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Core strength training based research on competitive sports training methods

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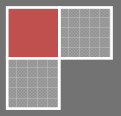
ABSTRACT

As European and American scholars frequently raised the concept of core strength training at the end of 20th century and gradually reach the competitive sports field, it still a comparatively new research in domestic academic world. Through the concept, we know that core strength is of great importance and significance to the improvement of Athletes' capacity. Also it exerts impact on the core strength training, which used to be frequently applied in fitness and rehabilitation and now in competitive sports training. Absolutely, there are still more questions to study, especially on theoretical knowledge, training methods and assessment. The training and assessment of core strength should be strengthened through the application of innovative research, so as to improve the scientific level of core strength training in competitive sports and reduce the non-targeted training. Core strength training in competitive sports is now gradually attracting attentions. Athletes could solve the problem of insufficient training of the trunk muscles through core strength training, especially in small muscles. However, there are also inescapable problems in core strength training. Theoretical study and practical application seriously disjoint with each other, which is reflected in the lacking of basic research and incomplete assessment method. Through research and analysis of theoretical knowledge on core area, core stability and core strength training, this essay is designed to raise some basic methods and notices on core strength training in competitive sports training. Besides, it also summarizes the basic training methods, so as to provide some referential suggestions on core strength training in competitive sports training.

KEYWORDS

Core strength; Competitive sports; Core area; Core stability.



INTRODUCTION

Athletes exert their strength on foreign objects through the ends of their arms and legs, resulting in movement. This is competitive sports. However, most athletes focus too much on arms and legs in training, so as to neglecting the training of body. Most movements are generally whole body movements, which call for the participation of articulations and muscle groups. However, athletes are always faced with problems about how to exert strength through arms and legs. Generally, it needs the shrinkage and integration of different articulations and muscles, so as to form kinematic chain of muscles. As an entirely new competitive sports training method, core strength used to be applied in medical field for fitness and rehabilitation, but now been used for competitive sports training. As a essential part in functional training, it is called body support strength in European countries, and core strength in China.

BASIC CONCEPTS

Core area and core stability

According to physiology, core area refers to the area formed by waist, pelvis and hip. It is the central part of body structure, which can be specifically defined as the whole area from hip to shoulder, along with pelvis, including 32 muscle groups, mainly refers to the back, abdomen, all the muscles composing pelvis and the small muscle groups deep in these parts.

Therefore, waist and abdomen is an important part of the core area. However, the core area refers to a broader area, which involves more parts and muscles (As is shown in TABLE 1).

TABLE 1 : Muscle distribution of the core area

Muscle Groups	Distribution of muscle starting point		
	Starting and ending in the core (9couples+1 piece)	**Starting in the core(19 couples)**	**Ending in the core(3 couples)**
Pots with muscle (8 couples)		Iliacus, Psoas, Piriformis, Gluteus maximus, Gluteus medius maximus, Gluteus minimus, Obturator internus, Obturator externus	
Thigh muscles (11)		Rectus femoris, Sartorius, Tensor fascia lata, Long head of the biceps femoris, Semitendinosus, Semimembranosus, Pubic muscle, Pubic muscle, Pubic muscle, Adductor magnus, Periosteal muscle	
Muscles of back (7)	Roundabout muscle, Multifidus muscle, Transverse myenteric		Erector spinae, Latissimus dorsi
Abdominal muscle (5 couples)	Rectus, Abdominal oblique, Abdominal oblique, Back side muscle		Latissimus dorsi
Diaphragm (1)	Diaphragm		

Core stability: A body posture that the body will provide a supporting point for arms and legs through the stability of core area, pave the way for the transformation of upper and lower extremity strength, and provide strength for the stabilization and movement of body gravity. The quality of core stability is determined by the strength of core position and the coordination of different parts.

Core strength

Core strength refers to the strength that aims to stabilize the core area of body, control the movement of body gravity and deliver the strength between upper and lower extremity. Core strength is not only an essential capability developed by core stability, but also a active strength point in competitive sports and body movements. Therefore, core stability is the consequence of core strength training, and core strength is a strength capability paralleled with upper and lower extremity strength.

Denis raised three-pillar theory in 1980s; Panjabi put forward the concept of spinal stability in 1985 and the concept of Sanya line models and core stability in 1992. There are other theoretical basis, for example, the core stability introduced by Kibler into competitive sports in 2006, body support force in 1996 and core strength introduced by American scholars in 2005. These are three earliest basic theories of core strength.

Comparison between core strength and traditional strength

Despite its unique effect in competitive sports, core strength is actually a part of body force. The training of core strength should also take the coordination of other strength training into consideration, that is to say, the training of core strength and traditional strength should be implemented simultaneously.

