CONSEQUENCES OF COMPOUND TRAINING ON THE MOBILITY OF TENNIS PLAYERS

CONSEQUÊNCIAS DO TREINAMENTO COMPOSTO SOBRE A MOBILIDADE DOS JOGADORES DE TÊNIS

CONSECUENCIAS DEL ENTRENAMIENTO COMPUESTO EN LA MOVILIDAD DE LOS TENISTAS

Original Article
Artigo Original
Artículo Original

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ABSTRACT

Introduction: Considering the sports practice of tennis, several researchers are looking for the reasons that can benefit the movement technique of its players. It is currently believed that the use of compound training can provide beneficial results to tennis players. Although there is some empirical evidence, this theory lacks scientific references for developing based mobility training for its practitioners. Objective: Study the consequences of combined training on the mobility of tennis players. Methods: The experimental and statistical-mathematical method was adopted in 36 young tennis players. Divided equally between the experimental and control group, the former received 6 weeks of training by a compound experimental protocol. A comparative study was conducted on deceleration ability, mobility, and other indicators with the control group, which received conventional training in the same period. Results: In the standard 10m short-run deceleration test, the experimental and control groups showed no significant differences (P=0.66, 0.59>0.05). In terms of the completion time of the acceleration of the 30m run and the completion time of the fan-shaped run, simulating the movement characteristics of tennis shoes, there was a significant difference (P=0.11>0.05, P=0.82>0.05). Conclusion: Adding compound training into traditional tennis training can positively affect compound deceleration ability and movement ability among young tennis players. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Physical Fitness; Physical Education and Training; Tennis.

RESUMO

Introdução: Considerando a prática esportiva do tênis, vários pesquisadores procuram os motivos que possam beneficiar a técnica de movimento nos seus jogadores. Atualmente acredita-se que o uso do treinamento composto possa fornecer resultados benéficos aos praticantes de tênis. Embora haja alguma evidência empírica, essa teoria carece de referências científicas para o desenvolvimento embasado de treinos de mobilidade aos seus praticantes. Objetivo: Estudar as consequências do treinamento combinado sobre a mobilidade nos jogadores de tênis. Métodos: Adotou-se o método experimental e estatístico-matemático em 36 jovens tenistas voluntários. Divididos igualmente entre grupo experimental e controle, o primeiro recebeu 6 semanas de treinamento por um protocolo experimental composto. Foi realizado um estudo comparativo sobre a capacidade de desaceleração, mobilidade e outros indicadores com o grupo de controle, que recebeu o treinamento convencional no mesmo período. Resultados: No teste padrão de desaceleração de corrida curta de 10m, tanto o grupo experimental quanto o grupo controle não apresentaram diferenças significativas (P=0,66, 0,59>0,05). Em termos do tempo de conclusão da aceleração da corrida de 30m e do tempo de conclusão da corrida em forma de leque, simulando as características de movimento do tênis, houve diferença significativa (P=0,11>0,05, P=0,82>0,05). Conclusão: Adicionar treinamento composto no treinamento tradicional do tênis pode proporcionar um resultado positivo na capacidade de desaceleração composta e a capacidade de movimentação entre jovens jogadores de tênis. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

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

RESUMEN

Introducción: Teniendo en cuenta la práctica deportiva del tenis, varios investigadores buscan las razones que pueden beneficiar la técnica de movimiento en sus jugadores. Actualmente se cree que el uso del entrenamiento compuesto puede proporcionar resultados beneficiosos a los tenistas. Aunque hay algunas pruebas empíricas, esta teoría carece de referencias científicas para el desarrollo de la formación en movilidad basada en sus practicantes. Objetivo: Estudiar las consecuencias del entrenamiento combinado en la movilidad de los tenistas. Métodos: Se adoptó el método experimental y estadístico-matemático en 36 jóvenes tenistas voluntarios. Divididos a partes iguales entre el grupo experimental y el de control, los primeros recibieron 6 semanas de entrenamiento mediante un protocolo experimental compuesto. Se realizó un estudio comparativo sobre la capacidad de desaceleración, la movilidad y otros indicadores con el grupo de control, que recibió un entrenamiento convencional en el mismo periodo. Resultados: En la prueba estándar de desaceleración en carrera corta de 10 metros, tanto el grupo experimental como el de control no mostraron diferencias significativas (P=0,66, 0,59>0,05). En cuanto al tiempo de finalización de la aceleración de la carrera de 30 metros y el tiempo de finalización de la carrera en forma de abanico, simulando las características

de movimiento de la zapatilla de tenis, hubo una diferencia significativa (P=0,11>0,05, P=0,82>0,05). Conclusión: Añadir el entrenamiento compuesto al entrenamiento tradicional de tenis puede proporcionar un resultado positivo en la capacidad de desaceleración compuesta y la capacidad de movimiento entre los jóvenes tenistas. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptores: *Aptitud Física; Educación y Entrenamiento Físico; Tenis.*

