

HUMAN BODY CONSTITUTION CARE MEDICINE UNDER THE INTERVENTION OF SPORTS SCIENCE



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OS CUIDADOS MÉDICOS COM A CONSTITUIÇÃO DO CORPO HUMANO SOB A INTERVENÇÃO DA CIÊNCIA DO ESPORTE

LOS CUIDADOS MÉDICOS CON LA CONSTITUCIÓN DEL CUERPO HUMANO BAJO LA INTERVENCIÓN DE LA CIENCIA DEL DEPORTE

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ABSTRACT

Introduction: The shape, physiological function, and physical fitness (exercise ability) of the human body are the main parts of physical fitness. Different sports kinesiology methods have different effects on the human physique. System science-related theories can be applied to the research of the human health system under medical theory. **Objective:** We researched the human body's physique and formulate relevant sports kinesiology programs for the human body. We could analyze the influence of human body shape and physiological condition on human body constitution. **Methods:** We conducted research on the human body's physical health and nutrition through methods such as physical tests, anthropometric measurements, diet surveys, and laboratory examinations of the human body. Analyzing the correlation between sports and human body conditioning medicine had a favorable outcome in the study. **Results:** The sports kinesiology program has apparent effects on improving and enhancing human body shape, physiological functions, and physical fitness. **Conclusion:** The sports kinesiology program has a significant effect on improving the physical fitness of the human body. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

Keywords: Sports nutritional science; Body constitution; After-hours care.

RESUMO

Introdução: A forma, a função fisiológica e o preparo físico (habilidade da prática de exercícios) do corpo humano são os principais componentes do preparo físico. Diferentes métodos de cinesiologia dos esportes têm diferentes efeitos no físico humano. Teorias científicas sistemáticas podem ser aplicadas à pesquisa do sistema de saúde humana sob a teoria médica. **Objetivo:** Pesquisamos o físico do corpo humano e formulamos programas de cinesiologia dos esportes relevantes para o corpo humano. Pudemos analisar a forma corporal e a condição fisiológica na constituição do corpo humano. **Métodos:** Conduzimos uma pesquisa sobre a saúde e nutrição física do corpo humano com métodos como testes físicos, medidas antropométricas, estudos sobre dietas e exames laboratoriais do corpo humano. A análise da correlação entre esportes a medicina do condicionamento do corpo humano teve resultados positivos neste estudo. **Resultados:** O programa de cinesiologia do esporte tem efeitos visíveis em melhorar e aprimorar a forma do corpo humano, suas funções fisiológicas e o preparo físico. **Conclusão:** O programa de cinesiologia do esporte tem um efeito significativo em melhorar o preparo físico do corpo humano. **Nível de evidência II; Estudos terapêuticos – investigação de resultados de tratamento.**

Descritores: Ciência da nutrição e do esporte; Constituição corporal; Plantão médico.

RESUMEN

Introducción: La forma, la función fisiológica y la preparación física (habilidad de la práctica de ejercicios) del cuerpo humano son los principales componentes de la preparación física. Diferentes métodos de kinesiológica de los deportes pueden aplicarse a la investigación del sistema de salud humana bajo la teoría médica. **Objetivo:** Investigamos el físico del cuerpo humano y formulamos programas de kinesiológica de los deportes relevantes para el cuerpo humano. Pudimos analizar la forma corporal y la condición fisiológica en la constitución del cuerpo humano. **Métodos:** Conducimos una investigación sobre la salud y nutrición física del cuerpo humano a través de métodos como pruebas físicas, medidas antropométricas, estudios sobre dietas y exámenes laboratoriales del cuerpo humano. El análisis de la correlación entre deportes y la medicina del condicionamiento del cuerpo humano tuvo resultados positivos en este estudio. **Resultados:** El programa de kinesiológica del deporte tiene efectos visibles en mejorar y primorear la forma del cuerpo humano, sus funciones fisiológicas y la preparación física. **Conclusión:** El programa de kinesiológica del deporte tiene un efecto significativo en mejorar la preparación física del cuerpo humano. **Nivel de evidencia II; Estudios terapéuticos – investigación de resultados de tratamiento.**

Descritores: Ciencias de la nutrición y del deporte; Constitución corporal; Atención posterior.



