

# EFFECTS OF STRENGTH TRAINING ON PHYSICAL CONDITIONING IN SOCCER PLAYERS

EFEITOS DO TREINAMENTO DE FORÇA SOBRE O CONDICIONAMENTO FÍSICO EM JOGADORES DE FUTEBOL

EFFECTOS DEL ENTRENAMIENTO DE FUERZA EN LA CONDICIÓN FÍSICA EN JUGADORES DE FÚTBOL



ORIGINAL ARTICLE  
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## ABSTRACT

**Introduction:** With the development of contemporary soccer, it can be seen that the physical conditioning of athletes has become the gold standard for player evaluation. **Objective:** Analyze the effects of strength training on soccer players' physical conditioning. **Methods:** By combining functional strength training with traditional soccer training, the literature was compared, using the method of mathematical statistics and comparative analysis to study the influence of physical conditioning in youth soccer ( $n=62$ ). **Results:** After the test, the difference between the control group and the experimental group was significantly enhanced ( $p = 0.66 > 0.05$ ), but there was no difference in effectiveness between the experimental group and the control group after 10 minutes ( $p = 0.03. < 0.05$ ). There was a significant difference in post-test performance between the experimental group and the control group ( $p = 0.04 < 0.05$ ), with emphasis on the hand-throw performance after training. **Conclusion:** The strength training protocol presented here had a positive impact on the physical conditioning of soccer players, especially on the agility performance of young athletes. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

**Keywords:** Physical Education and Training; Physical Conditioning, Human; Soccer.

## RESUMO

**Introdução:** Com o desenvolvimento do futebol contemporâneo, pode-se constatar que o condicionamento físico dos atletas se tornou o padrão ouro para avaliação de seu jogador. **Objetivo:** Analisar os efeitos do treinamento de força sobre o condicionamento físico dos jogadores de futebol. **Métodos:** Combinando o treinamento funcional de força ao treinamento de futebol tradicional, comparou-se a literatura bibliográfica, utilizando o método de estatística matemática e análise comparativa para estudar a influência sobre o condicionamento físico no futebol juvenil ( $n=62$ ). **Resultados:** Após o teste, a diferença entre o grupo controle e o grupo experimental foi significativamente aprimorada ( $p = 0,66 > 0,05$ ), porém não houve diferença na eficácia entre o grupo experimental e o grupo controle após 10 minutos ( $p = 0,03. < 0,05$ ). Verificou-se uma diferença significativa no desempenho pós-teste entre o grupo experimental e o grupo controle ( $p = 0,04 < 0,05$ ), com destaque ao desempenho do lançamento manual após o treinamento. **Conclusão:** O protocolo de treinamento de força apresentado repercutiu positivamente sobre o condicionamento físico nos jogadores de futebol, com destaque para o desempenho da agilidade nos jovens atletas. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

**Descritores:** Educação Física e Treinamento; Condicionamento Físico Humano; Futebol.

## RESUMEN

**Introducción:** Con el desarrollo del fútbol contemporáneo, se puede comprobar que la condición física de los atletas se convirtió en el patrón de oro para la evaluación del jugador. **Objetivo:** Analizar los efectos del entrenamiento de fuerza en la condición física de los futbolistas. **Métodos:** Combinando el entrenamiento de fuerza funcional con el entrenamiento de fútbol tradicional, se comparó la literatura, utilizando el método de la estadística matemática y el análisis comparativo para estudiar la influencia en el acondicionamiento físico en el fútbol juvenil ( $n=62$ ). **Resultados:** Después de la prueba, la diferencia entre el grupo de control y el grupo experimental fue significativamente mayor ( $p = 0,66 > 0,05$ ), pero no hubo diferencia de eficacia entre el grupo experimental y el grupo de control después de 10 minutos ( $p = 0,03. < 0,05$ ). Hubo una diferencia significativa en el rendimiento posterior a la prueba entre el grupo experimental y el grupo de control ( $p = 0,04 < 0,05$ ), con énfasis en el rendimiento del lanzamiento manual después del entrenamiento. **Conclusión:** El protocolo de entrenamiento de fuerza aquí presentado tuvo un impacto positivo en el acondicionamiento físico de los jugadores de fútbol, con énfasis en el rendimiento de la agilidad en atletas jóvenes. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

