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ORIGINAL

EXPERIMENTAL STUDY ON THE IMPACT OF FUNCTIONAL TRAINING ON THE AGILITY QUALITY OF YOUNG ATHLETES

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ABSTRACT

At present, there is a lack of relevant literature on functional training for young athletes aged 10-12 years old in China. This project plans to combine functional training with sports training classes. Through 40 young athletes aged 10-12 years old, the impact of functional training on 10-12-year-old athletes is systematically studied. Effects on agility in age-old athletes and exploring its causes. This article uses expert interview methods, experimental methods, mathematical statistics and other methods to analyze the survey results. Before the experiment begins, general information about the research subjects is collected, and then they are divided into experimental groups and control groups, and then a difference analysis is performed to determine the differences between the two groups. After 12 weeks of experimental intervention, the sensitivity quality evaluation indicators of the two groups of students were compared. Results: There was a very significant difference in the experimental group's scores on the hexagonal reaction ball test before and after the experiment ($P<0.01$), with an improvement rate of 10.8%; the difference between the control group's scores on the hexagonal reaction ball test before and after the experiment was statistically significant ($P<0.01$). Significance ($P<0.05$), the average improvement was 4.0%. There was a very significant difference ($P<0.01$) in the performance of the experimental group in the 4×10m return run before and after the experiment, with an improvement rate of 11.7%; in the control group, there was a significant difference in the 4×10m return run before and after the experiment. The difference was statistically significant ($P<0.05$), and the average progress rate was 8.0%. Conclusion: Whether functional training or traditional physical training can improve the physical fitness of children aged 10 to 12 years old to varying degrees. Among athletes

aged 10 to 12 years old, functional training has a significant promotion effect on improving the speed and flexibility of the 6-angle reaction ball and 4×10 m. Traditional physical training has a significant effect on improving the speed and flexibility of the 4×10 m return run between the ages of 10 and 12 years. Performance is improved to varying degrees, and functional training is more effective. Functional training can increase the interest in sports practice of teenagers aged 10 to 12 years old, and relieve the monotony of training classes to a certain extent.

KEYWORDS: Functional training; Agility quality; 10-12-year-old athletes

1. INTRODUCTION

Physical fitness is the cornerstone of all sports activities and is increasingly valued in physical education. However, domestic research in this area lags far behind that of European and American countries (X. Chen, 2023; Y. Gao, 2023; Sun, 2023). At present, the sports professional teams of our country's colleges and universities still use traditional strength training as the main content, which to some extent restricts the improvement of their competitive level. The characteristics of sports are fast speed, comprehensive skills, switching between offense and defense, and coordination of muscles in various parts of the body, which places higher demands on the body's sensitivity and coordination capabilities. On the court, in the face of ever-changing situations, you must react quickly and take reasonable technical actions in order to successfully complete the shot. Agility quality is an important aspect of human body quality. It will change with age. This plays a great role in the early selection of athletes and the arrangement of sports training. It is also important in daily life and sports. It can play a big role. 10-12 years old is a critical period for the development of sensitive qualities. Sufficient attention needs to be paid during this period (Jin, 2021; Ren, 2021; Shen, 2023). Only in this way can the potential of sensitive qualities be maximized. This study aims to provide theoretical basis and technical support for the cultivation of agility qualities in children aged 10 to 12 through the study of agility qualities in children aged 10 to 12 years old.

Functional training originated from the United States. Later, during the 2012 London Olympics, our national team had an academic exchange with the American Functional Research Institute AP organization and integrated functional training into daily training. In a series of important events, achieved very good results, making functional training widely used in China. American scholar Gary Cook first proposed the concept of "functional training". It regards the body as a complete chain and avoids simple structural training. After completing various exercises, one can discover one's own weaknesses to achieve the purpose of exercise. Functional training refers to multi-level exercises based on proprioception without the aid of instruments, which can