INTRODUCTION

In the past 20 years, the development of our students' physical shape, function, and quality is highly uneven. The morphological indicators such as height and weight of students have increased significantly. The vital capacity and physical fitness level decreased significantly. The comprehensive evaluation level of physical fitness is also declining. Exploring the method suitable for students' physical exercise improves the student's physical fitness.¹ Aerobic exercise is one of the most used and effective methods to enhance physical fitness and improve human health. The effect of aerobic exercise on improving the human body has been applied to fitness exercises in all walks of life. Aerobic aerobics is a common sport among female college students. In this study, aerobic bodybuilding operations were used as exercise methods. Exercise intervention programs were formulated to analyze the changes in female college students' body shape, physiological functions, and physical fitness. This provides a basis for guiding students to exercise.

METHODS

Experimental subjects

According to the principle of voluntary registration, we divided 146 first-year female college students (Table 1) into two groups (experimental group and control group). We formulate a one-semester aerobic fitness exercise intervention program. The experimental group trains three times a week, each time is 60 minutes.² The control group only performed daily physical activities except for learning and did not participate in any physical exercises.

Research methods

Exercise Intervention Program

Sports intervention programs are formulated following the principles of fun, science, knowledge, and practicability. The specific content includes basic aerobics, basic pace aerobics, boxing aerobics, Latin aerobics, mat aerobics, dumbbell aerobics, and body exercises.³ Three times a week, 60 minutes each time. The total exercise time is 1 semester. The exercise frequency is 60% to 80% of the maximum heart rate and is generally controlled at 120 to 150 beats/min.

Test index body shape

Weight, chest circumference, waist circumference, hip circumference, BMI, body composition, vital capacity, maximum oxygen uptake, etc.

Statistical processing

All data are expressed as mean and standard deviation. The difference between groups was tested by t. The most basic perceptron model of an artificial neural network is set as follows. x_i is input. Y_i is the output. w_i is the weight coefficient. The mathematical expression of the model is:

$$O_i = f\left(\sum_{j=1}^n w_{ij} S_j - \theta_i\right) (i=1, 2, L, n; S_j = 1 \text{ or } 2) \quad (1)$$

The model structure is divided into two layers: input and output. The input layer has multiple input nodes and the output layer has one or more output nodes. S is the learning sample: $(S_1(k), S_2(k), S_3(k), \dots, S_m(k))$; $(Y_1(k), Y_2(k), Y_3(k), \dots, Y_m(k))$, k is the number of samples. $k = 1, 2, \dots, p$. The weight correction formula is $\delta_i = Y_i - O_i$. Y_i is the expected output (actual output). O_i is the network calculation output. The average absolute error is $\delta = \frac{1}{n} \sum_{i=1}^n |y_i - \hat{y}_i|$ (The smaller the value of δ , the higher the prediction accuracy).

Table 1. The basic situation of the tested students.

Group	Number/person	Age/year old	Height/cm	Weight/kg
Control group	69	19.58±1.52	157.01±4.36	52.96±5.38
Test group	77	19.63±1.45	156.81±3.12	53.56±5.58

If $f(x)$ is a bounded monotonically increasing continuous function. K is the compact subset of R . Then for any continuous image: $\phi(x) \rightarrow f(x)$. The number of hidden layer nodes affects the time and accuracy of the fitting. But it is not that the more nodes, the higher the accuracy.⁴ The weight coefficient formula is:

$$w_{ij}(k+1) = w_{ij}(k) + \Delta w_{ij} \quad (2)$$

$$\Delta w_{ij} = \alpha \cdot \delta_i(k+1) \cdot S_j, \alpha > 0 \quad (3)$$

If the value of δ is smaller, it means that the prediction accuracy of the artificial neural network is higher, and the calculated weight coefficient w is more meaningful.⁵ The experiment mainly compares the difference between the model output value (δ_i) and the actual value (Y_i). The higher the degree of fit, the more accurate the weight coefficient w_i of the corresponding indicator.