**Descriptores:** Educación y Entrenamiento Físico; Acondicionamiento Físico Humano; Fútbol.



INTRODUCTION

With the development of football today, we can find that the physical fitness of athletes has become the basic standard for measuring a football player. Asians generally have an advantage in technology-led projects, while there is a general disadvantage in physical-led projects.<sup>1</sup> If racial reasons determine the upper limit of physical fitness, then the lower limit should be determined by our training methods and methods to improve physical fitness. Through long-term, high-intensity physical fitness training, the physical fitness of athletes can be comprehensively improved, it has become a major problem that football coaches and sports researchers all over the world need to solve.<sup>2,3</sup> Therefore, football players must understand this athletic ability. In summary, it can be seen that functional training has some positive effects on the above research projects, and these special abilities are more or less improved after functional training: By improving balance ability and core stability, it provides conditions for athletes to move quickly; By improving the coordination between muscles and muscles, and between muscles and joints, athletes can complete movements more effectively.<sup>4,5</sup>

METHOD

Research object

The speed of young athletes up to the age of 13. The effect of strength training on the strength and strength of 32 students in the experimental group and 30 students in the control group. A total of 62 students, 7 students who have not studied 6th grade or above. There were 26 students in the experimental group and 29 students in the control group. There were 24 training sessions in each control and experimental group. The experimental and control groups were strictly represented in the context of the data.

Research methods

(1) Documentation method

Through the network query and retrieval of the China Academic Journal Network database, foreign language materials, related works, papers, project reports, etc., mainly to consult several famous and influential foreign learning theories, and collect the relevant literature data about youth football training, youth strength characteristics and functional strength training, and organize and analyze the collected information, so that the demonstration of this research has more sufficient theoretical support.<sup>6</sup>

(2) Mathematical Statistics

By using SPSS software and Excel software to test the experimental data to provide data support for the research.<sup>7</sup>

Selection of test indicators

Six test indicators: 10-meter run, 30-meter run, Illinois run, 5x25-meter return run, hand toss, fixed-point kick.

The speed indicators are 10 meters and 30 meters. According to the "Chinese Youth Football Training Outline", the important indicators tested by the outline in the selection of football players aged 7 to 10 are 10 meters and 30 meters. Sensitive indicators Illinois run and 5x25-meter turnaround run; 5x25-meter turnaround run is also selected according to the "Chinese Youth Football Training Outline".<sup>8</sup> The strength index is throwing the ball and kicking the ball at a fixed point, the "Chinese Youth Football Training Outline" does not have an index to test the strength of the youth.<sup>9</sup> The hand throw is an index set according to the actual situation of the football game, and it has certain pertinence to the upper body strength level of football players. The fixed-point kicking distance is borrowed from the index in "Research on the Change Characteristics of Sports Biomechanical Information of the Instep Kicking Technique Before and After Fatigue".<sup>10</sup>

ETHICAL COMPLIANCE

Research experiments conducted in this article with animals or humans were approved by the Ethical Committee and responsible authorities of Guizhou Normal University, Southwest University and East China Normal University-Xuhui Postdoctoral Workstation following all guidelines, regulations, legal, and ethical standards as required for humans or animals.

RESULTS

After the experiment, the experimental results were compared between the control and experimental groups

Figure 1 compares the average result of background test data with a bar chart. It can be seen that the difference in posterior scores between the two groups is unclear and that negative results do not represent the results of the experiment. Therefore, I performed a T-test on the data.

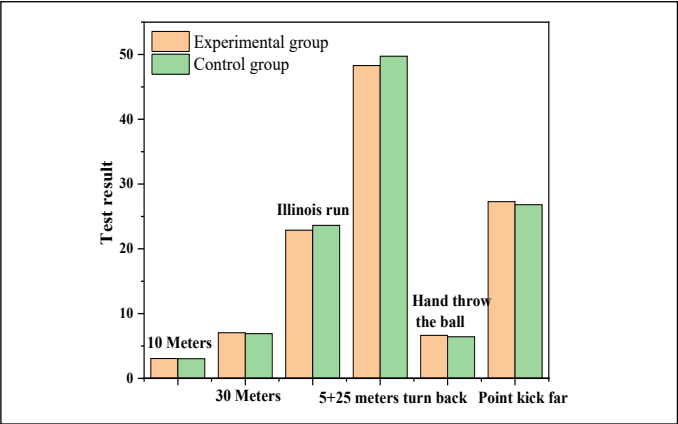


Figure 1. Compare the test results between the control group and the experimental group.