DOI: http://dx.doi.org/10.1590/1517-8692202329012022_0625 Article received on 11/01/2022 accepted on 11/30/2022

INTRODUCTION

With the continuous development of tennis, the development of men's tennis technology tends to be refined and comprehensive, in the fierce confrontation, because tennis players need to switch between offense and defense frequently, as a result, players need to move back and forth quickly to complete the shot at the same time, body stability is required to ensure hitting stability.[1]

Heldmaier F V pointed out in the article that the footwork movement should be reasonable, fast and precise. The perfect combination is reasonable batting and footwork techniques to get a better chance of hitting the ball, the purpose of learning footwork is to play the ball more reasonably.[2] Wang P believes that when volleying in the forehand position, there are usually three situations: The incoming ball in the forehand position, the incoming ball farther from the body, and the incoming ball directly facing the body, no matter what kind of ball comes, you need to make a quick response, and the fast movement makes the center of gravity drop quickly to hit the ball.[3] The action of the forehand volley can be well combined with the backhand, the difference between the two is that the left and right feet step forward. At the same time, it should be noted that the most important part of the volley is the split step before the left and right feet step out.[4] Crowley-Henry M thinks that the side-to-back and rear-side hits are the main hitting directions of high-pressure balls, and the most commonly used footwork is cross step and sliding step.[5] At the same time, when playing a high ball, keep one foot parallel to the bottom line, and the other toe slightly towards the right net post, and must face the incoming ball from the side. In the article, Xiang L believes that there are many factors such as time, venue and other factors in the movement of tennis footwork, therefore, it is normal to encounter many problems in training, if you want to improve your footwork movement ability, you must pay attention to high efficiency and proper training methods, in footwork training, a variety of methods such as circuit training and repetition training should be used.[6] Li H pointed out that there are many phenomena of slow response when hitting the ball, because the subsequent movement is too slow, the hitting position is wrong, and the body cannot maintain balance.[7]

Starting from the reality of tennis, the author seeks out the reasons that affect the movement technique of players in tennis, propose the use of compound training to provide professional training methods, provide scientific reference for the development of tennis among teenagers.

METHOD

Research object

The author took 36 young male tennis players aged 15.9±0.6 as the research objects, and sorted them in descending order of age, 18 people will be drawn at the interval of odd and even serial numbers, the experimental group (N1) and the control group (N2) were formed.

Experimental method

The same functional training was performed for the experimental group and the control group for 6 weeks, and then the experimental group was administered twice a week for 6 weeks, each 45min compound training mainly includes compound strength training and compound deceleration training; The control group was carried out according to the original mobile technology teaching plan, as shown in Table 1 below.

Mathematical Statistics

Use SPS19.0 to carry out statistical processing on the experimental data.[8]

Ethical Compliance

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

RESULTS

Evaluation of compound deceleration ability of experimental group and control group

From the analysis in Table 2, there is no significant difference between the number of deceleration steps and the deceleration time between the experimental group and the control group in the standard 10m sprint deceleration test (P=0.66, 0.59>0.05), it can be determined that there is no significant difference in compound deceleration ability between the two groups before the experiment; According to the evaluation criteria of the National Strength and Conditioning Association (NSCA) compound deceleration ability: Under the condition of short and full-speed run-up, the speed of the human body is reduced to 0 within seven steps, and the stability of the body can be maintained, it can be considered that the compound deceleration ability is qualified; The compound deceleration ability of the experimental group and the control group were both unqualified, and the athletes in both groups had poor deceleration ability in rapid movement, it is suggested that both the experimental group and the control group have a higher risk of sports injury during the transition from high-speed run-up to deceleration braking.

Evaluation of the acceleration ability of the experimental group and the control group

From the analysis of Table 3, it can be seen that: There was no significant difference in the completion time of the 30m running acceleration

Table 1. 6-week program of functional training in experimental group and control group.

Time	Training plan
1-2 weeks	Compound strength training, compound deceleration training
2-4 weeks	
4-6 weeks	

Table 2. Comparison of deceleration ability between experimental group and control group.

