INFLUENCE OF PHYSICAL TRAINING ON THE PHYSICAL FITNESS OF YOUNG THROWING ATHLETES

INFLUÊNCIA DO TREINAMENTO FÍSICO SOBRE A APTIDÃO FÍSICA DE JOVENS ATLETAS DE ARREMESSO

INFLUENCIA DEL ENTRENAMIENTO FÍSICO EN LA APTITUD FÍSICA DE JÓVENES ATLETAS DE LANZAMIENTO

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ABSTRACT

Introduction: The improvement of physical training is a prerequisite to achieving excellent athletic performance in throwing. Following these requirements, it is also necessary to improve the scientificity, effectiveness, and flexibility of the physical training of adolescent athletes. Objective: To study the influence of physical training on the physical fitness of young throwing athletes. Methods: This article uses mathematical statistics to study the physical fitness of young throwing athletes. We divided the young volunteers included in the experimental study into training and control groups. A comparative analysis of their physical fitness indicators before and after sports practice. Results: After physical training, the physical fitness indicators of adolescents showed a more significant impact. The athletics competitions of the young athletes' results also improved significantly (P<0.05). Conclusion: The throwing sport can improve the physical fitness of young athletes. In adolescence, the intervention of physical training can be increased to improve indicators of physical fitness in young practitioners. ***Evidence level II; Therapeutic Studies - Investigating the results.***

Keywords: Physical Conditioning, Human; Physical Fitness Testing; Track and field.

RESUMO

Introdução: O aprimoramento do treino físico é um pré-requisito para alcançar o excelente desempenho atlético em arremesso. Acompanhando essas exigências, também é necessário melhorar a cientificidade, eficácia e flexibilidade do treinamento físico dos atletas adolescentes. Objetivo: Estudar a influência do treinamento físico na aptidão física de jovens atletas de arremesso. Métodos: Este artigo utiliza estatística matemática para estudar a aptidão física de jovens atletas praticantes de arremesso. Dividimos os jovens voluntários incluídos no estudo experimental em grupos de treinamento e controle. Uma análise comparativa de seus indicadores de aptidão física antes e depois da prática esportiva. Resultados: Após o treinamento físico, os indicadores de aptidão física dos adolescentes demonstraram maior impacto. Os resultados das competições de atletismo dos jovens atletas também melhoraram significativamente (P<0,05). Conclusão: O esporte de arremesso pode melhorar a aptidão física dos jovens atletas. Na fase de adolescência, a intervenção do treinamento físico pode ser aumentada para melhorar os indicadores de aptidão física em seus jovens praticantes. ***Nível de evidência II; Estudos terapêuticos - Investigação de resultados.***

***Descritores*:** *Condicionamento Físico Humano; Testes de Aptidão Física; Atletismo.*

RESUMEN

Introducción: La mejora de la preparación física es un requisito previo para lograr un excelente rendimiento deportivo en el lanzamiento. Siguiendo estos requisitos, también es necesario mejorar la cientificidad, la eficacia y la flexibilidad del entrenamiento físico de los atletas adolescentes. Objetivo: Estudiar la influencia del entrenamiento físico en la condición física de jóvenes atletas de lanzamiento. Métodos: Este artículo utiliza estadística matemática para estudiar la condición física de jóvenes atletas de lanzamiento. Dividimos a los jóvenes voluntarios incluidos en el estudio experimental en grupos de entrenamiento y de control. Un análisis comparativo de sus indicadores de aptitud física antes y después de la práctica deportiva. Resultados: Después del entrenamiento físico, los indicadores de aptitud física de los adolescentes mostraron un impacto más significativo. Los resultados de las competencias de atletismo de los jóvenes atletas también mejoraron significativamente (P<0.05). Conclusión: El deporte del lanzamiento puede mejorar la condición física de los jóvenes atletas. En la adolescencia se puede incrementar la intervención del entrenamiento físico para mejorar los indicadores de condición física en los jóvenes practicantes. ***Nivel de evidencia II; Estudios terapéuticos - Investigación de resultados.***

Descriptores: Acondicionamiento Físico Humano; Pruebas de Aptitud Física; Atletismo.

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INTRODUCTION

Health is a necessary condition for students to conduct normal study and life. Teenagers are the hope for the future of China. However, the technological environment makes youth activities less and less. Electronic products such as mobile phones and computers occupy their lives. Some important indicators of adolescent physique show a downward trend.[1] The "Report on the Development of Chinese Youth Sports" issued by the State General Administration of Sports shows that the obesity rate of Chinese adolescents has increased significantly. Overweight and obesity increased to 5.05% and 9.41%, respectively. The vital capacity/body mass index distribution failure rate was 22.54%. There are many indicators of physical fitness, and the influencing factors are also diverse. Physical training can effectively improve various indicators of physical function.

