

STRENGTHENING THE ABDOMINAL CORE ON BALANCE IN BASKETBALL PLAYERS



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FORTALECIMENTO DO CENTRO ABDOMINAL SOB O EQUILÍBRIO EM JOGADORES DE BASQUETEBOL

FORTALECIMIENTO DEL NÚCLEO ABDOMINAL EN EL EQUILIBRIO DE LOS JUGADORES DE BALONCESTO

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ABSTRACT

Introduction: Basketball has the characteristics of physical struggle. This demands from its training and teaching that the participants and coaches work on the qualities of strength, speed, and tactics of the sport. **Objective:** Study the impacts of abdominal core strengthening on balance and agility in basketball players. **Methods:** After a literature survey, we used basketball players as experimental volunteers, divided into experimental and control groups, to validate an experimental protocol to strengthen the abdominal core added to routine training. T-run tests and Z-run tests were also performed before and after training. The method of mathematical statistics was used to compare the results in the research-relevant data. **Results:** After training, the two sensitivity test results in the young basketball players were significantly higher than the control group, with significant differences ($P < 0.05$), there was no significant difference in the two sensitive quality indices of the control group athletes before and after training ($P > 0.05$). **Conclusion:** It was evidenced that abdominal core stability training plays a positive role in improving the balance and agility of young basketball players. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Abdominal Core; Basketball; Physical Education and Training.

RESUMO

Introdução: O basquetebol tem as características de embate físico. Isso exige de seu treinamento e ensino que os participantes e treinadores trabalhem as qualidades de força, velocidade e táticas do esporte. **Objetivo:** Estudar os impactos do fortalecimento do centro abdominal sobre o equilíbrio e agilidade nos jogadores de basquetebol. **Métodos:** Após um levantamento de dados bibliográficos, utilizou-se jogadores de basquete como voluntários experimentais, divididos em grupo experimental e grupo de controle para validação de um protocolo experimental de fortalecimento do centro abdominal adicionado ao treino de rotina. Testes de corrida T e testes de corrida "Z" também foram realizados antes e depois do treinamento. O método de estatística matemática foi utilizado para comparar os resultados nos dados relevantes à pesquisa. **Resultados:** Após o treinamento, os dois resultados do teste de sensibilidade nos jovens jogadores de basquete foram significativamente superiores aos do grupo controle, com diferenças significativas ($P < 0,05$), não houve diferença significativa nos dois índices de qualidade sensível dos atletas do grupo controle antes e depois do treinamento ($P > 0,05$). **Conclusão:** Evidenciou-se que o treinamento de estabilidade do centro abdominal desempenha um papel positivo na melhoria do equilíbrio e agilidade sobre os jovens jogadores de basquetebol. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Centro Abdominal; Basquetebol; Educação Física e Treinamento.

RESUMEN

Introducción: El baloncesto tiene las características del choque físico. Esto exige de su formación y enseñanza que los participantes y entrenadores trabajen las cualidades de fuerza, velocidad y táctica del deporte. **Objetivo:** Estudiar los impactos del fortalecimiento del núcleo abdominal en el equilibrio y la agilidad en jugadores de baloncesto. **Métodos:** Tras un estudio de datos bibliográficos, se utilizaron jugadores de baloncesto como voluntarios experimentales, divididos en grupo experimental y grupo de control para la validación de un protocolo experimental de fortalecimiento del núcleo abdominal añadido al entrenamiento rutinario. También se realizaron pruebas de carrera en T y en Z antes y después del entrenamiento. Se utilizó el método de la estadística matemática para comparar los resultados en los datos relevantes de la investigación. **Resultados:** Después del entrenamiento, los resultados de las dos pruebas de sensibilidad en los jóvenes jugadores de baloncesto fueron significativamente superiores a los del grupo de control, con diferencias significativas ($P < 0,05$); no hubo diferencias significativas en los dos índices de calidad sensitiva de los atletas del grupo de control antes y después del entrenamiento ($P > 0,05$). **Conclusión:** Se demostró que el entrenamiento de la estabilidad del núcleo abdominal desempeña un papel positivo en la mejora del equilibrio y la agilidad de los jóvenes jugadores de baloncesto. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptores: Núcleo Abdominal; Baloncesto; Educación y Entrenamiento Físico.



