EFFECTS OF STRENGTH TRAINING ON PHYSICAL STABILITY IN DANCERS

EFEITOS DO TREINAMENTO DE FORÇA SOBRE A ESTABILIDADE FÍSICA DOS DANÇARINOS

EFECTOS DEL ENTRENAMIENTO DE FUERZA EN LA ESTABILIDAD FÍSICA DE LOS BAILARINES

Yafang Zhao¹ (D) (Physical Education Professional)

1. Zhengzhou Preschool Education College, Department of Dance, Zhengzhou, Henan, China.

Correspondence:

Yafang Zhao Zhengzhou, Henan, China. 450000. zhaozhao19802022@126.com

ABSTRACT

Introduction: Ballroom dance has evolved from a simple self-taught part of folklore to a technical, performative, and artistic competitive dance called the International Standard Dance. Objective: Study the effects of special lower limb strength training on the physical stability of dancers. Methods: 20 volunteers, students of a university specialized in dance, were divided into experimental and control groups, undergoing training of 30 minutes daily, 3 times a week, for 3 months. The control group followed the daily training, while the experimental group received special lower limb strength training. The relevant physical data measured before and after the intervention were statistically analyzed. Results: Compared to the control group, there was a significant difference in the athletes of the experimental group (P<0.05). The experimental group's lower limb strength and special skills were significantly improved. Conclusion: The lower extremity strength training protocol significantly improved the dancers' muscle strength, proportionally increasing the stability of the sports skills. *Level of evidence II; Therapeutic studies - investigation of treatment outcomes.*

Keywords: Resistance Training; Dance; Lower Extremity.

RESUMO

Introdução: A dança de salão evoluiu de uma parte autodidata simples do folclore para uma dança técnica, performática e artística competitiva, chamada de Dança Padrão Internacional. Objetivo: Estudar os efeitos do treinamento de força especial dos membros inferiores sobre a estabilidade física dos dançarinos. Métodos: 20 voluntários, estudantes de uma universidade especializada em dança, foram divididos em grupo experimental e controle, passando por um treinamento de 30 minutos diários, 3 vezes por semana, em 3 meses. O grupo controle seguiu com o treino cotidiano enquanto ao experimental foi adicionado um treinamento especial de força dos membros inferiores antes e após a intervenção passaram por análise estatística. Resultados: Em comparação com o grupo controle, houve uma diferença significativa nos esportistas do grupo experimental (P<0,05). A força dos membros inferiores e as habilidades especiais do grupo experimental foram significativamente aprimoradas. Conclusão: O protocolo de treinamento de força de membros inferiores executado apresentou um efeito significativo na melhora da força muscular dos dançarinos, aumentando propor-cionalmente a estabilidade das técnicas esportivas. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Treinamento de Força; Extremidade Inferior; Dança.

RESUMEN

Introducción: Los bailes de salón han pasado de ser una simple parte autodidacta del folclore a una danza competitiva técnica, performativa y artística, denominada Baile Estándar Internacional. Objetivo: Estudiar los efectos del entrenamiento de fuerza especial de los miembros inferiores en la estabilidad física de los bailarines. Métodos: 20 voluntarios, estudiantes de una universidad especializada en danza, fueron divididos en grupo experimental y de control, sometiéndose a un entrenamiento de 30 minutos diarios, 3 veces por semana, en 3 meses. El grupo de control siguió con el entrenamiento diario mientras que el grupo experimental recibió un entrenamiento especial de fuerza de las extremidades inferiores. Los datos físicos relevantes medidos antes y después de la intervención se sometieron a un análisis estadístico. Resultados: En comparación con el grupo de control, hubo una diferencia significativa en los deportistas del grupo experimental (P<0,05). La fuerza de los miembros inferiores y las habilidades especiales del grupo experimental mejoraron significativamente. Conclusión: El protocolo de entrenamiento de fuerza de los miembros inferiores ejecutado presentó un efecto significativo en la mejora de la fuerza muscular de los bailarines, aumentando proporcionalmente la estabilidad de las técnicas deportivas. **Nivel de evidencia II; Estudios tera-péuticos - investigación de los resultados del tratamiento.**



Descriptores: Entrenamiento de Fuerza; Baile; Extremidad Inferior.



ORIGINAL ARTICLE ARTIGO ORIGINAL

ARTÍCULO ORIGINAL

INTRODUCTION

With the evolution of time and the rapid development of modern technology and culture, sports dance is no longer a simple and self-entertaining folk dance, but has developed into a technical, performative and artistic competitive dance, it is called the International Standard Dance.¹ And if you want to get a good place in the competitive sports dance competition, core strength training is one of the key factors.

