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Application of Tabata Training to Improve Physical Fitness and DanceSports Skills for Guangdong University Students

Li Linjing[1] Nopporn Tasnaina[2] and Prakit Hongseanyatham[3]
Faculty of Sports Science and Technology Bangkokthonburi University, Thailand.
[1]E-mail: vanessaleeelj@gmail.com, ORCID ID: https://orcid.org/0000-0001-8647-495X
[2]E-mail: nop5503@hotmail.com, ORCID ID: https://orcid.org/0009-0001-6086-0657
3E-mail: prakitsport@gmail.com, ORCID ID: https://orcid.org/0009-0009-2196-0258

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Abstract

Background and Aims: With the continuous popularization of all-round education, the status of physical education is gradually improving. DanceSports, as a relatively new course, has important aesthetic value in higher education and meets the specific needs of all-around education in colleges and universities. Dance Sport has a unique aesthetic value compared with other traditional sports. There were many problems and limitations in dance such as course content and training models. Especially the improvement of endurance. The traditional training usually applied moderate-intensity continuous training (MICT) to train the Dance Sport athletes which could not meet the demand of aerobic and anaerobic endurance for them during competition. The new procedure to improve both aerobic and anaerobic endurance was the Tabata training method which was a high-intensity interval Training (HIIT) procedure that could be more advantageous than the MICT training procedure, the researcher plans to create a teaching model through the Tabata training method to prove this. This paper aims to Construct a DanceSports teaching program applying Tabata training to improve physical abilities and performance in DanceSports for university students.

Materials and Methods: The program of Tabata training added to the DanceSports teaching program was developed by interviewing 9 experts and a consensus of 19 experts with the Delphi method. The validity of the program was average.90 (.60 -1.00) and efficiency were 71.6/71.40. The two groups' pretest-posttest experimental was used. The subjects were 60 students studying DanceSports in physical education courses at the university level at Guangdong University. They were divided into two groups by systematic based on physical fitness test scores. The Dance Sport with Tabata training was a treatment in the experimental group and the Dance Sport with MICT training was a treatment in the control group, the experiment operated for 8 weeks, 2 sessions a week with 2 hours a session. The research tools were the Physical fitness tests, Dance Sport performance test, the added Tabata training in the DanceSports teaching program, and Traditional MICT added in the DanceSports teaching program. The data analysis used a paired t-test and an independent t-test to compare the results of the experiment.

Results: 1) The physical fitness in the Tabata training group was higher than in the MICT group at 0.05 significant level at the vital capacity, sprint, flexibility, long jump, abdominal muscle strength, and long-distance running. 2) The DanceSports performance in the Tabata training group was higher than in the MICT group at 0.05 significant level at the posture, dance hold, balance, foot action, Latin actions, general actions, and spins and turns.

Conclusion: The Tabata training was significant in improving physical fitness and DanceSports performance in university students than the MICT training in the program. I could prove that the Tabata training procedure can enhance the physical fitness and DanceSports performance of university students and might be applied to elite DanceSports players' training.

Keywords: Tabata Training; Physical Fitness; DanceSports Skills; University Students

Introduction

The Dance Sport has classified the dance into ten types based on Latin and standard styles. The events were performed by female and male dancers. The judgment of scores is combined with social sporting affairs, body movements, and artistic interpretation (Xu & Li, 2021). The dancers must determine body skills and techniques combined with body lines which was limited to a defined scope of music and rhythm. The scholars researched the physiological perspective and found that the physiological and fitness aspects were important for the scientific-based training of participants. Traditional DanceSports training focuses primarily on technical and artistic aspects such as choreography and dance techniques but often neglects the physical training required to achieve optimal performance.

Considering that the physical exertion of DanceSports athletes is comparable to that of elite running events, their physical training needs are clearly high.

