INFLUENCES OF BALANCE TRAINING ON THE PHYSICAL FITNESS OF MARTIAL ARTS ATHLETES

INFLUÊNCIAS DO TREINO DE EQUILÍBRIO SOBRE A APTIDÃO FÍSICA DOS ATLETAS DE ARTES MARCIAIS

INFLUENCIAS DEL ENTRENAMIENTO DE EQUILIBRIO EN LA APTITUD FÍSICA DE ATLETAS DE ARTES MARCIALES

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ABSTRACT

Introduction: Chinese martial arts constitute an integral sport, demanding high capacity and physical fitness from its athletes. It is believed that functional balance training can enhance the performance of its athletes, as it strengthens and tones the muscles, stimulating the active proprioception of the executed movements. Objective: This paper investigates the effect of balance training on martial arts athletes and its impact on the execution of complex sports movements. Methods: Under experimental control, 100 martial arts athletes were selected and divided into two groups without statistical differences to perform the experiment. The experimental group added balance training, while the control group followed the usual training script. Sports fitness indices were measured before and after the intervention for statistical analysis. Results: The data regarding the balance index of the experimental group pre was 7.00±0.52, and after the experiment, it went to 8.40±0.47; the functional indices increased from 7.50±0.55 to 8.46±0.42. No statistically relevant changes were found in the control group. Conclusion: Functional balance training can complement daily training routines for greater benefits in martial arts athletes. The improvement of active proprioception statistically increases the ability of its practitioners in the execution of complex movements. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Martial Arts; Physical Education and Training; Postural Balance; Proprioception.

RESUMO

Introdução: As artes marciais chinesas constituem um esporte integral, exigindo alta capacidade e aptidão física de seus atletas. Acredita-se que o treinamento funcional de equilíbrio possa potencializar o desempenho de seus atletas, na medida em que fortalece e tonifica a musculatura estimulando a propriocepção ativa dos movimentos executados. Objetivo: Este artigo investiga o efeito do treino de equilíbrio nos atletas de artes marciais e os seus impactos na execução de movimentos esportivos complexos. Métodos: Sob um controle experimental, 100 atletas de artes marciais foram selecionados e divididos em dois grupos sem diferenças estatísticas para realizar o experimento. O grupo experimental adicionou o treino de equilíbrio, enquanto o grupo controle seguiu o roteiro de treino habitual. Índices de aptidão física esportiva foram mensurados antes e após a intervenção para análise estatística. Resultados: Os dados referentes ao índice de equilíbrio do grupo experimental prévios foram 7,00±0,52, e após o experimento foram para 8,40±0,47; os índices funcionais elevaram-se de 7,50±0,55 para 8,46±0,42. Não foram encontradas alterações estatisticamente relevantes no grupo controle. Conclusão: O treino funcional de equilíbrio pode ser adicionado complementarmente na rotina de treinamento diário para maiores benefícios dos atletas de artes marciais. O aprimoramento da propriocepção ativa aumenta estatisticamente a capacidade de seus praticantes na execução de movimentos complexos. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores: *Artes Marciais; Educação Física e Treinamento; Equilíbrio Postural; Propriocepção.*

RESUMEN

Introducción: Las artes marciales chinas constituyen un deporte integral, exigiendo alta capacidad y aptitud física de sus atletas. Se cree que el entrenamiento funcional del equilibrio puede potencializar el rendimiento de los atletas, en la medida en que fortalece y tonifica la musculatura estimulando la propiocepción activa de los movimientos ejecutados. Objetivo: Este trabajo investiga el efecto del entrenamiento del equilibrio en atletas de artes marciales y sus impactos en la ejecución de movimientos deportivos complejos. Métodos: Bajo control experimental, 100 atletas de artes marciales fueron seleccionados y divididos en dos grupos sin diferencias estadísticas para realizar el experimento. El grupo experimental añadió entrenamiento de equilibrio, mientras que el grupo de control siguió el guion de entrenamiento habitual. Se midieron los índices de aptitud deportiva antes y después de la intervención para su análisis estadístico. Resultados: Los datos relativos al índice de equilibrio del grupo experimental pre fueron de 7,00±0,52, y tras el experimento pasaron a 8,40±0,47; los índices funcionales aumentaron de 7,50±0,55 a 8,46±0,42. No se encontraron cambios estadísticamente relevantes en el grupo de control. Conclusión: El entrenamiento del equilibrio funcional puede añadirse complementariamente en la rutina diaria de entrenamiento para mayores beneficios de los atletas

de artes marciales. La mejora de la propiocepción activa aumenta estadísticamente la habilidad de sus practicantes en la ejecución de movimientos complejos. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Artes Marciales; Educación y Entrenamiento Físico; Equilibrio Postural; Propiocepción.*

