved state, continuous left and right rotation of the body. Secondly, the supine Swiss ball in the action of throwing the solid ball, but also to bend both legs, back to the Swiss ball lying flat above, hands on the solid ball, throw the solid ball forward. Effective delivery of core strength and improve core explosive power. Finally, when lifting the barbell to squat action, the two feet should be separated from the shoulders to maintain the same width, pay attention to step on the two parallel discs respectively, squatting exercises, can effectively improve our muscle explosive power and control.

5. Conclusion

In short, basic strength training can help athletes achieve balance, control body stability, effectively ensure the sustainable development of various physical movements and thus improve their physical quality. Only when there is enough muscle energy in the core area can we provide energy to the body, accurately stabilize the center of gravity of the body and make our movements develop harmoniously. In actual basic strength training, we need to pay attention to the physical activity of athletes, moderately formulate the training content, standardize the rules of basic strength training, effectively improve the athletic performance of athletes, and maintain a stable state.

This paper lacks some specific experimental data, and only based on the conclusions of other researchers, summarizes and draws the best method for athletes' core training. It is expected that future study can use statistical biology and modeling methods to more accurately calculate the required data and research more targeted and efficient core training.

Reference

[1] Ketki P, Ronika A, Nazneen (2021) Effect of core stabilization exercise on balance performance in older adults. *International Journal of Contemporary Medicine*

[2] American College of Sports Medicine, ACSM's Guidelines fo Exercise Testing and Prescription (8thed.), Thompson, WR, ed. Philadelphia, PA: Lippincott, Williams&Wilkins, 2010

[3] Sannicandro I (2017) Effects of a core stability program on strength and balance skills in senior over *International Journal of Science and Research*, ISSN: 2319-7064

[4] Jerrold S, Cuneo M, Dial R, Pawley A, Hill J (2005) Core strengthening and balance in the geriatric *The Journal of Applied Research* **5(3)**: 423

[5] O sullivan P (2000) Lumbar segmental instability': Clinical presentation and specific stabilizing exercise *Manual Therapy* **5(11)**: 2-12

[6] Zhumei Shi, Junhua Zhou (2014) Effect of core stability training on balance in elderly women. Family *Medicine and Community Health* **2(4)**: 48-52

[7] Jerrold S, Cuneo M, Dial R, Pawley A, Hill J (2005) Core strengthening and balance in the geriatric *The Journal of Applied Research* **5(3)**: 423

[8] The effect of scapular strengthening exercise using elastic band on balance and quality of life in the old peopleSun-Young Ha 1, Yun-Hee Sung2021 Jun 30;17(3):214-219. doi: 10.12965/jer.2142222.111. eCollection 2021 Jun