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The important physical fitness for DanceSports athletes was motor coordination, balance, flexibility, speed and strength skills, body height and mass, the pelvis, torso, and chest indicators, and BMI. cardiorespiratory fitness which consisted of anaerobic and aerobic endurance (Zabrocka, et al, 2015). Considering that the physical exertion of DanceSports athletes is comparable to that of elite running events, their physical training needs are clearly high. The training to improve cardiorespiratory fitness is mainly on high-intensity interval training (HIIT) and moderate-intensity continuous training (MICT). Guo, et al (2023) studied "Effect of High-Intensity Interval Training vs. Moderate-Intensity Continuous Training on Fat Loss and Cardiorespiratory Fitness in the Young and Middle-Aged a Systematic Review and Meta-Analysis" found that HIIT affected fat loss and cardiorespiratory fitness in the young and middle-aged was similar to or better than MICT and the HIIT appears to be more time-saving and enjoyable than MICT.

Also, Edward Fox (Tabata, 2019) showed that the improvement of the body's maximal oxygen uptake (VO2max) after high-intensity interval training was linearly related to the oxygen demand (expressed as % VO2max) of the high-intensity interval training, indicating that exercise intensity is a key factor for the improvement of the body's maximal aerobic power after high-intensity interval training. Tabata (2019) demonstrated that to improve both the anaerobic and aerobic energy-releasing systems, the IE1 protocol was superior to the IE2 protocol. The IE1 protocol was also confirmed to stimulate both the aerobic and anaerobic energy-releasing systems maximally. Since the human body has only these two energy-supplying systems, the IE1 protocol can be regarded as one of the most energetically effective exercise training protocols for maximally improving both the aerobic and anaerobic energy-supplying systems. (the IE2 protocol: exercise intensity: approx. 200% VO2 max, 3–4 bouts of 30-s exercise with a 2-min rest between bouts, the IE1 (Tabata) protocol: exercise intensity: approx. 170% VO2max, 7–8 bouts of 20-s exercise with a 10-s rest between bouts)

Therefore, this study recommends Tabata training as a solution since it meets the high aerobic and anaerobic demands of Dance Sport while being time efficient. The current situation of dance physical education teaching at Guangdong University of Foreign Studies also needs to be improved urgently to meet the physical fitness and skill needs of students. The importance of this study is that it can improve the quality of dance physical education teaching in colleges and universities by providing a balanced, efficient, and science-based training method. This will help to understand how Tabata training can improve learning outcomes in DanceSports more effectively than traditional methods, thereby achieving the dual goals of athletic performance and aesthetic elegance.

Objectives

To Construct a DanceSports teaching program by adding Tabata training to improve physical abilities and performance in DanceSports in Guangdong University of Foreign Studies students.

Research Questions

What was the characteristic of Tabata training added to the DanceSports teaching program?

Could the Tabata training add to the DanceSports teaching program more improvement in physical fitness and DanceSports performance than the traditional teaching program?

Does the program satisfy the stakeholders and accept the practicality and appropriateness of the program?

Hypothesis

1. The university students who attended added Tabata training in the Dance Sport teaching program had better improvement in physical fitness than the students who attended in traditional Dance Sport teaching program

2. The university students who attended added Tabata training in the Dance Sport teaching program had better improvement in Dance Sport performance than the students who attended in traditional Dance Sport teaching program.

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Scope of study

This study scope on Dance Sport class at Guangdong University, because in this university, there were many students interested in Dance Sport and many of them were the national youth Dance Sport Athletes.

Literature Review

This literature review delves into research on the physical fitness, training, and special abilities of DanceSports athletes. In terms of physical fitness, both Qian (2015) and Ren (2019) emphasized that such athletes need to have excellent speed, strength, endurance, balance, and flexibility. Speed and power are especially important in Latin dance. Tabata, Nishimura & Kouzaki (1996) and Tabata, Ogita & Miyachi (1997) demonstrated through their studies that high-intensity interval training (HIIT) can effectively improve these physical qualities.

