

IMPACTS OF INTERMITTENT HIGH-INTENSITY TRAINING ON AEROBICS STUDENTS' PERFORMANCE



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IMPACTOS DO TREINAMENTO INTERMITENTE DE ALTA INTENSIDADE SOBRE O DESEMPENHO DOS ESTUDANTES DE AERÓBICA

IMPACTOS DEL ENTRENAMIENTO INTERMITENTE DE ALTA INTENSIDAD EN EL RENDIMIENTO DE ESTUDIANTES DE AERÓBIC

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ABSTRACT

Introduction: The performance of aerobics students during competition is closely related to the level of complexity of their movements. The requirement of muscular strength associated with sensorial precision to reach maximum athletic performance demands more specialized training, and the intermittent high-intensity training technique can supply these demands. **Objective:** Study the impacts of intermittent high-intensity training on the performance of aerobics students in the execution of their movements. **Methods:** Forty-eight aerobics students were selected and equally divided into two groups. The experimental group was given high-intensity intermittent training using the experimental control, while the control group was given no relevant intervention. The intervention lasted nine weeks, respecting the normal course of these students' practice classes. **Movement quality** was assessed before and after the experiment by the systematic balance test **Results:** The degree of movement completion of the experimental group was close to 2 points, rising to 2.5 points at the end of the movement, and the difficulty level was changed from 1.5 to 2 points. When to the control group, it initiated in 2 points, and after the intervention, it was significantly less to the experimental group. The difficulty level remained at 1.5 points, collected before and after the experiment. **Conclusion:** High-intensity interval training can improve the performance of aerobics students, acting favorably on the level of complexity of the movements of their sport. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: High-Intensity Interval Training; Aerobic Exercise; Athletic Performance.

RESUMO

Introdução: O desempenho dos estudantes de aeróbica durante a competição está intimamente relacionado ao nível de complexidade de seus movimentos. A exigência de força muscular associada à precisão sensorial para atingir o máximo desempenho atlético exige treinamentos cada vez mais especializados e a técnica de treinamento intermitente de alta intensidade parece ser capaz de suprir essas demandas. **Objetivo:** Estudar os impactos do treinamento intermitente de alta intensidade sobre o desempenho dos estudantes de aeróbica na execução de seus movimentos. **Métodos:** Foram selecionados 48 estudantes de aeróbica, igualmente divididos em dois grupos. Ao grupo experimental foi dado treinamento intermitente de alta intensidade utilizando o controle experimental, enquanto que ao grupo de controle não foi dada intervenção relevante. A intervenção teve duração total de nove semanas, respeitando o curso normal das aulas práticas desses alunos. A qualidade dos movimentos foi avaliada antes e depois do experimento pelo teste sistemático de equilíbrio **Resultados:** O grau de finalização de movimentos do grupo experimental foi próximo a 2 pontos, elevando-se a 2,5 pontos no final do movimento, o nível de dificuldade foi alterado de 1,5 para 2 pontos. Quando ao grupo controle, iniciou em 2 pontos, e após a intervenção foi significativamente menor ao grupo experimental. O nível de dificuldade permaneceu nos 1,5 pontos, coletados antes e após o experimento. **Conclusão:** O treinamento em intervalos de alta intensidade pode melhorar o desempenho dos estudantes de aeróbica, atuando favoravelmente no nível de complexidade de seus movimentos esportivos. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Treinamento Intervalado de Alta Intensidade; Exercício Aeróbico; Desempenho Atlético.

RESUMEN

Introducción: El rendimiento de los estudiantes de aeróbic durante la competición está estrechamente relacionado con el nivel de complejidad de sus movimientos. La demanda de fuerza muscular asociada a la precisión sensorial para alcanzar el máximo rendimiento atlético exige entrenamientos cada vez más especializados y la técnica de entrenamiento intermitente de alta intensidad parece ser capaz de suprir estas demandas. **Objetivo:** Estudiar los impactos del entrenamiento intermitente de alta intensidad sobre el rendimiento de estudiantes de aeróbic en la ejecución de sus movimientos. **Métodos:** Se seleccionaron 48 estudiantes de aeróbic y se dividieron equitativamente en dos grupos. El grupo experimental recibió entrenamiento intermitente de alta intensidad utilizando el control experimental, mientras que el grupo de control no recibió ninguna intervención relevante. La intervención duró un total de nueve semanas, respetando el curso normal de las clases prácticas de estos estudiantes. La calidad de



