Application of Body Movement Function Training Methods in Adolescents' Sports Courses

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Abstract: The “quality-oriented education” that has always been emphasized in the field of education in China not only refers to the quality of students in terms of cultural knowledge, but also includes their physical fitness. Body and mind are closely integrated. If a student savagely takes the time for physical exercise to pursue the results of paper tests, his physical condition will get worse and worse, and the bad physical condition may also greatly negatively affect his academic education at last. Most of the students who faint in the examination room because of tension are those who do not pay enough attention to physical exercise. Body movement function is an important component of physical fitness, referring to the human body's ability in speed, endurance, muscle strength, flexibility and other aspects. The foundation that supports human body to possess these abilities is the health of the internal organs and the strong muscles and bones. The adolescent stage is a critical period for physical development, and it is also an important stage for exercising motor functions and improving physical fitness. Applying body movement function training methods to students' sports courses is a necessary means to improve the overall physical fitness of adolescents.

1. Introduction

Introduction: According to survey data about adolescent students’ health released by relevant national departments, the rates of myopia and obesity continue to increase in the adolescent students, while average data about exercise speed and body endurance continues to decline. It is very obvious from the data that the overall sports training of adolescent students is insufficient and the average physical fitness is low, and thus their physical health should be a concern of the whole society. Adolescents have been receiving physical education since kindergarten and participating in physical activities organized by schools and teachers, but the average physical fitness of the group has been declining. This reflects the problem of the teaching effect of sports courses in the education field of China. The body movement function of adolescents has not been well exercised in the physical education curriculum, and their sports awareness and thinking have not been developed. The sports courses at this stage is not satisfactory. Enriching the content of sports courses for adolescents and improving the quality and effectiveness of physical education are parts that must be paid attention to in the education reform project.

2. Overview of Body Movement Function Training

(1) Brief description of body movement functions

The human body usually exhibits five abilities in daily actions and sports: speed, strength, durability, agility and flexibility [1]. For example, when a person is doing an elbow exercise, his shoulder muscles are actually exerting strength. The contraction ability of this part of the muscle is related to the strength and endurance effect shown by the body. For another example, when people talk about physical flexibility, what they are discussing is the speed at which their nervous system transmits signals to muscles and joints. If the information speed of the three parts is not high, the flexibility of the limbs is very poor.

(2) Concept of body movement function training

Body movement function training first appeared in the field of rehabilitation, aiming at the

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proprioception of various muscles and joints of the human body during exercise and the ability of trunk control during exercise. Its purpose is to enhance the coordination of human muscles, joints and nerves, improve the stability, controllability and coordination of the driving process of the human body, so that the exercise ability of human body can be comprehensively improved. Body movement function training is essentially a corrective training activity. It can be roughly divided into four parts: balance training, stability training, trunk core training and dynamic sports training, which can help to correct the incoordination and imbalance of the human body, enhance physical fitness and reduce unnecessary sports injuries [2]. The starting point of body movement function training is the movement pattern of the human body, that is, the various movements made by the upper limbs, lower limbs and torso in coordination with each other. What it emphasizes is not the improvement of local strength, endurance and sensitivity, but the human body's ability in the coordination of upper and lower limbs, the symmetry of the left and right sides of the body, the efficiency of muscle power transmission, and the control of body posture. These are the abilities that have been given in the long evolutionary process, and body movement function training is to correct the human body back to the best state so that these abilities can be maximized.

3. Content of Body Movement Function Training

The content of body movement function training is divided according to the movement system of the human body, which is roughly divided into three parts: upper limb movements, torso movements, and lower limb movements.

The upper limb movements are divided into single-arm movements and double-arm movements; each movement can continue to be divided into “push” and “pull”, and double arms can do “push and pull synchronously”; at the same time, each movement can be divided into sagittal plane, coronal plane, transverse plane and multi-plane movements according to the movement mode, as shown in Figure 1.

