

The Influence of Dynamic Strength Training on Physical Load State

Ning Li

Rizhao Polytechnic, Rizhao, 276800, China

Abstract: The influence of dynamic strength training on physical condition was analyzed and studied. Method: through the research and analyze 40 elite athletes, respectively from the strength, speed, stamina, agility and flexibility in five aspects, to determine the test indicators, respectively before and after the dynamic strength training of athletes on the physical fitness test, and analyze the data obtained, through the changes of heart rate before and after the training, in order to study the effect of dynamic strength training for athletes physical stamina training. Results: through the analysis of the experimental data of physical fitness test before and after training, it can be found that dynamic strength training can significantly improve the physical fitness of 40 athletes, and the athletes' various physical qualities can be significantly improved. Conclusion: dynamic strength training can significantly improve the physical fitness of athletes.

Keywords: Speed; Power; Physical fitness; Power performance

1. Introduction

Physical fitness is the foundation of all sports. In all kinds of sports competitions, the lack of physical fitness of athletes will seriously affect the executive ability of athletes, which directly determines the outcome of the competition[1]. Sports performance depends on two main aspects: one is the physical ability and quality of athletes accumulated through daily training; The second is the technical play of the match. Of course, although the latter can play a certain role, but the fundamental decision of athletes competitive level or the level of daily training. As an important subject of daily training of athletes, physical training directly determines the athletes' competitive level and athletic performance. Through scientific physical training, track and field athletes can always maintain a high level of physical function, and through the improvement of skills and psychological stability, and other means to achieve continuous improvement of competitive level[2].

In daily training, athletes are usually trained by means of dynamic strength training. Therefore, based on the actual situation and the situation of dynamic strength training of 40 elite athletes, the characteristics of physical training after dynamic strength training are studied and analyzed. Through the construction of reasonable and effective, scientific and practical, simple and practical and easy to operate physical examination index system, the physical training of athletes to carry out effective measurement, so as to design a scientific and effective dynamic strength training methods and means to assist coaches in daily training. In order to increase the physical ability of athletes play a role in promoting.

2. Preparation for Experimental Study on the Influence of Dynamic Strength Training on Physical Condition

2.1. Research object

The selected 40 elite athletes with an average of more than 2 years of training. There were 20 male and 20 female athletes. The age of the male was 17.0 2.1, and that of the female was 17 1.6. Comprehensive health monitoring was carried out on athletes before the test, and the results showed that there was no significant difference in athletes' physical fitness[3]. Through the method of heart rate test, the continuous heart rate index in the process of training is studied, and the measured data are processed by mathematical statistics. The data of athletes' basic physical fitness are shown in table 1.

Table 1. Physical condition of athletes table

Sex	Age	Height	Weight
Male	17.90	174.45	72.36
Female	17.40	168.54	63.65

Athletes were randomly divided into two groups to ensure that the age and gender distribution of researchers in the two groups were balanced and the average detection conditions of physical health were basically the same[4]. All physiological functions were normal without obvious sports trauma. The control group and the observation group were recorded respectively. In addition, independent samples and team evaluation index data of the two groups of subjects were sampled for subsequent comparison and observation of the physical load status of the two groups of subjects.

2.2. Research methods

In theory, kinetic training is actually the consumption of athletes' physical functions. It not only strengthens physical reserve, but also accumulates sports injuries in athletes' bodies. Therefore, it is necessary to organically combine physical training with sports injury rehabilitation[5]. Therefore, according to the requirements of the experiment, physical training should be carried out for athletes three times a week, and the time of each training should be controlled at about 2 hours. The training will be conducted on Monday, Tuesday and Friday mornings, and the corresponding functional repetitive training will be carried out in each training. The training will last for 10 months[6]. During the training, dynamic strength training is adopted for physical training. Firstly, the method of unstable apparatus exercise is adopted for training. Equipment such as: ruituoball, balance ball, balance plate, elasticity, pad, strength trainer, etc., strictly abide by the labeling of all equipment training and then carry out comprehensive equipment training. Such as single, double foot standing balance ball, do all kinds of upper limbs holding light equipment lift, push, pull, squat, dry twist and other forms of learning; Sit on a Swiss ball and do various forms of exercise, etc[7].

At present, the physical training mode of many professional track and field sports teams is relatively simple.

