

The Exertion and Function of Core Strength Training in Competitive Sports Training

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Abstract. The core strength is a kind of power ability that stabilizes the core part of the human body, controls the movement of the center of gravity, and transmits the strength of the upper and lower limbs. It is a "power source" for human movement. The essence of core strength training is the core stability of the human body. The core strength training was introduced into the practice of competitive sports in China at the beginning of the 21st century. It can be divided into two periods: most of the early people did not really understand the essence of core strength training, and the improvement of physical fitness and sports performance was not significant. The paper uses literature data method, experimental method, mathematical statistics method, etc. to study the effect of core strength training on improving the special quality of female gymnasts.

Keywords: Athletes; The role of core training; Training methods; Female gymnasts.

1. Introduction

Core training, in order to facilitate intuitive understanding, is also translated into core strength training, which is increasingly recognized by industry experts and coaches as an important part of athlete strength training. However, for the understanding of core training, most people are only a vague concept. They can't really understand the essence and key points of core training, and thus fail to play their due role in competitive sports training. At present, core strength training has become a hot topic in physical training. China has carried out core strengths in swimming, gymnastics, pole vaulting, and kayaking, and achieved gratifying results [1]. Nowadays, physical and technical experts, coaches and athletes at home and abroad have incorporated core strength into strength training, which has a certain effect on the special achievements of each project. The main role of core strength in sports is to generate strength, transmit power and control power, especially for systemic sports projects [2].

Competitive gymnastics refers to a competitive sport in which athletes complete the required movement difficulty, complete set of arrangement movements and scores according to specific rules and under relatively fixed conditions. Its greatest feature is the pursuit of technical difficulty and novelty, mainly through the difficulty of the arrangement and innovation of the action, high standards of motion specifications and good stability and other factors [3-4]. In recent years, with the rapid development of gymnastics, the difficulty of gymnastics is becoming more and more difficult, and the requirements for athletes' special physical quality are getting higher and higher. In order to more scientifically and systematically improve the special physical fitness of women gymnasts, advanced physical training methods have been adopted abroad, and core strength training is one of them [5]. In China, the research on the core theory training of gymnasts is not systematic and in-depth (through literature search, only literature [4] studies the application of core training in gymnastics teaching, literature [6] is training on core strength and landing stability. The study of sexual relations, etc.), the promotion and popularization of core strength training methods in the practice of gymnastics training is slow. In order to better promote the core strength training methods and improve the special qualities of gymnasts, this study is based on the general theory and training methods of core strength training, to study the core strength training of women gymnasts, and to improve the athletes' special qualities. Evaluation, providing reference for gymnastics training practice.

2. Research Objects and Methods

2.1 Research Object

The six female gymnasts of our school are taught by the author. The basic situation is shown in Table 1. Tested to reflect the core strength of gymnasts (such as 30 s on both sides of the head, 45° on the wall, 30 s on the trolley, 180° 15 s on the ribs, 30 s on the legs).

Tab.1 Basic situation of the research object

Name	Date of birth	Height / m	Weight / kg	Third-level all-around results / points	Grade
A	1991-01	1.67	59	32.38	Sophomore
B	1991-04	1.63	54	35.30	Sophomore
C	1991-07	1.61	51	34.35	Sophomore
D	1990-11	1.65	55	36.00	Junior
E	1991-01	1.62	54	34.30	Sophomore
F	1989-05	1.65	57	34.07	Kenichi

2.2 Research Methods

2.2.1 Literature Method

The book review network sorts out meaningful and valuable information, and makes a reasonable analysis through the reference of the literature and the actual situation of the research object, thus proposing the correct scientific training method.

2.2.2 Logic Analysis

Starting from the actuality of the research object, combined with the previous scholar's work literature for specific analysis and logical reasoning, a new scientific and feasible training method is introduced.

2.2.3 Experimental Method

In the period from March to August 2018, the author tested the core stability qualities and 10 special physical fitness of 6 women's gymnasts in Shanghai Sports Institute (including 30 s from the back of the head, 45° leaning against the wall, pulling the trolley) 30 s, rib wood legs 180 ° 15 s, continuous leg jump 30 s, inverted climb, rabbit jump 15 s, control inverted, hanging leg 180 °, hanging front level) for field test. In order to keep the random error, system error, condition error and other factors within the minimum limit, the main test, test items, sequence, time, instrument and conditions are strictly controlled throughout the test.

2.2.4 Mathematical Statistics

Regular statistical processing of test data was performed using SPSS 18.0 software.

3. Female Gymnast Core Strength Training Program and Special Quality Test Results

3.1 Female Gymnasts Core Strength Training Program

The design of the core strength training program generally follows the following processes: testing the athletes' special qualities and special techniques; formulating preliminary core strength training programs, implementing training programs and conducting dynamic monitoring; diagnosing athletes' movement techniques; The strength training program is adjusted; the new core strength training program is re-implemented until the end of the final training period.