Project	Test group (N1=18)	Control group (N2=18)	Sig. (Bilateral)
7-step deceleration (step)	9.3±1.0	9.1±1.1	0.66
Deceleration time (s)	0.8±0.1	0.9±0.1	0.59

P>0.05.

between the experimental group and the control group (P=0.11>0.05), it can be considered that there is no essential difference between the experimental group and the control group in terms of the stance (standard half-squatting position, eye level) of the tennis exercise, and the acceleration ability of running 30m from a static state.

Evaluation of the dynamic stability of the experimental group and the control group

The authors used movement patterns to screen for FMS as a method of assessing the dynamic stability of the body in the experimental and control groups. Action pattern FMS screening is simple and easy to implement, with high effectiveness,[9] it is an action safety screening tool commonly used by professional teams in major leagues in North America, the screening evaluates the seven basic functional movements of the human body to observe the reasonable degree of stability, flexibility and symmetry of functional movements, the full score of each screening item is 3 points, and the total score is 21 points, if the FMS score is lower than 14 points, the risk of sports injury will increase by 3 times, among them, the squat mode, the leg lift mode, the lunge retreat mode and the rotation stabilization mode are the effective observation indicators to analyze the human body's squatting, single-leg support leg raising, lunge braking and rotation stabilization capabilities.

From the analysis of Table 4, it can be seen that: The results of FMS screening of action patterns in the experimental group and the control group, it showed that the mean total score of the experimental group was slightly higher than that of the control group, but there was no statistically significant difference (P=0.56>0.05); Through the above analysis, it can be considered that there is no qualitative difference in dynamic stability between the experimental group and the control group.

Table 3. Comparison of the acceleration ability between the experimental group and the control group.

Project	Test group (N1=18)	Control group (N2=18)	Sig. (Bilateral)
Fan run(s)	16.0±0.8	15.9±1.2	0.82
30m run(s)	4.6±0.1	4.4±0.3	0.11

P>0.05.

Table 4. Comparison of FMS action screening between the experimental group and the control group.

Project	Test group (N1=18)	Control group (N2=18)	Sig. (Bilateral)
Squat mode	2.4±0.6	2.6±0.5	0.26
Leg lift mode	2.1±0.5	2.2±0.5	0.74
Lunge retreat mode	2.2±0.5	2.4±0.5	0.23
Supine leg lift mode	2.8±0.4	2.5±0.7	0.10
Shoulder rotation mode	2.3±0.7	2.3±0.6	0.81
Sit-up mode	2.4±1.1	2.4±0.8	0.87
Rotational stabilization mode	2.0±0.3	1.8±0.5	0.15
Overall FMS score	16.1±1.3	15.9±1.8	0.56

P>0.05.

DISCUSSION

In the current process of physical fitness training of athletes, compound training should be paid attention to. Independent simultaneous and physical training coordinate with each other, and the two complement each other to promote the development of compound training. In the composition of compound training, compound training and centripetal training are two contents, therefore, it is necessary to attach great importance to the high-speed conversion ability of compound force and centripetal force, which is in line with the current physical development and physical function development requirements of young people, systematically carry out training, so that the current training can meet the technical development requirements of youth tennis.[10] In the teaching and training of tennis footwork, the training of athletes' footwork movement ability should be strengthened, it is recommended to use the method of adding training methods to conventional training methods, which can improve tennis players' footwork movement ability better and faster.

Due to the limitation of practical conditions, the author lacks in the selection of experimental objects and the design of experimental time, it is suggested that qualified scholars can conduct more in-depth research on this experiment, strive to conduct more detailed and in-depth research, in order to find more precise and convincing conclusions, it can provide a more instructive basis for training.

CONCLUSION

Due to the lack of systematic compound deceleration ability training in traditional tennis mobile training, the compound ability of young tennis players is poor, compound and concentric high-speed transition sports have a high risk of injury, which seriously affects the ability of young tennis players to move at high speeds in multiple directions, stance stability and body posture after braking. It is suggested to add systematic compound training content in tennis mobile technology training, and design training methods according to the special characteristics of tennis high-speed changing direction, and integrate compound training into the physical training system. It is suggested that all sports with the characteristics of compound centripetal high-speed conversion and instantaneous direction change, such as badminton, basketball and football, should systematically arrange compound training in physical training according to the characteristics of the project's direction change.

ACKNOWLEDGMENT

Project 1: Teaching Reform Project: 2021 Sichuan Province Online and Offline Mixed First-Class Undergraduate Course ("Tennis").

Project 2: Teaching Reform Project: Sichuan Province Curriculum Ideological and Political Demonstration Course in 2022 ("Tennis").

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

AUTHORS' CONTRIBUTIONS: Each author made significant individual contributions to this manuscript. Xiaoshan Luo: writing and data analysis; Yuxuan Yang: article review and intellectual concept of the article.

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