Most of them adopt the methods of running circles, equipment training and body function training[8]. The disadvantage of this mode is that it is difficult to take into account the musculoskeletal characteristics of different athletes and the need of athletes' physical reserve in different track and field events[9]. Moreover, if this mode is adopted for a long time, athletes will generally feel boring, which will directly affect the overall effect of physical training. So we use free weights to do strength exercises on athletes. Such as the use of negative balance plate exercise: athletes stand on one, two feet on the balance plate. Various forms of exercises, such as lifting, pushing, pulling, squatting, and torsion of the torso, are carried out before the athletes' dynamic strength training, and then the athletes are tested again after the 8-week cardio strength training with mobilization[10]. The test items include speed, endurance, flexibility, agility and strength, etc. The selected test indexes are: 1) 100m run 2) 800m run 3) 3000m run 4) 4 x 10m round trip run 5) sitting position forward bend 6) cross fork; (7) back throw solid ball: 8) standing long jump 9) bench press; 10) weight squat: 11) left and right knee lift; 12) sit-ups[11]. In order to observe the movement more directly, the training content of the two groups was set under the condition that the two groups of trainees' living environment, working and rest time, food intake and other factors were completely consistent. The specific content is as follows:

Table 2. Athlete training standards

Control group			Observation group		
Training content	Group number x number of	Intergroup interval	Training content	Group number x number of	Intergroup interval
Warm-up jog	4*15	3min	Warm-up jog	4*15	3min
Joint activity	-	2min	Joint activity	-	2min
Sit-ups	3*30	2min	sit-ups	4*30	2min
Run-up to touch high	2*20	2min	Run-up to touch high	3*30	1min
Throw away	3*20	3min	Throw away	3*30	3min
Sit and reach	3*20	1min	36 m mobile	4*30	1min
Hop	3*20	1min	Jumping jacks	3*30	1min
Squat jump	3*20	1min	Multistage frog leaping	3*30	1min
Stretch	1	15min	stretch	1	15min
Lunch break	1	2h	Sit and reach	1	2h
Warm-up jog	4*15	3min	Warm-up jog	4*15	3min
Joint activity	-	2min	Joint activity	-	2min
Sit-ups	3*30	2min	sit-ups	4*30	2min
Run-up to touch high	2*20	2min	Multistage leapfrog	3*30	1min
Throw away	3*20	3min	Throw away	3*30	3min
Sit and reach	3*20	1min	36 m mobile	4*30	1min
Hop	3*20	1min	Jumping jacks	3*30	1min
Stretch	1	15min	Multistage leapfrog	3*30	1min
-	-	-	Night run	800m/1500m	4/6min
-	-	-	stretch	1	15min

2.3. Tracking and detection

According to the time arrangement and the task and goal of this experiment, determine the basic points of the physical training plan[12]. (1) strength training and tech-

nical training closely combined with the use of "less food more meals" arrangement. Keep the load of strength training of the two groups consistent, especially strictly control the intensity of strength training before class in

the experimental group, and ensure the subsequent technical and tactical training. Strength training movement design as close as possible to basketball technical action (strength training time ratio of 20%~30%).

To ensure the implementation of experimental means, the first two weeks prepare for the adaptation phase[13]. The adjustment and recovery in week 1 included the initial physical fitness test of the athletes. It mainly focuses on flexibility, flexibility and small joint strength training, and at the same time to improve the cardiopulmonary function of athletes through aerobic training. The main task is to lay the foundation for the later intensive training[14]. The main means of training include stretching exercises, exercises to improve the range of motion of joints, exercises to improve small joint ligaments and muscle strength, etc. Week 3~6 is the training stage, the main task of training is to improve the overall strength of athletes. The design of training means takes special needs into consideration first[15]. According to the specific situation of athletes, three training sessions per week adopt the force load of three natures. The first is similar to the basketball movement or structure or force charac-

teristics of similar training methods: small load intensity, explosive force. Develop athletes' whole body explosive power and waist and abdomen strength; The second type USES 60~80% intensity load to increase the muscle volume of athletes. The third is to increase the maximum strength of athletes load, load intensity of more than 80%. After the strength training, the experimental group went to the gym for 60 minutes of technical and tactical exercises. The control group was trained in the strength room after 60 minutes of technical and tactical exercises. Week 7 is the training ability maintenance stage. The main task of the training is to reduce the intensity and ensure the load.