los movimientos se evaluó antes y después del experimento mediante la prueba sistemática de equilibrio. Resultados: El grado de realización de los movimientos del grupo experimental fue próximo a 2 puntos, su- biendo a 2,5 puntos al final del movimiento, el nivel de dificultad pasó de 1,5 a 2 puntos. En cuanto al grupo de control, inició en 2 puntos, y tras la intervención fue significativamente inferior al grupo experimental. El nivel de dificultad se mantuvo en 1,5 puntos, recogidos antes y después del experimento. Conclusión: El entrenamiento en intervalos de alta intensidad puede mejorar el rendimiento de los alumnos de aeróbic, actuando favorablemente en el nivel de complejidad de sus movimientos deportivos. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptor: Entrenamiento de Intervalos de Alta Intensidad; Ejercicio Aeróbico; Rendimiento Atlético.

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INTRODUCTION

In the training of aerobics special students, there will be a strict interval of rest between every two training, which is called intermittent training.¹ The heart rate change of each training student is different, so the interval time is also different. If you haven't recovered your physical strength, you can't go to the next group of exercises. The combination of interval training and high-intensity training will make the students of aerobics training burn their body heat faster.² As we all know, most of the calories consumed in the human body come from the oxidation reaction of food during the intensive training. Therefore, in order to make the utilization rate of oxygen in the human body higher, it is necessary to burn the body heat energy of special students.³ When students jog, they can carry out aerobic exercise and aerobics training through the oxygen absorbed in the training process. If the aerobics special students can't use the oxygen in the body for metabolism after a long time of training, this means that high intensity intermittent training needs a lot of oxygen absorption.⁴

In the training, every special training student needs to be full of certain vitality and have certain creativity for all movements. The movements involved in the training process of aerobics special students need to be smooth and accompanied by certain movement following. Aerobics athletes should show all types of movements in training.⁵ If they repeat the same movement, they need to show their strength and flexibility, so as to further balance the overall movement style. If the special students of the training show that the body is straight and there are leg movements when the aerobics movements are displayed, then the students' movements are needed, and the shape has higher development and utilization space in the arrangement.⁶ If the movements of aerobics show strength, rhythm and style, it will bring people a relaxed feeling. Each training movement needs to be adjusted so that the technology can be further presented. If the students of aerobics training are not good enough in rhythm, they need to alternate in the overall regularity.⁷ In order to enable students in aerobics practice to show artistic and ideological characteristics, this paper further explores the specific effect of interval training on the difficulty of aerobics students through a large number of experimental studies.

METHOD

Research object

In this study, 48 aerobics students were selected as experimental subjects, and the experiment lasted for 9 weeks. The study and all the participants were reviewed and approved by Ethics Committee of Zhejiang Institute of Economics and Trade (NO.ZIETFD085). Before the experiment, the physical health of the aerobics special students was accurately measured. The 48 students participating in the experiment were in good health and could be trained in high-intensity intermittent training. In addition, the physical condition of the 48 aerobics special

students participating in the experiment is small, so it will not cause any unnecessary error to the results of the experiment. The 48 aerobics students have studied for more than 2 years and have rich training experience, so they can quickly adapt to high-intensity interval training. During the 9-week experimental period, all the aerobics students participating in the experiment had their breakfast, lunch and dinner in the school canteen, and kept the same eating habits as usual. At work and rest, we should strictly maintain more than 8 hours of sleep every day to ensure that aerobics students can have sufficient energy when participating in training during the day.

