

# EFFECTS OF THE CYCLIC TRAINING METHOD ON AEROBIC GYMNASTICS

EFEITOS DO MÉTODO DE TREINAMENTO CÍCLICO SOBRE A GINÁSTICA AERÓBICA

EFFECTOS DEL MÉTODO DE ENTRENAMIENTO CÍCLICO EN LA GIMNASIA AERÓBICA



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## ABSTRACT

**Introduction:** The results of the exercises provide an important parameter for evaluating the impact of aerobic activities on athletes. Cyclic training is believed to perform better due to its combination of functional movements. **Objective:** Study how cyclic training affects fitness in the performance of aerobic gymnastic movements in its practitioners. **Methods:** 90 athletes practicing aerobic gymnastics were selected, and randomly divided into experimental and control groups, for a 9-week experiment. While the control group practiced the daily exercises, the experimental group added a cyclic training protocol. Tests were performed before and after the intervention to measure any variation in the athletes' fitness. **Results:** The rate of ground weight lifting in one minute in the experimental group increased from  $16.72 \pm 4.98$  to  $18.37 \pm 4.16$ , the number of lifts per minute was increased from  $38.56 \pm 8.50$  to  $39.38 \pm 7.35$ , the number of rope jumps in one minute also increased from  $149.90 \pm 14.67$  to  $158.30 \pm 11.52$ , and the gain in the exercise of vertical and horizontal supports in 30 seconds evolved from  $16.96 \pm 2.21$  to  $17.33 \pm 2.42$ . The experimental group also achieved significant improvements after the circulation training. In contrast, the changes in the data of both groups in the control group were not as evident as those in the experimental group. **Conclusion:** The combination of cycling and daily training can effectively improve the functional performance of aerobic gymnasts. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

**Keywords:** Aerobic Exercise; Gymnastics; Physical Fitness; Physical Functional Performance.

## RESUMO

**Introdução:** O resultado dos exercícios fornece um parâmetro importante para a avaliação do impacto das atividades aeróbicas sobre os atletas. Acredita-se que o treinamento cíclico possa desempenhar melhores resultados devido a sua combinação de movimentos funcionais. **Objetivo:** Estudar como o treinamento cíclico afeta a aptidão física no desempenho dos movimentos da ginástica aeróbica em seus praticantes. **Métodos:** Foram selecionados 90 atletas praticantes de ginástica aeróbica, divididos aleatoriamente em grupo experimental e controle, para uma experiência com duração de 9 semanas. Enquanto o grupo de controle praticou os exercícios cotidianos, ao grupo experimental foi adicionado um protocolo de treinamento cíclico. Testes foram executados antes e após a intervenção para mensurar qualquer variação na aptidão física dos atletas. **Resultados:** O índice de levantamento de peso terra em um minuto no grupo experimental elevou-se de  $16,72 \pm 4,98$  para  $18,37 \pm 4,16$ , a quantidade de levantamentos por minuto foi incrementada de  $38,56 \pm 8,50$  para  $39,38 \pm 7,35$ , o número de saltos de corda em um minuto também se elevou de  $149,90 \pm 14,67$  para  $158,30 \pm 11,52$ , e o ganho no exercício de apoios verticais e horizontais em 30 segundos evoluiu de  $16,96 \pm 2,21$  para  $17,33 \pm 2,42$ . O grupo experimental também obteve melhoras significativas após o treinamento de circulação, enquanto as mudanças de dados dos dois grupos no grupo de controle não foram tão evidentes quanto as do grupo experimental. **Conclusão:** A combinação do treinamento cíclico ao treinamento diário pode efetivamente melhorar o desempenho funcional dos praticantes de ginástica aeróbica. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

**Descritores:** Exercício Aeróbico; Ginástica; Aptidão Física; Desempenho Físico Funcional.

## RESUMEN

**Introducción:** El resultado de los ejercicios proporciona un parámetro importante para la evaluación del impacto de las actividades aeróbicas en los atletas. Se cree que el entrenamiento cíclico puede ofrecer mejores resultados debido a su combinación de movimientos funcionales. **Objetivo:** Estudiar cómo afecta el entrenamiento cíclico a la condición física en la realización de movimientos gimnásticos aeróbicos en sus practicantes. **Métodos:** Se seleccionaron 90 atletas practicantes de gimnasia aeróbica, divididos aleatoriamente en grupo experimental y grupo control, para un experimento de 9 semanas de duración. Mientras el grupo de control practicaba los ejercicios diarios, al grupo experimental se le añadió un protocolo de entrenamiento cíclico. Se realizaron pruebas antes y después de la intervención para medir cualquier variación en la forma física de los atletas. **Resultados:** El ritmo de levantamiento de peso en el suelo en un minuto en el grupo experimental aumentó de  $16,72 \pm 4,98$  a  $18,37 \pm 4,16$ , la cantidad de levantamientos por minuto se incrementó de  $38,56 \pm 8,50$  a  $39,38 \pm 7,35$ , el número de saltos de cuerda en un minuto también aumentó de  $149,90 \pm 14,67$  a  $158,30 \pm 11,52$ , y la ganancia en el ejercicio de apoyos verticales y horizontales en 30 segundos evolucionó de  $16,96 \pm 2,21$  a  $17,33 \pm 2,42$ . El grupo experimental también obtuvo mejoras significativas



