

SOCCER PLAYER'S PHYSICAL TRAINING FOR PHYSICAL FUNCTION IMPROVEMENT



ORIGINAL ARTICLE
ARTIGO ORIGINAL
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APLICAÇÃO DO TREINAMENTO FÍSICO DOS JOGADORES DE FUTEBOL NA MELHORIA DA FUNÇÃO FÍSICA

APLICACIÓN DEL ENTRENAMIENTO FÍSICO DE LOS FUTBOLISTAS EN LA MEJORA DE LA FUNCIÓN FÍSICA

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ABSTRACT

Introduction: Soccer is an intensely competitive sport. With its development and elevation in techniques, athletes' higher demands for physical fitness, strategy, and tactics are presented. An excellent physical training protocol is essential to achieve these goals. **Objective:** To study how soccer players can improve their physical function in physical training. **Methods:** Soccer players from a school were selected as research subjects. Physical training interventions and follow-up tests were performed on soccer players during training. Physical training included a physical function test and a body composition test. Finally, SPSS 16.0 software was used for statistical analysis of the obtained data. **Results:** The mean hemoglobin and red blood cell concentration mean values in the athletes' final test increased slightly compared to the first test; the difference was insignificant ($P > 0.05$). However, the hematocrit index improved significantly ($P < 0.01$). **Conclusion:** Physical training can reduce the body fat content in the physical function of soccer players and reduce the weight of soccer players. This physical training mode can be used as a reference standard for the physical training of other high-level soccer teams.

Evidence Level II; Therapeutic Studies - Investigating the result.

Keywords: Soccer; Physical Fitness; Endurance Training.

RESUMO

Introdução: O futebol é um esporte intensamente competitivo. Com o seu desenvolvimento e elevação no nível das técnicas, são apresentadas exigências mais altas para a aptidão física, estratégia e tática dos atletas. Um bom protocolo de treinamento físico é essencial para atingir essas metas. **Objetivo:** Estudar como os jogadores de futebol podem melhorar sua função física no treinamento físico. **Métodos:** Os jogadores de futebol de uma escola foram selecionados como objetos de pesquisa. Intervenções de treinamento físico e testes de acompanhamento foram feitos em jogadores de futebol durante o treinamento. O treinamento físico incluiu um teste de função física e um teste de composição corporal. Finalmente, o software SPSS 16.0 foi usado para análise estatística dos dados obtidos. **Resultados:** Os valores médios de concentração de hemoglobina e células vermelhas sanguíneas no teste final dos atletas aumentaram ligeiramente em comparação com o primeiro, a diferença não foi significativa ($P > 0,05$). Entretanto, o índice do hematócrito melhorou significativamente com efeito significativo ($P < 0,01$). **Conclusão:** O treinamento físico pode reduzir o conteúdo de gordura corporal na função física dos jogadores de futebol e reduzir o peso dos jogadores de futebol. Esse modo de treinamento físico pode ser usado como um padrão de referência para o treinamento físico de outras equipes de futebol de alto nível.

Nível de evidência II; Estudos Terapêuticos - Investigação de Resultados.

Descritores: Futebol; Aptidão Física; Treino Aeróbico.

RESUMEN

Introducción: El fútbol es un deporte intensamente competitivo. Con su desarrollo y elevación en el nivel de las técnicas, se presentan mayores exigencias para la aptitud física, la estrategia y la táctica de los atletas. Un buen protocolo de entrenamiento físico es esencial para alcanzar estos objetivos. **Objetivo:** Estudiar cómo los jugadores de fútbol pueden mejorar su función física en el entrenamiento físico. **Métodos:** Se seleccionaron jugadores de fútbol de una escuela como sujetos de la investigación. Se realizaron intervenciones de entrenamiento físico y pruebas de seguimiento a los jugadores de fútbol durante el entrenamiento. El entrenamiento físico incluyó una prueba de función física y una prueba de composición corporal. Finalmente, se utilizó el software SPSS 16.0 para el análisis estadístico de los datos obtenidos. **Resultados:** Los valores medios de concentración de hemoglobina y glóbulos rojos en la prueba final de los atletas aumentaron ligeramente en comparación con la primera prueba, la diferencia no fue significativa ($P > 0,05$). Sin embargo, el índice de hematocrito mejoró significativamente con un efecto importante ($P < 0,01$). **Conclusión:** El entrenamiento físico puede reducir el contenido de grasa corporal en la función física de los futbolistas y reducir el peso de los mismos. Este modo de entrenamiento físico puede utilizarse como norma de referencia para el entrenamiento físico de otros equipos de fútbol de alto nivel. **Nivel de evidencia II; Estudios terapéuticos - Investigación de resultados.**

Descriptor: Fútbol; Aptitud Física; Entrenamiento Aeróbico.