Experimental method

This experiment mainly adopts the experimental control method. 48 aerobics special students are randomly divided into experimental group and control group. During the experiment, the experimental group is given high-intensity intermittent training, while the control group is only given daily aerobics exercises. In addition, this experiment also adopted the balance system test to measure the balance quality of aerobics special students. The measurement indicators include ODC score and CTT time. The higher the ODC score of aerobics special students, the shorter the CTT time, the stronger the balance quality ability of aerobics special students. In the course of the experiment, the physical quality index includes the number of 15-second split-leg jumps, the number of 30-second push-ups and the number of right-angle supports. The sports score includes three items, namely, the score of movement completion, the score of movement difficulty and the score of movement performance of the aerobics students.

RESULTS

Effect of high-intensity intermittent training on the physical quality of aerobics students

As shown in Table 1, it is the change of the physical quality indicators of the aerobics special students in the experimental group before and after the high-intensity interval training, and the change of the

Table 1. The Influence of High Intensity Intermittent Training on the Physical Quality of Students Specialized in Aerobics.

Test items	Group	Before experiment	After experiment	t	P
15s split-leg jump (pcs)	Experience group	11.301±2.835	15.145±1.926	-7.3896	<0.01
	Control group	11.656±2.234	12.948±1.358	-0.1519	<0.01
30s push-ups (pcs)	Experience group	24.189±7.933	30.592±36.920	-7.6049	<0.01
	Control group	26.693±7.594	28.442±8.072	-5.4434	<0.01
Right angle support (piece)	Experience group	5.641±2.498	9.546±1.336	-5.6084	<0.01
	Control group	7.037±2.733	8.089±2.120	-1.8142	<0.01

physical quality indicators of the control group members who do not carry out the high-intensity interval training, but only carry out the daily aerobics training.

By comparing the changes of the physical quality indexes of the aerobics special students in the experimental group and the control group before and after the experiment, it can be seen that after the high-intensity interval training, the changes of the number of 15-s split-leg jumps, the number of 30s push-ups and the number of right-angle supports of the aerobics special students in the experimental group are very obvious, while the number of 15-s split-leg jumps, the number of 30s push-ups and the number of right-angle supports in the control group have changed. However, the value of change is very small, and the range of change is not obvious compared with the changes of various data indicators of the experimental group members. Therefore, it can be concluded that high-intensity interval training can effectively improve the physical quality of aerobics students.

As shown in Figure 1, it is the result of measuring the balance quality of aerobics students in the experimental group and the control group before and after the experiment. This measurement is based on the CTT time index standard. Before the experiment, the CTT time of the experimental group exceeded 60, and after the high-intensity interval training, the data of the experimental group decreased significantly, close to 50. Before the experiment, the CTT time of the control group exceeded 60, and after the experiment, the data was still close to 60. Through data comparison, it is not difficult to see that after high-intensity interval training, the CTT time of aerobics students in the experimental group was significantly shortened, while the relevant data of the control group without high-intensity interval training did not change significantly. From this, it can also be seen that high-intensity intermittent training can effectively shorten the CTT time of aerobics special students, thus improving the balance quality of aerobics special students.

After measuring the CTT time of the experimental group and the control group, the ODC scores of the aerobics students in the two groups were further measured. The data changes of the aerobics students in the experimental group and the control group before and after the experiment are shown in Figure 2. Before the experiment, the ODC score of the aerobics students in the experimental group was close to 40 points, and after the high-intensity interval training, the ODC score exceeded 60 points. Before the experiment, the ODC score of aerobics students in the control group was less than 40 points, and after the experiment, the data score was close to 50 points.

Through the comparative analysis of the ODC score of the aerobics students in the experimental group and the control group, it can be seen that after the intensive interval training, the ODC score of the aerobics students in the experimental group has been significantly improved,

while the change of various indicators of the aerobics students in the control group is not as obvious as that of the aerobics students in the experimental group. From this, it can be concluded that inserting high-intensity interval training in aerobics training can effectively improve the ODC score of aerobics students. ODC score and CTT time are two important factors to measure the balance quality of aerobics special students. It can be seen that high intensity interval training has a great effect on improving the balance quality of aerobics special students.