The core strength training program of the female gymnasts designed by the author is as follows, and the athletes are required to strictly perform the training. The program divides core strength training into three stages: core stability training, core muscle strength training, and core special strength training.

3.1.1 Core Stability Training Phase

Training purposes: to enhance the adaptability of the core muscles, improve the ability of nerve-muscle control, and emphasize the stability of the lumbar spine. Training characteristics: mainly based on static and stable movements, low intensity, repeated movements, and prolonged stimulation time. Examples of practice actions: one-legged balance on the pad, balance on the brace, the balance of the swallow, the one-legged knee-squatting, the low-hanging ring, the Swiss ball against the wall, the knees, the low-hanging ring, the knees and the knees. Training time: 8 lessons, 24 hours, 4 weeks. Training content: special training + core strength training. Frequency of practice: 2 to 3 groups per class, 5 times in each group, each lasting 15 to 90 seconds. Practice with bare hands or a single instrument: low rings, Swiss balls, etc.

3.1.2 Core Muscle Strength Training

Training purposes: to strengthen the muscles, enhance muscle strength, improve the quality of individual movements. Training characteristics: combination of static and dynamic movements. Examples of practice exercises: low-hanging rings, supine knees, static hip extension, hanging push-pull exercises, clipping the ball from both ends, holding the ball and swallowing balance. Training time: 12 lessons, 36 hours, 6 weeks. Training content: core strength training. Practice frequency: 3 to 5 groups per class, 5 to 8 times per group; dynamic action lasts 10 to 12 s each time, and static action lasts for 90 to 120 s each time. Practice with bare hands or single equipment: Swiss ball, skipping rope, barbell, soft volleyball, solid ball, etc.

3.1.3 Core Special Strength Training

Training purposes: to improve the nervous system control of the core muscles, improve the stability of a single movement and the success rate of a set of movements; maximize the role of the core part in the transmission of power. Training characteristics: core strength combined with special strength training. Examples of practice exercises: riding a Swiss ball practice, low-hanging suspension front horizontal practice, balance beam big jump stability practice. Training time: 8 lessons, 24 hours, 4 weeks. Training content: special training + core strength training. Frequency of practice: 2 to 3 groups per class, 5 times in each group, each lasting 15 to 90 s. Practice with bare hands or a single instrument: low rings, Swiss balls, etc.

3.2 Female Gymnast's Special Quality Test Content and Evaluation Criteria

The special quality refers to the various qualities related to training and competition that are exhibited during the movement of the body under the control of the central nervous system. The special ability is a comprehensive manifestation of the special quality, and the special quality and special ability are inseparable [13]. In the process of coaching, the author pays great attention to the training of athletes' special ability, always puts the improvement of athletes' special quality in the first place of training, and strengthens the practice in the core area in the training of special qualities. According to the "Standard Actions and Scoring Criteria for Gymnastic Athletes" promulgated by the National Sports General Administration of Gymnastics, the study selected 10 special quality test items, which were supine on both sides, leaning against the wall, pulling the trolley, and lifting the legs. , continuous leg jump, inverted climb, rabbit jump, control inverted, overhanging legs, hanging front level.

4. Evaluation of the Core Strength Training Effect of Female Gymnasts

After core strength training, leaning against the wall upside down 45° and controlling the inverted test value increased the most. Inclined against the wall upside down 45° time increased by 40 s, and the control inverted time also increased by 30 to 40 s. The core strength training method was used to improve the athlete's special quality and sports level. The athletes coached by the author finally passed the qualification test of the second-level gymnastics athletes. In order to scientifically verify the true effect of core strength training, this study further systematically evaluated the core training effects of athletes. The specific results are shown in Table 2.

Tab.2 Comparison of standardized results of core comprehensive index before and after training of female gymnasts

N O.	Specialized quality data standardization results		8-point star test data standardization result		Core composite index		Paired sample t test
	Before training	After training	Before training	After training	Before training	After training	
A	-17.1018	-5.0665	6.3758	-4.7667	25.06	26.01	t=-16.415 df=5 Sig.(2-tailed) =0.000
B	-8.0082	8.3562	0.3749	-5.0201	25.80	27.17	
C	-12.9997	2.8629	9.7308	1.5650	25.43	26.74	
D	-5.0581	10.4608	-6.1575	-11.6133	26.00	27.30	
E	-17.9466	-3.2711	19.3108	8.2353	25.07	26.26	
F	-25.5801	-13.3423	21.0340	11.5998	24.43	25.42	

Table 2 shows that the paired test t-test for the core composite index of the gymnasts before and after training yields: mean - 1.185, standard deviation 0.176 83, $t = - 16.415$, $P = 0.000 < 0.05$. This shows that there is a significant difference in the core composite index of athletes before and after training, that is, the special quality of gymnasts after the core strength training is significantly improved compared with that before training, indicating that the use of core strength training methods is very effective in improving the special quality of female gymnasts. The author believes that the effect of core strength training to improve the special qualities of women gymnasts is based on the following reasons.