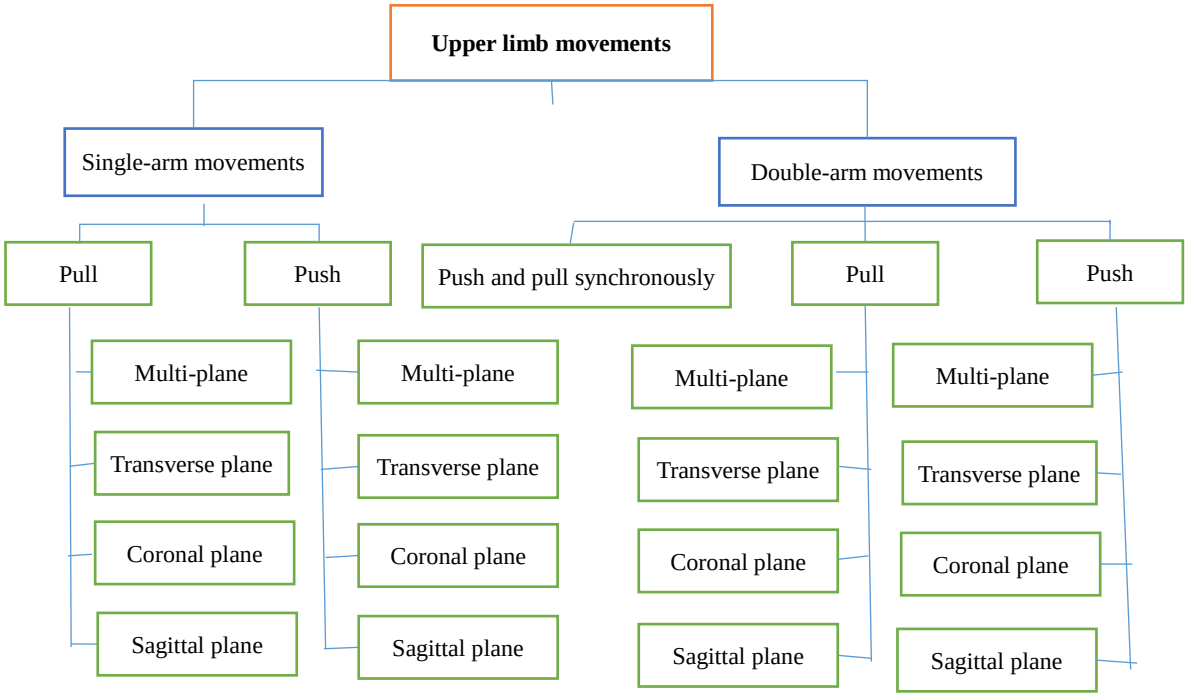

Fig.1 Body Movement Function Training -- Movements of Upper Limbs

Torso movements are divided into static movements and dynamic movements: static movements can be divided into plank movements and bridge movements according to the shape of the body when the body is frozen; dynamic movements can be divided into sagittal plane, coronal plane, transverse plane and multi-plane movement according to the way of human movement. In daily sports or physical education classes, coaches or teachers often say “bend and stretch”, “heel” or

“rotate”, which actually correspond to the sagittal plane, coronal plane and transverse plane, as shown in Figure 2.