Effect of high-intensity intermittent training on the performance score of aerobics students' sports difficulty

There are many indexes to measure the sports score of aerobics students, including the completion score, the difficulty score and the performance score. As shown in Figure 3, it is the specific situation of the sports scores of aerobics students in the experimental group and the control group. Before the experiment, the aerobics students in the experimental group scored close to 2 points on the degree of movement completion, and close to 2.5 points after high-intensity interval training. Before the experiment, the aerobics students in the experimental group scored nearly 1.5 points on the difficulty of movement, and nearly 2 points after high-intensity interval training. Before the experiment, the aerobics students in the experimental group scored more than 1 point for their performance, and more than 2 points after the high-intensity interval training. Before the experiment, the aerobics students in the control group scored close to 2 points on the degree of movement completion, and after the experiment, the control group scored more than 2 points on this item. Before the experiment, the aerobics students in the control group scored more than 1.5 points on the difficulty of movement, and after the experiment, the score of this score in the control group did not

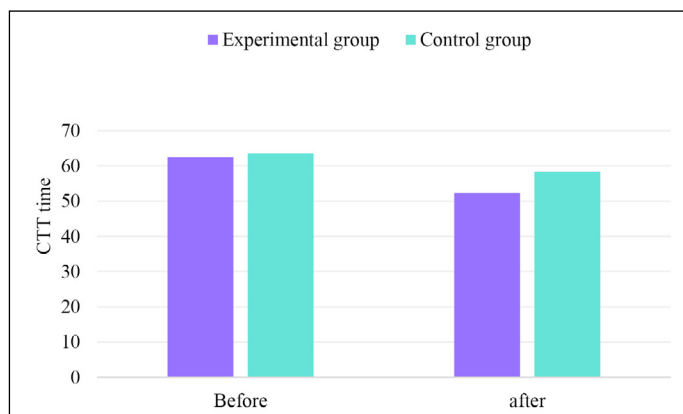


Figure 1. Effect of high intensity intermittent training on balance quality of aerobics students (based on CTT time).

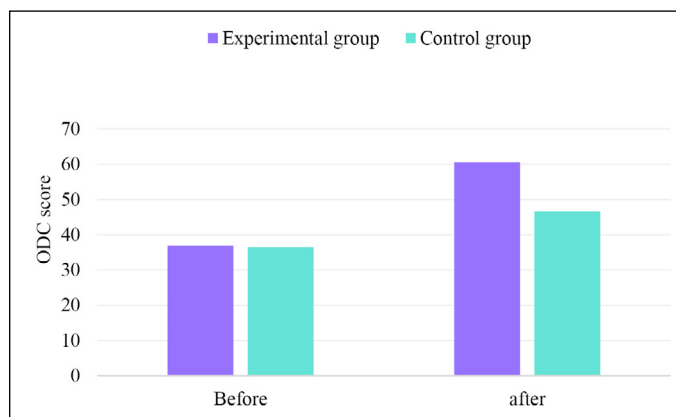


Figure 2. Influence of high intensity intermittent training on balance quality of aerobics students (based on ODC score).

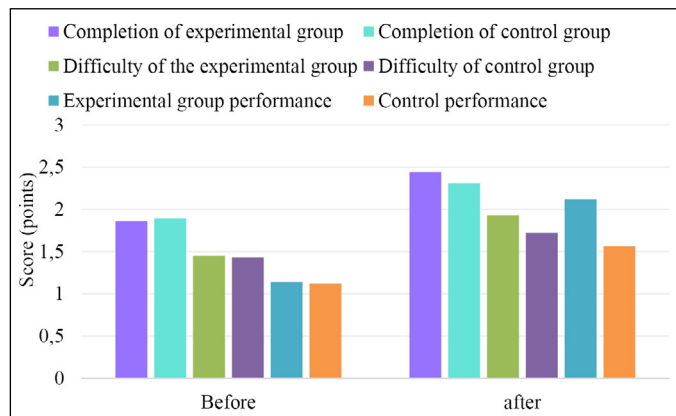


Figure 3. The Effect of High-intensity Intermittent Training on the Sports Score of Aerobics Students.

exceed 2 points. Before the experiment, the aerobics special students in the control group scored more than 1 point for their performance, and after the experiment, the score of this item in the control group was more than 1.5 points.