5. Competitive Sports Training Core Strength Training Recommendations

The core strength training is different from the traditional strength training. It makes the muscles of the lower back and the abdomen work at the same time during training, just like the upper and lower body work at the same time. To a certain extent, all sports must be done together with the core. Only a very small number of muscles are isolated. On the contrary, the whole body must be integrated. The training of the core strength is to strive to coordinate the whole body to ensure that the athletes in the core area can stabilize the body and transmit energy while doing the movement.

5.1 Single Practice without any Instrument

This type of exercise is suitable for the initial stage of core strength exercises. The purpose is to enable athletes to deeply understand the strength of the core muscles and effectively control the body. This type of practice has been recognized and affirmed by most experts and is generally considered to be the most basic core. The means of strength practice. There are many such exercises, such as supine hip (A), inverted bridge (B) one-armed abdomen (C), leg arms crossed (D) and so on.

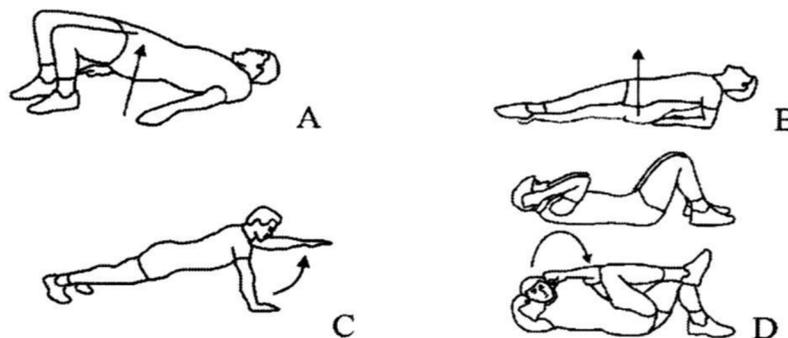


Fig.1 Single practice without any instrument

5.2 Exercises with a Single Device

Such as Swiss ball, balance ball, balance board, suspension rope, strength training equipment. In this practice mode, most of the exercises are performed on the training instruments of the unfixed

trajectory such as the balance ball, the balance board and the sling rope, effectively mobilizing the deep muscles of the trunk to participate in the movement, and controlling during the movement. The body always maintains the correct posture, thus discarding the drawbacks of using traditional forces to support the body in traditional strength exercises.

5.3 Exercises Using Integrated Instruments

Such as single and double feet standing on the balance ball, doing various kinds of exercises such as lifting, pulling, pulling, squatting, and torso rotation of various upper limbs; sitting on the Swiss ball to do various forms of exercises. This kind of exercise increases the difficulty of the exercise. It is generally suitable for athletes whose core muscle ability is above the intermediate level. They are trained in the initial freehand or single instrument, which can better control the body and keep the torso in the movement. The correct body postures.

5.4 Various Pilates Practice Forms

This is a movement that combines the body and mind, training to control body movements with willpower. The idea of Pilates training is to evenly strengthen the muscles of the various parts and the dynamics of the core dynamics. Under the correct body alignment structure, the muscles are used to extend, contract and control each muscle. The purpose is to strengthen the core muscles of the human body. The power to improve the stability of the body and the correct posture of the whole body.

5.5 Various Standing Exercises with Blinking Eyes and Closed Eyes

This type of practice is mainly to exercise the athlete's muscle proprioception control ability. In order to maintain the balance of the body without a reference object, the body mainly depends on the control of the muscle. For example, blinking or closing your eyes with your knees and one leg standing or lifting exercises (Figure A) will give you a good workout of your core muscles to maintain your body's balance. To increase the difficulty, you can use the exerciser to stand or stand on the balance ball (as shown in Figure B) to do the same.

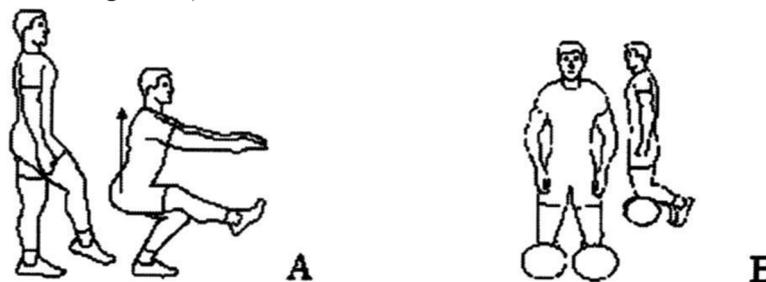


Fig.2 Various standing exercises with blinking eyes and closed eyes

6. Conclusion

1) Core strength training is an indispensable factor in athletes' physical training and one of the important prerequisites for improving athletes' sports quality. 2) For athletes, the main role of core strength training is to stabilize the athlete's spine and pelvis, maintain correct body posture, improve body control and balance, and improve energy output from the core to the limbs and other muscle groups during exercise. , to prevent damage during the operation and recovery after injury, thus contributing to the improvement of athletic performance. 3) The coaches in the training should be based on different special requirements and the individual characteristics of the athletes, combined with various training methods and methods of exercise ability to practice.

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