

TRAINING BY THE PROGRESSIVE LIFTING OF LOAD IN YOUNG SOCCER PLAYERS

TREINAMENTO POR ELEVAÇÃO PROGRESSIVA DE CARGA EM JOVENS JOGADORES DE FUTEBOL

ENTRENAMIENTO MEDIANTE ELEVACIÓN PROGRESIVA DE CARGA EN JÓVENES FUTBOLISTAS



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ABSTRACT

Introduction: Among the main characteristics of soccer are a long-time of competition and its intensity; its athletes quickly alternate between attack and defense, executing distinct intensities of exercise and manding a high level of physical conditioning. **Objective:** Verify the impacts of training with progressive load elevation on young soccer athletes. **Methods:** Fifty students from the soccer special class 2019 of the School of Physical Education were selected as volunteers for the experiment. They were randomly divided into the experimental and control group. The experimental group received a physical training program with progressive load lifting, while the control group received a conventional training program. The experiment lasted 45 minutes daily, three times a week for ten weeks. The fitness index was checked before and after the experiment, and the data were statistically analyzed to verify the influence of the special progressive load lifting training on the physical training of young soccer players and the feasibility of its application in physical training. **Results:** The index scores of the vertical jump and 30m fast run tests were slightly higher than those of the control group ($P>0.05$). The mean scores of the experimental and control groups were 15.02 and 15.56, and the standard deviations were 1.07 and 0.93, respectively. **Conclusion:** The experiment's performance in tests of speed, strength, agility, and endurance showed improvements in varying degrees. Among them, the indicators of endurance and sensitivity showed significant differences, indicating that physical training by progressive load elevation can effectively promote the development of endurance and agility in young soccer players. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Soccer; Physical Endurance; Physical Education and Training.

RESUMO

Introdução: Entre as características principais do futebol estão o longo tempo de competição e a sua intensidade, seus atletas alternam entre ataque e defesa rapidamente, executando distintas intensidades de exercício, exigindo um elevado nível de condicionamento físico. **Objetivo:** Verificar os impactos do treinamento com elevação progressiva de carga nos jovens atletas de futebol. **Métodos:** Foram selecionados 50 alunos da turma especial de futebol 2019 da Escola de Educação Física como voluntários para o experimento. Eles foram divididos aleatoriamente em grupo experimental e controle. O grupo experimental recebeu um programa de treinamento físico com elevação progressiva de carga enquanto o grupo controle recebeu um programa de treinamento convencional. O experimento durou 45 minutos diários, três vezes por semana, durante 10 semanas. O índice de aptidão física foi verificado antes e após o experimento, os dados foram analisados estatisticamente para verificar a influência do treinamento especial de elevação progressiva de carga no treinamento físico dos jovens jogadores de futebol e a viabilidade da sua aplicação no treinamento físico. **Resultados:** Os escores dos índices dos testes de salto vertical e corrida rápida de 30m foram ligeiramente superiores aos do grupo controle ($P>0,05$). As pontuações médias do grupo experimental e do grupo controle foram 15,02 e 15,56, e os desvios padrão foram 1,07 e 0,93, respectivamente. **Conclusão:** O desempenho do experimento em testes de velocidade, força, agilidade e resistência evidenciaram melhoras em graus variados, entre eles, os indicadores de resistência e sensibilidade mostraram diferenças significativas, indicando que o treinamento físico por elevação progressiva de carga pode efetivamente promover o desenvolvimento de resistência e agilidade em jovens jogadores de futebol. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Futebol; Resistência Física; Educação Física e Treinamento.