RESULTS

The impact of an aerobic exercise intervention program on body shape

Bodyweight is an indicator that comprehensively reflects the developmental status of human body circumference, width, and thickness. Chest circumference is an indicator that reflects the size of the chest and the development of chest and back muscles.⁶ The data in Table 2 show that the weight, chest circumference, waist circumference, and hip circumference of the experimental group after exercise intervention are significantly better than those of the control group, with significant differences ($P < 0.05$).

The waist-to-hip ratio is the ratio of waist circumference to hip circumference. It mainly reflects the distribution of body fat. It is generally believed that excessive abdominal fat is closely related to the occurrence and development of various diseases. The data showed that the waist-to-hip ratio of the experimental group after exercise intervention was significantly smaller than that of the control group.⁷ This has a very significant difference ($P > 0.01$).

Body mass index (BMI) is mainly used to evaluate body composition and obesity. It can also indirectly reflect a person's nutritional status. There was no noticeable change in the body mass index of the students after aerobic exercise.

The effect of an aerobic exercise intervention program on body composition

The effect of an aerobic exercise intervention program on the thickness of sebum in various parts of the body

Table 3 indicates that the thickness of sebum in various parts of the body after exercise intervention in the experimental group was significantly smaller than in the control group. The difference in the abdomen was the most obvious ($P < 0.01$), followed by the thigh and scapula ($P < 0.05$). Aerobic exercise can enhance the consumption of fat. It can reduce body fat content, obviously increase muscle strength, and make people look

Table 2. The influence of aerobic fitness intervention program on body shape indicators.

Index	Control group (n=69)		Experimental group (n=77)	
	Before intervention	After the intervention	Before intervention	After the intervention
Weight/kg	52.96±5.38	51.58±5.12	53.56±5.58	48.34±3.65
Bust/cm	84.58±13.9	84.34±12.6	84.95±14.3	80.12±12.1
Waist circumference/cm	61.82±4.91	60.89±4.63	60.12±4.13	61.01±7.22
Hips/cm	90.82±13.12	90.68±12.61	89.89±12.53	87.67±13.8
BMI/kg·cm ²	22.54±4.52	22.36±4.74	22.13±3.47	20.91±3.12

fit. This change is reflected in changes in body composition. Aerobics can effectively promote the decomposition of body fat during and after exercise and increase fat as energy.⁹ This will achieve the goal of fat loss.

The influence of aerobic exercise intervention program on lean body mass, body fat%, and body density

The data in Table 3 suggest that the experimental group has significant changes in lean body mass after exercise intervention.⁹ This shows that female college students have stronger muscles and softer lines after aerobic exercises. It shows that long-term adherence to aerobic exercise can significantly improve the body composition of girls and reduce excess body fat. Exercise can promote the development of muscles and make the body transform in the direction of health, strength, and beauty.

The influence of aerobic exercise intervention program on cardiopulmonary function

Vital capacity and maximum oxygen uptake are essential indicators that reflect cardiopulmonary function. The data in Table 4 shows that the resting heart rate of the experimental group after exercise intervention is not significantly different from that of the control group ($P>0.05$). Vital capacity and maximum oxygen uptake were significantly greater than those of the control group. It has a significant difference ($P<0.05$).

The impact of an aerobic exercise intervention program on physical fitness

The data in Table 5 shows that the physical fitness of the experimental group after exercise intervention is significantly different from that of the control group ($P<0.01$).

Physical fitness indicators such as 50-min running, 800-min running, forward bending, and sit-ups were significantly improved ($P<0.05$).

Table 3. The effect of an aerobic fitness intervention program on body composition.

Index	Control group (n=69)		Experimental group (n=77)	
	Before intervention	After the intervention	Before intervention	After the intervention
Arm/mm	12.25±2.61	12.31±2.78	13.16±2.75	10.21±2.14
Scapula/mm	13.32±3.14	13.12±3.41	13.20±3.56	10.74±3.2
Abdomen/mm	13.98±3.72	13.68±3.59	14.08±3.28	11.96±3.53
Thigh/mm	13.57±4.26	13.09±4.30	14.17±4.58	1.04±2.61
Lean body weight/kg	36.96±8.46	35.76±7.97	37.26±7.96	41.83±9.86

Table 4. The influence of aerobic fitness intervention program on cardiopulmonary function.