The Tabata training method is a high-intensity interval training method designed by Dr. Izumi Tabata for the Japanese speed skating team. It emphasizes that 4 minutes of high-intensity exercise is divided into eight 20-second training cycles and a 10-second rest. Although short-lived, the effects are similar to aerobic exercise. This type of training involves a warm-up and cool-down phase but is not suitable for everyone. Multiple factors need to be considered comprehensively during design, and multiple evaluation methods are required to ensure its effectiveness. (Tabata, et al. 1997). The brief procedure of Tabata training was “exercise intensity: approx. 170% VO2max, 7–8 bouts of 20-s exercise with a 10-s rest between bouts” (Tabata, 2019)

Regarding mental health and training methods for athletes, McCabe (2013) and Tremayne & Ballinger (2008) provide useful insights into the psychological and emotional processing of dancers. Particularly in competitive settings, these psychological qualities are seen as factors that have a significant impact on performance. Prelevi (2017) discussed the research progress in DanceSports teaching and pointed out that compared with the psychological and physiological aspects, there is still relatively little research in this field.

Yang and Liu (2012) further focused on the specific needs of Dance Sport training models and athletes' psychological preparation. They believe that compared with traditional sports training, Dance Sport need to focus more on special abilities and mental preparation, including how to communicate more effectively with dance partners, how to manage emotions before competition, etc.

In the WDSF 2.1 scoring system, athletes not only need to pay attention to the technical level but also to the physical quality level. Ren (2019) conducted a comprehensive physical fitness test to address this point and selected 12 test indicators, including dynamic balance and coordination, etc., which echoed the multi-evaluation criteria in the WDSF 2.1 scoring system.

Taken together, these studies provide a comprehensive and multi-layered understanding, showing that DanceSports not only has complex demands on the physical and psychological levels but also requires further research and exploration in teaching and training models. Although there is a large amount of experimental research on psychological and physiological aspects, there is a relative lack of research on teaching, training models, and special abilities. These gaps suggest that future research can focus more on how to integrate these scattered research findings into a unified training and evaluation system to more comprehensively improve the performance of DanceSports athletes.

Conceptual Framework

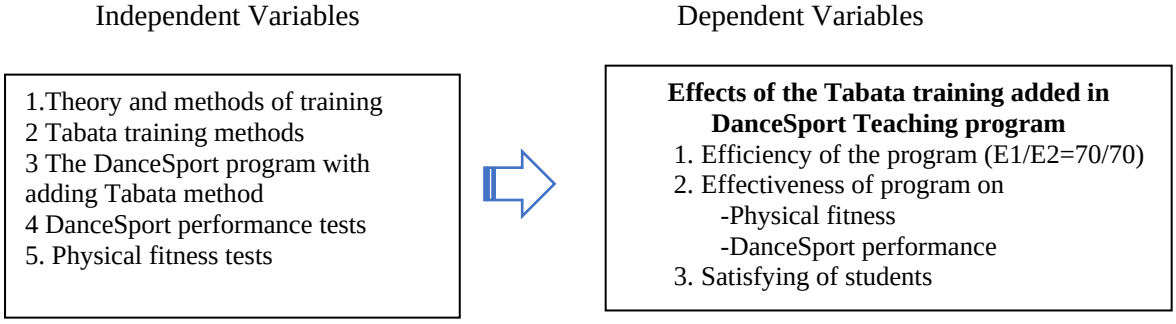

Figure 1 Conceptual Framework

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Methodology

Population and sample: This study surveyed 218 students taking Dance Sport in physical education courses at Guangdong University. The subjects were 60 students, and they tested and ranked the test scores as data to divide into 2 groups by systematic sampling method.

Research Instrument: (1) "Questionnaire Star" software was used for data collection through the questionnaires during the survey. (2) The Added Tabata training in the Dance Sport instructional program. (3) The form to record the connoisseurship. (4) Package software was utilized to assess the normal distribution of the data to ensure conformity with the assumption of normality. (5) Dance Sport performance test: the posture, dance hold, balance, foot action, Latin actions, general actions, and spins and turns. And (6) The physical fitness test: cardiovascular fitness, muscle strength, flexibility, and body fat composition.

