Application of Core Strength Training in Badminton Footwork Teaching with Computer Aid

Wei Huang¹*, Fazhen Zhang¹

¹Tianjin Light Industry Vocational Technical College, China

*Corresponding author e-mail: huangwei@tjlivtc.edu.cn

Abstract. Badminton, as a national sport in China, has been strongly concerned by the Chinese people. In the sports arena, China's badminton also occupies a leading position in the world. As for the core concept of badminton, how to effectively master the badminton footwork is also an important goal for every badminton lover in training and teaching. Core strength training, as a practical application in the teaching of badminton pace, occupies a position that cannot be ignored. Under the influence of a certain body center of gravity and conduction, core strength training has a flexible function to drive the physical strength. The training and teaching of badminton footwork of core strength is conducive to the flexible movement of limbs in badminton and plays an important role in the balance of power. Compared to traditional situation, there are many core strength training methods. However, problems still exist in some potential training. From the point of view of badminton step training, besides the use of both hands and brain, badminton has certain technical requirements on feet step and the coordination ability of the body, which requires the basic application of core strength training. In this regard, with the help of computer, this paper will focus on the nationwide badminton sports to conduct in-depth exploration and analysis on the teaching of core strength training.

Keywords: Core Strength Training, Badminton Footwork Teaching, Application, Computer Aid

1. Introduction

Whether in China or the world, as long as it is related to sports training, the main body of training is the core strength and core strength in sports projects plays a crucial role. Through the effective training of core strength, the body's physique, sports skills and muscle flexibility will have an important enhancement. In the training of badminton footwork, the effective use of the training method of core strength can make the athletes' posture graceful and they will be more likely to control the badminton technique of footwork flexibility. On the other hand, effective core strength training can promote the protective function of badminton players’ body muscles [1-3]. Therefore, in the badminton step training, the core strength training is essential.
2. The role of core strength training in badminton footwork training

In a sense, functional training is core strength training. The main idea of functional training is to add other functional skills to the original exercise on the basis of the original exercise. For badminton footwork training, the core is to drive the athletes at the foot of the pace of important support function while the good footwork training of badminton in the most basic training course will be applied to the core strength training [4-6]. As far as the back to twist in the gait (as shown in Figure 1) is concerned, if the strength training is not carried out in a timely manner, the underfoot operation of this type of postures is bound to cause damage to the muscles and ligaments of the athletes' legs under certain pressure. Therefore, for badminton players, the core element of badminton footwork training is strength training.

![Figure 1. Schematic diagram of turn stroke footwork.](image)

2.1. Body stability and balance

As we all know, badminton is not only a sport of using both hands and brain, but also a sport of jumping, rotating and footwork. With strong footwork conversion and muscle driving, if there is no good stability, it is bound to bring imbalance to badminton players. On the court, the badminton player should make corresponding response actions according to the situation of the opponent, such as pushing, jumping, rotating and swinging the racket. These movements are not predictable and require the athletes to face impromptu on the field of competition, which requires certain resistance requirements on the coordination ability of the limbs and the endurance ability of the leg muscles. If the badminton players do not train their core strength well before the game, once they perform some urgent pull and kill movements in the game, they will strain the muscles and ligaments during the jumping and stretching of the footwork, which will lead to imbalance of the body. Therefore, effective core strength training can greatly improve the body stability and balance of badminton players.

2.2. Beneficial to improve the speed of athletes' footwork movement and reduce physical energy consumption

Badminton movement footwork is the core foundation of the whole badminton movement. For the badminton players on the field to catch the best batting position timing, they need to have the certain ability. In the reasonable footwork movement, combined with the stroke action as well as the judgment of the ball line, it is necessary to effectively complete through the core strength training. Good core strength training can promote the flexibility of players' footwork on the court. It can also effectively relax the muscles of the whole body and avoid muscle strain. Therefore, the stronger the core strength of the athletes is, the more physical safety the athletes will have on the badminton court. Effective core strength training can drive the strength restructuring of the athletes' calf muscles and
thigh muscles and keep the muscles relaxed at all times on the court without the appearance of muscle stiffness. It can not only avoid the pull of the leg muscles of the badminton players, but also improve the footwork movement speed of the badminton players, thus reducing the energy consumption of the badminton players in the competition.

