

# EFFECTS OF GYMNASTICS TRAINING ON PHYSICAL FITNESS OF FEMALE COLLEGE STUDENTS

EFEITOS DO TREINAMENTO DE GINÁSTICA SOBRE A APTIDÃO FÍSICA DE ESTUDANTES UNIVERSITÁRIAS

EFFECTOS DEL ENTRENAMIENTO GIMNÁSTICO EN LA APTITUD FÍSICA DE ESTUDIANTES UNIVERSITARIAS



ORIGINAL ARTICLE  
ARTIGO ORIGINAL  
ARTÍCULO ORIGINAL

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## ABSTRACT

**Introduction:** The physical education curriculum aims to improve the level of students, benefiting the development of physical and mental health. Currently, the original physical education curriculum does not meet the specific requirements of today's students and needs to undergo a new stage of restructuring in its development. **Objective:** Analyze the impacts of gymnastics training on the physical fitness of female college students. **Methods:** We selected 86 female college students who chose the gymnastics elective course. The volunteers were divided into an experimental (n=43) and a control group (n=43). While the control performed basic training, the experimental group performed aerobics training according to an established protocol. The experiment, 60 minutes daily, was performed twice a week for 18 weeks. Data related to body composition and functional physical performance were collected before and after the intervention, and a comparative analysis was performed with statistical software. **Results:** The experimental group showed considerable gains; body fat ratio decreased from 27.99 to 26.25; vital capacity increased by 15.13%, and maximum strength performance in one minute increased by 15.02%. **Conclusion:** According to the results presented, gymnastics training significantly improved female college students' physical fitness. Its constant exercise also has the potential to improve the muscle tone of the pelvic girdle and abdomen. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

**Keywords:** Gymnastics; Physical Fitness; Physical Education and Training; Students.

## RESUMO

**Introdução:** O objetivo do currículo de educação física é melhorar o nível dos alunos, beneficiando o desenvolvimento da saúde física e mental. Atualmente, o currículo original de educação física não atende às exigências específicas das alunas atuais, necessitando passar por uma nova etapa de reestruturação em seu desenvolvimento. **Objetivo:** Analisar os impactos do treinamento de ginástica sobre a aptidão física das estudantes universitárias. **Métodos:** Selecionou-se 86 estudantes universitárias que elegeram o curso optativo de ginástica. As voluntárias foram divididas em grupo experimental (n=43) e controle (n=43). Enquanto o controle realizava o treinamento básico, o grupo experimental realizou um treinamento de aeróbica segundo um protocolo estabelecido. O experimento de 60 minutos diários, foi realizado duas vezes por semana durante 18 semanas. Dados relacionados à composição corporal e desempenho físico funcional foram coletados antes e após a intervenção e uma análise comparativa foi realizada com software estatístico. **Resultados:** O grupo experimental apresentou ganhos consideráveis, a taxa de gordura corporal diminuiu de 27.99 para 26.25; a capacidade vital aumentou 15.13%; e o desempenho de força máxima em um minuto aumentou 15.02%. **Conclusão:** De acordo com os resultados apresentados, o treinamento de ginástica apresentou efeitos significativos na melhoria da aptidão física das estudantes universitárias. O seu exercício constante também tem o potencial de melhorar o tônus muscular da cintura pélvica e do abdômen. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

**Descritores:** Ginástica; Aptidão Física; Educação Física e Treinamento; Estudantes.

## RESUMEN

**Introducción:** El objetivo del currículo de educación física es mejorar el nivel de los alumnos, beneficiando el desarrollo de la salud física y mental. En la actualidad, el plan de estudios original de educación física no satisface los requisitos específicos de los alumnos actuales, por lo que necesita pasar por una nueva etapa de reestructuración en su desarrollo. **Objetivo:** Analizar las repercusiones del entrenamiento gimnástico en la aptitud física de estudiantes universitarias. **Métodos:** Se seleccionaron 86 alumnas universitarias que eligieron la asignatura optativa de gimnasia. Los voluntarios se dividieron en grupo experimental (n=43) y grupo de control (n=43). Mientras el grupo de control realizaba entrenamiento básico, el grupo experimental realizaba entrenamiento aeróbico según un protocolo establecido. El experimento, de 60 minutos diarios, se realizó dos veces por semana durante 18 semanas. Se recogieron datos relacionados con la composición corporal y el rendimiento físico funcional antes y después de la intervención y se realizó un análisis comparativo con programas informáticos estadísticos. **Resultados:** El grupo experimental mostró ganancias considerables, la proporción de grasa corporal disminuyó de 27,99 a 26,25; la capacidad vital aumentó un 15,13%; y el rendimiento de fuerza máxima en un minuto aumentó un 15,02%. **Conclusión:** Según los



resultados presentados, el entrenamiento gimnástico mostró efectos significativos en la mejora de la aptitud física de las estudiantes universitarias. Su ejercicio constante también tiene el potencial de mejorar el tono muscular de la cintura pélvica y el abdomen. **Nivel de evidencia II; Estudios terapéuticos: investigación de los resultados del tratamiento.**