Body gravity is generally in equilibrium in traditional strength training, which always includes resistance training and exercises that overcome elastic objects. The training method has such problems as follow. Athletes can't play at full strength when they lose their balance, and their small muscle groups can't be trained. As to the above problems, core strength training can perfect these problems. Core strength training is featured in the training of small muscle groups and the training in disequilibrium. In this way, core strength training could compensate the shortcomings of traditional training. If the basic principle is followed, the training methods of core strength and traditional strength won't conflict with each other.

STATUS OF CORE STRENGTH TRAINING IN COMPETITIVE SPORTS TRAINING

Characteristics and effect of core strength training

The core strength training mainly focus on the core muscles and deep muscles of the body, whose major function is strength transmission, coordination and muscle controlling. The basic effect of core strength is to stabilize and balance the body, and transmit power to different parts of body. As the initial site of force, it can coordinate the upper and lower limbs to complete the work. The body would be more stable and moving posture can be modified through certain training. The kinematic chain can be established simultaneously to provide supporting point for body movements. Disjointed phenomenon action is commonly caused by the lacking of core strength and the instability of the whole body, so as to impact the subsequent action stereotypes and hair force. To stabilize and strengthen hip strength, exert more power to the limbs will help the athletes with their acceleration and transformation of movements. If the efficiency of limb coordination is improved and body is solidly supported, then the limbs would complete the technical action more coordinately. Reduce energy consumption and improve efficiency of actions. With a stable core area, the limbs would work more efficiently.

In order to improve the stability of core area, the core strength training is an important part. That is to say, core stability is determined by core strength, and the two are inseparable.

Common training methods and assessments of core strength

Core strength training can be divided into several categories as follow. According to the external environment, it can be divided into: stable and non- stable; according to the direction of movement, divided into: one-dimensional, two-dimensional, three-dimensional; according athlete's load, divided into: Unarmed and weight-bearing; according to the method to apply forces, divided into: Static, dynamic and alternate movement. We will show you several frequent training methods as follow:

(1) Single training: An exercise without any instruments applicable to the primary training of core strength, mainly including single-arm pillar stabilizer push-up and other training courses. As is shown in Figure 1.

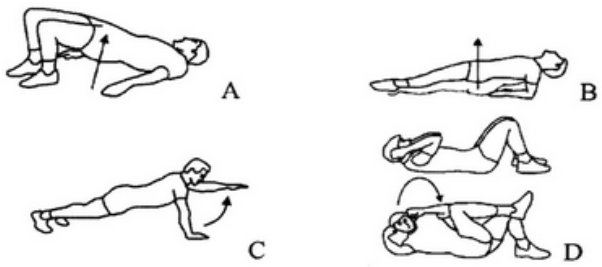


Figure 1 : Frequent methods of single training

(2) The application to simple instruments, like balance ball, hanging rope, swiss ball and so on. These would efficiently diminish problems in traditional strength training and keep the body in right posture. Besides, the deep muscles also participate in the training process. As is shown in Figure 2.

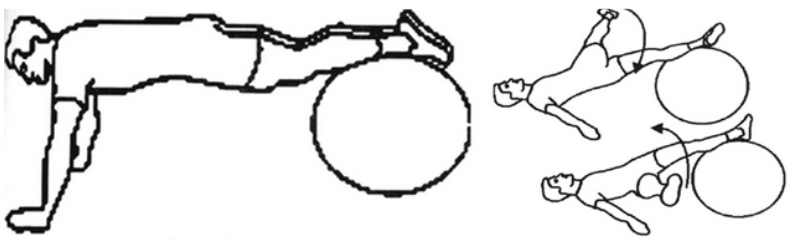


Figure 2 : Balance ball training methods

(3)Squat training. In this training process, the spinal column should keep straight all the time, so does the hip. Training difficulty can be increased be add weight. As is shown in Figure 3.

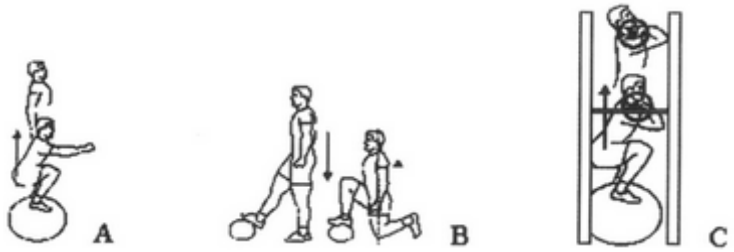


Figure 3 : Squat training

(4) Standing training. The training is done combined with the open and close of eyes, so as to make the athletes feel the control capability of the muscles. Through the control capability of the muscles, human can keep the balance of body. The specific training methods are shown in Figure 4. A is the method of standing on one leg. B is standing or kneeling on the balance ball, which is comparatively difficult.