Research method: The research proceeded in 6 steps as follows: (1) Collected data to formulate the conceptual framework by reviewing the literature. (2) Interview 9 experts concerned with the problems of DanceSports teaching, exercise to improve physical fitness and DanceSports performance, and Opinions on applying Tabata training to the DanceSports teaching program. (3) Defined the conceptual framework of research. (4) Draft questionnaire to collect data on the application Tabata training in the DanceSports program to enhance physical fitness and DanceSports performance for University students by consensus with 19 experts by Delphi technique for 2 rounds. (4) Drafted the Application Tabata Training in DanceSports Program to Enhance Physical Fitness and Dance Sport Performance for University Students, this program will be a research tool for experiment with 8 weeks, 2 sessions a week, 2.00 hours a session. Validated the program by Indexes of Items Objective Congruence (IOC) with 5 experts and got it as 0.90 (0.60 -1.00). Selected the students who were not the subjects of research to try out the program with 3 students, 9 students, and 30 students to find the efficiency of the program (E1/E2) and found that was 71.65/71.40 which met the setting criteria of 70/70. (5) Executed experiment. With two groups pretest-posttest design for 8 weeks, 2 sessions a week, 2.00 hours a session. And (6) Experimental group: the subjects attended the Tabata training added to the Dance Sport teaching program. Control group: attend the traditional MICT training added to the DanceSports teaching program

Data collection: Baseline (Pretest) and concluding (Posttest) assessments were systematically undertaken to gauge two primary metrics. (1) Physiological aptitude was ascertained through a series of seven evaluations, namely: 800-meter run, 50-meter run, vital capacity, standing long jump, sit-ups, seated forward bend, and Body Mass Index (BMI) computation. And (2) DanceSports performance tests were determined through the assessment of specific parameters, including Posture, Dance Hold, Balance, Foot Action, Latin Actions, General Actions, and Spins and Turns.

Data analysis:

To verify the efficiency of the scheme, it will be tried on 1, 9, and 30 students first. At the same time, two groups of pretest-posttest experiments were set up to compare the newly constructed program with the traditional teaching program. This comprehensive solution has met the evaluation criteria of E1/E2 = 70/70, showing high efficiency and feasibility. After applying Tabata training, this guidance program has reached the standard of E1/E2 = 70/70, indicating that it has certain effectiveness.

Results

The Tabata training added in the DanceSports teaching program to enhance physical fitness and DanceSports performance for university students was valid at 0.90 (.60-1.00), The Efficiency of the program was 71.65/71.40 which accepted by the criteria of E1/E2 = 70/70

The result of the comparison of physical fitness Between the control group and the experimental group showed that all 5 items of physical fitness tests in the experimental group were better improved than in the control group at 0.05 level of significance, they consisted of Vital capacity, 50 meters running, sit forward bend, and standing long jumps. There was a sit-up that was better at 0.5 level of significance, but weight and BMI were not different. (See Table 1)

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Table 1: Comparison of Physical Fitness in the Post-test Between Control Group and Experimental Group

Tests	Groups	n	Mean	SD.	t	df	p-value
Weight	Control G	30	49.88	7.43	0.46	58	0.646
	Experimental G	30	49.02	7.12			
Vital capacity	Control G	30	2851.70	407.07	-4.95	58	0.001*
	Experimental G	30	3336.57	349.84			
50 meters running	Control G	30	9.07	0.46	3.10	58	0.003*
	Experimental G	30	8.70	0.46			
Sit forward bend	Control G	30	16.45	6.49	-6.41	58	0.001*
	Experimental G	30	26.37	5.43			
Standing long jump	Control G	30	169.07	21.68	-3.59	58	0.001*
	Experimental G	30	186.03	14.10			
Sit-ups	Control G	30	38.77	7.08	-2.41	58	0.019*
	Experimental G	30	43.53	8.21			
800 meters running	Control G	30	3.89	0.33	4.18	58	0.001*
	Experimental G	30	3.56	0.26			
BMI	Control G	30	19.41	2.75	0.97	58	0.338
	Experimental G	30	18.68	3.08			