From this, it can be seen that the score of movement completion, difficulty and expressiveness of aerobics students are greatly affected by high-intensity intermittent training. After high intensity interval training, the sports scores of aerobics students in the experimental group increased significantly, but the sports scores of aerobics students in the control group without interval training did not increase significantly. Therefore, we can draw a conclusion that through high-intensity intermittent training can effectively improve the sports score of aerobics students, so that they can achieve higher results in the competition.

In addition, the performance scores of aerobics students in the experimental group and the control group were measured and recorded, as shown in Figure 4. Before the experiment, the performance score of aerobics students in the experimental group was close to 60 points. After the high-intensity intermittent training, the performance score of aerobics students in the experimental group was close to 90 points, with a very obvious improvement effect. The performance score of aerobics students in the control group was close to 60 points. After the experiment, the performance score of aerobics students in the control group increased to more than 70 points. However, the growth rate of the performance score of aerobics students in the control group is not as large as that of the performance score of aerobics students in the experimental group. It can be seen from this that high-intensity intermittent training can effectively improve the performance score of aerobics students' sports difficulty.

DISCUSSION

In the daily aerobics training, the use of this intermittent training can eliminate the boredom of routine training, and also increase the physical fitness of aerobics students. There are several very important factors in indirect training, which are very important for aerobics students. These factors are interval time, number of exercises and distance. For aerobics students, a perfect combination of these important factors can improve their skills a lot. In the training of aerobics special students, the stimulation and load of various training will achieve many different effects. In order to enhance the endurance of aerobics special students, we need to develop another training plan, to increase the training time of students, reduce the interval time of students, and then make the training time of each time more than the interval time, so as to enhance the endurance of students.

Trainers can burn body heat quickly through high-intensity interval training, and will break their exercise load again and again. Aerobics special students use this indirect training in their daily training,

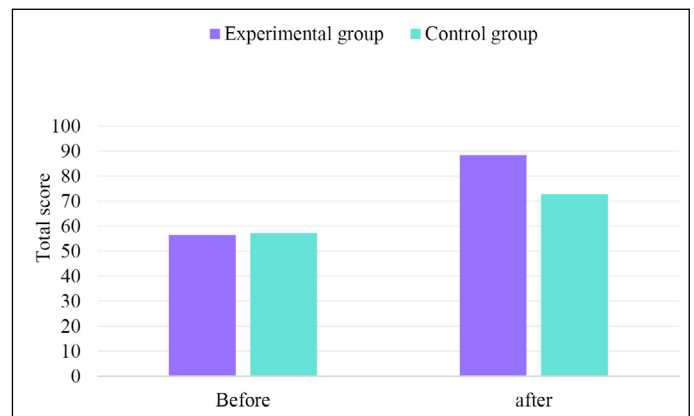


Figure 4. The Effect of High Intensity Intermittent Training on the Performance Score of Aerobics Students.

which will effectively burn their body fat. Aerobics special students can carry out intensive intermittent training, let them carry out multiple groups of training, and recover a certain amount of physical strength between each group of training. This high-intensity training method will have much better effect than the normal training method. When using this training method, more scientific use of this method will enhance the oxygen intake of aerobics students, thus increasing the students' vital capacity. Through this method, aerobics special students will enhance the metabolism of the body, thereby burning the body's heat, thus enhancing the oxygen delivery ability of blood vessels, and then enhancing the students' endurance and physical strength, making the long-distance running easier, so as to achieve the purpose of intermittent training.

CONCLUSION

During the experiment, this paper accurately measured and recorded and analyzed the physical fitness index of aerobics students, the CTT time and ODC score index of balance quality, the sports score and the sports difficulty performance score. It can be seen that after the high-intensity interval training, the physical fitness index and the sports difficulty performance score of aerobics students have significantly improved. From this, it can be concluded that adding high-intensity interval training to the routine training of aerobics can not only improve the physical quality and balance quality of aerobics special students, but also further improve the performance score of aerobics special students' sports difficulty, thus improving the overall competitive performance of aerobics special students in the competition process.

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