significantly improve the performance of the body while maintaining body balance, it is explained in a book "Functional training for sport". Improve athletes' performance. Functional training in the United States, proposed that functional training is a discipline that combines body functions with special movement characteristics. In a daily life, the activities you participate in should follow the characteristics of sports biomechanics and reflect vitality and coordination. It is proposed in a book "Functional Training: Interpretation and Application" that functional training refers to comprehensive training through multiple joints, multi-directions, and multi-level proprioception. Its goal is to improve the functions of various parts of the human body and make it more comfortable. Achieve comprehensive performance, and on this basis, achieve stability of movement patterns and energy saving, thereby achieving an efficient movement state (C. Gao, Yang, Liao, & Li, 2021; C. Liu, 2023; S. Liu, 2023; Yi, 2022). It is proposed in a "Research Review on Conceptual Analysis and Theoretical Framework of Functional Training" that based on the "kinetic chain" theory and the competitive ability structure model as the theoretical basis, based on the structure and genetic characteristics of the human body, through "training" of practitioners "Action mode" monitoring to achieve a better competitive state, thereby achieving a better competitive state (M. Zhan, 2021). Professor Kang Ling pointed out in his "Hot Spots, Issues and Prospects of Physical Functional Training Research in China": "Functional training is to evaluate the physical functions of practitioners, strengthen the weak links of the body, and improve athletes' athletic ability and optimize The movement function of the human body plays an important role (Tong & Li, 2023). a functional physical training method is proposed that conforms to the rules of human body activity in "On the Characteristics and Application of Functional Physical Training in Competitive Sports". It is an effective means to effectively improve the physical functional status of athletes (Lin, 2020; Min, 2023). In short, functional training with anatomy as the core is different from the traditional physical training method of "muscle isolation". It is a multi-joint, Multi-plane and multi-dimensional training is more in line with the characteristics of competitive sports. It is a systematic training method to improve physical fitness, optimize sports performance and prevent sports injuries.

So far, research on functional exercise and sensitivity quality has been recognized by social and academic circles at home and abroad, and many achievements have been achieved. After combing the relevant literature, we can see that most researchers summarize the practical research on agile quality into: a simple linear training method such as rope ladder exercise, which can improve agile quality to a certain extent., but after a long time, the practitioner will feel bored. Therefore, the content of training should be diversified, and functional training is a relatively new training method, especially suitable for physical training in various sports. Its concept is to start from the body movement itself. and be improved and developed in practice. In today's society, children's physical health has received more and more attention, and

sensitivity quality is a comprehensive reflection of multiple qualities, so it is very important to cultivate their sensitivity quality. The sensitive period for agility quality is usually between 10 and 12 years old. In order to better improve agility quality and achieve twice the result with half the effort, after drawing on previous research results, functional training was combined with the daily training of athletes aged 10 to 12 years old to explore its It can play a positive role in promoting the functional training of sports events, provide scientific guidance for the development of agility quality, and also provide some reference for coaches (Qin, Liu, Yu, & Zhang, 2023).

2. Survey Objects and Methods

2.1 Survey Objects

This study takes young athletes aged 10-12 years old from 2-12 years old in a sports training base in a certain city as the research subjects, 20 males and 20 females respectively, for a total of 40 people. Before the trial began, general information on the two groups of athletes was collected, including height, weight and age. Before the test, there was no significant difference between the experimental group and the control group in height, weight, age, independent sample t test $P>0.05$. Therefore, the experimental grouping of experimental subjects this time is scientific and reasonable, and further experimental research can be carried out.

2.2 Survey Methods

2.2.1 Experimental Objectives

The research results will help improve the methods and contents of cultivating the sensitive qualities of adolescents aged 10 to 12 years old, and provide scientific basis for the cultivation of sensitive qualities of adolescents aged 10 to 12 years old in the future.

2.2.2 Training Content

According to the physiological and psychological development patterns of the subjects and the characteristics of the sports events, corresponding functional training movements were selected, and through interviews with relevant experts at home and abroad, four aspects including rapid telescopic strength training, strength and explosive power, energy system development, and trunk pillars were Dimensions, the functional training movements of the experimental group were screened out. The control group used conventional physical training movements.

The course is divided into preliminary, middle and final sections, totaling 45 minutes. The experimental group and the control group were basically the

same in the preparatory and finishing stages. The 8-minute preparatory stage was mainly for aerobic warm-up to adjust the athletes' mental state and physical functions to prevent injuries during training; the last 7 minutes was mainly for finishing. and relaxation activities, which can reduce the fatigue and lactic acid experienced by athletes during training and promote their recovery to avoid any impact on the next training. The 30 minutes of basic exercise in the middle section are mainly functional exercises and regular physical exercises. During training, the training content must be strictly observed, and at the same time, attention must be paid to the training status of the students, and the training plan must be adjusted in a timely manner. The experimental group was trained, while the control group was trained by teachers from the school.

