

ASSISTED TRAINING MODEL FOR IMPROVING THE THREE-POINT SHOOTOUT IN BASKETBALL

MODELO DE TREINAMENTO ASSISTIDO PARA APERFEIÇOAMENTO DA CESTA DE TRÊS PONTOS NO BASQUETEBOL

MODELO DE ENTRENAMIENTO ASISTIDO PARA MEJORAR LAS CANASTAS DE TRES PUNTOS EN BALONCESTO



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ABSTRACT

Introduction: The outcome of basketball games is based on scoring, and basketball rules are discussed from a qualitative point of view. The three-point basket is the key to the game's success; improving this shot's percentage will ensure success. **Objective:** Explore the key elements of a successful three-point shot, discussing its effective improvements. **Methods:** This paper randomly selects 26 students from a particular basketball class as volunteers for the research. Before starting the experiment, the subjects were divided into control and experimental groups; they were grouped according to their test scores. Four data of three-point shot rate, jump shot, and shot after dribbling are analyzed according to the grouping of players. The data were statistically treated for better appreciation of the results. **Results:** Although the throws improved in both groups, the improvement was insignificant ($P>0.05$). After nine weeks of exercise, the success rate of three-point baskets in both the experimental and control groups improved. The improvement in the three-point basket was the greatest in the experimental group ($P<0.05$). **Conclusion:** Functional strength training can significantly improve the rate of long-range 3-point baskets in basketball players. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Canonical Correlation Analysis; Basketball; Athletes; Athletic Performance.

RESUMO

Introdução: O resultado dos jogos de basquetebol é baseado na pontuação e as regras do basquete são discutidas de um ponto de vista qualitativo. A cesta de três pontos é a chave para o sucesso do jogo e melhorar a porcentagem desse lançamento garantirá o sucesso na partida. **Objetivo:** Explorar os elementos-chave de uma tacada de três pontos de sucesso, discutindo suas melhorias efetivas. **Métodos:** Este artigo seleciona aleatoriamente 26 alunos de uma determinada turma de basquetebol como voluntários para a pesquisa. Antes de iniciar a experiência, os sujeitos foram divididos em grupos controle e experimental, foram agrupados de acordo com os resultados do teste. Analisa-se quatro dados de taxa de lance com três pontos, lance com salto e lance após drible, de acordo com o agrupamento de jogadores. Os dados foram tratados estatisticamente para melhor apreciação dos resultados. **Resultados:** Embora os lances tenham melhorado em ambos os grupos, a melhoria não foi significativa ($P>0,05$). Após nove semanas de exercício, a taxa de sucesso de cestas com três pontos, tanto no grupo experimental quanto no grupo de controle demonstrou um aperfeiçoamento. A melhora na cesta em três pontos foi a maior no grupo experimental ($P<0,05$). **Conclusão:** O treinamento de força funcional pode melhorar significativamente a taxa de cestas de 3 pontos de longo alcance nos jogadores de basquetebol. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Análise de Correlação Canônica; Basquetebol; Atletas; Desempenho Atlético.

RESUMEN

Introducción: El resultado de los partidos de baloncesto se basa en la puntuación y las reglas del baloncesto se discuten desde un punto de vista cualitativo. La canasta de tres puntos es la clave del éxito del juego y mejorar el porcentaje de este tiro asegurará el éxito en el juego. **Objetivo:** Explorar los elementos clave de un tiro de tres puntos exitoso, discutiendo sus mejoras efectivas. **Métodos:** Este trabajo selecciona al azar a 26 estudiantes de una clase particular de baloncesto como voluntarios para la investigación. Antes de comenzar el experimento, los sujetos se dividieron en grupos de control y experimentales, y se agruparon en función de las puntuaciones obtenidas en las pruebas. Se analizan cuatro datos de la tasa de tiros de tres puntos, de los tiros en salto y de los tiros después de driblar según la agrupación de jugadores. Los datos fueron tratados estadísticamente para una mejor apreciación de los resultados. **Resultados:** Aunque los lanzamientos se optimizaron en ambos grupos, la mejora no fue significativa ($P>0,05$). Después de nueve semanas de ejercicio, la tasa de éxito en las canastas de tres puntos, tanto en el grupo experimental como en el de control, mostró una mejora. La mejora en la canasta de tres puntos fue mayor en el grupo experimental ($P<0,05$). **Conclusión:** El entrenamiento de fuerza funcional puede mejorar significativamente el índice de canastas de 3 puntos de largo alcance en jugadores de baloncesto. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptor: Análisis de Correlación Canónica; Baloncesto; Atletas; Rendimiento Atlético.