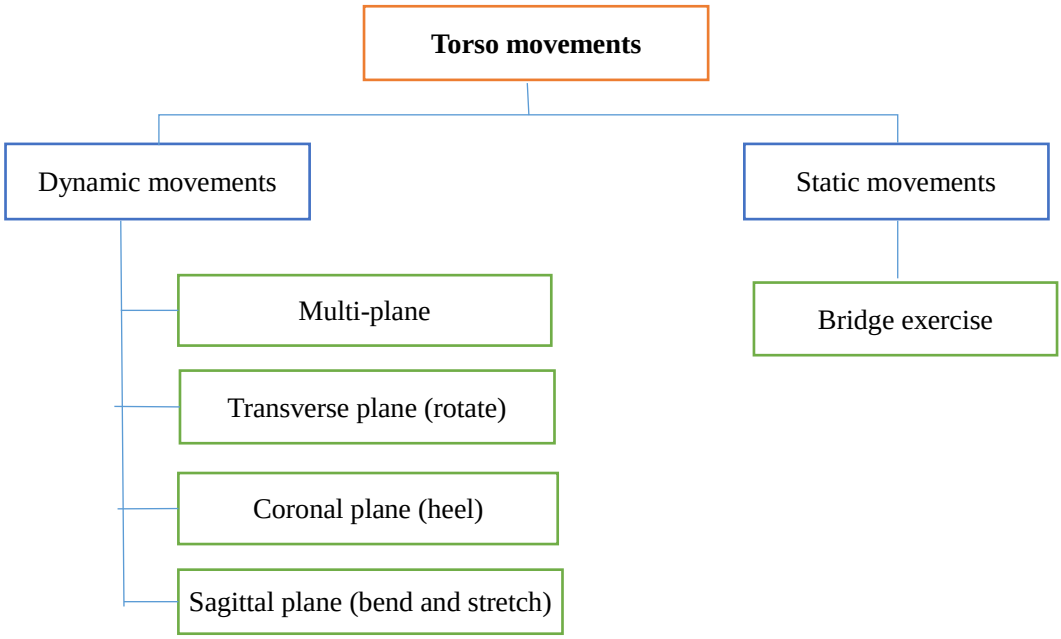

Fig.2 Body Movement Function Training -- Torso Movements

The division of lower limb movements is very similar to that of upper limb movements. They are first divided into single-leg movements and double-leg movements, and then distinguished as “squat” and “stretch”, and finally, they are divided into sagittal plane, coronal plane, transverse plane and multi-plane movements according to the movement mode, as shown in Figure 3.