INTRODUCTION

Football is a fierce confrontational sport, with the development of sports and the improvement of the level of football, higher requirements are put forward for athletes' physical fitness and strategy and tactics. Under fast and fierce confrontation conditions, how to accurately use technology to win the game is the goal of football, athletes should strengthen their physical training at ordinary times, maintain a stable physical strength, give full play to your value on the field, in order to win honor for the collective.¹ Football players should pay attention to the recovery of sports fatigue during physical training, according to the characteristics of football, the mechanism of fatigue should be analyzed, looking for measures to recover physical fitness, provide necessary reference for football teaching and training.² Based on this, the proposed use of South Korea's BioSpace company Inbody3.0 body composition tester to test body composition separately; Use Beckman Coulter's GEN.S blood cell analyzer and other instruments to test body functions before and after training. Physical training can reduce the body fat content of football players, but the impact on muscle circumference is related to the training form and load.³

METHOD

Research objects

A male youth athlete on the football team of a sports school in a city.

Research methods

1. Basic information of test object

50 test team members, average age (24.73 ± 2.66) years old, the average height is (200.63 ± 8.38) cm, and the average weight is (103.53 ± 13.37) kg.

2. Test arrangement and test method

1. Test location: Training base.

2. Test time: The body composition test is carried out in 2 times, and the first test is carried out in the morning, as a base value; The second test was carried out on the morning of the last day. The physical function test is divided into 3 times, and the first test in the morning is the basic value; The second test was conducted on the morning of the 11th day; The third test was conducted on the morning of the last day.⁴

3. Test method: The physical function test is about 7 o'clock in the morning, athletes take blood from their fingers on an empty stomach; the body composition test is also at around 7 in the morning, the athlete takes an empty stomach, removes socks, step on the sensing area of the body composition tester with both feet, grasp the handle of the tester with both hands, wait for the tester to complete the analysis.

Data Statistics and Processing

Use SPSS16.0 software to carry on statistics and analysis to the obtained data. The two-sample variance T test is used for the changes of various indicators before and after training; All parameters are expressed as mean \pm standard deviation ($\bar{x} \pm s$), among them, the test of body shape index adopts the comparison before and after training, the physical function index test uses the second and third stages to compare with the first stage, the significance level (*) is $P < 0.05$, the very significant level (**) is $P < 0.01$, and the insignificant level is $P > 0.05$.

RESULTS

Physical training plan and load arrangement

This training is divided into 3 stages, among which the first stage is the adaptation stage, make the team members adapt to the environment and prepare for the later physical training. The physical training load in the first 3 days is low, the training content mainly

focuses on shoulder, knee, and ankle joint maintenance exercises and core stability, core dynamics, and low-intensity aerobic endurance training on the mat; The first formal strength training class after the start of the 4th day, the load intensity and amount have been improved.⁵ The second stage is the improvement stage, and 3 formal physical training sessions are arranged, the goal of physical fitness training is to improve the team members' specific physical fitness, at this stage, the intensity and amount of training load gradually increase, and the interval between sprint runs is shortened, the strength training intensity and the training intensity of the combined ball increase, speed up the completion rate. The third stage is the breakthrough stage, where physical training and special events are more closely integrated.⁶

In this study, in the definition of load intensity and load, the maximum value of the main load indicators (bench press, squat, high pull) in the last 2 weeks is used as the standard to determine the load intensity; The total weight of the main load indicators is used to determine the load. The high load schedule is reflected by the percentage of each index in the daily maximum load and total weight during the training period, the relationship between load intensity and load. (Figure 1)

Changes in physical function indexes of physical training athletes at various stages