2.4. Evaluation criteria

The statistical software SPSS10.0 was used to conduct paired tests on the physical fitness test data before and after the experiment, and it was found that the fitness (A) and fatigue (F) began to fade, and the extinction rate was related to the current fitness and fatigue. This is shown in figure 1.

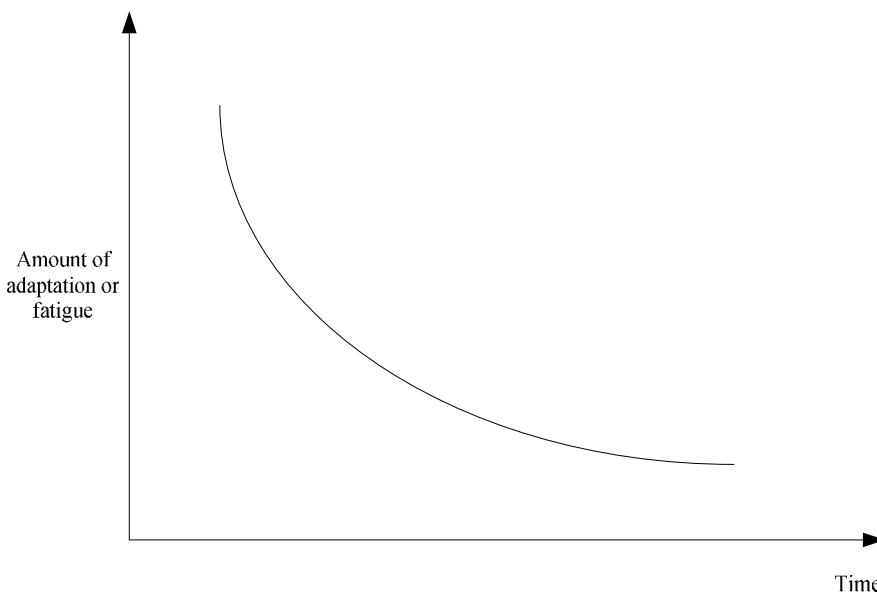


Figure 1. Training adaptation and fatigue extinction

The gain of fitness and fatigue induced by training (ka, kf is the gain coefficient), and the increase of fitness has a limit (G), that is, the difference equation of fitness state after training is:

$$P_n = A_n - F_n = A_{n-1}e^{-\tau} + k_e W_n (1 - \frac{A_{n-1}e^{-\tau}}{G}) - F_{n-1}e^{-\tau} + k_f W_n \quad (1)$$

The significance of variables in the model:, represents the training load on the n day, and represents the physical condition on the day. Respectively represent the adaptive and fatigue amounts on day n. Respectively represents

the time of adaptation and fatigue extinction caused by training and the fatigue gain coefficient. G is the limit of adaptation. According to the results, all variables are normally distributed.

3. Analysis of Experimental Results

3.1. Experimental results

After the dynamic strength training, the athletes were given the above 12 physical training, and the obtained

number was processed through SPSS10.0. The test data before and after the experiment are shown in table 2.

Table 3. Test data before and after the experiment

Project	After experiment	Before the trial	Average value	Standard deviation
100 m run (s)	14.7	15.98	15.34	0.38
800 m run (s)	160	177	169.75	5.85
3000 m run (s)	805	824	815	6.80
4 x 10 m back to run (s)	10.67	11.3	11.11	5.80
Sit and reach	47.00	59	52.50	4.78
Cross the fork	46.00	51	48.88	1.73
Back throw a solid ball	95.00	130	140.13	14.62
Standing long jump	25.00	55	37.50	9.26
Bench press	2.12	2.29	2.21	0.06
Weight-bearing squat	7.3	12.85	9.59	1.94
Ask around knee	12.3	21.6	17.01	3.41
sit-ups	4	17.00	9.31	4.61

Through eight weeks of physical training. Athletes' physical fitness has been significantly enhanced. After this period of rehabilitation training, athletes' injuries have also been somewhat recovered and improved. Some athletes have been able to participate in normal physical training. The physical fitness indexes tested before physical training are analyzed and sorted out as shown in table 2. The indicators measured after physical training are analyzed and described. Table 2 shows that the measured physical data before and after physical training are described by paired sample T test with statistical software. As can be seen from the data in the table. After the dynamic strength training, all the bodies tested by the athletes showed an improvement in q. According to the deficiency of athletes' physical ability, systematic physical training was carried out. Athletes can train in strict accordance with the physical training plan and complete the training tasks on time.