RESUMEN

Introducción: Entre las principales características del fútbol están el largo tiempo de competición y su intensidad, sus atletas alternan entre el ataque y la defensa rápidamente, ejecutando distintas intensidades de ejercicio, exigiendo un alto nivel de acondicionamiento físico. **Objetivo:** Verificar los impactos del entrenamiento con elevación progresiva de carga en jóvenes atletas de fútbol. **Métodos:** Cincuenta estudiantes de la clase especial de fútbol 2019 de la Escuela de Educación Física fueron seleccionados como voluntarios para el experimento. Se dividieron aleatoriamente en grupo experimental y grupo de control. El grupo experimental recibió un programa de entrenamiento físico con elevación progresiva de cargas, mientras que el grupo de control recibió un programa de entrenamiento convencional. El experimento duró 45 minutos diarios, tres veces por semana, durante 10 semanas. Se comprobó el índice de aptitud física antes y después del experimento, y los datos se analizaron estadísticamente para verificar la influencia



del entrenamiento especial de levantamiento de cargas progresivas en la formación física de los jóvenes futbolistas y la viabilidad de su aplicación en el entrenamiento físico. Resultados: Las puntuaciones del índice de las pruebas de salto vertical y de carrera rápida de 30 metros fueron ligeramente superiores a las del grupo de control ($P > 0,05$). Las puntuaciones medias del grupo experimental y del grupo de control fueron de 15,02 y 15,56, y las desviaciones estándar de 1,07 y 0,93, respectivamente. Conclusión: El rendimiento del experimento en las pruebas de velocidad, fuerza, agilidad y resistencia mostró mejoras en diversos grados, entre ellos, los indicadores de resistencia y sensibilidad mostraron diferencias significativas, lo que indica que el entrenamiento físico mediante la elevación progresiva de carga puede promover eficazmente el desarrollo de la resistencia y la agilidad en los jóvenes futbolistas. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptores: Fútbol; Resistencia Física; Educación y Entrenamiento Físico.

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INTRODUCTION

The perfect completion of many technical movements requires young football players to have plenty of physical fitness, almost any sports are built on the basis of abundant physical fitness. The characteristics of football are that it takes a long time and the competition is fierce, athletes need to be able to switch offense and defense quickly, and young football players need to master a variety of technical movements to complete at different distances, and young football players have different sports forms, different exercise forms require different exercise intensity, different exercise time and different interval time.¹ In this case, not only technical movements need to be mastered in football games, but physical fitness level also plays a crucial role. Therefore, in football training, physical training is one of the most commonly used training items. With the increasing development of campus football, in order to improve the football level of students more efficiently, it is very necessary for students to save time in football or competitions and to improve the efficiency of football levels, it is very necessary to carry out comprehensive physical training.²

METHOD

Research object

There are 50 students in the 2019 football special class of the Physical Education College, all of whom are boys, the experiment was guided and cooperated by the teachers of the special class. The details of the athletes are shown in Table 1.

Research methods

Mathematical statistics

After summarizing, sorting and reviewing the various original data obtained from the experimental results, Excel and SPSS software were used for statistical processing and data analysis. In the early stage of the experiment, the experimental group and the control group were tested and data analyzed, and the data was analyzed according to statistical principles, the main mathematical analysis method used was the paired sample t test, statistical analysis was performed on the physical fitness-related index data of the two groups of players before and after the experiment.³

Table 1. Basic information of athletes.

Group	Number of people	Age	Height (Centimeter)	Professional training years (years)	Weight (Kilogram)
Test group	25	17.40±1.35	174.50±5.10	4.70±2.00	67.40±7.33
Control group	25	17.75±0.89	178.25±6.32	3.37±2.45	69.00±10.39
Total	50	17.55±1.15	176.17±5.82	4.11±2.25	68.11±8.58

Logical analysis method

Use the method of logical analysis to carry out logical analysis on the obtained data, find out the influence of special energy supply training on the physical training of young football players, and the feasibility of application in physical training, retain the useful data for this study, and eliminate the invalid data.⁴

Experimental method

Fifty athletes from the 2019 football special class of the Physical Education Institute were randomly divided into 2 groups, one group of 12 people was used as the experimental group, and the other group of 12 people was used as the control group, and then the group experiment was carried out. The experimental group was given a preloaded physical training program, while the control group was given a conventional physical training program of the coaching group.