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INTRODUCTION

This paper takes the influence of balanced training on the complex movements of Chinese martial arts athletes as the research material, and uses the methods of literature, mathematical statistics, comparative analysis and logical analysis to explain and analyze the discussion of "balance" in the development of martial arts.[1] This paper summarizes the evolution of the strategic layout of Chinese martial arts, studies the current situation of the development of Chinese martial arts, and puts forward the layout and measures for the balanced training and development of martial arts.[2] Balanced training is to comprehensively improve the success rate of martial arts athletes in performing complex actions, highlight the performance of martial arts actions, guide the comprehensive development of martial arts and sports, and promote the improvement of the number and quality of innovative projects based on comprehensive development.[3] The rise of Chinese martial arts cannot be separated from the strategic blueprint for the development of martial arts at all stages, especially the arrangement and priority development of some important training programs, as well as the implementation of the "Olympic Glory Plan" at all stages, which has rapidly improved our strength and played an important role in a certain period, but also brought some weaknesses.[4] Although Chinese Wushu athletes have made some achievements, the current situation is not optimistic. The strength of some events has declined, and various imbalances have led to a low success rate of complex action effects, which reminds us that we need to continue to work hard. In order to promote the balanced training of the development of Chinese martial arts, we adopt the strategies of "four effective" and "four comprehensive".[5] That is, effectively organize and respect the development of martial arts, effectively organize the reasonable layout of the project, effectively improve the precision control level of martial arts training, effectively strengthen the reform of martial arts system, comprehensively promote the dynamic control of martial arts, strengthen the cultivation and development of martial arts talents, and comprehensively strengthen the impact of Chinese martial arts athletes on complex movements.[6] Therefore, this paper discusses the effect of balanced training on the completion of complex movements of Wushu athletes. The research attempts to use the control experiment method to study the influence of the weight-bearing training method on improving the whip leg strength of Wushu athletes.[7]

METHOD

Research object

In this paper, 100 professional Wushu athletes were selected as the subjects of the experiment, and there was no significant difference in the physical indicators of the selected subjects. The study and all the participants were reviewed and approved by Ethics Committee of Guangxi Police College (NO.GXPCF055). The average age of the subjects is 19-20 years old, the height is about 176-178 cm, and the average weight is 67-69 kg. The 100 martial arts athletes were randomly divided into two groups, the experimental group and the control group, and were trained for 8 weeks. The experimental group received 8 weeks of balance training. The control group did not receive any balance ability training, but only daily training. During the eight-week experiment, 100 martial arts athletes maintained normal work and rest time and normal eating habits. The basic physical conditions of the subjects are shown in Table 1.

Experimental method

The brand is characterized by the balance master balance training tester, which is a global industry leader in developing computer systems and equipment for detecting and rehabilitating human balance and movement disorders. The equipment guides athletes to exercise on the platform. The experimental subjects in this study are all right-handed people. The test index is the test of standing on one leg. The time (seconds) to complete specific activities is the test score.

RESULTS

The influence of balanced training on the balance and stability of Wushu athletes

Table 2 shows the changes of balance and stability data of martial arts athletes in the experimental group before and after the training experiment.

Through the analysis of the data before and after the experiment comparing the balance and stability changes of the martial arts athletes in the experimental group, there are changes in the balance and stability of the martial arts athletes in the process of dynamic eye closure and dynamic eye opening. In the comparison of various data, it is not difficult to find that the ability of the martial arts athletes after the experiment is significantly lower than the data before the experiment, whether the feet are in dynamic balance or static eye closure, Or when you open your eyes statically, the ability of Wushu athletes after the experiment is higher than that before the experiment, but the overall improvement is not very obvious; However, in the experiment of maintaining dynamic balance and static balance of the right foot, we found that the data before the experiment improved significantly, but the data of the right foot static eye-opening movement was not ideal. Its value before the experiment was significantly higher than the value after the experiment, with a particularly large difference.