Based on the review of relevant literature, this article proposes a 12-week, 2-week, and 3-period training plan (see Table 1). The first phase is mainly comprehensive exercises focusing on rapid contraction and trunk support, allowing players to have an adaptation period; the second phase is based on this, adding training related to physical development, and gradually increasing the load and load of training.; The third stage is to increase strength and explosive training to make their training more solid and stable.

Table 1: Training outline for the experimental group and the control group

TRAINING METHOD	**TEST GROUP**	**CONTROL GROUP**
	functional training	traditional physical training
THE FIRST STAGE ADAPTATION PHASE (1-3 WEEKS)	Quick Telescopic Compound Training Trunk Support	Traditional physical fitness based on agility quality Training methods and scientific arrangements for training
SECOND STAGE ENHANCEMENT PHASE (4-7 WEEKS)	Quick telescopic compound training energy system development trunk support	
THE THIRD PHASE CONSOLIDATION AND STABILITY PHASE (8-12 WEEKS)	Quick telescopic compound training Strength and explosiveness energy system development trunk support	

2.2.3 Evaluation indicators of sensitive quality

According to the age characteristics of the selected subjects, and with reference to expert opinions on agility quality detection indicators, the two events of hexagonal reaction ball and 4×10-meter return run were finally selected as the evaluation indicators for the agility quality of athletes aged 10 to 12 years old.

Hexagonal Reaction Ball Test: This test is a comprehensive test of the human body's lower limbs, trunk, upper limbs, and eye-hand coordination. It is

a method of comprehensive testing of the human body's agility quality. The test method is that the athlete stands one meter away from the landing point of the hexagonal ball, and then places the hexagonal ball at a height of 2 meters and descends at a speed close to free fall. When the hexagonal ball falls on the ground, the player will quickly to catch the bounced ball, and then catch the ball. Test equipment: Hexagon, stopwatch Test requirements: Starting the move to catch the ball in advance will not be counted in the score. See Figure 1.

Figure 1: Hexagonal reaction ball

4*10m return run: Mainly to test the athlete's explosive ability of the legs in a short period of time, as well as the ability to withstand the muscles in a short period of time. Test method: The tester first measures the distance of 10 meters and draws the running distance with chalk. Then, the contestant takes a ready posture and stands behind line A (see Figure 2). When he hears the command, he speeds up and rushes to line B, lowers his center of gravity, touches the finish line with his hand, turns around quickly, and Run, and then go back and forth between line A and line B, 4 times in total, record the time spent, measure twice, and choose the best time. Test equipment: measuring tape, chalk, stopwatch. Test requirements: At the beginning of the game, you are not allowed to cross the finish line. You must touch the finish line with your hand every time, otherwise no points will be awarded.

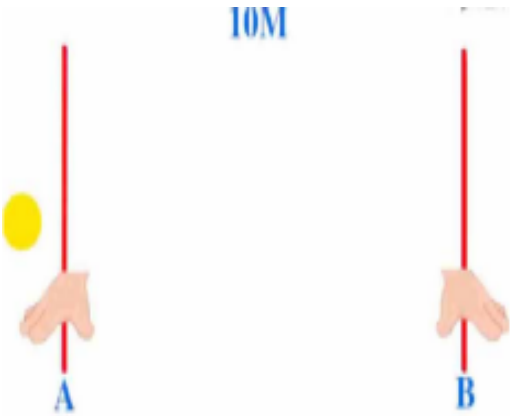

Figure 2: 4×10m return run

2.3 Statistical Analysis Method

After the experimental intervention, Excel tables and Spss25.0 software were used to statistically process the experimental data obtained, and the independent sample t test, paired sample t test, mean value, standard deviation, etc. were used for analysis, and further The effects of two training modalities were explored.