* $p<0.05$

The result of the comparison of Dance Sport Performance Between the control group and experimental group showed that all 7 performance tests of Dance Sport in the experimental group were better improved than in the control group at 0.05 level of significance (See Table 2)

Table 2 Comparison of Dance Sport Performance in the Post-test Between the Control Group and the Experimental Group.

Tests	Groups	n	M	SD	t	df	p-value
Posture	Control G	30	4.98	0.78	-8.30	58	0.001*
	Experimental G	30	6.94	1.02			
Dance Hold	Control G	30	5.20	0.85	-4.96	58	0.001*
	Experimental G	30	7.15	1.97			
Balance	Control G	30	5.15	0.79	-5.18	58	0.001*
	Experimental G	30	7.14	1.96			
Foot Action	Control G	30	5.16	0.88	-6.46	58	0.001*
	Experimental G	30	6.89	1.17			
Latin Actions	Control G	30	5.12	0.88	-7.04	58	0.001*
	Experimental G	30	6.83	0.10			
	Control G	30	5.17	0.92	-6.51	58	0.001*

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Tests	Groups	n	M	SD	t	df	p-value
General Actions	Experimental G	30	6.86	1.08			
Spins and turns	Control G	30	5.16	0.90	-6.69	58	0.001*
	Experimental G	30	6.87	1.08			

* P<.05

To explore the deep results, the researcher found that the experimental group had significant improvement in cardiovascular fitness, lung capacity, muscle fitness, flexibility, and body composition. But there was no significant difference in the control group (see Table 3-4).

Table 3: Comparison of physical fitness in the pretest and the posttest of the experimental group

Test items	Paired Differences					t	df	p-value
	Mean	SD.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Weight, Pre, and Post	2.83	4.06	0.74	1.32	4.35	3.82	29	0.001*
Vital capacity, Pre and Post	-361.90	575.60	105.09	-576.84	-146.97	-3.44	29	0.002*
50 meters sprint, Pre and Post	0.62	0.52	0.09	0.43	0.82	6.61	29	0.001*
Sit forward bend, Pre and Post	-6.77	7.49	1.36	-9.57	-3.97	-4.95	29	0.001*
Standing long jump, Pre and Post	-17.40	21.28	3.88	-25.35	-9.45	-4.48	29	0.001*.
Sit up, Pre and Post	-5.90	11.79	2.15	-10.30	-1.50	-2.74	29	0.001*
800 meters running, Pre and Post	0.42	0.45	0.08	0.25	0.58	5.09	29	0.001*
BMI, Pre, and Post	1.04	1.63	0.30	0.43	1.65	3.49	29	0.002*

*P<.05

Table 4: Comparison of Physical Fitness in the Pretest and the Posttest of the Control Group

Test items	Paired Differences					t	df	p-value
	Mean	SD.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Weight, Pre, and Post	-0.10	3.10	0.57	-1.26	1.06	-0.18	29	0.861
Vital capacity, Pre and Post	-10.57	622.17	113.59	-242.89	221.75	-0.09	29	0.927
50 meters sprint, Pre and Post	0.20	0.68	0.12	-0.06	0.46	1.61	29	0.119
Sit forward bend, Pre and Post	0.56	9.41	1.72	-2.96	4.08	0.33	29	0.747
Standing long jump, Pre and Post	-2.93	26.37	4.81	-12.78	6.91	-0.61	29	0.547
Sit-ups, Pre and Post	-0.77	8.75	1.60	-4.03	2.50	-0.48	29	0.635
800 meters running, Pre and Post	0.18	0.49	0.09	0.00	0.37	2.04	29	0.051
BMI, Pre, and Post	-0.05	1.28	0.23	-0.53	0.43	-0.22	29	0.829

To explore the deep results, the researcher found that the experimental group had significant improvement in Posture, Dance Hold, Balance, Foot Action, Latin Action, General Action, Spins, and Turns. However, there was no significant difference in the control group (see Table 5 6).