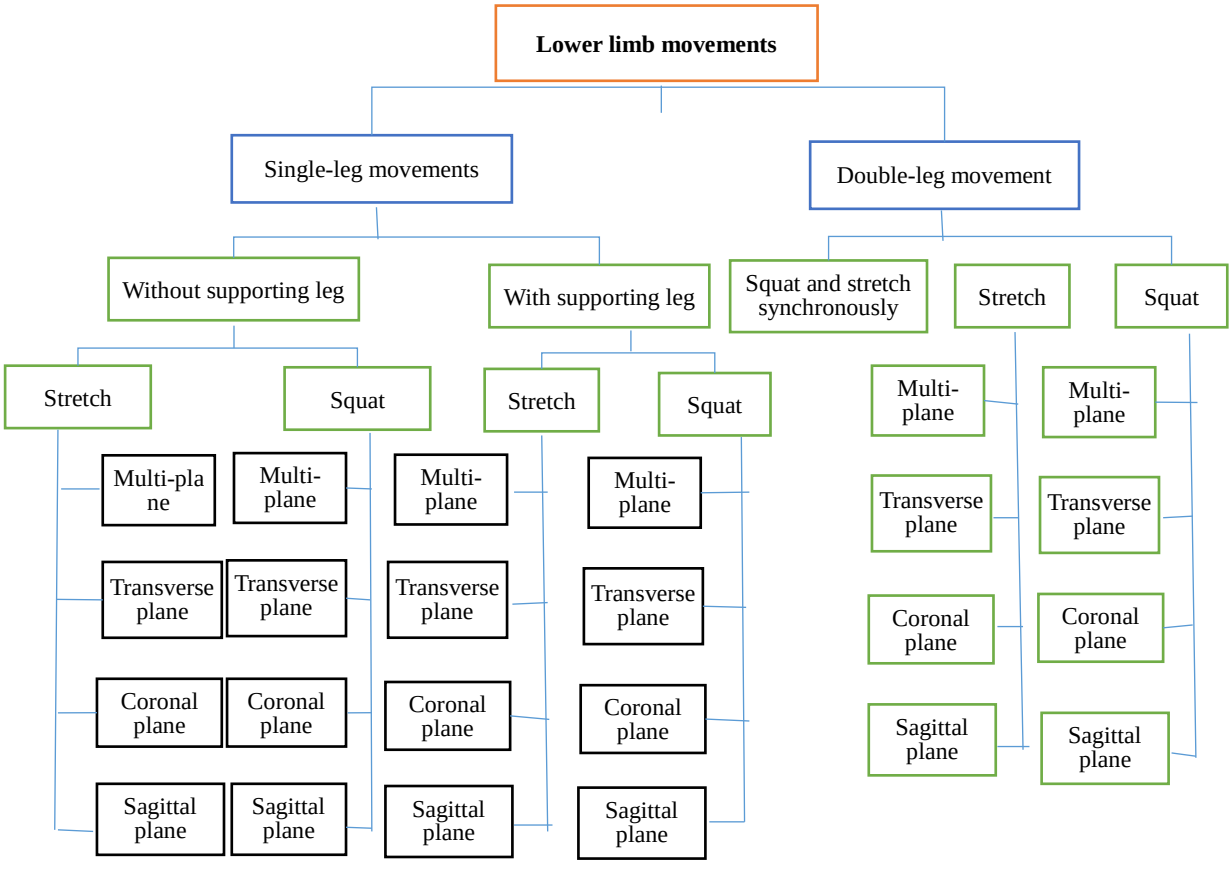

Fig.3 Body Movement Function Training -- Lower Limb Movements

It can be seen from the description above that the key to body movement function training is not local strength or muscle training, but to training based on the natural movement of the human body. The purpose of this type of training is to correct various problems in human body, such as asymmetry in muscle force, imbalance in limbs, uncoordinated movement, and so on. It emphasizes the development of multi-dimensional and all-round training around the muscles, joints and nerves of the human body, laying the foundation for the accumulation of physical fitness.

4. The Necessity of Body Movement Function Training in Sports Courses

(1) Reduce the obesity rate of adolescents

According to national survey data, the obesity problem among adolescents in China has reached a level that cannot be ignored. The obesity rate of adolescents has surpassed that of developed countries such as Europe and the United States, which reflects that Chinese adolescents are lagging behind in terms of physical fitness. This mass obesity problem is caused by various factors, including poor exercise awareness, scarce average exercise time, low exercise efficiency, over-burdened studies, too much emphasis on academic performance, etc. The application and development of body movement function training in the sports courses of primary and middle schools as well as colleges and universities is a powerful means to improve the exercise efficiency of adolescents, and it can gradually solve the general problem of incorrect force exertion in the human body. For example, there are some adolescents whose height to weight ratio is normal, but they seem to be obese and show severe lack of strength and endurance during exercise. Some of them may choose incorrect weight loss methods such as dieting because of their emphasis on appearance, which may not only make them fail to make their body look healthier, but also damage their body functions or make them become fatter due to dieting rebound. The reason is that it is not really obese, but the high body fat ratio and insufficient muscle strength caused by insufficient exercise and improper way of exerting force. By carrying out body movement function training, students can find a normal way to exert force, reduce compensatory local obesity, reduce body fat ratio to a healthy range and improve body health.

(2) Improve the athletic ability of adolescents

The physical test have been included in the scope of the high school entrance examination in many provinces, cities and regions, and it is unknown whether it will enter the scope of the college entrance examination in the future. The addition of physical testing to the senior high school entrance examination is not to make students to practice how to cope with the exam in a short period of time, but to encourage students, parents, and schools to attach importance to athletic ability training. However, due to the lack of the concept of body movement function training in sports courses, the teaching of running, jumping, straddling, and ball sports is more emphasized in sports courses. Students have a higher risk of injury when they exert incorrect force and cannot effectively correct their athletic ability. Moreover, when students notice that exercise in sports courses cannot make them lose weight and even make them face a higher risk of injury, they may have an incorrect understanding of physical exercise and then choose unhealthy ways to lose weight, such as dieting. Incorporating body movement function training in sports courses can help students mobilize the muscle groups that should be exerted, and lead them to use large muscle groups to drive small muscle groups to exercise. Students participating in sports activities in a safe and healthy state can effectively reduce the risk of body injury in exercise, thereby helping them to form correct sports cognition.

5. The Method That Body Movement Function Training is Carried out in Sports Courses

(1) Attract students' attention

In body movement function training, there are many basic movements that the human body can easily do under normal movement functions. These movements are “Functional Movement Screen”, which is abbreviated as FMS in English [3]. PE teachers can introduce this screening mechanism in sports courses, and ask students to complete related movements independently after taking the lead

in doing the actions. Some students can finish these movements, and some cannot. When they check each other, the teaching atmosphere will naturally become active. Moreover, at this time, students will generally ask “Why can't I/he/she do the movement?”, and then their attention will be quickly grasped by a simple action. PE teachers can not only attract students' attention in class through FMS, but also find individuals with weak motor functions corresponding to each movement in a class, laying the foundation for subsequent training, evaluation and testing.