tras el entrenamiento circulatorio, mientras que los cambios en los datos de ambos grupos en el grupo de control no fueron tan evidentes como los del grupo experimental. Conclusión: La combinación del entrenamiento en bicicleta con el entrenamiento diario puede mejorar eficazmente el rendimiento funcional de los practicantes de gimnasia aeróbica.

**Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

**Descriptores:** Ejercicio Aeróbico; Gimnasia; Aptitud Física; Rendimiento Físico Funcional.

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## INTRODUCTION

In the aerobics competition, if the athletes want to obtain excellent scores, they need to pay attention to combination training and a series of complex aerobics movements in the daily training process.<sup>1</sup> There are many combinations of aerobics exercises, and back exercises and leg exercises are very important. In the back exercise, athletes can use their hands to grasp the center of gravity of the object according to their own support, and then move the body's center of gravity backward and slowly lower. Athletes can also move backward slowly according to the objects beside them, such as tables and chairs.<sup>2</sup> In order to stretch the back muscles of the trainer, you can maintain a posture for a certain period of time through the above methods. The sitting posture training requires the athlete's body to move backward slowly, and then make both hands behind to help the chest to tuck in.<sup>3</sup> The athletes clasp their hands to stretch the shoulder muscles for more than 10 seconds. At the same time, the leg muscles should also be stretched. The leg exercises can make the athletes stand on one foot and bend their knees backwards. If this leg is tired, you can change it to another leg.<sup>4</sup>

When you are tired, you can relieve fatigue through a common training method. In sports, in order to make athletes recover after training, you can do some small actions after training, but you can't stop training without permission. In the process of training, the cycle training method needs to combine and allocate the training content.<sup>5</sup> In order to complete the task on time, the training athletes need to determine the training time and the completion route. In the cycle training, in order to enable each athlete to quickly transfer to the next project, it is necessary to sort the organizers in order to complete each specified task in order.<sup>6</sup> At the same time, every athlete should improve the training content and technology even after completing the cycle training, so that all athletes can have a light amount of compound training in the training program. In order to improve the enthusiasm and the amount of exercise of athletes in the training process, this paper studies the training methods of aerobics athletes and the training effect of athletes through a series of experiments.<sup>7</sup>

## METHOD

### Research object

According to the requirements of this experiment, 90 professional aerobics athletes were selected. The subjects were all over 20 years old, with an average height of about 178 cm and weight of more than 65 kg. The study and all the participants were reviewed and approved by Ethics Committee of Tangshan Normal University (NO.TSNU20D108). These subjects have been trained for more than 4 years and have not received formal circular training before the experiment. In the process of selecting the subjects, the differences between the subjects were reduced as much as possible, especially in terms of physical quality. Therefore, the differences of 90 selected subjects in all aspects are not obvious and will not affect the reliability and credibility of the experimental results. The experiment lasted for 9 weeks. During the experiment, the subjects were randomly divided into two groups. The aerobics athletes in the experimental group were trained circularly, while the athletes

in the control group only received routine training every day, without other training interventions. During the nine-week training period, the athletes always kept the normal working and rest time, and there was no difference in diet.

### Experimental method

Before the experiment, the physical fitness of the 90 selected subjects was tested for 9 weeks. The test results showed that the physical fitness of the 90 aerobics athletes had reached the standard and met the highest physical load standard of the experiment. In addition, before the beginning of the experiment, the quality of the experimental subjects in the experimental group and the control group was measured by professional equipment, and recorded in the book, so as to facilitate the comparative analysis of the subsequent experimental data. In the course of the experiment, the experimental objects are randomly sorted, and the circular training is carried out according to the order randomly selected by the experimental objects. The experimental group was given basic circular training, and the basic quality data and flexibility quality data of the experimental subjects were measured and recorded. At the same time, the experimental data of the control group were classified and recorded. In addition, in the course of the experiment, we always pay attention to the physical condition and exercise load of each aerobics athlete, and make small adjustments to the training volume according to the physical differences of the athletes without affecting the experimental results.

