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An Empirical Study on the Effect of 12-Week Functional Training on Sprint Performance of Adolescent Track and Field Athletes

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Abstract: **Objective:** To compare the effects of 12-week functional training and traditional physical training on sprint performance of young track and field athletes. **Methods:** Twenty young track and field athletes were divided into an experimental group (10 people) and a control group (10 people). The experimental group received functional training for 60 minutes thrice a week. The control group received 60 minutes of traditional physical training three times a week. Before and after the intervention, the indexes of weight-bearing squat, weight-bearing half squat, standing long jump, standing triple jump, 30 meters, 50 meters, and 100 meters were tested. **Results:** (1) Before the intervention, there was no difference in height, weight, age, strength quality, and speed quality between the experimental group and the control group. (2) After the intervention, the strength quality and speed quality of the athletes in the experimental group and the control group have changed, and the results of the experimental group and the control group have improved compared with those before the experiment. (3) After the intervention, compared with the control group, the results of the experimental group improved significantly. **Conclusion:** After 12 weeks of intervention, the strength quality and speed quality of the subjects in the experimental group and the control group have been improved, but the functional training in the experimental group has a more significant improvement in speed quality and a better effect.

Keywords: Functional training; Track and field athletes; Sprint results; Teenagers

Preface

Sprint is one of the track and field events, For sprinters, physical training is undoubtedly the core and dominant position, effective physical training can effectively help athletes to improve their physical level, to achieve more remarkable results in high-level events [1]. Functional training is a training method to improve and enhance the action mode, optimize the body power chain, and make all parts and qualities of the body develop in an all-around way [2]. This paper takes the influence of functional training on the sprint performance of young male track and field athletes as the research object, and compares the influence of two training methods on the exceptional sprint performance through training intervention and traditional physical training methods through tests.

1. Research Object and Research Method

1.1 Subjects of Study

The research object of this paper is 20 male athletes in the track and field team of Taizhou No.1 Middle School (10 in the experimental group and 10 in the control group). The research object has a specific training foundation, and the training period is 2-3 years.

1.2 Research Methodology

1.2.1 Exercise Prescription

Exercise content and intensity:The experimental group received 60 minutes of functional training three times a week (including 10 minutes of preparation activities and 10 minutes of relaxation activities). According to the theory of functional training, based on ensuring basic training and aiming at the characteristics of middle school students, the experimental group did training programs, which not only trained students'lower limb strength, but also paid more attention to students'waist and abdomen strength and core strength training. The control group received 60 minutes of traditional physical training three times a week. The training program of the control group, according to the requirements of the syllabus, focuses on training students'lower limb strength, mainly barbells, and at the same time has some auxiliary exercises.

Exercise frequency and exercise cycle:From March to July, 2022, every Monday, Wednesday, and Friday from 5:00 pm to 6:00 pm, each exercise lasts for 60 minutes, including a warm-up exercise for 10 minutes and a relaxation exercise for 10 minutes, lasting for 12 weeks.

1.2.2 Selection of Test Indicators

Combined with the characteristics of sprint events, the test indicators of this study are selected as follows:Height, weight, age, Weight-bearing squat, weight-bearing half squat, standing long jump, standing triple jump, 30 meters, 50 meters, 100 meters

1.2.3 Equipment for the Experiment

Stopwatch, weighingscale, spongepad, balance ball, tapemeasure, suspension, barbell, etc.

1.2.4 Statistical Methods

SPSS 25.0 statistical software was used to analyze the collected data. The results were expressed by mean ± standard deviation (M ± SD), The independent sample T-test and paired sample T-test were used to analyze the indexes before and after the intervention statistically, and the significant difference was $P < 0.05$.

2. Result

2.1 Changes of Lower Limb Muscle Strength Before and after Intervention

That the comparison before and after intervention in the group shows that after intervention, the standing long jump, standing triple jump, weight-bearing barbell half squat, and weight-bearing barbell squat in the experimental group are significantly higher than those before intervention $P < 0.05$; After the intervention, standing long jump and weight-bearing barbell squat in the control group were significantly higher than those before the intervention ($P < 0.05$). It can be seen that the comparison of different time points between groups found that there was no significant difference between various indexes before intervention. Still, after the intervention, the standing triple jump in the control group was significantly higher than that in the control group ($P < 0.05$).

2.2 Changes in Speed Quality of Subjects in Two Groups Before and After Intervention

That the comparison before and after the intervention in the group shows that the scores of 50 meters and 100 meters in the experimental group after the intervention are significantly lower than those before the intervention, and there is no significant difference in each index in the control group before and after the intervention. we can see that there is no statistical significance between various indexes before and after the intervention.

3. Discussion

3.1 Effect of Functional Training on Lower Limb Muscle Strength of Young Track and Field Athletes

Muscle strength and speed quality of lower limbs have always been the training focus of young track and field athletes. Traditionally, high-intensity physical training can effectively improve the strength and speed of young track and field athletes. Still, teenagers are in a critical period of growth and development, which is not suitable for high-intensity strength training [3]. This study compares traditional physical training with functional training, and explores their influence on the lower limb strength and speed quality of athletes. The results show that functional training has the same promotion effect as traditional physical training in strength and explosive force, and can better improve the speed quality and sports performance ability of young track and field athletes[4].

The results of this study show that after 12 weeks of functional training and traditional training intervention, the standing long jump, weight-bearing barbell half squat, and weight-bearing barbell deep squat in the experimental group and the control group are all higher than those before intervention $P < 0.05$, which shows that functional training and traditional training have a good effect on improving the lower limb strength of young track and field athletes, and there is little difference between them. In this study, after 12 weeks of training, the lower limb muscle strength of young athletes increased significantly, which is similar to the results of other scholars. Yildiz S research shows that 8weeks of functional training can improve the flexibility, vertical jumping, acceleration, agility, balance, and FMS test scores of the subjects, and the effect is better than that of traditional training [5].

3.2 Effect of Functional Training on Sprint Performance of Young Track and Field Athletes

Functional training, as a training means, has significant training results in many sports [6, 7]. Core strength factor and speed factor are the fundamental indexes to evaluate the athletic quality of track and field athletes, and the speed quality and strength quality of athletes play a crucial role in athletic performance. After 12 weeks of routine physical training, the sprint scores of the athletes in the control group were tested by paired sample T-test. It can be seen that after 12 weeks of routine physical training, the scores of athletes in 30 meters, 50 meters, and 100 meters were improved, but they did not reach the statistically significant level ($P > 0.05$). This situation is mainly because the content of conventional physical training pays attention to repeated fixed exercises or emphasizes strength training in fixed links.

After 12 weeks of exercise intervention, it is found that functional training in the experimental group can significantly improve the performance of 50-meter and 100-meter sprints ($P < 0.05$). However, the performance of 30-meter running has not achieved significant progress. Subjects'50-meter and 100-meter dash performance has improved significantly, mainly because functional training is based on athletes'physical fitness test sports characteristics and athletes'own thin and falling links to choose targeted training methods to practice. Therefore, targeted functional training can effectively help athletes to establish an efficient and feasible action mode in a short time, and help athletes to better to control their own sense of balance and stability, to improve athletes physical qualities and achieve better sports results in competitions.

4. Conclusion

In this study, aiming at the physical training methods of sprinters, the functional training method is put forward Mobilization for training, and compared with traditional physical training methods, verified the superiority and scientificity of functional training in athletes'physical fitness training. After 12 weeks of intervention, it is found that both the functional physical training group and the traditional physical training group can improve the muscle strength and sprint performance of the subjects, but the intervention effect of functional training team sprint performance is better.

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