INTRODUCTION

Basketball is a collective sport with the characteristics of confrontation, competition, fun, viewing, and commerciality. Basketball has the characteristics of strong physical confrontation, which requires that in basketball competition, training, teaching and other activities, participants and training personnel need to have good speed quality, strength quality, basketball skills and tactics. Sensitive quality is a combination of strength quality, speed quality, flexibility quality and other qualities.¹ A Moré-Pacheco points out in Teaching and Training Basketball Mobility: Basketball movement technology is a general term for various action methods used by basketball players to control their bodies to change position, direction, speed, and strive for height in basketball games.² Seo D put forward in the article "Analysis of Technical Training Methods of Basketball Footwork in Colleges and Universities": "Foot action is a basketball player's control of the body during the game, changing the body's center of gravity, changing speed and body direction according to the needs of the game, coordinate the position of the body on the ground and space, obtain body balance, and quickly and agilely complete a series of basketball movements". The concepts of foot movement techniques in basketball are all related to the movement of body parts and the center of gravity.³ Kipp put forward in "Research on the Status Quo and Countermeasures of Physical Fitness "Soft Quality" Training of High-level Men's Basketball Players in Chinese Colleges and Universities": Sensitive quality is an athlete's ability to quickly change position, change movements and adapt to changes, and it is the comprehensive performance of athlete's sports skills and various qualities in sports.⁴ Garcia F pointed out in "Research on Physical Fitness Training of Chinese Men's Basketball Team": Agility refers to the ability to change the direction of the body quickly, explosively, and controlled in motion.⁵

To sum up, scholars at home and abroad have a high degree of unity in the cognition of sensitivity, and they all have the following common points: The stimuli given by sudden changes in external conditions, the randomness of human action selection, the stability of the center of gravity, the rapid changes in speed and direction, and the ability to complete actions. From this, it can be seen that sensitivity is a comprehensive quality, and it has high requirements for the choice of signal stimuli, the ability to control the center of gravity to complete the movement, the speed of movement and the change of movement direction.^{6,7}

METHOD

Research object

The author's research object is the effect of core stability training on the agility of college basketball players. The basic information of the experimental subjects is shown in Table 1.

The author takes teenage male basketball players around the age of 20 in the basketball club as the experimental subjects. The experiment was carried out during the summer vacation of 2018, starting from July

Table 1. List of basic conditions of experimental subjects.

Serial number	Age	Height	Weight	Years	Damage
1	21	191	88	5	None
2	20	185	84	6	None
3	21	182	78	5	None
4	19	180	74	6	None
5	20	182	76	4	None
6	21	184	80	5	None
7	19	186	83	6	None
8	20	188	80	7	None
Average	20.1	184.8	80.4	5.5	None
Standard deviation	0.8	4.8	6.1	0.9	

10th to the end of September 4th, for a total of 8 weeks, schedule 2 workouts per week, 45 minutes each. Take the T-run test and the Z-type test as the sensitivity test indicators. Before and after the experiment, 80 young athletes were tested and randomly divided into an experimental group and a control group; The experimental group carried out core stability training, and the control group used conventional training.⁸

Research methods

Documentation method

According to the author's research needs, through the library, reference room and electronic reading room, China National Knowledge Infrastructure (CNKI), Wanfang Database (WFPD), etc., have collected information about core strength training, core stability training, and sensitive quality of basketball players, nearly 100 books and materials, understand the concept definition of core stability training and agility quality.⁹ On the basis of previous research, the training methods of core stability and the related evaluation indicators of sensitive quality are summarized, which provides the corresponding theoretical basis for the author's research.

Questionnaire distribution and recovery

In this survey, a total of 12 questionnaires were distributed to basketball coaches of the basketball team, physical education colleges and other schools, and 12 were returned, there were 12 valid questionnaires in total, with a recovery rate of 100% and an effective rate of 100%.

Validity test of the questionnaire

In order to improve the rationality of the content of the questionnaire as much as possible, experts were interviewed on the validity of the questionnaire before the questionnaire was distributed, the validity statistics are shown in Table 2.

Mathematical Statistics

According to the needs, the statistical software SPSS19.0 was used, the test results of basketball players in the experimental group and control group before and after the experiment were routinely processed and tested for significance, among them, independent samples T test was performed between groups, and paired samples T test was performed within groups, P<0.05 was used to achieve a significant level, and P<0.01 was considered a very significant level.¹⁰

Ethical Compliance

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

RESULTS

Test comparison of sensitivity quality between experimental group and control group before training

As shown in Table 3, before training, the experimental group compared with the control group of teenage basketball players: The average scores of the "T" running test were 9.79±0.56s, 9.55±0.63s; The "Z" running scores were 7.82±0.48s, 7.63±0.56s; The two sensitive qualities of the experimental group were worse than those of the control group (P>0.05), indicating that the sensitive qualities of the two groups of young basketball players were basically at the same level before the experiment.