Table 3 shows the changes of Wushu athletes in the control group before and after the balance and stability experiment.

Table 1. Basic information of two groups of martial arts athletes.

Group	Age (years)	Height (cm)	Body weight (kg)	Years of exercise (years)
Experience group	19.66±0.948	176.33±3.759	69.78±5.216	2.42±0.516
Control group	20.77±0.963	178.22±3.189	67.12±3.672	2.17±0.636

Table 2. Changes of balance and stability of wushu athletes in experimental group.

Primary classification	Secondary classification	Before experiment	After experiment	T	P
Both feet	Dynamic equilibrium	1698.47±310.019	1652.77±272.159	2.9101	<0.05
	Static eye closure	485.35±230.650	436.70±184.573	0.8021	<0.01
	Static eye opening	1421.54±645.127	1395.62±528.256	0.6998	<0.05
Right foot	Dynamic equilibrium	2017.88±502.714	1602.59±199.896	2.3880	<0.01
	Static eye closure	655.71±410.648	314.34±126.704	2.4358	<0.05
	Static eye opening	2650.16±1254.102	2400.00±867.592	2.1134	<0.05

Table 3. Changes of balance and stability of Wushu athletes in the control group.

Primary classification	Secondary classification	Before experiment	After experiment	T	P
Both feet	Dynamic equilibrium	1759.14±252.090	1731.12±232.273	2.1426	>0.05
	Static eye closure	484.64±218.984	447.60±163.945	1.0481	>0.05
	Static eye opening	1516.28±773.566	1479.14±670.360	0.9085	>0.05
Right foot	Dynamic equilibrium	2004.41±506.065	1880.39±395.919	1.7258	>0.05
	Static eye closure	636.34±407.111	602.01±364.303	0.7574	>0.05
	Static eye opening	2649.07±1237.879	2638.41±998.074	0.7969	>0.05

Through the comparison between the two feet and the right foot of the martial arts athletes in the control group before and after the experiment of dynamic balance, static eye closure, and static eye opening, it is found that the data of the martial arts athletes before and after the experiment of static eye opening of both feet and dynamic balance of the right foot are significantly improved, which proves that this contrast experiment has great help for the balance and stability of martial arts athletes, and the static eye closure of both feet The improvement effect of the right foot dynamic balance after the experiment is not obvious compared with that before the experiment. Therefore, the data of the control group before the experiment has a great improvement on the balance and stability of martial arts athletes compared with the data after the experiment. However, the dynamic balance of both feet and the static eye opening of the right foot improved slightly before and after the comparative experiment.

Influence of balanced training on the completion effect of complex movements of Wushu athletes

Table 4 shows the changes in the completion effect of complex movements of martial arts athletes in the experimental group.

By comparing the complex movement data of 50 martial arts athletes in the experimental group, it can be found that after 8 weeks of training intervention, the spinning training and twirling foot vertical fork training of martial arts athletes have significantly improved. Compared with the data of 50 martial arts athletes in the control group before and after the experiment, it is found that there is no statistically significant difference in the complex movement training of martial arts athletes in the control group before and after the experiment. The data improvement of cyclone foot connecting with vertical fork and cyclone foot connecting with horse step is also not obvious. After the experiment, when comparing the data of Wushu athletes in the experimental group and the control group, we can detect that there is a significant difference. Among the 50 martial arts athletes who received balance training in the experimental group, the coordination of the whirlwind movement after the experiment was significantly better than that in the control group, especially the training of the whirlwind foot to the horse step was significantly better than that in the control group, and the difference was statistically significant.

Comparing the data of Wushu athletes in the experimental group after the experiment, it can be found that the 50 Wushu athletes in the experimental group who have been trained in complex movements after the experiment are significantly better than the martial artists before the experiment.

Table 5 shows the changes in the effect of complex movements of the control group martial arts athletes before and after the experiment.

Wushu athletes in the control group completed different complex movements before and after the experiment, and their effects changed

Table 4. Changes in the completion effect of complex movements of Wushu athletes in the experimental group.