Mprab C believes that sports dance emphasizes speed and strength, and requires sports dancers to strengthen special speed and strength physical fitness exercises. Physical fitness is only a certain aspect of athletic ability of sports dancers, and does not cover the training of athletes' functions and willpower.² Noveletto F conducts research on the core stability and core strength of sports dancers, the author said that ballet is basically one of the training methods for most of my sports dance teachers in sports dance teaching, and after many studies, it has been confirmed that it can promote the basic guality of sports dancers.³ Rafig MT believes that one of the charms of the standard dance is the smooth and graceful movement of the dancer in the dance, where does this movement come from, the key method and the correct application, all from the movement principle of the standard dance.⁴ In terms of physical guality, it is specifically the difference in line, proportion and speed and strength; Most of the gaps in artistic expression originate from the cultural backgrounds of China and the West, behind which is the gap between profound historical accumulation and rich cultural literacy. Ignacio G believes that agility is essential for athletes and ordinary students to master the skills of various sports, establish correct technical dynamic stereotypes, the formation of good muscle proprioception and other aspects have had an important impact, which is the basis for quickly and correctly mastering sports techniques.⁵ Lum D believes that with the development of standard dance in the world towards a higher and stronger direction, if standard dancers want to keep up with the pace of its development, they must make great efforts in the training of standard dancers.⁶ Meattini R's research found that the main laws of the growth process of sports dance champions are reflected in the influence of the environment and the mining of musical talent.⁷

To sum up, in terms of sports dance, the research on the impact of lower limb strength training theories on the special physical fitness of standard dance athletes has not been involved, therefore, the author wants to learn from the existing researches on lower body strength training and standard dance training, in order to explore the impact of lower body strength training on the special physical quality of standard dance athletes, and to further enrich the practice methods of standard dance training and improve the theory of standard dance training.

METHOD

Research object

The author takes the students who specialize in standard dance as the experimental objects, among them, there are 20 people in total, and the influence of lower limb strength training on the special technical ability of standard dancers is the research object. The subjects were randomly divided into groups according to grade, height, weight and physical fitness training, the situation after grouping is shown in Table 1, there is no significant difference between the experimental group and the control group after statistical test (P>0.05), indicating that the principle of random grouping is met, and the experimental design and experimental research can be carried out on the basis of this grouping.

DOCUMENTATION METHOD

Obtained through electronic retrieval of electronic databases such as China Journal Network, China Excellent Doctoral and Master's Thesis

Full-text Database, and professional network search engines such as Google and Baidu.⁸ Search keywords such as "strength training", "lower body strength training", and "sports dance" to find relevant literature. For organize and analyze the existing research results, get the latest information on standard dance strength training research in countries around the world.⁹

Experimental Design Experimental content

According to the needs of this research, the experimental subjects were divided into two groups, 10 people in each group. One group is the control group, and they carry out technical and physical training in accordance with the teaching plan formulated by the standard dance special teacher, and no strength training for the lower body is arranged; The other group is the experimental group, in order to ensure the feasibility and validity of the experiment, under the premise of not affecting the normal class training, the content of lower body strength training should be added to the technical training class. The two groups of athletes maintained normal eating habits and work and rest patterns in daily life. Neither the experimental group nor the control group did any special lower body strength training.

Questionnaire survey

According to the research purpose and the needs of the research content, the questionnaire was designed by consulting relevant literature and interviewing relevant experts, after three rounds of repeated revision, deletion, addition and improvement, the questionnaire finally formed a formal questionnaire. In order to ensure the reliability and validity of the questionnaire, an expert reliability and validity test is carried out before the questionnaire is distributed, as shown in Figure 1 below.

Mathematical statistics

Statistical analysis was carried out on the data collected from the experiment through spss18.0, and an objective, accurate and scientific quantitative description of the data was made, and the difference in the impact of lower limb strength training on the special physical fitness of the standard dance option was found. The differences in the effects of different training methods between the two groups were analyzed, provide corresponding data support for the experimental results.¹⁰

Table 1. List of characteristics of experimental objects (N=20).

Gender	Group	Number of people/person	Age	Height/cm	Weight/ kg	Р	
Male	Control group	5	20.67±0.53	179.5±1.76	66.83±4.78	>0.05	
	Test group	5	20.78±0.46	180.3±1.45	67.21±3.17		
Female	Control group	5	20.42±0.51	167.29±2.13	53.71±2.27	>0.05	
	Test group	5	20.29±0.27	168.23±1.15	54.02±3.08		



Figure 1. Statistical results of questionnaire survey distribution and recovery.

Ethical Compliance

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

RESULTS

Comparative analysis of lower limb muscle strength tests

On this basis, this part will conduct a further analysis from the indirect indicators reflecting the strength of the lower body (standing long jump and vertical jump in place), in order to reveal the changes in the leg strength of the standard dancers after training.

As can be seen from Table 2, compared with the control group, the standing long jump scores of male and female athletes in the experimental group were significantly different within and between groups (P<0.05), indicating that lower body strength training could help improve leg strength, after a semester of leg strength training, the standard dancer's leg muscles can be adaptively changed, and the stimulation effect of the leg muscles is better. The training content arranged in this lower body strength training program can be proved to be effective and play a role in developing leg strength.

Comparative analysis of vertical jump in situ between the experimental group and the control group

As can be seen from Table 3, compared with the control group, there were significant differences in the in-situ vertical jump scores of male and female athletes in the experimental group (P<0.05), in-situ vertical jump is another test index that indirectly reflects the strength of lower limb muscles, and it is necessary to deeply analyze the principle of its force.