The training content of the experimental group was mainly divided into 4 stages and a 10-week period of 45-minute half-time physical training of a simulated football match. Train three times a week, Monday, Wednesday and Friday. The duration of the first-stage experiment was 3 weeks, the second and third stages were 2 weeks, and the fourth stage was 4 weeks. Because the first stage is the beginning of the experiment, in order to make the athletes adapt to the training program, the experiment time is longer. In order to achieve the effect of excessive recovery at the end of training, the training load in the fourth stage is increased, so the time is also 3 weeks.⁵ The experimental program of the experimental group included 30-meter sprint training for developing speed, 50×10 continuous sprinting training for developing speed endurance, 1000-meter running training for developing aerobic endurance, 2v2 small field (15×10m) confrontation, 3v3 small field (15×20m) confrontation, 4v4 (15×25m) small field confrontation and core strength training, etc., at the same time, a 7v7 over-competition training is arranged once a week, that is, each quarter of 10, 15, 20, 25 minutes of competition, for 2-4 quarters. The above scheme runs through the four-stage experimental process, and the training intensity is continuously increased. During the experiment, subjects were subjected to follow-up tests and regular tests of physical fitness and skill indicators.⁶

Ethical Compliance

Research experiments conducted in this article with animals or humans were approved by the Ethical Committee and responsible authorities of Wuhan Sports University, Guangxi Normal University and Guangxi Normal University for Nationalities following all guidelines, regulations, legal, and ethical standards as required for humans or animals.

RESULTS

As can be seen from the data in Table 2, the experimental group was slightly lower than the control group in the 30m fast running and Illinois sensitivity test, and the experimental group was slightly better than the

Table 2. Comparison of the performance of each physical fitness index between the experimental group and the control group before the experiment (n=25).

index	test group (n=25)		control group (n=25)		t	p
	x	S	x	S		
Vertical jump in place (cm)	64.23	1.79	63.80	1.81	0.57	0.59
30m fast run (seconds)	3.46	0.09	3.42	0.10	1.236	0.24
12 minute run (meters)	2965	6.54	2963	4.24	1.96	0.08
Illinois Sensitivity (sec)	16.14	1.15	15.61	0.94	1.14	0.28

control group in the two performances of vertical jump and 12-minute running, there were no significant differences between groups.

As can be seen from the data in Table 3, after 10 weeks of training, among the four performances of the experimental group, the test index scores of vertical jump and 30m fast running were slightly higher than those of the control group. Among them, the 30-meter fast running results of the experimental group and the control group were 3.23 and 3.38, respectively, and the standard deviations were 0.13 and 0.12, respectively, when $t=-3.59$, $p=0.45 > 0.05$, there was no significant difference. The average scores of in-situ vertical jumps were 64.71 and 63.41, respectively, and the standard deviations were 1.63 and 1.74. When $t=0.49$, $P=0.63 > 0.05$, there is no significant difference between the two groups. The average scores of the experimental group and the control group were 15.02 and 15.56, and the standard deviations were 1.07 and 0.93, respectively. When the t was -2.42, the p was $0.006 < 0.05$, and there was a significant difference. The average score of the experimental group in the 12-minute running was 3112, while that of the control group was 2976, with standard deviations of 5.94 and 5.83, respectively.⁷

The data in Figure 1 shows that after 10 weeks of teaching training and preloading physical training, the performance of both groups improved, in contrast, the 30-meter fast running performance of the experimental group increased by 0.23 seconds on average, the average score in the control group improved by 0.04 seconds. The improvement of the Illinois sensitivity test experimental group was significantly higher than that of the control group, and the average improvement of the experimental group was 2.12 seconds, this is quite significant compared to 0.006 seconds in the control group. In situ vertical jumping scores, the two groups have basically the same improvement range, and there is no significant difference between the two groups. The 12-minute running performance of the experimental group increased by 145 meters, while the performance of the control group was only increased by 13 meters, and the experimental group improved significantly. After the experiment, the endurance and sensitivity indicators of the experimental group were significantly improved, it can be seen that the special energy supply training is feasible to improve the endurance and sensitivity of young football players.⁸