### Test location

This nine-week test is always conducted in the professional training classroom of aerobics athletes at ordinary times. The professional training classroom is selected to reduce the time for athletes to adapt to the field, and the professional training classroom is more comprehensive in all aspects of facilities and has great security. Before the start of the experiment, strict safety tests were conducted again on various facilities in the professional classroom to reduce any unnecessary sports injuries to aerobics athletes during the training process. The measurement results were in line with the normal safety standards.

## RESULTS

### The influence of circular training method on the basic quality of aerobics athletes

As shown in Table 1, the basic quality measurement results of the control group that did not participate in the cycle training intervention before and after the experiment.

Through the comparison and further analysis of the obtained experimental data, and referring to the P value difference standard, it can be seen that the difference in the basic physical quality of the aerobics athletes in the control group who did not participate in the cycle training before and after the experiment was not obvious, in which the number of athletes jumping rope in one minute showed a decreasing trend, while the other four indicators increased, but only slightly increased, and the effect was not obvious.

**Table 1.** Influence of basic quality of aerobics athletes in control group before and after experiment.

Index	Before experiment	After experiment	t	p
1 minute from two ends (pcs)	16.97±4.022	17.27±3.664	-0.508	0.008
1 minute Sit-ups (pcs)	39.26±4.530	39.59±4.734	-0.609	0.034
1 minute Push-ups (pcs)	25.80±12.152	26.44±11.613	0.189	0.006
1 minute Jump Rope (pcs)	149.48±16.590	148.34±14.833	0.790	0.016
30 Seconds Burpees (pcs)	16.55±1.937	16.93±2.472	0.715	0.015

Through the 9-week experiment, the basic quality indicators of the aerobics athletes in the experimental group participating in the cycle training were further measured and counted. The measurement indicators included the number of two-head lifts in 1 minute, the number of sit-ups in 1 minute, the number of push-ups in 1 minute, the number of rope jumps in 1 minute and the number of standing and lying supports in 30 seconds. The results of the specific data are shown in Table 2.

By comparing the changes of the basic quality indicators of the aerobics athletes in the experimental group before and after the cycle training, we can see that after the cycle training, the indicators of the experimental group members increased significantly. At the same time, by further comparison with the data of the control group, it can also be seen that the changes in the basic quality data of the experimental group after cyclic training are significantly greater than those of the control group without cyclic training. Therefore, we can draw the conclusion that adding cycle training in the daily training process can improve the basic quality indicators of aerobics athletes, and is conducive to improving the effect of action combination exercise of aerobics complex sports.

### Effect of circular training method on flexibility quality of aerobics athletes

Table 3 shows the changes of various flexibility qualities of the control group without any cycle training before and after the experiment. The flexibility quality indexes of aerobics athletes include the left longitudinal split leg distance, the right longitudinal split leg distance, the horizontal split leg angle, the forward bending length of the sitting body, the distance between the grip rope and the shoulder, the vertical split leg angle, the left angle of the front holding leg, and the right angle of the front holding leg.

Through the comparison of the data before and after, it can be seen that the changes of various flexibility quality indicators are not obvious, and there are four indicators showing a significant trend of reduction. Therefore, it can be concluded that the effect of the control group members who do not undergo cycle training is not significant.

Table 4 shows the changes of various flexibility quality indicators of the athletes in the experimental group who have been trained circularly. Among them, the left longitudinal split distance, the right longitudinal split distance, the horizontal split angle and the grip and shoulder rotation distance have decreased, while the other four indicators show an obvious trend of increase.

By comparing the data before and after the experiment group, it can be seen that the circular training has a great effect on the overall level of the flexibility quality of aerobics athletes. Although some flexibility quality indicators have decreased, the trend of other quality indicators is very obvious. Therefore, adding circular training in the process of aerobics training is conducive to improving the flexibility of athletes, improving the adaptability of athletes to complex movements, and improving the training effect.

**Table 2.** The Influence of Cyclic Training Method on the Basic Quality of Aerobics Athletes.

Index	Before experiment	After experiment	t	P
1 minute from two ends (pcs)	16.72±4.985	18.37±4.167	2.089	0.010
1 minute Sit-ups (pcs)	38.56±8.506	39.38±7.352	0.261	0.019
1 minute Push-ups (pcs)	26.15±12.910	28.96±12.982	5.382	0.008
1 minute Jump Rope (pcs)	149.90±14.671	149.90±14.671	6.165	0.038
30 Seconds Burpees (pcs)	16.19±2.01	16.96±2.211	0.591	0.008

**Table 3.** Effect of flexibility quality of aerobics athletes in control group before and after experiment.

Index	Before experiment	After experiment	t	p
Left longitudinal split leg (cm)	25.59±2.107	23.86±1.932	-3.349	0.011
Right longitudinal split leg (cm)	24.66±2.124	23.69±2.088	-2.335	0.013
Transverse split leg (°)	139.08±4.332	142.98±4.453	4.736	0.040
Forward flexion in sitting position (cm)	9.31±4.456	10.47±4.511	3.022	0.020
Rope grip and shoulder rotation (cm)	79.73±5.384	77.18±5.354	-1.521	0.022
Vertical split leg (°)	123.36±4.115	143.20±3.923	0.511	0.023
Front holding leg left (°)	126.78±4.225	128.25±4.260	0.145	0.013
Front holding leg right (°)	139.21±4.392	139.21±4.392	-1.070	0.013