3.2. Experimental discussion

In strength training, athletes should integrate all kinds of strength training. Do not develop a single strength, otherwise it will affect the development of other strength qualities of athletes and further affect the performance of athletes. Athletes should train according to their needs for different types of strength. Comprehensive training to avoid a single training method. Through bench press, weight squat, standing long jump and sit-up, this paper reflects the different types of strength required by athletes. Bench press is the main reflection of athletes' upper body strength. The strength of upper body can determine the strength of attack and defense in actual combat. It can be found that the development of athletes' upper limb strength is relatively weak through pushing tests before and after physical training, and the overall trend of the athletes' upper limb strength is uneven, and the polarization is too large, which can significantly improve the athletes' upper limb strength after training. Weight-bearing squat is the reflection of athletes' lower limb

strength. The strength of athletes' lower limb directly determines the outcome of the competition. Through the comparison of athletes' weight squat before and after physical training, it can be found that the development of athletes' lower limb strength is relatively balanced, and the average level of athletes' lower limb strength is about 130kg. In the actual training process, the athletes can realize the importance of lower limb strength, and the coaches can reasonably arrange the training according to the actual situation of the athletes.

In sports, good endurance can control the outcome of the competition, as well as the effective implementation of taekwondo project techniques and tactics, especially after the modification of the rules of taekwondo competition, the athletes' endurance is put forward with strict requirements. An athlete's endurance can be expressed in terms of both aerobic and anaerobic capacity. The 3,000-meter and 800-meter runs tested in the program responded to both capabilities. 800m is the medium distance running group, which can reflect the anaerobic ability of the body, while 3000m is the long distance running, which requires a lot of aerobic ability of the athletes. According to the test results, it can be seen that athletes' anaerobic ability is relatively balanced, but there is still a certain gap between elite athletes. Under the existing rules of the game, the lack of oxygenated borderline ability will make the athletes appear dizzy and weak at the critical moment, and their reaction will slow down, so that they cannot normally implement the tactics arranged by the coach. Therefore, in the daily training, the anaerobic ability training of athletes should be reasonably arranged according to the actual situation of athletes.

3.3. Conclusion

Athletes in the process of exercise power through the combination of speed, stamina, agility, flexibility down, either a lack of ability to appear will be a player in the game the influencing factors, and so on to carry on the dynamic strength training should follow a comprehensive

system of training, to attach importance to everybody quality, make the athletes have a balanced development and improve, thus to ensure the training before the end of the degree of the recovery of heart rate and per unit time and training load arrangement and keep in a certain range. Through the analysis of 40 students' heart rate recovery after training and training sessions, the heart rate changes are shown in figure 2 below.

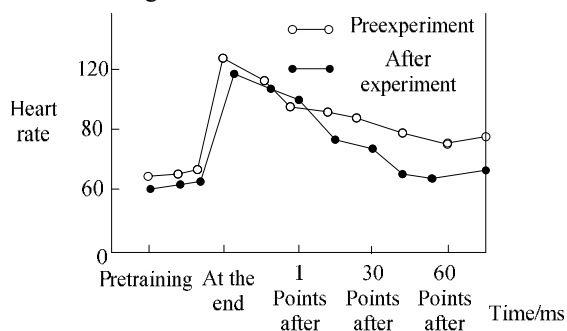


Figure 2. Heart rate changes before and after the experiment

As can be seen from the above figure, the average heart rate recovery rate before and after the experiment was 132 beats/min and 140 beats/min, respectively. After the dynamic strength training, the heart rate decreased more significantly, reaching around 65. With the extension of time, the recovery rate per unit time increased significantly. Therefore, the change of heart rate recovery rate can be judged that the dynamic strength training can significantly improve the physical state of athletes.

4. Conclusion

In order to more quickly and efficiently improve the athletes' physical fitness, the assessment skills, pay attention to the athletes need to heart rate recovery rate changes can scientific and reasonable arrangement and assess students' physical fitness, sports load in order to improve the athletes' physical qualities, thus combining power training methods have quite conform to the state to study the influence on running. The results showed that the change of heart rate recovery after dynamic strength training was significantly higher than that before training, which was helpful for the recovery of sports status. Therefore, it is proved that dynamic strength training can obviously improve the athletes' physical condition.

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