

# EFFECT OF 12 WEEKS OF FUNCTIONAL TRAINING ON COLLEGE SOCCER PLAYERS



ORIGINAL ARTICLE  
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EFEITO DE 12 SEMANAS DE TREINAMENTO FUNCIONAL SOBRE OS JOGADORES UNIVERSITÁRIOS DE FUTEBOL

EFFECTO DE 12 SEMANAS DE ENTRENAMIENTO FUNCIONAL EN FUTBOLISTAS UNIVERSITARIOS

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## ABSTRACT

**Introduction:** Soccer is a sport with intense rivalry, where physical strength is a prerequisite to ensure high level of playability. **Objective:** Explore the application of functional training in soccer training and its influence on soccer players' specific physical fitness. **Methods:** 24 s and divided into experimental and control groups into an experimental group and a control group. The control group underwent the intervention according to the normal program, while the experimental group used a functional training program protocol. The subjects' FMS scores and special fitness and ss were tested before and after the experiment, the results were statistically analyzed and discussed in the light of up-to-date scientific literature. **Results:** Before the experiment, the overall functional action screening scores of the two groups of players were low, and there was a high risk of sports injuries. After 12 weeks of training intervention, the experimental and control groups' FMS scores were significantly elevated, indicating that traditional physical and functional training can effectively improve functional movement screening performance. **Conclusion:** The 12 weeks suggested functional training protocol can significantly improve the physical fitness of soccer players. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

**Keywords:** Soccer; Physical Education and Training; Physical Fitness.

## RESUMO

**Introdução:** O futebol é um esporte com intensa rivalidade, onde a força física é pré-requisito para a garantia do alto nível de jogabilidade. **Objetivo:** Explorar a aplicação do treinamento funcional no treinamento de futebol e sua influência na aptidão física específica dos jogadores de futebol. **Métodos:** 24 jogadores de futebol foram selecionados como objeto de pesquisa, e divididos em grupo experimental e grupo de controle. O grupo de controle sofreu a intervenção de acordo com o programa normal, enquanto o grupo experimental utilizou um protocolo de programa de treinamento funcional. Os resultados de FMS dos sujeitos e a aptidão física especial foram testados antes e depois do experimento, os resultados foram analisados estatisticamente e discutidos à luz da bibliografia científica atualizada. **Resultados:** Antes do experimento, a pontuação geral da triagem de ação funcional dos dois grupos de jogadores era baixa, e havia um alto risco de lesões esportivas. Após 12 semanas de intervenção de treinamento, as pontuações FMS do grupo experimental e do grupo de controle foram significativamente elevadas, indicando que o treinamento físico tradicional e o treinamento funcional podem efetivamente melhorar o desempenho da triagem de movimento funcional. **Conclusão:** As 12 semanas sugeridas no protocolo de treinamento funcional podem melhorar significativamente a aptidão física dos jogadores de futebol. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

**Descritores:** Futebol; Educação Física e Treinamento; Aptidão Física.

## RESUMEN

**Introducción:** El fútbol es un deporte de intensa rivalidad, en el que la fuerza física es un requisito indispensable para garantizar un alto nivel de jugabilidad. **Objetivo:** Explorar la aplicación del entrenamiento funcional en el entrenamiento de fútbol y su influencia en la condición física específica de los futbolistas. **Métodos:** Se seleccionaron 24 jugadores de fútbol como sujetos de la investigación, y se dividieron en grupo experimental y grupo de control. El grupo de control se sometió a la intervención según el programa normal, mientras que el grupo experimental utilizó un protocolo de programa de entrenamiento funcional. Antes y después del experimento se comprobaron las puntuaciones de FMS y la forma física especial de los sujetos, se analizaron estadísticamente los resultados y se discutieron a la luz de la literatura científica actualizada. **Resultados:** Antes del experimento, las puntuaciones globales del cribado de acción funcional de los dos grupos de jugadores eran bajas, y existía un alto riesgo de lesiones deportivas. Tras 12 semanas de intervención de entrenamiento, las puntuaciones de FMS del grupo experimental y del grupo de control se elevaron significativamente, lo que indica que el entrenamiento físico tradicional y el entrenamiento funcional pueden mejorar eficazmente el rendimiento del cribado del movimiento funcional. **Conclusión:** El protocolo de entrenamiento funcional de 12 semanas sugerido puede mejorar significativamente la forma física de los futbolistas. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

