

INFLUENCE OF EXPLOSIVE STRENGTH TRAINING ON LOWER LIMBS OF BADMINTON ATHLETES

INFLUÊNCIA DO TREINAMENTO DA FORÇA EXPLOSIVA NOS MEMBROS INFERIORES DAS ATLETAS DE BADMINTON

INFLUENCIA DEL ENTRENAMIENTO DE LA FUERZA EXPLOSIVA EN LOS MIEMBROS INFERIORES DE LAS ATLETAS DE BÁDMINTON



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ABSTRACT

Introduction: In sports, most athletes are required to have great explosive power, that is, the maximum power that athletes can show in a short period. **Objective:** To analyze the influence of explosive training in lower limbs on the performance of badminton players. **Methods:** Taking the 17 existing players of the Middle School B girls' badminton team as the experimental object, the explosive power of the lower limbs of the 17 players were tested and compared before and after the experiment. **Results:** The 30m run results showed that the fastest athletes completed in 4.39s, with most of them completing in 5s. The overall test results were higher than before the experiment. **Conclusion:** After adopting the improved training method, the lower limbs of the team members improved in technical and tactical performance, raising the athletes' fitness. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Resistance Training; Racquet Sports; Lower Extremity.

RESUMO

Introdução: Nos esportes, a maioria dos atletas é obrigada a ter grande poder explosivo, ou seja, a potência máxima que os atletas conseguem mostrar em um curto espaço de tempo. **Objetivo:** Analisar a influência do treinamento explosivo em membros inferiores no desempenho das jogadoras de badminton. **Métodos:** Tomando como objeto experimental as 17 jogadoras existentes da equipe de badminton feminina da Escola Média B, o poder explosivo dos membros inferiores das 17 jogadoras foi testado e comparado antes e depois do experimento. **Resultados:** Os resultados de 30m de corrida mostraram que as atletas mais rápidas completaram em 4,39s, sendo que a maioria delas completou em 5s. Os resultados gerais do teste foram mais elevados do que os anteriores ao experimento. **Conclusão:** Após adotar o método de treinamento aperfeiçoado, os membros inferiores das integrantes da equipe melhoraram no desempenho técnico e tático, elevando a aptidão física das atletas. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Treinamento de Força; Esportes de Raquete; Extremidade Inferior.

RESUMEN

Introducción: En el deporte, a la mayoría de los atletas se les exige una gran potencia explosiva, es decir, la máxima potencia que los atletas pueden mostrar en un corto período de tiempo. **Objetivo:** Analizar la influencia del entrenamiento explosivo en miembros inferiores en el rendimiento de los jugadores de bádminton. **Métodos:** Tomando como objeto experimental a las 17 jugadoras existentes del equipo de bádminton femenino de la Escuela Media B, se comprobó la potencia explosiva de los miembros inferiores de las 17 jugadoras y se comparó antes y después del experimento. **Resultados:** Los resultados de la carrera de 30 metros mostraron que los atletas más rápidos completaron en 4,39s, y la mayoría de ellos en 5s. Los resultados generales de las pruebas fueron más altos que antes del experimento. **Conclusión:** Tras adoptar el método de entrenamiento mejorado, los miembros inferiores de los atletas mejoraron su rendimiento técnico y tático, aumentando su aptitud física. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descritores: Entrenamiento de Fuerza; Deportes de Raqueta; Extremidad Inferior.



INTRODUCTION

The so-called enhanced training is a way to strengthen muscle strength through explosive actions. Explosive force is the integration of speed and strength. This kind of method has been used in various events, mainly including: speeding up the running speed and improving the height of vertical jump in the process of sprint, the rapid throwing level of baseball pitcher and the speed of boxer's punch, etc. The so-called enhanced training is the exercise performance in the form of lengthening shortening cycle, mainly including high-intensity centrifugal contraction, followed by rapid and powerful centripetal contraction.¹ Centripetal contraction with centrifugal contraction can significantly increase the force of formation. Lower limb muscles are stretched during centrifugal contraction, and some energy exists in the elastic components of muscles. This effect requires the conversion time between centrifugation and centripetal contraction.² In response to this study, Dai Feng, Y. U. and others intervened in the special strength practice of 18 young volleyball players. Among them, 9 players used the special strength practice method, while other players increased the deep jump practice. After 12 weeks, there was a significant difference between the two groups in the indicators that can reflect the jumping force, such as in-situ vertical jump, pad step vertical jump and touching the height of both hands. The author believes that the deep jump practice method can further improve the explosive strength of players' legs.³ Hung, C. L. and others Studied the obvious effect of reinforcement exercise from the change of muscle.⁴ The stored force can make the later contraction stronger. The stored force can be related to increasing the proportion of transverse bridge of actin in muscle fibers and reducing the separation rate of transverse bridge. This process is called lengthening shortening cycle, which also shows the system of enhanced training. In addition to the elastic retraction force of tendon, it also contains components of nervous system.^{5,6}

METHOD

Selection of research objects

Subjects: This study takes 17 players of the women's badminton team in B middle school as the experimental objects.