(2) Choose suitable training content for students

After the FMS, the weak links of individual students' physical motor function can be fully exposed. Then PE teachers can carry out test about squat strength, endurance, jogging sensitivity, etc., to understand the characteristics and shortcomings of students in terms of physical motor function [4]. Some students have poor upper limb motor function, some may have poor lower limb motor function, some may have poor physical stability, and some may have weak body motor functions. Teachers need to select suitable training content for students according to the actual situations of students, so as to improve the pertinence of physical education training and enhance the effectiveness of sports for improving their athletic ability and physical fitness. When training for all students, teachers need to find out some movements that are suitable for adolescents, with moderate difficulty and low risk, so as to fully improve the efficiency of the time use of sports courses. Balance training, body-weight training and fast ladder training are generally widely adopted in foreign schools that use body movement function training, and Chinese schools and PE teachers can fully refer to and learn from these methods.

(3) Implement training content in the class

To achieve the effect of improving physical fitness and improving the body's athletic ability through exercise, there is a need for a period of repetitive and cyclic training, and the quality and intensity of training must be ensured during the training process. In sports courses, teachers need to focus on students to design training plans featured by regular and quantitative exercise, medium and small loads, multiple frequencies and long intervals. It is also necessary to lead the students to implement the training plans and gradually increasing the complexity and load of the movements from easy to difficult, thereby improving their athletic ability. For example, in the first 1~3 weeks, after warming up, the PE teacher can lead the students to do push-ups, knee support, swallow-styled balance, standing on one foot, squats, plank and stretch, each movement for 20 seconds. After students are familiar with this body movement function training program, teachers can increase the load and complexity on this basis. For example, in the 4^{th} to 7^{th} weeks, they can lead students to do 15 squats with arm swinging, 15 single-leg jumps and squats, 15 90-degree spin jumps, 15 high-step stretches, 20 leg stampings and swings, 10 times of back step running, 10 cross-steps, and 10 horizontal jumps with both feet. In the 8^{th}-12^{th} weeks, body movement function training basically enters the later stage, and students have adapted to the training in the 4^{th}~7^{th} weeks. Teachers can continue to increase the training load for students, such as 20-second-long prone hip extension, 12 Russian twists, 12 side-lying leg lifts, 12 side-lying raising from both ends, 10 mini-belt squats, 20 supine cross-knee lifts, 10 times of back step running, 10 cross-steps, and 10 rapid hip rotations.

(4) Carry out test of students' body movement function

To understand the impact of body movement function training on the physical fitness of students, teachers can test the students before and after implementing body movement function training, and then judge the actual impact of the training on students from data analysis. Before training, students need to attend tests such as 50-meter run, standing long jump, 15-meter shuttle run, etc., and relevant test data should be recorded. After the training, students need to accept these test items again, and then the data differences between the two tests should be calculated; the teacher can compare the data difference with that of students who do not participate in the body movement function training. The following Table 1 and Table 2 show the indicators of the boys and girls in class x before and after the training. It can be seen from the data that the physical fitness of the boys and girls was greatly improved after the training. In terms of the 50-meter run, the difference in seconds after the body movement function training reaches 0.14s, which is 0.06s more than the

improvement difference of regular course training. The improvement of girls' physical fitness is slightly greater than that of boys.

Table 1 Comparison of Various Indicators of Boys Before and after Training

	50m run/s	Standing long jump/cm	...	15m shuttle run/s
Before training	8.04s	208.6cm	...	7.88s
After training	7.90s	211.1cm	...	7.46s
After the regular course	7.98s	208.9cm	...	7.54s

Table 2 Comparison of Various Indicators of Girls Before and after Training

	50m run/s	Standing long jump/cm	...	15m shuttle run/s
Before training	8.62s	185.1cm	...	8.32s
After training	8.37s	189.8cm	...	8.16s
After the regular course	8.53s	186.4cm	...	8.20s

6. Conclusion

Body movement function training is an important means to improve the physical fitness of students, and it is also a powerful means to train students in the correct way of muscle exertion. Teachers should make full use of the body movement function training program in sports courses to design repetitive and periodic training content for students and then gradually increase the load of student training, which will help to comprehensively develop the students' movement ability of upper and lower limbs and torsos, strengthen their core stability, and reduce the risk of being injured during sports. As a new concept, body movement function training needs to be run-in and optimized if it wants to be combined with the content of the traditional sports courses. Teachers need to implement it according to the actual situations of students, and gradually improve the rationality of the training program.

7. Acknowledgment

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