2.3. Beneficial to reduce exercise fatigue and prevent sports injury
Badminton is characterized by offensive and defensive conversion and conversion speed is extremely fast. In this process, badminton has a continuous battle state, which requires a high degree of mental concentration and strong physical quality in body coordination and physical support. From the perspective of badminton training courses, while inculcating core strength training, athletes' physical qualities should also be trained accordingly. The main idea of the training should be to simulate the actual situation in the actual competition and to conduct in-depth research on the athletes' body jump, foot step change and hand swing between elbow and wrist. Secondly, we make timely prevention and training countermeasures based on the persistent sports fatigue phenomenon and possible sports injuries on the field of play. We should strengthen the physical fitness of athletes, reduce their physical fatigue on the field of play so that we can effectively prevent athletes from physical injuries.

3. Application of Core Strength training in badminton footwork teaching

3.1. Static and dynamic strength training and its application
Static and dynamic badminton training refers to the static and dynamic badminton training methods. In the actual training, the standard movements of badminton sports need substantial training, such as side-support exercise, prone elbow-support exercise, single arm push-up abdominal control exercise and recumbent walk-support exercise. The main feature of these exercises is that they do not need any sports equipment for auxiliary training. This training method may help badminton players overcome their own resistance to a great extent. This kind of training method which does not need any sports information to complete has substantial training significance. However, the following drawback is that, driven by the development of modern sports technology, it has been unable to meet the demands of badminton players in physical training and core strength training. Therefore, in the process of badminton training, we should carry out scientific and professional training programs on physical fitness and athletes' core strength to avoid detours and finish physical training in a targeted and effective way.

3.2. Special quality training for Badminton players
In the badminton movement, the special quality and the physical quality are closely linked that also constitute the badminton movement's overall structure. With the comprehensive development of sports in our country, badminton is in a dominant position and the athletes' special quality training in badminton training is particularly important. The physical quality of badminton players is very high. It requires athletes to have the ability to change their thinking quickly on the field of play as well as the good use of flexible footwork. Combined with the athletes' physical quality, the badminton players can be in good condition on the field of play. Special quality training is a link that badminton players must pay attention to in the training course. In terms of special training, we should make it targeted and effective.

4. Conclusion
To sum up, China's badminton sport occupies a dominant position on the international stage. For Chinese badminton players, while leading the leading position, they should deepen their own badminton ability. In the footwork training of badminton, the effective combination of the actual situation of the game does a good job in the core strength training. In terms of physical characteristics of the body and flexible use of footwork, a good foundation for core strength training can better carry forward the badminton in China.
References

[1] Wu Haiying. Study on the influence of core strength training on college students' badminton footwork [J]. Journal of Tonghua Teachers College, 2017, 38(10): 125-128.

[2] Lei Lei. Optimization of badminton footwork training method and experimental study on training effect [D]. Xi'an Physical Education University, 2016.

[3] Liu Jianping, Ouyang Zhiping, Li Mingxing, Liu Wenwu, Yu Yu. Innovative research on the teaching method of badminton footwork in local universities [J]. Movement, 2015(05): 69-71.

[4] Deng Jingjie, Shang Junfeng, Zhang Jin. Development of badminton footwork training assistant system [A]. Chinese society of sports science sports biomechanics branch. The 17th national sports biomechanics academic exchange conference paper summary compilation [C]. Chinese society of sports science sports biomechanics branch: Chinese society of sports science sports biomechanics branch, 2014: 1.

[5] Dai Jin, Wu Xueqing, Zhong Jianping. Youth badminton basic training seminar (10) badminton footwork training Chinese society of sports science sports biomechanics branch [J]. China School Physical Education, 2009(11): 66-69.

[6] Guo Ping. The problems and countermeasures in the teaching and training of badminton footwork in our school were discussed [J]. Journal of Pingxiang College, 2008(01): 75-77.