**Descriptor:** Fútbol; Educación y Entrenamiento Físico; Aptitud Física.



## INTRODUCTION

Football is a sport with great influence in the world today.<sup>1</sup> Every country in the world is vigorously promoting the development of its own football. In Asia, South Korea and Japan have also invested heavily in football in recent years, and the results are very clear. In contrast, the development of football in China has been unsatisfactory, not only with a very big gap between the world's football powers, but also in Asia.<sup>2</sup> Football is a sports event with intermittent, high-intensity repeated sprints and frequent attack and defense conversion in the fierce struggle. This feature determines that players must have good physical fitness. How to effectively improve the physical fitness of players is one of the key issues discussed in the football world today.<sup>3</sup> At present, football techniques and tactics are developing in the direction of full attack and full defense, and the competition intensity is also increasing, High intensity (fast-paced competitions also put forward higher requirements on the physical fitness of athletes, which not only requires athletes to have good physical fitness (It is more necessary to give full play to their own qualities in the game, so as to help the team win the game. Good physical fitness is an important cornerstone for the full play of technology and tactics. The country has spent a lot of manpower, material resources and financial resources to solve the problem of physical fitness of athletes for many times, but it is still unable to catch up with the world's top football teams, even compared with Japan and South Korea, there is a big gap, and the physical fitness level of Chinese football players is still Need to constantly seek ways to improve.<sup>4</sup>

Physical function training has penetrated into professional football in recent years, which has proved to be a new physical training method that can effectively improve the physical quality of players.<sup>5</sup> Figure 1 shows the pyramid model of physical function training. Functional training entered the sports field of our country late, and the research level in the functional training field of our country has been in a relatively slow development.<sup>6</sup> Introducing physical function training into football projects may be an effective way to improve the physical fitness of our players and improve their physical fitness level.<sup>7</sup> This article will combine functional training with football training, observe the impact of functional training on the specific physical fitness training and physical fitness of football players, promote the research and promotion of functional training in the football field, and provide theoretical reference for the improvement of grass-roots football coaches in China.

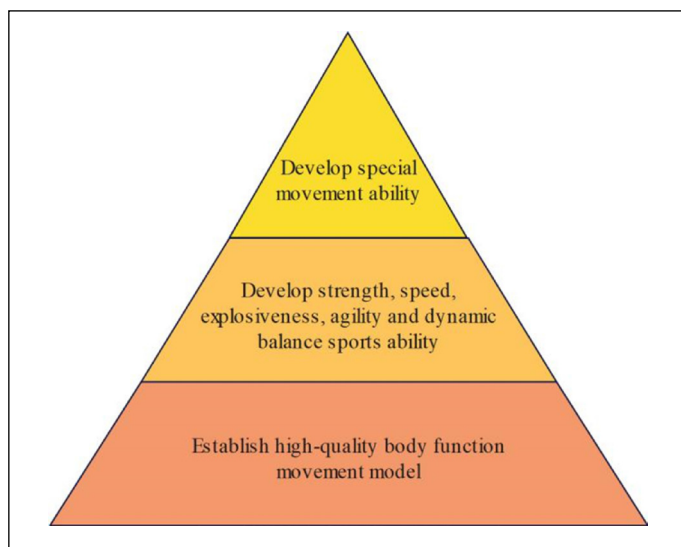


Figure 1. "Pyramid" model of functional fitness training.

## Research objects and research methods

### Definition of the concept of physical function training

Physical function training is an active self treatment method in the field of rehabilitation training at the earliest. In recent years, it has been introduced into the field of competitive sports. Because of its remarkable improvement effect on physical fitness, it has increasingly attracted the attention and attention of the theoretical and practical circles. However, looking at the current research, we can see that there is no authoritative and unified definition of the concept of body function training at present. To clarify the meaning of this concept is the first problem to be solved before the research. Physical function training is also an important supplement to basic physical training, and also plays a significant role in the development of athletes' basic physical qualities such as balance ability, flexibility and coordination ability. That is to say, physical function training breaks the results of various elements in traditional physical training, emphasizes the basic position of flexibility, coordination and balance in physical training, takes the comprehensive development of athletes' physical functions as the fundamental goal, and is consistent with the sports specific action mode. It focuses on multi body feeling, multi plane and multi joint training content, and focuses on balance, flexibility, coordination Stability and core area can promote the all-round development of neuroskeletal muscles and sports quality, and better meet the requirements of competitive competitions.