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Table5: Comparison of Dance Sport Performance Between Pretest and Posttest in Experimental Group

Test items	Paired Differences					t	df.	p-value
	Mean	SD.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
pre-post	-1.63	0.97	0.18	-2.00	-1.27	-9.19	29	0.01*
Dance Hold-pre-post	-1.98	1.96	0.36	-2.71	-1.24	-5.51	29	0.01 *
Balance -pre-post	-1.96	1.98	0.36	-2.70	-1.22	-5.42	29	0.01 *
Foot Action -pre-post	-1.75	1.19	0.22	-2.19	-1.30	-8.00	29	0.01 *
Latin Action -pre-post	-1.59	1.02	0.19	-1.97	-1.20	-8.50	29	0.01 *
General Action-pre - post	-1.66	1.03	0.19	-2.05	-1.28	-8.87	29	0.01 *
Spins and Turns-pre-post	-1.68	1.06	0.19	-2.08	-1.29	-8.70	29	0.01 *

*P<.05

Table 6: Comparison of Dance Sport Performance Between Pretest and Posttest in Control Group

Test items	Paired Differences					t	df	Sig. (2-tailed)
	Mean	SD.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-post	0.17	0.84	0.15	-0.15	0.48	1.09	29	0.28
Dance Hold- pre-post	0.01	0.86	0.16	-0.31	0.33	0.06	29	0.95
Balance- pre-post	0.02	0.72	0.13	-0.25	0.29	0.18	29	0.86
Foot Action- pre-post	0.05	0.93	0.17	-0.30	0.39	0.27	29	0.79
Latin Action- pre-post	-0.02	0.82	0.15	-0.33	0.29	-0.14	29	0.89
General Action- pre-post	0.07	0.84	0.15	-0.24	0.39	0.46	29	0.65
Spins and Turns-pre -post	0.00	0.79	0.14	-0.30	0.29	-0.01	29	1.00

Discussion

This study examines in detail the impact of Tabata high-intensity interval training on WDSF dance technical standards, specifically in the area of "spins and turns." Compared with previous studies such as Zheng and Wang (2017), our study has several commonalities and uniqueness. Both emphasize the application of multidimensional and personalized training methods in the field of sports and health, but this study further explores the application of these training models in the field of dance.

Unique is its multidisciplinary approach, including exercise physiology, psychology, and biomechanics, as well as a comprehensive comparison of the two training modalities, MICT and Tabata. Not only does this provide dancers and coaches with practical guidance that can be applied immediately but, it also provides valuable scientific insights into WDSF's scoring system.

However, the study had limitations, including insufficient sample size and diversity, a short study period, and insufficient attention to other WDSF technical standards. Compared with previous studies, these limitations need to be addressed in future studies.

Overall, this study makes significant contributions in both theory and practical applications, enriches previous research, including the work of Zheng and Wang (2017) and Wang G (2018), and Zhang Si (2017), and provides a more comprehensive and in-depth theoretical framework and practical guidance. Despite its limitations and potential methodological issues, it provides valuable new perspectives and insights into the field of dance training.