3. Results

3.1 After the experiment, the impact of students in the experimental group and the control group on the performance of the hexagonal reaction ball

After 12 weeks of training, we calculated and counted the post-test scores of the hexagonal response balls of the two groups. From Table 2, we can see that the average of the overall post-test scores of the experimental group was 2.21, with a standard deviation of The average score of boys is 2.15, with a standard deviation of 0.08; the average score of girls is 2.28, with a standard deviation of 0.08. The average post-test total score of the students in the control group was 2.42, with a standard deviation of 0.11; the average score of the boys was 2.38, with a standard deviation. 12; girls had an average score of 2.46 and an average of 0.09. After the experiment, whether from the overall perspective or from the perspective of boys or girls, the independent sample t-test showed P<0.01. That is to say, there was a very significant difference in the performance of the hexagonal reaction balls after the experiment, which means, under the same training time and conditions, using different training methods can improve the performance of the hexagonal reaction ball.

Table 2: Comparison of test results before and after hexagonal reaction ball training

TEST INDICATORS	GROUP	TEST GROUP (N=20)	CONTROL GROUP (N=20)	T	P
HEXAGONAL REACTION BALL (SECONDS)	all	2.21±0.14	2.42±0.12	-10.56	0.000
	male	2.15±0.07	2.38±0.13	-9.34	0.000
	female	2.28±0.07	2.46±0.08	-8.21	0.000

3.2 Comparison of scores between the experimental group and the control group after the 4×10 m return run test

After the experimental intervention, the 4 × 10 m post-test results of the two groups were statistically analyzed and analyzed. From Table 3, we can see that the total post-test score of the experimental group averaged 21.25 and the standard deviation was 1.44; The average score of male students is 20.88 points, with a standard deviation of 1.15 points; the average score of girls is 21.62 points, with a standard deviation of 1.72 points. The average post-test score of students in the control group was 22.86 points, with a standard

deviation of 1.56 points; the average score of male students was 22.26, with a standard deviation of 1.21; the average score of girls was 23.46 points, with a standard deviation of 1.91 points. In the 4x10 m independent sample t test, the overall P<0.05, while for men, P<0.01, there is a very significant difference; the female independent sample t test P<0.05, showing significant differences in gender, and Before the test, there was no obvious difference between the two, indicating that for 10-12-year-old athletes, functional training has a better impact on 4 × 10 m competition performance under specific times and conditions. Good results.

Table 3: Comparison of test results before and after 4x10 m return run training

TEST INDICATORS	GROUP	TEST GROUP (N=20)	CONTROL GROUP (N=20)	T	P
4 × 10M RETURN RUN (SECONDS)	all	21.25±1.43	22.86±1.55	-3.114	0.010
	male	20.88±1.14	22.26±1.22	-3.123	0.008
	female	21.62±1.71	23.46±1.92	-3.212	0.012

3.3 Before and after the experiment, the impact of students in the experimental group and the control group on the performance of the hexagonal reaction ball

The results showed that the hexagonal reaction ball significantly improved the subjects' academic performance within 12 weeks. As can be seen from Table 4 and Figure 3: the mean and standard deviation before the experiment were 0.20, and the average and standard deviation after the experiment were 2.21 and 0.15, with an overall increase of 0.27 seconds, an increase of 10.8%; the average mean of the control group was 2.52, the average mean after the experiment is 0.15, the standard deviation is 2.42, 0.11, the overall improvement is 0.10 seconds, the increase is 4.0%.

Through the analysis of the results before and after the hexagonal reaction ball experiment, it was found that the academic performance of both male and female students has improved. As can be seen from Table 4 and Figure 3, before and after the experiment, the average score of the boys in the experimental group was 2.43, the standard deviation was 0.27, and the score increased by 0.28 seconds, an increase of 11.5%; the average score before and after the experiment was average is 2.52, the average level after the experiment is 0.12, the score after the experiment is 2.28, the score after the experiment increases by 0.24 seconds, an increase of 9.5%. The average score of boys in the control group before and after the experiment was 2.49, with a standard deviation of 0.19, and the score after the experiment was 2.38, with a score improvement of 0.11 seconds, an increase of 4.4%; the average score of girls in the control group before and after the experiment The score was 2.55, the standard deviation was 0.10, and the score improved by 0.09 seconds, an increase of 3.5%. Through comparative analysis of the performance of the

hexagonal reaction balls in the experimental group and the control group, it was found that the paired sample t-tests of the experimental group and the control group were P<0.01 and P<0.05 respectively. This means that there is a big difference in the performance changes of the experimental group before and after the experiment, while there is a significant difference in the control group. The academic performance of both groups improved to a certain extent before and after the experiment, but the degree of increase was different. The improvement of functional training was better than that of conventional physical exercise.