DISCUSSION

The development of sports dance has increasingly standardized the physical quality of sports dancers, especially the mid-body strength, however, many dancers often ignore the training of core strength in strength training, this hinders further improvement in the skills of sports dancers. Therefore, we should pay attention to the core strength training of sports dancers. Strengthening core strength training can improve
 Table 2. List of standing long jump values of experimental group and control group (unit: m, N=10).

Gender	Testing time	Control group	Test group
A 4 - L -	Before experiment	1.90±0.56	1.94±0.43
iviale	After the experiment	2.04±0.63	2.25±0.25
Famala	Before experiment	1.61±0.37	1.65±0.42
Female	After the experiment	1.63±0.26	1.88±0.29

Table 3. List of vertical j	ump values i	in the expe	rimental group	o and conti	rol group
(unit: m, N=10).					

Gender	Testing time	Control group	Test group
Male	Before experiment	0.35±0.03	0.36±0.05
	After the experiment	0.36±0.01	0.47±0.06
Female	Before experiment	0.22±0.01	0.23±0.02
	After the experiment	0.24±0.01	0.31±0.03

the stability of the dancer's body axis, form a beautiful body shape, and improve the dancer's body balance and coordination ability, prevent sports injuries of dancers' bodies, innovate a new concept of strength training and effectively improve the efficiency of dancers' body power transmission, reduce energy consumption, so that sports dancers can always control the center of gravity freely during exercise, completing the skill movements with perfect standards provides a theoretical basis for athletes to obtain better results in the competition.

CONCLUSION

The standing long jump and vertical jump performance of standard dancers have improved significantly, lower body strength training can help improve the strength of the legs, and can make the standard dancers' leg muscles produce adaptive changes, the stimulation effect on the leg muscles is better, making the body more stable. It is recommended to add relevant training methods and methods in future research, and the male and female load should be adjusted in real time according to the actual ability of the players; Strictly follow the principles of training science to gradually increase the difficulty and load of training.

The author declare no potential conflict of interest related to this article

AUTHORS' CONTRIBUTIONS: Each author made significant individual contributions to this manuscript. Yafang Zhao: writing and data analysis.

REFERENCES

- Scrivener K, Dorsch S, Mccluskey A, Schurr K, Graham PL, Cao Z, et al. Bobath therapy is inferior to task-specific training and not superior to other interventions in improving lower limb activities after stroke: a systematic review. J Physiother. 2020;66(4):225-35.
- Roussel MP, Hébert LJ, Duchesne E. Strength-training effectively alleviates skeletal muscle impairments in myotonic dystrophy type 1. Neuromuscul Disord. 2020;30(4):283-93.
- Noveletto F, Soares AV, Eichinger F, Domenech SC, Hounsell M da S, Bertemes Filho P. Biomedical Serious Game System for Lower Limb Motor Rehabilitation of Hemiparetic Stroke Patients. IEEE Trans Neural Syst Rehabil Eng. 2020;28(6):1481-7.
- Rafiq MT, Hamid M, Hafiz E. Effect of Progressive Resistance Strength Training on Body Mass Index, Quality
 of Life and Functional Capacity in Knee Osteoarthritis: A Randomized Controlled Trial. J Multidiscip
 Healthc. 2021;14:2161-8.
- Gaunard I, Gailey R, Springer B, Symsack A, Clemens S, Lucarevic J, et al. The Effectiveness of the DoD/ VA Mobile Device Outcomes-Based Rehabilitation Program for High Functioning Service Members and Veterans with Lower Limb Amputation. Mil Med. 2020;185(Suppl 1):480-9.
- Lum D, Barbosa TM, Joseph R, Balasekaran G. Effects of Two Isometric Strength Training Methods on Jump and Sprint Performances: A Randomized Controlled Trial. J Sci Sport Exerc. 2021;3(2):115-24.
- Meattini R, Chiaravalli D, Palli G, Melchiorri C. sEMG-Based Human-in-the-Loop Control of Elbow Assistive Robots for Physical Tasks and Muscle Strength Training. IEEE Robot Autom Lett. 2020;5(4):5795-802.
- Kppel M, Mathis K, Schmitz KH, Wiskemann J. Muscle Hypertrophy in Cancer Patients and Survivors via Strength Training. A Meta-Analysis and Meta-Regression. Crit Rev Oncol Hematol. 2021;163(571):103371.
- Drozdova-Statkeviien M, Esnaitien VJ, Levin O, Pauwels L, Pukėnas K, Helsen WF, et al. The beneficial
 effects of acute strength training on sway activity and sway regularity in healthy older men: evidence
 from a posturography study. Neurosci Lett. 2021;749:135718.
- Dehno NS, Kamali F, Shariat A, Jaberzadeh S. Unilateral Strength Training of the Less Affected Hand Improves Cortical Excitability and Clinical Outcomes in Patients with Subacute Stroke: A Randomized Controlled Trial. Arch Phys Med Rehabil. 2021;102(5):914-24.