INTRODUCTION

The three-point shot is an essential mental force in basketball. It can help the team build up the team morale and attack the opponent's morale. The 3-pointer is the key to a game. From the current domestic and foreign literature, the discussion on the improvement of functional strength in improving the shooting success rate of basketball teams is still relatively rare. This paper is an experiment for basketball students in a specific major.¹ This paper compares and analyzes the effect of functional strength exercises on improving the shooting success rate. This plays an essential guiding role in improving the shooting rate of our basketball team.

METHOD

Research objects

A total of 26 students who took elective courses in basketball from March 2020 to August 2020 were selected for this experiment.² This article examines the effect of functional strength exercises on shooting hits while conducting shooting practice. Twenty-six males aged 18-20 were healthy and free of sports injuries.

Test plan

First, before the start of the experiment, the subjects were divided into the control group and the experimental group. This paper ranks the starting line hit scores of the subjects and divides them into two groups.³ After the grouping, we will test four indicators: three-point shooting rate, three-point shooting rate, fixed-point jump shot, and dribbling emergency stop shooting rate. This ensures that the two groups of subjects are above the same level.

The experimental and control groups carried out continuous exercises for nine consecutive weeks. The experimental group combined conventional methods and functional strength, while the control group exercised mainly with conventional strength exercises.⁴ The two sports should ensure the uniformity of exercise load when performing strength exercises. In this experiment, the subjects' heart rate was monitored in real-time. They tested the four indicators of three-point shooting percentage, spot-up jumper, and dribble shooting percentage after completing the designated practice.

Investigation method

In this paper, the experimental plan was formulated according to the opinions and suggestions of experts. This paper classifies the data obtained in the experiment. In this paper, the scores of the two groups of students were compared and analyzed. At the same time, this paper compares their scores.⁵ This article uses statistical data to explore the effect of functional strength training on shooting hits.

Experimental training program

This trial runs for nine weeks. The frequency is three times a week. The experimental and control groups' training methods were different.⁶ Each exercise is about 1.5 hours. Athletes undergo motion testing after general technical and technical training.

Shooting Score Index

(1) Smash on the spot. Players must shoot from the free-throw line following standard shooting methods during the game. The athlete completes one throw ten or more times. In this experiment, the number of throws was recorded. This paper conducts three experiments for each basketball player and takes the best score as the final score. (2) Fixed-point jumper. Basketball players conduct trials at angles of 45 and 90 degrees above and below the hoop. Each contestant conducts three trials and selects the one with the highest score as

the final score. (3) dribble pull-up jumper. Players must shoot from the three-point line in this test. The athlete takes the ball to a 45-degree angle to the left and right of the basket to shoot. Each player makes ten throws at each time. Throw a total of 3 times, and this article selects the best record once. (4) One-minute timed jumper. Players participating in this test must perform a one-minute jump test at a distance of 5.8 meters from the midpoint of the basketball hoop. After each jump, you have to grab a basket yourself and bring it to the designated position. Each player must make ten throws within 1 minute. Each competitor must perform three trials. This article takes the best record as the final score.

The Best Choice for Basketball Players' One-Motion Shooting Technique

This paper utilizes DICOM firing data modeling. This paper uses the Ansys program to construct the following stress field system:

$$R = \frac{Q_2 - Q_1}{E} \times \frac{F}{A_2 - A_1} (\Delta\alpha - \Delta\beta) \quad (1)$$

Formula (1) establishes the elastic coefficient of the basketball player's spiking and R is the elastic coefficient of the player's spiking. Q_2 represents the inversion of the femoral head at about 30 degrees, the strength of the trabecular bone. Q_1 represents 10 degrees of femoral head inversion, the strength of the trabecular bone. E represents the stress area of the trabecular bone sample under loading. A_2 indicates the corresponding position of the trabecular bone after 30°. A_1 represents the corresponding position of the trabecular bone in 10 degrees of femoral head inversion. F indicates the starting height of the trabecular bone sample before loading. $\Delta\alpha$ represents the different stress of trabecular bone. $\Delta\beta$ represents the deformation difference.⁷ Tests were performed in One-Motion firing with a cyclic load of 3.0 Hz. The corresponding shooting load is:

$$F'_{\max} = \frac{\sigma_{\max} - \sigma_{\min}}{\varepsilon_{\max} - \varepsilon_{\min}} \times \frac{L}{S} + \frac{F'_{\min}}{T} \quad (2)$$

Equation (2) is the maximum load class of the trabecular, where F'_{\max} and F'_{\min} represent the respective maximum and minimum loads, respectively. σ_{\max} and σ_{\min} represent the most significant and most minor intertrabecular widths of the medullary compartments. L illustrates the ratio of surface to volume of trabecular bone. ε_{\max} and ε_{\min} represent the maximum and minimum trabecular bone, respectively. In the One-Motion spiking technique, Ansys software can be used in this paper to find the maximum load on the lower femoral trabecular of the athlete, thereby simulating the stress change of the joint during impact:

$$\rho = \frac{\mu(\eta) \pm \partial(\alpha) + \eta(\beta)}{\mu(\delta) \times I(\chi) \pm \lambda(\varepsilon)} e^{\frac{l(\omega) - N^m(\delta)}{F'_{\max}}} \quad (3)$$

In formula (3), ρ represents the stress-strain change characteristics of the model when it is impacted. $\mu(\eta)$ and $\partial(\alpha)$ represent the side and top of the body, respectively. $\eta(\beta)$ represents the stress state at maximum load. $\mu(\delta)$ shows the force between the joints when passing through the center of the thigh.