This research document compares the impact of Tabata high-intensity full-body training and moderate-intensity continuous training (MICT) on the performance of Dance Sport dancers through an 8-week experiment. Research has found that Tabata training has significant effects in many aspects. Specifically, in terms of Posture, the experimental group's score increased by an average of 1.2 points, with a P value of less than 0.05; in terms of Dance Hold, the experimental group's performance also

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improved significantly, with a P value of less than 0.05; In terms of balance, the P value is much less than 0.05, showing significant improvement; in terms of foot action, the experimental group's score increased by an average of 1.33 points, and the P value is less than 0.05. Similarly, in terms of Latin Actions, the performance of the Tabata training group was significantly improved, with a P value of 0.001; in terms of General Actions, the score increased by an average of 1.66 points, with a P value of 0.001; finally, in terms of Spins and Turns, the score of the experimental group increased from an average of 5.19 to 6.87, an average increase of 1.68 points, and a P value of 0.001. Meanwhile, MICT training in the control group showed few significant effects in these areas.

In terms of DanceSports performance, the data results of the Tabata group and the MICT group are compared has found that Tabata training has significant effects in many aspects. Specifically, in terms of Posture, the experimental group's score increased by an average of 1.2 points, with a P value of less than 0.05; in terms of Dance Hold, the experimental group's performance also improved significantly, with a P value of less than 0.05; In terms of balance (Balance), the P value is much less than 0.05, showing significant improvement; in terms of foot action (Foot Action), the experimental group's score increased by an average of 1.33 points, and the P value is less than 0.05. Similarly, in terms of Latin Actions, the performance of the Tabata training group was significantly improved, with a P value of 0.000; in terms of General Actions, the score increased by an average of 1.66 points, with a P value of 0.000; finally, in terms of Spins and Turns, the score of the experimental group increased from an average of 5.19 to 6.87, an average increase of 1.68 points, and a P value of 0.001. Meanwhile, MICT training in the control group showed few significant effects in these areas.

In Dance Sport's traditional teaching, continuous moderate-intensity training (MICT) is mainly used as the main training method. However, this approach shows shortcomings in some aspects.
First of all, from the perspective of effectiveness, MICT may not be as efficient as other high-intensity training methods in improving DanceSports skills, especially in terms of skills and dynamic transitions. Long periods of sustained moderate-intensity training may not provide enough challenge for dancers to reach higher levels of technical and physical fitness.

Second, MICT may lack efficiency. Compared to high-intensity interval training such as Tabata, MICT may take longer to achieve similar training effects. This may not be the best option for dancers who have limited time or want better results in a short amount of time.
Furthermore, the singularity and repetitiveness of MICT may cause students to become bored and lose interest. In contrast, high-intensity interval training like Tabata, due to its variety and challenge, may be better at engaging students and keeping them engaged.

Based on the above considerations, it is necessary to explore new training methods, such as Tabata, to see if they can provide better results for DanceSports students and dancers. Tabata training is not only high-intensity and interval-bas but, it is also considered to have potential advantages in improving dancers' physical fitness, technical performance, and adaptability. Therefore, introducing Tabata into Sports training and teaching may bring innovative changes to the field.

Ethics approval

This research was approved according to the regulation of “research ethic in humans” by the Committee approval no. 87/2566 on 29 July 2566.

Recommendations

1. This study provides preliminary insights into dance technique improvement through Tabata training and makes recommendations for future research and policy implementation. First, given the limitations of sample size and diversity, future studies should expand the sample and include participants of different ages, genders, and dance experiences. At the same time, long-term observation and follow-up are necessary to accurately evaluate the long-term effects of Tabata training on dance skills. In addition, future research should also comprehensively consider other technical standards of the WDSF and further explore how individual differences affect responses to Tabata training.

2. In terms of policy and practice recommendations, educational institutions could consider integrating Tabata training into regular dance classes and organizing training for dance teachers and coaches. It is recommended to conduct regular technical assessments and physical examinations to

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accurately grasp the specific impact of training on dancers and make corresponding course adjustments. In addition, the government and relevant institutions should consider providing more resource support to dance schools or groups that introduce this new training method.

Overall, these recommendations aim to improve the quality of dance education and training across the board and are expected to have broad and far-reaching impacts at the teaching, training, and policy levels.

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