Index	Index	Resting heart rate/time-min ⁻¹	Vital capacity/mL	Maximum oxygen uptake/L
Control group (n=69)	Before intervention	80.95±4.72	3011.65±120.72	2.21±5.48
	After the intervention	80.23±4.34	3101.65±143.78	2.29±5.34
Experimental group (n=77)	Before intervention	80.35±4.56	3121.65±158.62	2.27±5.68
	After the intervention	78.95±4.61	3915.42±113.72	2.49±4.73

Table 5. The influence of aerobic fitness intervention program on physical fitness indicators.

Index	Control group (n=69)		Experimental group (n=77)	
	Before intervention	After the intervention	Before intervention	After the intervention
50min/s	11.66±0.58	10.71±0.69	10.43±0.72	10.27±0.65
800min/s	329.21±9.92	319.34±8.68	330.95±9.33	226.12±8.51
Body flexion/cm	10.32±3.92	10.89±4.53	11.12±4.13	15.46±6.22
Standing up/n:10s	4.82±0.62	5.18±0.48	4.89±0.53	6.67±0.98
Sit-ups/n:min	26.54±3.52	28.06±4.20	27.13±3.32	33.91±3.12

There is a very significant difference in the index of standing up support ($P<0.01$). This shows that the aerobic exercise intervention program can effectively enhance the strength of the students' lower limbs.

DISCUSSION

An anaerobic exercise is a form of exercise often used in fitness. The current research shows that the proportion of fat energy supply increases with prolonged exercise time during exercise. For example, during the continuous exercise of 40min, 90min, and 180min, the fatty acid energy supply accounts for 27%, 37%, and 50% of the total energy consumption.

The aerobic exercise intervention program is an effective method for female college students to shape

The heritability of human body shape is relatively significant, and it takes a long time to practice to change the acquired form. From physiological anatomy, the human body is mainly composed of bone, muscle, fat, and other tissues. Human body height, weight, skinfold thickness, and circumference are indicators that reflect the development of human bones, muscles, and fat. If you can persist in aerobic exercise for a long time, it will encourage women to consume excess body fat. This makes a relative increase in lean body mass, which can help improve the body's health. Long-term aerobic fitness can improve body shape.

The mechanism of an aerobic exercise intervention program to improve body composition

Body fat is an essential factor that affects the body's exercise capacity. Reducing the proportion of body fat is conducive to improving the physical fitness of female college students. Regular participation in aerobic exercise can consume excess body fat. This has a better effect on simple obesity. Aerobic exercise can effectively reduce body fat components and reduce subcutaneous fat reserves. Aerobic exercise can increase the rate of body fat breakdown. The mechanism is to increase critical lipolytic enzymes such as lipoprotein lipase (LPL) and liver lipase (HL) in tissues such as muscle and liver. It accelerates the decomposition of LDL-containing triglycerides and can reduce total blood lipids. Therefore, regular participation in aerobic exercise can make women consume excess body fat.

Aerobic exercise intervention can significantly improve physical fitness

The experimental results showed that the speed and endurance quality of female college students improved to different degrees after aerobic exercise intervention, and the speed quality and speed endurance quality were improved ($P<0.05$).

Flexibility refers to the stretching ability of joints, muscles, tendons, and ligaments when the body completes movements. Aerobic exercise can improve joint flexibility, improve the function of soft tissues around joints, and stretch muscles, ligaments, and muscles. Sensitivity refers to athletes' ability to quickly, accurately, and coordinately change the spatial position and direction of body movement to adapt to the changing external environment under sudden changes. Aerobic exercise intervention can improve the body's sensitivity, and continuous aerobic exercise for a relatively long time can better improve the sensitivity of the body.

CONCLUSION

1) The aerobic exercise intervention program has a good effect in improving the body shape of female college students. 2) The improvement of the aerobic exercise intervention programs in terms of physical function is also more apparent. 3) The aerobic exercise intervention program has a significant effect on improving the physical fitness of female college students.

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