### Research on the characteristics of physical function training

At present, functional training in competitive sports involves two aspects: competition and rehabilitation. In the field of competitive sports, functional training integrates multidisciplinary knowledge such as biomechanics, sports physiology and sports anatomy, and embodies the characteristics of dynamic chain, dimension and state, and power efficiency in competitive sports; In the rehabilitation field of competitive sports, physical function training can help reduce body pain and reduce the probability of injury and disease. These four ways provide ideas for the development of physical function training. Some scholars pointed out that core stability is the source of core strength, and proprioception, balance and flexibility constitute the main content of body function training. In a word, the physical function training takes the characteristics of modern competitive sports as the starting point, carries out physical training through the thinking in the rehabilitation field, and optimizes the normal sports functions of athletes. At present, the research on football physical fitness training and core strength training in domestic and foreign theoretical research is relatively rich, and core strength training is only a part of functional training. The practice of functional training in football projects is still in its infancy, and the method of functional training has not yet formed a system.

### Index selection and scheme design

The study is Purely observational studies which no need to registry ID of ICMJE, and all the participants were reviewed and approved by Ethics Committee of Jiaozuo Normal College, China (NO. 2022011)

### Selection of healthy fitness test indicators

According to the research on physical function training in recent years, the commonly used evaluation methods for functional training mainly include FMS test, core strength measurement, EMG measurement, etc. Different evaluation methods have their advantages and disadvantages. In recent years, FMS test is the most commonly used method in the evaluation of functional training effect in China. The full name of FMS is Functional Movement Screen. It is a diagnostic method of motion disorder jointly designed by Gray Cook, a physiotherapist in the field of rehabilitation in the United States, and Lee Burton, a sports training

expert in the field of competitive sports.<sup>10</sup> Its main design purpose is to predict the incidence of injury and disease by measuring the asymmetry and compensation of exposed body in terms of stability, flexibility, etc.

FMS test is an innovative action mode quality evaluation system, including seven simple action modes and three exclusion experiments, which provides a reference baseline for sports training and is widely used in the evaluation of basic sports abilities such as flexibility and stability of various groups, with good results. The test content mainly includes 7 aspects, including deep squat test, head lifting pole test, hurdle span test, separate squat test, active leg lifting test, shoulder flexibility test, spinal stability push up test, and body rotation stability test. According to the research needs, this paper also uses FMS test to test and evaluate the physical function of athletes after the test, in order to verify the experimental effect.

### Experimental research method

FMS functional movement screening was used to test the selected students before the experiment to obtain the original functional body data.<sup>9</sup> Functional action screening includes: squat, hurdle step, straight lunge, shoulder flexibility, active straight leg lift, trunk stability push up, and rotation stability. It consists of 7 test actions in total.

### Experimental results and analysis

This article attempts to integrate the body function training into the football training practice by summarizing the relevant research results of body function at home and abroad, and observing the daily training practice of Chinese football players, and to verify the effect of body function training on improving and improving the physical quality of Chinese football players through experiments. The purpose of this study is to explore the application of functional training technology in football training physical training and its impact on specific physical fitness of football players.<sup>8</sup> By studying how to improve the attention of domestic football coaches and players to physical training, we can learn from and absorb the world's advanced physical function training concepts and methods in time to improve the scientific level of football physical training in China, and change the status quot of long-term neglect of physical stability training.