Test comparison of sensitivity quality between experimental group and control group after training

As shown in Table 4, after training, the two groups of young basketball players' performance on two sensitivity tests were improved to varying degrees. After training, the experimental group compared

Table 2. Statistical Table for validity analysis.

Number of experts	Very reasonable	Basically reasonable	Reasonable	Unreasonable	Very unreasonable
12	2	6	4	0	0
proportion	16.7%	50%	33.3%	0	0

Table 3. Comparison of the test results of sensitivity quality between the experimental group and the control group before and after training (unit: s).

Group	Test Method	Test Group	Control Group	T	P
Before Training	"T" Run	9.8±0.6	9.6±0.6	-0.20	0.84
	"Z" Run	7.8±0.5	7.6±0.6	0.66	0.52
After Training	"T" Run	8.8±0.3	9.4±0.6	-2.22	0.047*
	"Z" Run	7.0±0.01	7.6±0.6	-0.91	0.049*

(Note: * means $P < 0.05$; ** means $P < 0.01$).**Table 4.** Comparison of sensitivity test results before and after training between the experimental group and the control group. Unit: s

Group	Test method	Before training	After training	T	P
Test group	"T" run	9.8±0.6	8.8±0.3	4.7	0.003**
	"Z" run	7.8±0.5	7.0±0.04	7.2	0.000**
Control group	"T" run	9.6±0.6	9.4±0.6	2.3	0.06
	"Z" run	7.6±0.6	7.6±0.6	2.0	0.09

(Note: * means $P < 0.05$; ** means $P < 0.01$).

with the control group of teenage basketball players: The "T" running results were 8.84 ± 0.31 s, 9.41 ± 0.60 s, respectively; the "Z" running results were 7.01 ± 0.04 s, 7.55 ± 0.62 s, and the two sensitivity test scores of the experimental group were better than those of the control group, and significant difference ($P < 0.05$). It shows that core stability training has a positive effect on improving the agility of young basketball players, and the training effect is significantly better than traditional conventional training methods.

Test comparison of sensitivity quality before and after training between experimental group and control group

As shown in Table 4, in the 2-month experiment, the experimental group's "T" running scores before and after training were 9.79 ± 0.56 s and 8.84 ± 0.31 s, an increase of 0.64s, an increase of 6.79%, and there was a very significant difference ($P < 0.01$); The "Z" running test was 7.82 ± 0.48 s, 7.01 ± 0.04 s, an increase of 0.81s, an increase of 10.31%, and there was a very significant difference ($P < 0.01$). In the control group, the "T" running scores before and after training were 9.55 ± 0.63 s, 9.41 ± 0.60 s, an increase of 0.14s,

an increase of 1.51%, and there was no significant difference ($P > 0.05$); The "Z" running results were 7.63 ± 0.56 s and 7.55 ± 0.62 s, an increase of 0.08s, and the increase was only 1.10%, and there was no significant difference ($P > 0.05$). Both were improved, but the increase was small.

DISCUSSION

The two test indicators selected by the author, "T" running and "Z" running, can reflect the athlete's good mobility, from the comparison of the two groups of athletes before and after the experiment, it can be seen that although the two groups of athletes have improved to varying degrees in the two sensitivity test indicators after the two-month test, the improvement rates are significantly different. From the test results between the groups: After training, the two sensitivity test results of the young basketball players in the experimental group were significantly higher than those in the control group, and the difference was significant ($P < 0.05$), it shows that core stability training has a significant effect on the development of youth basketball players' agile quality, which is required for the development of modern basketball; After a 2-month experiment in the youth basketball players in the control group, although the two sensitive quality test indicators improved, the improvement was relatively small, and the differences in the two sensitive quality indicators of the athletes in this group before and after training were not statistically significant. ($P > 0.05$).

CONCLUSION

When carrying out basketball-related sensitivity training, we should pay attention to the limit of exercise load that can be endured by participants of different ages and sports levels, targeted training activities, avoid the mental fatigue and fatigued physical state of athletes due to excessive load intensity, and ensure that athletes are in good physical condition and have a high attitude when participating in training. During the training activities, pay attention to the physical adaptation of the athletes, and the training methods should be updated regularly to avoid the occurrence of single training methods, athletes get bored. Coaches should actively adopt different training methods, continuously provide new stimulation to athletes, so as to improve the enthusiasm of athletes for training and improve the training effect.

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