Table 4: Changes in the hexagonal reaction ball scores of the two groups before and after the experiment

TEST INDICATORS	GROUP	GENDER	BEFORE EXPERIMENT	AFTER THE EXPERIMENT	P	VALUE ADDED(S)	GROWTH RATE
HEXAGONAL REACTION BALL (SECONDS)	test group (N=20)	all	2.47±0.21	2.22±0.14	0.000	0.26	10.80%
		male	2.42±0.26	2.14±0.07	0.000	0.26	11.50%
		female	2.51±0.11	2.27±0.07	0.000	0.23	9.50%
	control group (N=20)	all	2.51±0.14	2.41±0.10	0.016	0.11	4.00%
		male	2.48±0.18	2.37±0.11	0.010	0.12	4.40%
		female	2.54±0.11	2.45±0.08	0.015	0.08	3.50%

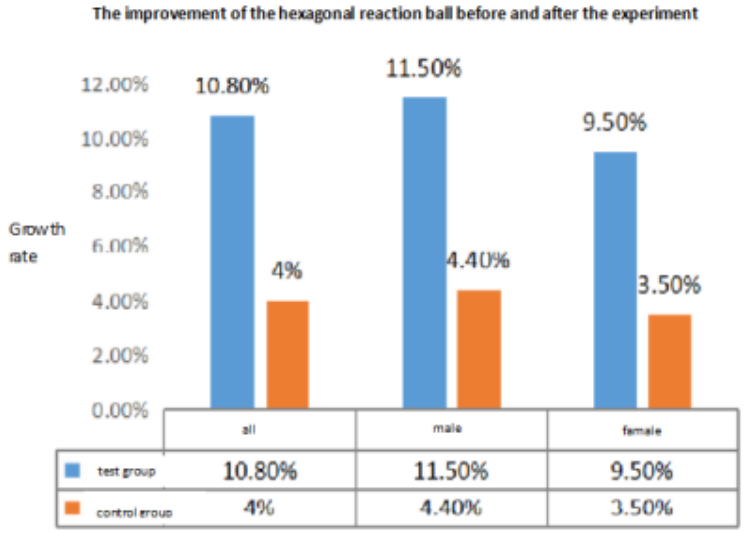

Figure 3: The improvement of the hexagonal reaction ball before and after the test

3.4 Comparison between the experimental group and the control group before and after the 4×10 m return run test

The 4×10 m return run results of the two groups of athletes were compared and compared. As can be seen from Table 5 and Figure 4, the average and standard deviation of the experimental group before the experiment were 24.08 and 1.87, and after the experiment they were 21.25 and

1.44, an overall increase of 2.83 seconds, an increase of 11.7%; the average mean of the control group was 24.86, the average mean after the experiment is 1.15, the standard deviation is 22.86, the average level of the control group is 1.56, the overall increase is 2.0 seconds, the increase is 8.0%.

By analyzing the performance of men and women before and after the 4 ×10-meter return run test, it was found that the performance of both male and female athletes has improved. The average score of the boys in the experimental group before the experiment was 23.53, the average score after the experiment was 1.97, and the score after the experiment was 20.88. The score after the experiment improved by 2.65 seconds, an increase of 11.2%; the average score of the girls in the experimental group before the experiment The score after the experiment was 24.63, with a standard deviation of 1.76. The score after the experiment was 21.62. The girls' score improved by 3.01 seconds, an increase of 12.2%. The average score of boys in the control group before the experiment was 0.91, the average score after the experiment was 0.91, the score after the experiment was 22.26, the score after the experiment was 1.21, an improvement of 1.71 seconds, an increase of 7.1%; the girls in the control group before the experiment The average score was 25.74, the standard deviation was 1.38, and the post-experiment score was 23.46.

The girls' score improved by 2.28 seconds, an increase of 8.8%. Through the comparative analysis of the 4x10 m return running results of the experimental group and the control group, it can be obtained that: the paired sample t test of the experimental group P<0.01; the paired sample t test of the control group P<0.05, showing the results of the experimental group before and after the experiment. There was a highly significant change in performance, while there was a significant difference in the performance of the control group. The results showed that compared with the control group, both the experimental group and the control group improved, but the increase in each index was significantly different.