Research methods

Experimental purpose: through the construction of the enhanced training system of the lower limb explosive power of female badminton players in Middle School B and the establishment of specific enhanced training methods, means and load, we can improve the players' technical and tactical performance on the basis of improving the athletes' lower limb explosive power.

Tests before and after the experiment: before and after the experiment, the lower limb explosive power of 17 existing players of the women's badminton team in B middle school was tested.

Experimental hypothesis: by using the enhanced training method to construct the lower limb training system of the women's badminton team in Middle School B and the establishment of specific enhanced training methods, means and load, the players can improve their technical performance on the basis of improving their physical fitness after using the enhanced training methods.

Subjects: This study takes 17 players of the women's badminton team in B middle school as the experimental objects.

Experimental arrangement: this experiment is an empirical study on the lower limb explosive power of women's badminton team in Wuhan Jiefang middle school by using the enhanced training method. This experiment adopts the comparative experimental method of data comparison before and after the experiment. In order to minimize external

interference factors and control variables, this experiment adopts a unified training venue, the same training coach and the same test equipment. During the training, the work and rest life of team members is strictly controlled. The test contents and test instruments are consistent before and after the training.

Training arrangement: participate in strength training twice a week (Tuesday and Friday). 16:00-19:00 p.m. is the training time every day, of which the enhancement training is 60min to 90min.

Starting from the main purpose of this study, the data obtained before and after the experiment were input by computer, and the data were processed and analyzed by SPSS software and Excel software.⁷ The main choice is to describe and analyze the mean, standard deviation, maximum value and minimum value of the data before and after the experiment, and conduct the paired sample t-test for the data before and after the experiment to analyze the changes and differences of various indexes before and after the experiment. If the p value is less than 0.01, there is significant difference within the group, if the p value is less than 0.05, there is difference within the group, and if the p value is greater than 0.05, there is no difference within the group. Relevant data shall be saved to provide data support for paper writing.

There is no need for a code of ethics for this type of study.

RESULTS

Diagnosis and analysis of lower limb explosive power of women's badminton team players in Wuhan Jiefang middle school

The test data of athletes before the experiment are shown in Table 1 and Figure 1.

Before the experiment, the test indexes of athletes are tested, and the test results are collected and sorted. Through the description and analysis in the analysis options of SPSS software, the analysis results are as follows:

Before the experiment, 17 athletes were tested for standing long jump. The same coach did the action requirements and explanation demonstration. The team members were tested for three times, with an

Table 1. Statistical list of various test data of athletes before the experiment.

Test item	Mean value	Standard deviation	Least value	Crest value
Standing long jump (cm)	217.77	16.911	1 81	236
Half-squat vertical jump for high height (cm)	258.28	5.372	248	268
Jump height (cm)	266.89	5.545	256	277
30m Sprint result (s)	5.0825	0.276	4.56	5.54
3 / 4 Field sprint run results	3. 9954	0.428	3.52	4.74
High-height with one foot (cm)	283.19	14.918	265	312
15m * 3 Return run (s)	7. 6666	0.4307	6.87	8.53

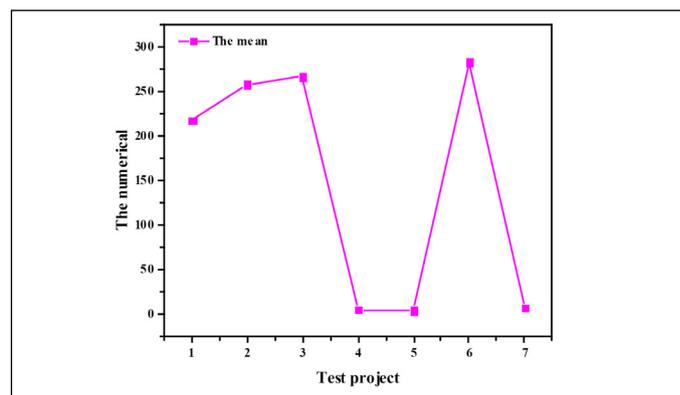


Figure 1. Mean value of each test data of the athletes before the experiment.

interval between them, and the best results were obtained for three times. According to the analysis of the above table, the first 17 athletes jumped 180cm recently and 235cm furthest, with an average value of 217.6cm. It can be seen that the gap is obvious within the 17 athletes group.