Analysis of Speed Quality

Speed quality index: 10 meters

The median 95% confidence interval in Table 1 is 0.05; t = 0.44; p = 0.66 > 0.05 indicating no significant difference in 10m performance after the test. Both the group and the control group found that strength training did not affect improvement in 10m strength in young men. As expected, the test scores of the experimental group did not differ from the control group. Even with performance improvements, however, the relationship between performance improvement and employee productivity is weak.

Because the 10m sprint depends on the explosive power of the legs. And strength training is strength training. But the explosive power of the muscles is still low. The authors believe that the quality of training at the 24 workshops played a significant role in the 10m performance between the experimental and control groups. 13 of the 24 statistics courses included quality teaching. The foundation of this quality teaching is competition.

Sensitive quality analysis

Indicators of agility qualities: Illinois running

Table 2 Statistics for the Illinois experimental and control groups. As shown in the comparison table between the experimental group and the Illinois control after the experimental paper. The significance level determined for the 95% confidence interval was 0.05. t = -2.2; p = 0.03 < 0.05 shows that there is a significant difference in post-test performance in Illinois between the test and the cohort. This exercise was related to the empowerment of young people in Illinois. As expected, the post-test data differed between the two groups. The improvement of the experimental group was related to tasks as well as 24 regular training sessions.

The experimental and control groups improved their running scores after 24 training sessions in Illinois. Pre-test and post-test scores were

**Table 1.** Scores were analyzed after a 10-meter test in the experimental and control groups in a soccer classroom.

Group	Sample size	10 meters (s)	t	p
Test group	26	3.1 ± 0.2		
Control group	29	3.0 ± 0.2		
			0.44	0.66

**Table 2.** Articles on experimental and controlled teams in Illinois running backs measure performance in the prep football classroom.

Group	Sample size	Illinois score (s)	t	p
Test group	26	22.9 ± 1.4		
Control group	29	23.6 ± 1.1		
			-2.2	0.03

significantly different between the experimental and control groups. The scores of the two groups were different before age. The next exam is different. The experimental group performed better than the control group. Both Illinois teams improved with running backs, which are often hindered by training. However, the post-test scores in the experimental group were higher than those in the control group. This shows that the difference between the experimental group and the employees is good only in Illinois.

Analysis of Strength and Quality

Indicators of Strength Quality: Hand Toss

The significance level determined for the 95% confidence interval in Table 3 is 0.05. t = 2.13; p = 0.04 <0.05, indicating a significant difference between the experimental and control groups. Post-exercise pitching performance has shown that strength training improves youth pitching performance. As expected, the test scores were significantly different between the two groups. This shows that the experimental group did strength training rather than arm training.

Although the test scores differed significantly before and after training. However, the control score did not improve significantly. Independent T-test samples of post-test scores in both groups showed significant differences between the experimental and control groups. The experimental group

**Table 3.** After the experimental arms were evaluated, the experimental group and the control group in the soccer room.

Group	Sample size	Hand toss score (m)	t	p
Test group	26	6.6 ± 0.4		
Control group	29	6.4 ± 0.3		
			2.13	0.04

performed better than the control group. The functional effect had a clear effect on the improvement of the experimental group. Because the only difference between tests is a function of functional strength.

DISCUSSION

This experiment did not reflect the effect of functional strength training on youth speed quality, so whether functional strength training can significantly improve youth speed quality remains to be studied. Functional strength training can significantly improve the agility of young people, which is precisely a very important quality in football, the close combination of functional strength training and special projects will make the training effect more significant. Functional strength training can significantly improve the upper body and core strength of adolescents, but it has no significant effect on the strength of adolescents' lower body. Therefore, the training effect of functional strength training is not necessarily better than that of traditional strength training in improving the strength quality of young people.

CONCLUSION

After the test, the speed index of both groups improved significantly, but the post-test data did not differ between the two groups, indicating that the young man was unable to improve the speed of work performance. Sensitivity was improved in both groups, but the performance in the experimental group was higher than that in the control group, indicating that strength training was effective in improving adolescent sensitivity. Post-test data in the experimental group were better than those in the control group. Control data did not improve significantly. This shows that strength training can improve youth strength levels.

The authors declare that they have no competing interests.

**AUTHORS' CONTRIBUTIONS:** Each author made significant individual contributions to this manuscript. Bo Cao: writing; Xiaojin Zeng: data analysis; Lin Luo: article review and intellectual concept of the article.

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