**Descriptor:** Gimnasia; Aptitud Física; Educación y Entrenamiento Físico; Estudiantes.

DOI: [http://dx.doi.org/10.1590/1517-8692202329012022\\_0723](http://dx.doi.org/10.1590/1517-8692202329012022_0723)

Article received on 11/30/2022 accepted on 12/08/2022

## INTRODUCTION

With the continuous development of physical education curriculum in schools, the physical education curriculum in contemporary universities is also constantly developing and changing.<sup>1</sup> The purpose of physical education curriculum is to improve the health level of students, to better improve the physical quality of students, so as to improve the overall development of physical and mental health; Schools can develop students' enthusiasm for physical education from their interest and habits in physical education, which can lay a good foundation for the development of lifelong physical education.<sup>2</sup> Nowadays, especially for female students, the original physical education curriculum can not meet the relevant requirements of contemporary students.<sup>3</sup> Today's female college students are now in the age of youth and vitality. As long as they continue to carry out aerobics training for a long time, they can not only correct their body posture, but also have a good body shape.<sup>4</sup> Through aerobics training, they can become more healthy. For today's female college students, they can not only understand the relevant knowledge of aerobics in physical exercise, but also learn the relevant movement skills, which will have an effective impact on the shape, composition, quality and physiological function of the body, and comprehensively improve the physical quality of female college students. The external beauty and internal temperament required by female college students have been improved.<sup>5,6</sup>

## METHOD

### Research object

This paper selects 86 female college students from A University in a province who have chosen aerobics as an elective course to participate in this experiment, which is used to analyze the role of aerobics in the physical quality of female college students. The study and all the participants were reviewed and approved by Ethics Committee of Sichuan Institute of technology (NO.SIT2020-SE076).

### Experimental methods

Before the experiment, the data of 172 students in the aerobics elective course were measured before the experiment. After the data were obtained, the T-test was carried out, and the test result was  $P > 0.05$ . From the experimental results, it can be seen that the students had no obvious differences, which was in line with the requirements of the experiment. 86 students were randomly selected for the experiment. They were divided into two groups, 43 in each group. They were divided into the experimental group and the control group. The former carried out aerobics training, while the latter carried out basic training. The experiment lasted 18 weeks in total, and 60 minute training was carried out twice a week. After the training, the corresponding experimental data are obtained, and the experimental data are collated through the relevant software to carry out comparative analysis of the experimental results, which is used to study some changes in the physical fitness of students before and after the experiment.

### Experimental control

In order to ensure the accuracy of the experimental data, the following requirements are required: 1. The instructor and students must

strictly observe the class time, and the two groups of students need to maintain consistent teaching content in class. 2. In the experiment, it is necessary to ensure that there is no change in the personnel of the two groups of students. 3. It is necessary to ensure that all students have not participated in aerobics training.

## RESULTS

### The influence of aerobics teaching on female college students' body shape

It can be concluded from Table 1 that the p value of the experimental group is less than 0.05, indicating that the experiment has a very good effect. From the change rate, both the upper arm skin fold thickness, the abdominal skin fold thickness, the shoulder skin fold thickness, the body fat ratio, and the waist hip ratio have significantly decreased. From the P value perspective, the upper arm skin fold thickness P value is less than 0.05; The P value of abdominal skin fold thickness was less than 0.01; The P value of shoulder skin fold thickness is less than 0.05; P value of body fat rate is less than 0.05; P value of waist hip ratio is less than 0.01. From the change rate, the change rate of upper arm skin fold thickness is -1.126%; The change rate of the thickness of abdominal skin fold was -29.150%; The change rate of shoulder skin fold thickness was -17.099%; The change rate of body fat rate was -6.636%; The change rate of waist hip ratio was -6.258%; Therefore, from the data results before and after the experiment, it can be seen that aerobics teaching has a significant impact on the body shape of contemporary female college students, especially in the abdomen and shoulders.