Table 5: The impact of the two groups of athletes on the 4x10 m return run performance before and after the experiment

TEST INDICATORS	GROUP	GENDER	BEFORE EXPERIMENT	AFTER THE EXPERIMENT	P	VALUE ADDED(S)	GROWTH RATE
4 × 10M RETURN RUN (SECONDS)	test group (N=20)	all	24.07±1.86	21.24±1.43	0.000	2.82	11.70%
		male	23.42±1.96	20.87±1.14	0.000	2.64	11.20%
		female	24.62±1.75	21.61±1.71	0.000	3.02	12.20%
	control group (N=20)	all	24.85±1.14	22.85±1.55	0.012	2.02	8.00%
		male	23.96±0.90	22.25±1.20	0.013	1.72	7.10%
		female	25.73±1.37	23.45±1.90	0.013	2.27	8.80%

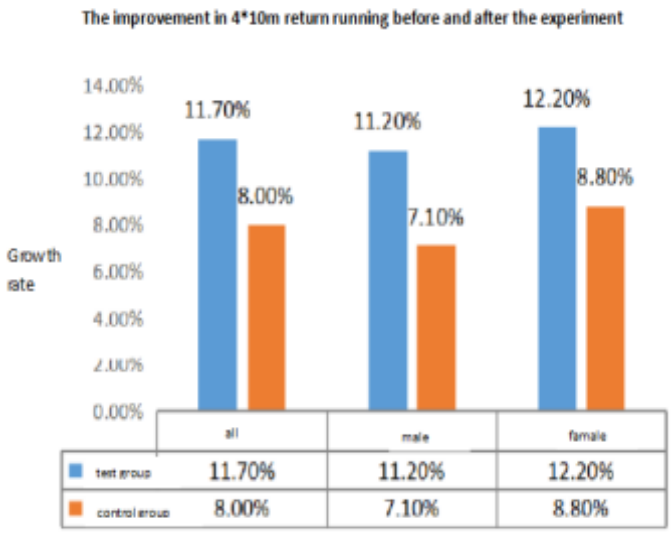

Figure 4: Lifting range before and after the 4x10 m return run test

4. Discussion

4.1 Research on the functional training effect of hexagonal reaction ball

Hexagonal reaction ball detection is a sensitive quality detection method. It is sudden, random and has high requirements on the upper limbs and trunk. It also requires hand-eye cooperation and can detect the practitioner's quick reaction, quick start and Rapid adaptability (Li, 2020). The results of this study show that hexagonal reaction ball practice has a great improvement effect on the performance of players aged 10 to 12 years old. Combined with the impact of previous functional training on the hexagonal reaction ball, applying functional training methods to competitive sports can effectively improve the sensitivity of the hexagonal reaction ball compared with traditional physical training. In addition, from the perspective of prevention and treatment of sports injuries, functional training also plays a great role in improving athletes' physical function levels. The footwork of an athlete's legs is a very important sport. Its support, starting and braking speed will have a great impact on the game. The strong can completely control the situation of the game, and the weak will also be injured. Therefore, in the specific training plan, training is mainly arranged for rapid telescopic combination training, using rope ladders to move/jump in multiple directions with one or both feet to strengthen the start and braking of exercises, accelerate the frequency of foot movement, and improve the pace. flexibility. Through continuous training, the muscles of the body can actively function and the muscles of various joints of the lower limbs can be activated, thereby promoting the improvement of the athlete's movement speed and quality. By reviewing relevant information, it was found that functional training has a very good effect on the development of the human body. It can not only strengthen the muscle tissue around the knee joint, but also strengthen the practitioner's ability to control various technical movements, so it can be better mastered. Movement skills (C. Wang & An, 2023; Wei, 2023; X. Zhan, 2023;

Zhang, 2023). In addition, after consulting relevant information, we learned that the most basic form of movement in the nervous system is reflex, and its most basic structure is the reflex arc, which consists of five major components: receptors, afferent nerves, nerve centers, efferent nerves, and effectors. Partially composed. When combined with sports activities, it is necessary to ensure that the practitioner's body posture is correct and the pace changes quickly. This requires arranging more responsive exercises as much as possible in functional training, such as line exercises to conduct different exercise routes. Changes: square running, fan-shaped running, continuous signal turn back running, etc. These can improve the practitioner's quick reaction ability. In addition to being limited by physical sensitivity and other factors, their ability to respond quickly is also affected by reaction time. In sports activities, you must first make good predictions and then use appropriate movements to hit the ball. This also places high demands on the hand-eye coordination of athletes. The hexagonal reaction ball, just like its kinematic principles, is a very A good detection method, and it can also help 10-12-year-old athletes improve the level of hexagonal reaction balls, so it should be valued by more people.