The changes of physical function indexes of football players at each stage of training are shown in Table 1, among them, the indicators HB, RBC and HCT that reflect the oxygen carrying capacity have undergone significant changes after training ($P < 0.01$), there was a gradual increase in the three tests, compared with before training, after training, the three indicators increased by 5.3%, 6% and 7.5% respectively; the BUN and CK indicators reflecting the load intensity changed significantly on the 11th day of training ($P < 0.01$), increased by 19.3% and 58.8% respectively, but in the next 10 days, the two showed a downward trend, by the 21st day, the average value of

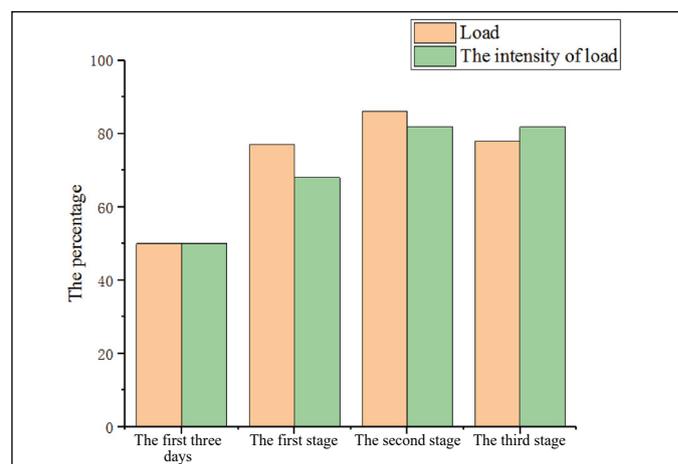


Figure 1. Relationship between Altitude Training Load and Intensity Changes in Week 13.

Table 1. Changes in physical function indexes of physical training athletes.

index	Day 2	Day 11	Day 21
HB	148.32 \pm 7.31	154.64 \pm 6.79	16.38 \pm 6.86
RBC	4.57 \pm 0.30	5.09 \pm 0.27	5.27 \pm 0.27
HCT	45.47 \pm 2.38	47.02 \pm 2.17	48.89 \pm 2.18
BUK	6.05 \pm 1.16	7.22 \pm 1.26	5.78 \pm 0.87
CK	382.70 \pm 182.22	576.12 \pm 208.89	200.88 \pm 112.29
T	496.14 \pm 186.81	558.19 \pm 140.18	698.70 \pm 115.62
C	16.73 \pm 2.85	14.64 \pm 2.62	14.78 \pm 1.20
T/C	43.76 \pm 12.41	46.22 \pm 16.10	48.35 \pm 12.99

the two is lower than the pre-training level; The average value of testosterone (T), an indicator of the body's anabolic ability, dropped slightly on the 11th day of training, but in the next 10 days it showed a sharp upward trend, the test value on the 21st day increased by 11.9% compared with the second day ($P < 0.05$); Similar to the testosterone index, the average value of cortisol (C), which reflects the body's catabolism, also shows a trend of first decreasing and then increasing, it also dropped on the 11th day, and then returned to the level on the 2nd day after 10 days; The T/C ratio showed a gradual increase trend throughout the training phase, but there was no significant change ($P > 0.05$).⁷

Changes in physical fitness indicators of athletes in various stages of physical training

The changes of football players' body shape indicators before and after training are shown in Figure 2 and 3, the total water content and protein content of the athlete's body increased slightly after training, but the change was not significant ($P > 0.05$); The average weight of athletes decreased slightly ($P > 0.05$), and the content of skeletal muscle increased ($P > 0.05$), the fat content decreased by 16.2% after training, the difference was significant ($P < 0.05$); The change in body fat percentage also reached significant ($P < 0.05$), reduced by 15.9%; athletes' basal metabolic rate has increased, but there is no significant difference ($P > 0.05$).⁸ In terms of muscle circumference, athletes' chest circumference, hip circumference, waist circumference, right arm and right leg circumferences all tend to decrease after training, but the difference was not significant ($P > 0.05$), only the change in waist-to-hip ratio reached significant ($P < 0.05$), which was 2.4% lower than before.