It can be concluded from Table 2 that the body shape of female college students in the control group has also changed correspondingly, but the change of the control group who only had the corresponding basic training is not very significant. From the P value, the P value of the upper arm skin fold thickness is less than 0.05; The P value of abdominal skin fold thickness is greater than 0.05; The P value of shoulder skin fold thickness is less than 0.05; P value of body fat ratio is greater than 0.05; P value of waist hip ratio is less than 0.05. From the change rate, the change rate of upper arm skin fold thickness is 2.619%; The change rate of the thickness of abdominal skin fold was -2.758%; The change rate of shoulder skin fold thickness was 0.180%; The change rate of body fat rate was -0.146%; The change rate of waist hip ratio was 0.301%.

**Table 1.** Changes of body shape of female college students in the experimental group.

Option	Before experiment	After experiment	P	Rate of change
Upper arm skin fold thickness (cm)	18.118 ±3.595	17.916 ±3.177	<0.05	-1.126%
Thickness of abdominal skin fold (cm)	30.606 ±8.308	23.698 ±6.369	<0.01	-29.150%
Shoulder skin fold thickness (cm)	17.456 ±4.633	14.907 ±3.981	<0.05	-17.099%
Body fat percentage	27.993 ±4.597	26.251 ±4.890	<0.05	-6.636%
Waist hip ratio	0.804 ±0.071	0.757 ±0.061	<0.01	-6.258%

**Table 2.** Body shape changes of female college students in the control group.

Option	Before experiment	After experiment	P	Rate of change
Upper arm skin fold thickness (cm)	17.989 ±3.177	18.473 ±3.058	<0.05	2.619%
Thickness of abdominal skin fold (cm)	30.728 ±8.525	29.903 ±9.061	>0.05	-2.758%
Shoulder skin fold thickness (cm)	17.247 ±3.851	17.278 ±3.520	<0.05	0.180%
Body fat percentage	27.862 ±5.718	27.821 ±5.048	>0.05	-0.146%
Waist hip ratio	0.794 ±0.091	0.797 ±0.111	<0.05	0.301%

### Effect of aerobics teaching on female college students' cardiopulmonary endurance

It can be seen from the results in Table 3 that the p values of the data on cardiopulmonary endurance of female college students in the experimental group are all less than 0.05. It can be explained that aerobics has an obvious role. In Table 3, there are obvious changes in vital capacity, resting heart rate and heart rate immediately after exercise, among which, the P value of vital capacity is less than 0.01, and the change rate is 15.135%; The P value of quiet heart rate is less than 0.05, and the change rate is -17.092%; The P value of heart rate immediately after exercise was less than 0.01, and the change rate was -4.170%. Therefore, it can be concluded that effective exercise methods such as aerobics training can improve cardiopulmonary endurance.

It can be seen from the results in Table 4 that the female college students in the control group have also had corresponding changes in cardiopulmonary endurance. After basic training, the vital capacity can be seen from the data results to have a significant improvement, but in the quiet heart rate and the heart rate immediately after exercise, although there is also an improvement, it is not very obvious. Therefore, according to the data in Table 4, the P value of vital capacity is less than 0.05, with a change rate of 7.797%; The P value of quiet heart rate is greater than 0.05, and the change rate is -7.757%; The P value of heart rate immediately after exercise was greater than 0.05, and the change rate was -0.366%. It can be seen from the results that after basic training, cardiopulmonary endurance can also be improved to a certain extent, but the effect of improvement is not very significant.

### The influence of aerobics teaching on the physical fitness of female college students

From the experimental results in Table 5, it can be concluded that the physical fitness of female college students in the experimental group has been significantly improved before and after the experiment, and there are significant changes in general. Except for the score improvement of 50 meters, the others have been significantly improved. However, in terms of standing long jump, sitting forward bending, one minute sit up and 800 meters, the experimental results show that the P value of 50 meters is less than 0.05; P value of standing long jump is less than 0.05; P value of anteflexion in sitting position is less than 0.01; The P value of one minute sit up is less than 0.01; P value of 800m is less than 0.01; The change rate of 50m is 1.066%; The change rate of standing long jump was 3.528%; The change rate of anteflexion in sitting position was 5.040%; The change rate of one minute sit ups was 15.052%; The change rate of 800m is 1.169%; On the whole, there is a very obvious improvement. In particular, the P value of forward bending, one minute sit up and 800 meters is less than 0.01, with very obvious changes.