4.2 The role of functional training in 4x10m return run

The 4×10-meter return run is a test of agility. When athletes exercise, they will get a lot of information and analyze it through their brains to make the fastest response in the shortest time. This is very important for the body. The ability to control is very important. When running back and forth in different directions, the center of gravity of the body must be constantly changed to control the direction of movement of the body. In sports competitions, the most commonly used technique is to hold the ball. During the stalemate stage, the athlete's body will run in multiple directions. When running, you must pay attention to adjusting and switching your center of gravity. Through the spatial perception of your sight and body, you can predict emergency stops and changes of direction in advance, and quickly reach the predetermined location to hit the ball. This is very important for athletes. There have always been high demands on attention (Q. Chen, 2023; Duan, 2023; X. Wang, 2023). The reason why functional training can improve the performance of 4×10 meters is mainly because of the characteristics of functional training. It is a multi-directional, multi-dimensional and multi-joint training, while the traditional physical training method is relatively simple and only focuses on a single Joint training. From a physiological point of view, functional training focuses on the control of nerves to muscles. Through low-intensity exercise, the changes in movement patterns are adjusted to stimulate deep muscles and maintain the stability of the spine and joints. However, traditional physical fitness Training only focuses on the development of muscles and ignores the important role of nerves in the body. 3. Exercise under functional training can better stimulate deep small muscle groups. With certain training, a 4×10-meter return run can

form a signal transmission path and establish a nerve-muscle connection. This will further improve the performance of 4×10 meters. During the exercise, athletes are required to contract their core when hitting the ball to ensure that the trunk is always stable. They must control their bodies to recover quickly after hitting the ball. Functional training focuses on the kinetic chain effect during training. The experimental group developed the energy system. Exercises can be added to functional training, such as: non-directional reaction/line exercises: short turn sprint running, square/fan running, etc., as well as some trunk support exercises similar to elementary crocodile crawling, which can enhance the athlete's core stability ability and enhance The stability of the pelvis and hip joints enhances the extension ability and flexibility of the spine, thereby enhancing the athlete's power chain transmission efficiency during exercise. The 4×10-meter return run is mainly aerobic and anaerobic mixed exercise. Therefore, aerobic glycolysis-powered exercise is added to the 4×10-meter return run, which can enhance the athlete’s glycolysis function and thereby improve the 4×10-meter return run. The results of ×10 meters have improved to a certain extent. The results show that functional training can enhance the mobilization efficiency of nerves in the movement process and increase the delay of muscle contraction. Through the 4×10-meter test on athletes aged 10-12 years old, functional training has targeted improvements in braking, emergency stopping and body control during movement during high-speed running.

5. Conclusions and Recommendations

5.1 Conclusion

Both functional exercise and traditional physical exercise methods can promote the agility quality of athletes aged 10 to 12 years old to varying degrees. Functional training has a significant improvement effect on the hexagonal reaction ball and 4×10 m movement performance of 10 to 12-year-old players, and it also has a certain promotion effect on the body's sensitivity. Among athletes aged 10 to 12 years old, traditional physical exercise has improved the level of 4×10 m return running to varying degrees, while functional training is more obvious. (4) Functional training can provide active exercise for teenagers aged 10 to 12 years old, and to some extent reduce the monotony of training classes.

5.2 Research Recommendations

(1) In the future, the cultivation of agility quality among teenagers aged 10 to 12 should incorporate the ideas and methods of functional training. (2) It is proposed that when selecting functional training movements, the athletes' physical and psychological development characteristics and the characteristics of the sports should be fully considered, and corresponding training plans

should be formulated. (3) Future researchers can study and compare the growth and changes of agile qualities in each period at different time points. (4) At present, physical training is developing rapidly, and training methods are also showing a diversified tendency. In physical education teaching, more new exercise methods should be tried to make the training content more diverse and effective.

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