**Table 4.** The Influence of Cyclic Training Method on the Flexibility of Aerobics Athletes.

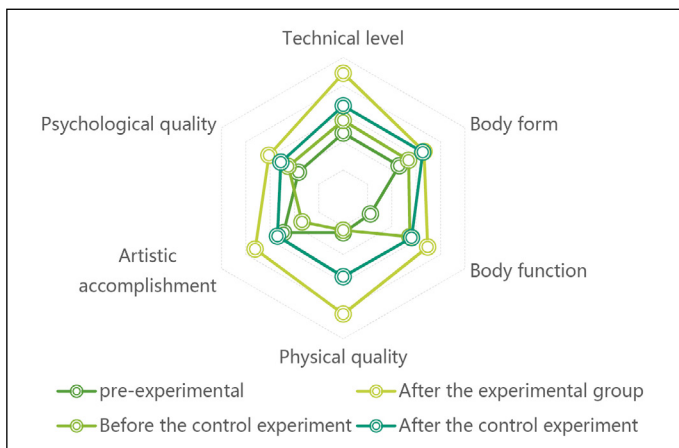
Index	Before experiment	After experiment	t	P
Left longitudinal split leg (cm)	26.49±1.774	20.52±1.108	-5.439	0.035
Right longitudinal split leg (cm)	26.24±1.703	20.16±1.064	-7.211	0.006
Transverse split leg (°)	138.72±5.308	156.57±5.054	-5.683	0.035
Forward flexion in sitting position (cm)	9.42±5.015	11.33±4.701	4.538	0.009
Rope grip and shoulder rotation (cm)	81.73±4.885	67.44±3.831	-3.659	0.027
Vertical split leg (°)	126.43±4.077	156.17±3.343	12.563	0.038
Front holding leg left (°)	127.53±3.153	137.80±2.961	9.567	0.025
Front holding leg right (°)	133.50±2.708	141.57±2.719	4.889	0.022

### Scoring optimization of complex aerobics movement combination by cycle training method

The scores of various movements of aerobics athletes include technical level, body shape, body function, physical quality, artistic accomplishment and psychological quality. As shown in Figure 1, it shows the optimization effect of cycling training on the score of aerobics athletes in the aspect of movement combination. It can be seen that after the cycling training, the scores of aerobics athletes in the experimental group have an obvious trend of increase, while the scores of the control group have no obvious change. Therefore, it can be concluded that cycle training can greatly optimize the scoring of complex aerobics movement combinations.

## DISCUSSION

Cyclic training is a very efficient training method. It is not only used for military training, but also very suitable for aerobics training. This kind of training can improve the physical strength of aerobics athletes, and



**Figure 1.** The effect of optimizing the score of complex aerobics movement combination by the method of circular training.

also enhance the metabolic ability of athletes, so that athletes consume more fat to increase muscle content. This training method has many advantages, for example, it can enhance the physical coordination ability of athletes, thus reducing the physical injury of athletes during training or competition, and thus greatly improve the confidence of aerobics. The circular training method helps athletes complete the complex combination actions during training or competition through both physical and mental aspects.

Between the number of all tasks and the total number of cycles, the arrangement sequence of tasks and the training content need to be

adjusted intermittently. During each cycle of training, the number of tasks in the cycle should be trained according to the basic physical condition of the athletes. In order to prevent athletes from being overburdened, it is necessary not only to delay the fatigue degree of different parts of the body of athletes, but also to carry out comprehensive training in order to achieve comprehensive development. For all athletes, the cycle training should be reasonably matched according to all principles in order to realize the all-round and healthy development of all athletes. If the competition of athletes needs to be classified into groups, it can not only increase the competitiveness of athletes in the cycle training, but also improve the interest of athletes.

## CONCLUSION

According to the experiment in this paper, we can draw these conclusions. First of all, cycle training can improve the basic quality of aerobics athletes, especially the number of one-minute push-ups and rope skipping. Secondly, the circular training can further improve the flexibility quality of aerobics athletes, especially in the aspect of vertical leg splitting and front leg holding. In addition, the cycle training method can further optimize the scoring effect of athletes' complex aerobics. Therefore, in the process of training aerobics athletes, the total amount of cycling training can be appropriately increased, so as to improve the training effect of complex movements combination of aerobics, increase the physical flexibility and flexibility of athletes, and achieve better results in the competition.

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