### Purpose and object of the experiment

After two different methods of training, the students in the experimental group and the control group can improve their sports performance, enhance their physical fitness, and develop their sports ability. More importantly, the training effect of the experimental group using the body functional training method is higher than that of the control group, and the use of the body functional training method can better improve the physical fitness of athletes. A total of 24 football students were randomly selected from the physical education college of a comprehensive university to conduct FMS functional action screening and special physical fitness test. Table 1 gives the main information of the subjects

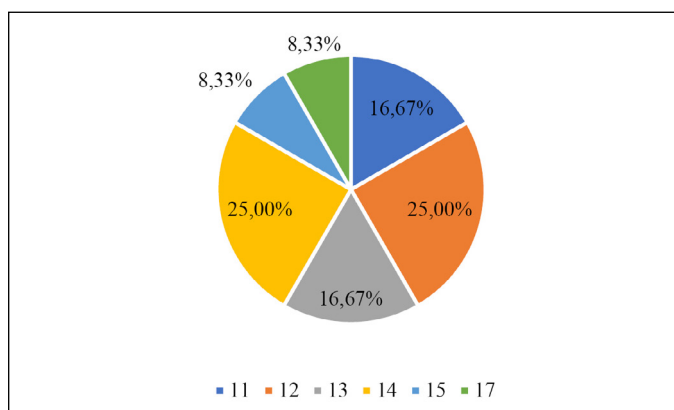
### Analysis of experimental results

According to the basic steps and methods of FMS test, 24 football students were tested with FMS before physical function training. The test results are shown in Figure 2.

The results showed that the average score of functional action screening of 24 football students was 13.17, the standard deviation was 1.75, and the 95% confidence interval was 12.06-14.28. Among them,

**Table 1.** Main information of research object.

Number	Year	Height	Weight	Years of exercise
24	20±1	170.2±19.17	67.2±5.87	4.56±1.64



**Figure 2.** Score proportion of functional movement screening (FMS) test for football majors before the experiment.

the highest score of seven movements is 17 points, and the lowest is 11 points. The number of students who scored 11 and 14 was the largest, both 6, accounting for 25.00% of the total screening population; According to further statistics, 10 people scored 14 or more, accounting for 41.67% of the total number of screening people, and 14 people failed to pass, accounting for 58.33% of the total number of screening people. It can be seen that in terms of the total score of functional screening, the tested football students showed poor results.

The physical fitness of 24 college football players was tested again after 12 weeks of functional training, and the test results before and after the test were tested by independent sample t test. The results showed that the average time of the 30 meter straight speed run was 0.015 seconds shorter than that before the experiment, and the average distance of the standing long jump was 0.041 meters longer than that before the experiment × the average time of the 25 meter turn back run was 0.762 seconds less than that before the experiment. The p value of the data before and after the 30 meter straight run test in each test item is >0.05, which shows that there is no significant difference between the two groups of data before and after the test; Standing Long Jump and 5 × the p value in the data comparison before and after the 25m turn back test is less than 0.05, indicating that the data comparison before and after the test of the two tests has obvious difference.

After 12 weeks of functional training for college football players, all movements have improved. Among them, squatting, hurdle step, straight lunge, active straight leg lifting and trunk stable push have increased significantly compared with those before the experiment, with the performance of p<0.05, indicating that specialized functional training for college football players can significantly improve students' physical functions, So as to reduce the risk of sports injury. The test results of shoulder flexibility and rotation stability before and after the experiment showed that although the two movements improved before and after the experiment, there was no significant difference, as p>0.05. The main reason for this result was that college football players scored higher on shoulder flexibility before the experiment, Therefore, there was no significant progress compared with other movements after the test - there was no significant difference before and after the rotation stability test, mainly because the difficulty coefficient of this movement was relatively high, and there was a high demand for flexibility, stability and muscle strength of all joints of the body.

### CONCLUSIONS

After understanding the needs of college football players, this paper designs functional training actions, which are composed of core strength training, joint stability, joint flexibility and dynamic chain training. The research results show that after 12 weeks of training, the

physical functions of college football players have been significantly improved, such as squatting, hurdle step, straight lunge, active straight leg lift and trunk stability push up, compared with those before the experiment, and there is no significant difference between shoulder flexibility and rotation stability. Therefore, functional exercises of shoulder and core control should be added to the training in the future to comprehensively improve the physical function of college football players and significantly improve the physical quality of football players,

such as standing long jump. Therefore, further in-depth analysis and research are needed to design more targeted functional training actions, comprehensively improve the physical function and fitness of football players, and provide scientific and effective training basis for basic football coaches.

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

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

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