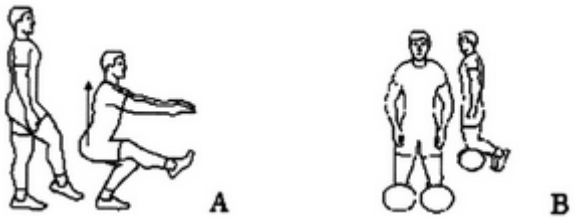


Figure 4 : Standing training

The development of core strength can only be controlled and diagnosed by reasonable assessment and evaluation methods. There are four commonly used assessment methods as follow: strength test device in same speed, core stability measurement (central equilibrium and star excursion balance), EMG measurements and intra-abdominal pressure measurement. However, these measurements above are more likely to be used in medical or rehabilitation field. There are still further researches to be done to evaluate the core strength training directly, or it will severely impede the development of core strength training. Therefore, more efforts need to be done to complete this research task.

Application of core strength training in competitive sports

Core strength training is of great importance to competitive sports. The technical skills are largely determined by the coordination and control of muscles. For instance, in water sports, besides excellent physical quality, the stability of body and ship is also an essential factor. Besides, core strength training is designed to improve this capability. The connection and integration function of core strength is essential in these sports. The training can also improve the sports that need to exert strength on the ends of body, like javelin and volleyball. The upper limbs can receive the strength from the lower limbs rapidly through core strength to meet the requirements in the competitive sports. Moreover, the movement that is finally done by the lower limbs, like running, is determined by the capability of core area.

According to investigation, most athletes lack of targeted training of core strength in their daily training, so as to impede them to fully exert their strength advantages, and thus get an unsatisfactory results. Core strength can stable and coordinate muscle, which is of great importance to competitive sports. Core area, the most essential part in competitive sports, build up the table support and deliver the strength to the whole movement rationally.

The core strength training should be improved in instable environment, so as to make more muscles participate in the movement. Furthermore, to keep balance, the deep small muscle groups are also activated to constantly increase the contraction power of muscle fibers and change the original relationship of muscles, improving the collaboration capability, like the relationship between big muscle group and small muscle group. Loaded core strength training can also improve the control ability of muscles and achieve the transformation between equilibrium and disequilibrium rapidly and accurately. The participated muscles in core area is the weak point in human body, for instance, small muscle groups can't bear too much load.

Core strength training increases the difficulty of competitive sports. Despite its harm to muscle, it improves the muscle strength to a large extent. High intensity training model of limbs can't be applied in core strength training, or it will easily cause damages.

CONCLUSION

Core strength has great differences with traditional strength in effects, methods and requirements. Current research on core strength can't meet the requirements in competitive sports training. The promotion of core strength training in competitive sports training is surely to be impacted by the backward of scientific research, thus, a perfect training system should be created in core strength training under the leadership of science and practical research. Targeted transition training of core strength do not have much showpoints. As a complementary part of traditional training, it will bring new changes to traditional strength through its focus on the connection and delivery of strength. Finally, core strength training should be perfected by a complete assessment system, with the scientific and accurate principle, resolving the problems that current assessment methods are unable to evaluate the standard of core strength.

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REFERENCES

[1] Huawei Chen, Zheng Yi, Shilin Wen; Current situation and prospects of core strength training research [J], Harbin Institute of Sports Journal, **30(3)**, 5-10 **(2012)**.

[2] Weixing Wang, Haixiao Li; Research on athlete's core strength training [J], Journal of Beijing Sports University, **30(8)**, 1119-1121 **(2007)**.

[3] Aijie Liu, Shaodan Li; Core training in competitive sports [J], China Sports Coaches, **45(4)**, 4-6 **(2007)**.

[4] Yongming Li; On core strength and its training in competitive sports – origin, problem, Development [J], Sports Science, **28(4)**, 20-26 **(2008)**.

[5] W.Endellp, A.B.Ted, Laurahg; Measuring core stability [J], J Strength Conditioning RES, **19(3)**, 583-586 **(2005)**.

[6] J.D.W.Illson, PD.Christo Pher, Mary Li et al.; Core stability and its relationship to lower extreme ity function and injury[J], J Am A cadem y 0 rth Surg, **(13)**, 316-325 **(2005)**.

[7] W.Ben Kibler, J.Press, A.Sciasia; The role of core stability in atheletic Funciton [J], Sports M ed, **36(3)**, 189-198 **(2006)**.

[8] M.Arjorie, M.S.A.King, atc; Pt University of V irginia, Core stability: creating a foundation for functional rehabilitation [J], A thletic Therapy today, **(3)**, 6-13 **(2000)**.

[9] Robert Stanton, Peter R.Reaburn, Bren Danhum Phries; The effect of short term Sw iss ball training on core stability and running economy [J], J.Stre.Cond.Rese., **18(3)**, 522-528 **(2004)**.

[10] Kim M.Samson, Mic Heelle A.Sandrey; All iso nheterick, A core stabilization training program for tennis athletes [J], A theletic Therapy Today, **12(3)**, 41-46 **(2007)**.