Classification	Before experiment	After experiment	T	P
Spinon	7.00±0.525	8.40±0.476	0.3217	<0.05
Whirlwind foot to horse step	7.50±0.559	8.46±0.427	0.1255	<0.01
Cyclone foot to vertical fork	7.28±0.357	8.38±0.295	0.2461	<0.05

Table 5. Changes in the completion effect of complex movements of Wushu athletes in the control group.

Classification	Before experiment	After experiment	T	P
Spinon	6.37±0.938	7.02±0.728	0.1345	<0.05
Whirlwind foot to horse step	6.70±1.023	7.20±1.049	0.1637	>0.05
Cyclone foot to vertical fork	7.01±1.043	7.89±1.482	0.2683	<0.05

significantly. When completing the complex movements of whirlwind, whirlwind foot to horse step, whirlwind foot to vertical fork, Wushu athletes can better complete the above actions after the experiment.

According to the P value<0.05, there is a significant difference in the training of the twister before and after the experiment in the control group, and there is no significant difference in the training of the twister foot connected with the vertical fork. This shows that the balanced training ability improves the process of Wushu athletes completing complex movements. This is mainly reflected in the whirlwind training, the whirlwind foot to the vertical fork training, and the impact on the whirlwind foot to the horse step is not obvious. The T value of the whirlwind foot to vertical fork training in the control group is the largest, with the data of 0.2683, followed by the whirlwind foot to horse step training in the control group, with the data of 0.1637, but only the T value of the rotation training in the control group is the smallest, indicating that after normal training, the effect of the whirlwind training of Wushu athletes will be reduced.

DISCUSSION

Accurate inspection and evaluation of complex movements of martial arts athletes is an important requirement for coaches to formulate balanced training plans. Therefore, establishing appropriate and accurate test and evaluation methods is the key to balanced training of martial arts athletes. At present, the research on the examination and evaluation of complex movements of Chinese Wushu athletes is still a new topic, and there are few related studies. In order to further improve the completion level of complex movements of high quality, good and bad martial arts athletes and promote the training effect of complex movements in martial arts, this paper discusses in detail the test and assessment methods of martial arts athletes and their specific actions and requirements from the aspects of data collection, logical analysis, expert interviews, training evidence, etc. In order to improve the competitive quality of martial arts athletes and provide reference for researchers engaged in this field, the pioneering development of Chinese martial arts should adhere to the concept of accurate positioning, fair selection, highlighting efficiency, and taking into account the concept of fair layout. Combined with the current development situation and future prospects of Chinese martial arts, we will implement advantageous projects, potential benefit projects, excellent traditional martial arts projects, basic martial arts sports projects, etc. We need to take different development measures for different projects.

For martial arts special sports, while investigating the completion effect of complex movements of martial arts athletes before and after

balance training, the test classification adopted by the experimental group in this paper is: dynamic balance of both feet, static eye closure of both feet, static eye opening of both feet, static eye closure of right foot, static eye opening of right foot, and static eye opening of right foot. The results of dynamic balance test of right foot and static eye opening test of right foot have significantly improved; The effect of dynamic balance test and static eye closure test on both feet was not significantly improved. This paper uses the test results of changes in balance and stability of Wushu athletes when checking the balance training of Wushu athletes before and after training.

CONCLUSION

Through the research of this paper, the balance training summarizes the completion effect of Wushu athletes when performing complex movements. In daily Wushu training, adding balance training can effectively improve the influence of Wushu athletes on the completion of complex movements. At the same time, we will train Wushu athletes in the whirlwind movement, the whirlwind foot to the horse step and the whirlwind foot to the vertical fork. Therefore, the improvement of the completion effect of the complex movements of Wushu athletes requires a higher level of Wushu skills of Wushu athletes. When carrying out balanced training, it is necessary to let professional coaches guide Wushu athletes to carry out training to prevent physical injury caused by improper exercise. At the same time, for martial arts athletes who have not had balance training before, balance training of primary difficulty should be carried out at the first time of balance training. And gradually transition to balance training with medium difficulty. With this gradual overtraining method, Wushu athletes have a good transition period. Wushu provides a buffer stage for athletes' body. The training ability of the experimental group of martial arts athletes with balanced training has been significantly improved, which can control the completion of martial arts movements more stably. It shows that balance training can effectively improve the balance and stability of martial arts athletes.

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