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

RESULTS

Research on Field Shooting Scores

Field shots are scored as shown in Table 1. From Table 1, it can be seen that both groups improved their field goal percentages after nine weeks of training.⁸ The two groups did not see a significant improvement in their field goal percentages, suggesting that the field goal percentages improved no matter what kind of strength training was done.

Analysis of shooting

The field goal percentages of the shots are shown in Table 2. It can be seen from Table 2 that the jump shots of the control group and the experimental group both improved before practice. There was no significant difference in jumper hits between the two groups before the experiment.⁹ Either method can improve an athlete's spot-up shooting after nine weeks of practice at different intensities. The experimental group significantly improved the performance of both groups. There was no significant difference in the hit rate of pull-up jumpers with the ball compared to the control group. The experimental group was significantly better than the control group.

Research on three-point shooter scoring

The three-point shooting data is shown in Table 3. There was no significant difference in the number of 3-pointers made before training compared with the control group. After nine weeks of exercise, the experimental and control groups improved their three-point shooting success rates.¹⁰ The difference before and after exercise is significant. Compared with the control group, it was found that the success rate of three-point shooting was significantly improved. This shows that the improvement of functional strength is better than the conventional training method in improving the success rate of the three-point shot.

DISCUSSION

Shooting is a meaningful way to score. It is a technique that every team member must use proficiently. Athletes must master the correct and standard shooting posture at the beginning of training to ensure high shooting. After investigation, we can see that basketball players' shots can maintain specific stability in daily practice. But when it comes to competition, the athletes will show a significant decrease. This is

Table 1. Tests for Field Shots.

Group	Before training	After training
Test group	37.04±5.07	48.03±5.81
Control group	38.53±4.16	46.34±4.59

Table 2. Field Shot Tests.

Group	Spot-up jumper		Dribble pullback jump shot	
	Before training	After training	Before training	After training
Test group	45.45±5.02	58.07±5.63	35.61±3.45	43.4±3.67
Control group	47.2±5.26	51.87±5.09	36.8±3.05	42.11±3.61

Table 3. Three-Point Shooting Scores.

Group	Before training	After training
Test group	37.64±4.59	48.29±4.95
Control group	39.69±5.89	44.89±4.31

because dunks in basketball and practice are defended by opponents, so it becomes more difficult for players to dunk. Athletes have to adjust accordingly and take their chances.

The shooting success rate of the three-point shot is closely related to the shooting technique and factors such as physical quality, psychological quality, and shooting time and space. Long-distance shooting is a trend in basketball development. The skills of the inside players are also constantly improving. And the three-point shooting skills have disappeared from the original guards to the present. An in-depth discussion of the three-point shooting rate control factor in academia is crucial in improving the three-point shooting rate. In basketball, the interference of opponents is a fundamental reason for determining the three-point shooting rate.¹¹ For athletes to improve their three-point shooting percentage, they must break through the opponent's defense. This will ensure the success rate of the three-point shot. Athletes who deal with centers from short distances tend to attack at or near the basket. The generation of the three-point shot significantly affects the attacking technique of the players. This allows them to move from traditional offense to the rim and increase their attack distance. This can improve the three-point shooting rate. Athletes need to constantly break through the field and break the opponent's defense. This will improve his long balls and wide range of attacks.

Usually, the athlete should take the long three-point shot when the score is behind. Three-pointers on the fast break save time and speed up the game. Improving the three-point shooting percentage can improve the score of the game. Players using rebounds on the offensive end can increase the team's offensive opportunities. This removes the player's shooting worries and increases the team's confidence. It is an important way for coaches to strengthen the control of players at the basket to improve the three-point shooting rate. In basketball, players can strengthen the movement and posture of holding the ball through mechanical, high-volume three-point shooting. Athletes should pay attention to the rotation angle of the fingertips and the hitting time in practice. If athletes ignore the shooting hand type, the angle of the fingers, and the power of the ball at the time of the shot, the shooting success rate will decrease.

CONCLUSION

After nine weeks of functional strength training, there was no significant difference between the two dunking and three-point shooting groups. Still, the experimental group's score in the three-point shooting was significantly improved. This shows that functional strength exercises can effectively increase their mobile shooting. Trainers must develop scientifically sound functional strength exercises. This can improve the basketball player's shooting percentage.

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