DISCUSSION

In this study, the average values of HB and RBC of the athletes in the second test only increased slightly compared with the first test, the difference is not obvious ($P > 0.05$), but the HCT index has been significantly improved, a significant effect has been achieved ($P < 0.01$), the reasons may be as follows: First, before this training camp, most of the athletes have been training for nearly one month, during this period, athletes

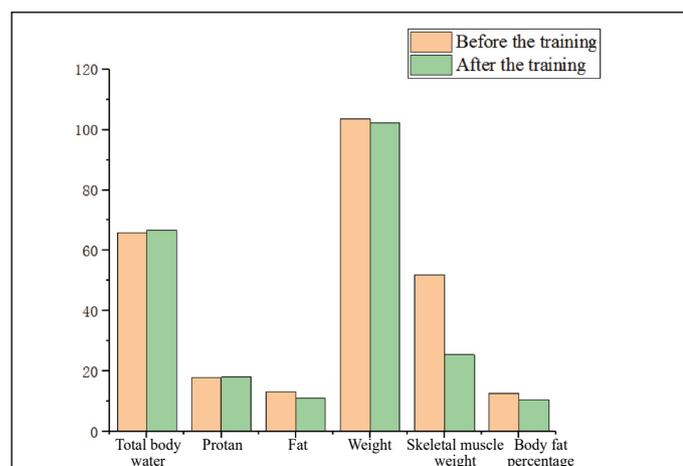


Figure 2. Altitude physical training athletes body shape changes.

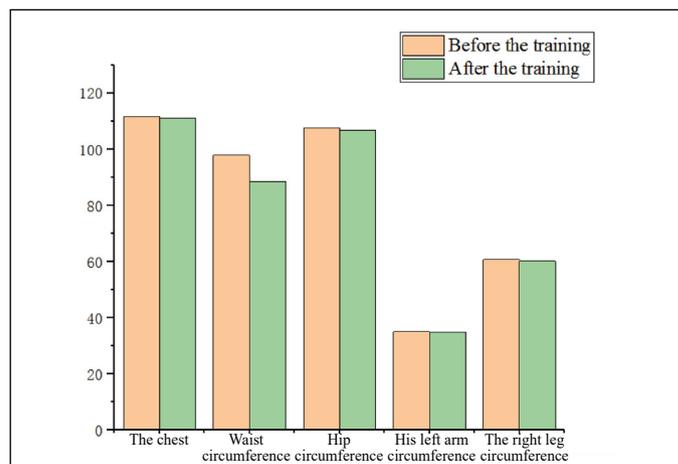


Figure 3. Changes of muscle circumference of athletes in plateau physical training.

also carried out aerobic endurance exercises, so that the basic values of HB and RBC were higher; Secondly, the first test of this study was not in the plains, but in the early morning of the second day, athletes were stimulated by hypoxic environment to increase EPO secretion, improved the basic values of HB and RBC, so that the 2 indicators in the second test did not change significantly.⁹ The significant increase in HCT may be due to the gradual increase of athletes' training volume, resulting in a large loss of body water, relevant studies have shown that athletes lose 1 to 2 liters of water per hour during training, athletes must add a lot of water and electrolytes to maintain the body's balance. As the exercise load increases, athletes' RBC and HB did not show a sharp decline or remain unchanged as shown by related research results, but a steady increase, a very significant change was achieved in the previous third test ($P < 0.01$). Studies have shown that the optimal value of HCT is about 50%. In this study, HCT did not increase sharply due to the significant increase in RBC and HB, the average finally reached 48.89%, keeping it within the optimal range, make red blood cells carry oxygen to a better state^[10]. The change of oxygen transport index shows that the physical training load arrangement is reasonable, and the athlete's physical function has improved significantly, on the premise of not disrupting the balance of the body, the athletic ability is improved. In this study, the men's basketball players are not only performing strength training, but also aerobic endurance and special technical exercises are also carried out, and increasing muscle circumference is not the main training task, therefore, the circumference of the chest, hips, arms, and legs does not change much; fat reduction is one of the training tasks, due to the significant changes in waist-to-hip ratio, it can be considered that this training has completed the training purpose of reducing fat.

CONCLUSION

Physical training can reduce the body fat content of football players, but the impact on muscle circumference is related to the altitude, form and load of training. This physical training mode can be used as a reference standard for physical training of other high-level football teams.

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

AUTHORS' CONTRIBUTIONS: Each author made significant individual contributions to this manuscript. XC: writing and performing surgeries; Hui Zhang: data analysis and performing surgeries, article review and intellectual concept of the article.

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