DISCUSSION

In this study, the physical training of athletes is combined with skill training, and the method of driving physical training with skill training and training with competition is a tentative change. In small field football training, the maximum load of the players is repeatedly impacted, the maximum speed of the impact, this is the idea of training the speed ability of athletes. It combines the requirements of football that athletes have the ability to respond quickly and start quickly, so that athletes can quickly respond to changes in the situation on the field during the game, at the same time, this training requires athletes to have a strong tactical comprehension ability, and has higher requirements for the ability of athletes to quickly play the ball and handle the ball quickly, with this ability, it is

Table 3. Comparison of physical fitness indexes between the experimental group and the control group after the experiment (n=25).

Index	Test group (n=25)		Control group (n=25)		T	P
	X	S	X	S		
Vertical jump in place (cm)	64.71	1.63	63.41	1.74	0.49	0.63
30m fast run (seconds)	3.23	0.13	3.38	0.12	-3.59	0.045
12 minute run (meters)	3112	5.94	2976	5.83	0.35	0.013
Illinois sensitivity (sec)	15.02	1.07	15.56	0.93	-2.42	0.006

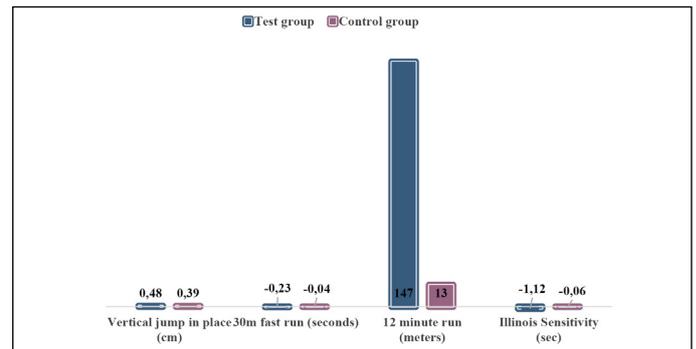


Figure 1. Comparison of the changes in the performance of various physical fitness indicators between the experimental group and the control group before and after the experiment (n=25).

ensured that the technical and tactical training and physical training of the entire team are well completed.⁹ In the process of repeated impact, the speed endurance of athletes has been better trained, research has proved that young football players need better speed endurance and the ability to repeatedly run fast with high intensity, in the experiment, the athletes are required to fully attack and fully defend, and devote themselves to the attack and defense, which can better train the athletes' speed and endurance ability, and develop the athletes' ability to supply mixed oxygen. Athlete's aerobic capacity is the basis for ensuring long-term exercise. In this experiment, athletes through long-term continuous impact, the aerobic capacity has been improved, ensuring its offensive and defensive capabilities in fatigued situations, thereby avoiding the increase in errors due to physical decline in the later stages of the game.¹⁰

CONCLUSION

After 10 weeks of pre-loaded physical training experiments, the experimental group's performance in speed, strength, agility, and endurance tests all improved to varying degrees, among them, the endurance and sensitivity indicators showed significant differences, indicating that preload physical training can effectively promote the development of endurance and agility of young football players. Regardless of the experimental group or the control group, the speed, strength and endurance performance after the experiment were improved compared with those before the experiment, the improvement of each performance in the experimental group was higher than that in the control group, but not all of them were significantly improved. Therefore, compared with general physical training, short-term special energy-supply training has no obvious advantages in developing the strength and speed of young football players. Since this experiment proves that preload physical training can improve athletes' physical fitness and skills, in the physical training of other sports, preload physical fitness can be implemented with reference to this experiment.

All authors declare no potential conflict of interest related to this article

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