It can be concluded from the experimental results in Table 6 that although the physical fitness of female college students in the control group has changed before and after the experiment, the change is not very obvious. Except for the significant change in one minute sit up, the other changes are very small. From the experimental results, we can

**Table 3.** Changes of Cardiopulmonary Endurance of Female College Students in the Experimental Group.

Option	Before experiment	After experiment	P	Rate of change
Vital capacity	2,893.530±372.445	3,409.554±92.856	<0.01	15.135%
Quiet heart rate	70.679±5.354	60.362±4.855	<0.05	-17.092%
Heart rate immediately after exercise	174.512±6.107	167.526±3.299	<0.01	-4.170%

**Table 4.** Changes of cardiopulmonary endurance in female college students in the control group.

Option	Before experiment	After experiment	P	Rate of change
Vital capacity	2,922.011±319.150	3,169.098±130.423	<0.05	7.797%
Quiet heart rate	70.425±7.271	65.355±6.765	>0.05	-7.757%
Heart rate immediately after exercise	172.939±6.488	172.308±6.177	>0.05	-0.366%

**Table 5.** Changes in physical fitness of female college students in the experimental group.

Option	Before experiment	After experiment	P	Rate of change
50 meters (seconds)	9.757±0.743	9.713±0.335	<0.05	1.066%
Standing Long Jump (cm)	160.545±0.266	166.416±0.801	<0.05	3.528%
Forward bending of sitting body (cm)	16.712±0.075	17.599±0.393	<0.01	5.040%
One minute sit-ups	34.865±0.184	41.043±0.307	<0.01	15.052%
800m (min)	3.484±0.325	3.443±0.361	<0.01	1.169%

**Table 6.** Changes of physical fitness of female college students in the control group.

Option	Before experiment	After experiment	P	Rate of change
50 meters (seconds)	10.148±0.783	9.925±0.541	<0.05	2.196%
Standing Long Jump (cm)	162.653±0.705	160.509±0.793	>0.05	-1.336%
Forward bending of sitting body (cm)	15.776±0.526	17.426±0.233	>0.05	9.469%
One minute sit-ups	34.182±0.078	35.827±0.683	<0.01	4.594%
800m (min)	3.501±0.401	3.496±0.991	>0.05	0.188%

see that there is no obvious change in 50m, standing long jump, sitting forward bending and 800m, and the P value of 50m is less than 0.05; The P value of standing long jump is greater than 0.05; The P value of forward flexion in sitting position is greater than 0.05; The P value of one minute sit up is less than 0.01; P value of 800m is greater than 0.05; The change rate of 50m is 2.196%; The change rate of standing long jump was -1.336%; The change rate of anteflexion in sitting position was 9.469%; The change rate of one minute sit ups was 4.594%; The change rate of 800m is 0.188%; Among them, especially in standing long jump, sitting forward bending and 800 meters, the P value is greater than 0.05, and there is basically no change before and after the experiment.

## DISCUSSION

This experiment will be divided into experimental group and control group by using the method of control experiment. The former will carry out aerobics training, while the latter will carry out basic training. After training, the corresponding experimental data are obtained and sorted out through relevant software, which is conducive to future data analysis. Through continuous aerobics training, it can be well observed that the overall physical quality of students has been improved, and the test results have also changed significantly, which can well explain that aerobics training can improve the overall physical level of students, and it also shows that this experimental research has achieved the desired effect.

According to the research results, the training of aerobics plays a significant role in improving the physical quality of female college students. However, relevant training methods need to be improved so as to improve the training effect and improve the physical quality of college students. Therefore, it is necessary to innovate and reform the training methods. By adjusting the training methods, we should attach importance to students' ability to practice aerobics. By using the method of aerobics training, students can quickly carry out aerobics practice through intuitive imitation training. This requires teachers to choose or create some new training methods, which can better motivate students to learn and practice.

## CONCLUSION

The training method of aerobics is to perform a relatively fast rhythm movement in a relatively short time, so that the body can better improve flexibility and lower limb strength. In the process of aerobics

training, because the body's center of gravity has been changing, the core area of the body's trunk can be contracted and relaxed to maintain the stability of the center of gravity, so it can also improve the dynamic balance ability of the body. According to the results of the research experiment, the training of aerobics plays a significant role in improving the physical quality of female college students. Regular exercise of aerobics can also improve the ability of aerobic exercise and the strength of the waist and abdomen.

## ACKNOWLEDGEMENT

This paper was supported by (1)Science and Technology Project of Fujian Provincial Department of Education (No.JA13233), (2)Xiamen Major Science and Technology Project (No.3502Z20111008).

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

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**AUTHORS' CONTRIBUTIONS:** The author has completed the writing of the article or the critical review of its knowledge content. This paper can be used as the final draft of the manuscript. Every author has made an important contribution to this manuscript. Wang Ju: writing and execution.

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