In badminton, most of the movements are completed in the movement. Layup shooting is an essential quality of badminton players. It also needs good lower limb explosive power for physical support to help the athletes complete technical movements. Before the experiment, the 17 high school female badminton players were tested for run-up, one foot take-off and touch height. During the test, the team members have a good understanding of the test action and can complete the test according to the specified test action requirements.⁸ In general, after testing and understanding the basic situation of the athletes, including age, height and weight, a diagnosis of explosive power before the experiment was made for the 17 high school female badminton athletes. The diagnosis was carried out from seven aspects: standing long jump test; Semi squat vertical jump touch height test; Squat vertical jump touch height test; 30m sprint test; Field Sprint (3 / 4 field) test; Run up single foot take-off touch height test; 15m * 3 turn back run test. Strive to have a more comprehensive understanding of the lower limb explosive power of the 17 high school female badminton players, so as to provide pre experimental data support for the follow-up enhanced training.⁹

Feedback and evaluation of enhanced training effect of women's badminton team in Wuhan Jiefang middle school

The test data of athletes after the experiment are shown in Table 2 and Figure 2.

After the experiment, the test indexes of athletes are tested, and the test results are collected and sorted. Through the description and analysis in the analysis options of SPSS software, the analysis results are as follows:

After 16 weeks of intensive training, the 17 high school female badminton players were tested every two days. According to the test results of standing long jump after the experiment, the farthest jump of athletes is 237cm, with an average of 222.76cm, which is higher than the data before the experiment. In the process of enhanced training, athletes do not know about enhanced training at the beginning of training, and their understanding is not in place. Under the active guidance and action demonstration of coaches, athletes are required to complete relevant training contents with quality and quantity. Through the interview with athletes, it is also known that the acceptance of enhanced training has been greatly improved and changed. After 16 weeks of intensive training, the athletes' touch high performance has changed significantly. According to the test results of semi squat vertical jump touch height after the experiment, the highest touch height is 272cm, and the average is more than 261cm. According to the observation and interview of athletes during the experiment, athletes can complete the process of enhanced training from previous maladjustment to later understanding according to the requirements of action. They also see a little change in

Table 2. Statistical list of various test data of athletes after the experiment.

Test item	Mean value	Standard deviation	Least value	Crest value
Standing long jump (cm)	222.77	15.807	183	238
Half-squat vertical jump for high height (cm)	261.42	5.234	253	273
Jump height (cm)	269.19	4.928	258	279
30m Sprint result (s)	4.9666	0.246	4.38	5.32
3 / 4 Field sprint run results	3.9348	0.426	3.47	4.64
High-height with one foot (cm)	286.28	15.669	267	314
15m * 3 Return run (s)	7.5713	0.426	6.87	8.53

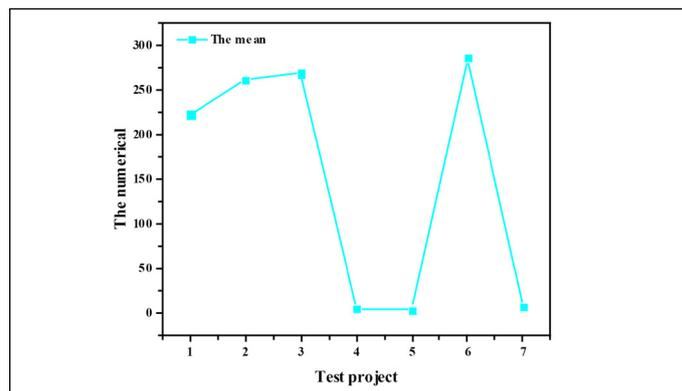


Figure 2. Mean value of each test data of the athletes after the experiment.

their physical quality. Compared with the traditional training methods, when the enhanced training is carried out in the experimental process, the athletes' emotion reflects no disgust and joy.¹⁰

CONCLUSION

This paper puts forward the influence of lower limb enhanced training on the lower limb explosive power of badminton players. According to the analysis of the results of 7 events after the experiment of 17 high school female badminton players, except that the test data of 15m * 3 turn back run has not changed significantly compared with that before the experiment, the other test data have been improved to a certain extent. Considering the limited experimental conditions and time, the experimental results verify the previous experimental assumptions to a great extent. Through the training detection, tracking and interview of athletes, we also know that athletes have their own reasonable understanding and understanding of enhanced training from the previous vague concept of enhanced training and even do not know what enhanced training is to the scientific evaluation of the training effect after the end of the experiment, which is also a major harvest of this study.

The author declare no potential conflict of interest related to this article

AUTHORS' CONTRIBUTIONS: The author made significant contributions to this manuscript. BX: writing; data analysis; article review and intellectual concept of the article.

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