Physical training is of great significance to the healthy growth of young athletes. Physical training can help athletes shape good character and handling habits and improve their physical fitness and cultivate the quality of diligence. Physical training promotes young athletes' physical and mental health and overall development.[2] And young athletes are the reserve force for the sustainable development of national competitive sports. Our physical training for athletes conforms to the inevitable trend of the development of the times and is also the basis for building a sports power. Therefore, the physical training method of young athletes is the focus of research in competitive sports. However, current research has not established a clear relationship between core stability, functional movements, and adolescents' physical fitness performance. Therefore, in physical training, theoretical reforms and practical innovations should be further strengthened. Improve the quality and efficiency of physical training. This is of positive significance for promoting the health of young people and developing amateur track and field training for young people.

METHOD

Research object

The research object of this article is a total of 70 students in the fifth grade of a primary school. Among them, 40 are boys, and 30 are girls. We randomly divided them into the control and physical training groups.[3] This article analyzes the influence of physical training on the physical fitness of a certain elementary school student.

Research methods

Literature data method

This article refers to many literature books, such as "Introduction to Physical Fitness Training,""Physical Fitness Training Theory and Methods," "Physical Fitness Training,""Experimental Research on Physical Intervention of Physical Education and Health Education for Middle School Students." The experimental method and index system are selected by analyzing the related theories and data basis.

Experimental method

Students in the physical training group implement a special physical training plan. The control class is for regular sports activities.[4] The physical training group and the control group conducted a comparative experiment. The control group performed regular physical activities, and the physical training group added a special physical training plan based on the control group. After 24 hours of physical training, compare the relevant indicators of physical fitness. The content includes 50m running, sitting forward bending, standing long jump, throwing a solid ball, etc. We compare the test data to get the influence of the students' physical fitness in the physical training team.

We choose 50m running, sitting forward bending, standing long jump, and throwing a solid ball as the intervention indicators for experimental comparison. 1) Seated forward flexion: The overall flexibility of the test sample reflects the shoulders, trunk, hip joints, and surrounding ligaments. 2) 50m running test: test the speed quality of the sample and the rapid conversion ability of the human central nervous system. 3) Standing long jump test: Test the muscle strength and explosive power of the lower limbs of the sample. 4) Throwing solid ball test: Test the explosive power level of the upper limb muscles of the sample.

Optimized modeling of intensity training for young athletes

The process of modeling the relationship between intensity training and sports injury of young athletes. E_{int} represents the extracted mechanism characteristics of the athlete's body creatine kinase before training. E_{ext} represents the index characteristics of the athlete's body plasma creatine kinase value before training.[5] Then use the following formula to divide the intensity training process of young athletes into different stages.

$$M_{E2} = \frac{(E_{\text{int}}, E_{ext})}{R_S \times R_C} \tag{1}$$

R_s, R_c represents the characteristics of the dynamic changes of body creatine kinase and the influencing factors on myocardial function at each stage of the athlete's training.[6] Calculate the incremental load of the athlete's myocardium during each training period. Use the following formula to express

$$M_{tis} = \frac{[E_{ext} \times R_S \times R_C)}{ID \times E_{ext}} \times M_{E2} \tag{2}$$

Where ID represents the individual anaerobic threshold of intensity training for young athletes. $X(t)$ represents the myocardial load intensity of the intensity training of young athletes. f represents the change state of biochemical indicators related to myocardial function after the athlete's training. $X(t\text{-}1)$ represents the body load intensity of athletes and young athletes during intensity training. g represents the load duration of the myocardium after training.[7] Then use the following formula to establish a model of the relationship between intensity training and sports injuries of young athletes

$$X_\beta = \frac{f(X(t), X(t-1))M_{tis}}{g(X(t), X(t-1))M_{E2}} \tag{3}$$

However, the traditional method only obtains an indicator of the creatine kinase changes of athletes before and after training. Using this indicator for relationship modeling has the problem of large modeling errors.[8] Therefore, we propose an optimized modeling method for the relationship between intensity training and sports injury of young athletes based on improved conditional probability constraints.

T represents the continuous training time of the athlete, and the intensity training load sample of the young athlete established at time t is M. Then use the following formula to establish the biochemical and physiological mechanism model in the intensive training of young athletes.

$$P(x^t \mid x_T, BG) = \sum_{m=1}^{B} \alpha_m N(x^1, \mu_m, \sigma_m^2 I) \tag{4}$$

α_m represents the physical load intensity that young athletes have to bear in intensity training. N represents the sparse expression and extraction of the energy features supplied by the athlete's anaerobic system during training. μ_m represents the energy characteristics of the aerobic (oxidation) system and the anaerobic system mixed supply of the athlete during the training process extracted by the sparse expression algorithm. x^t represents the natural energy supply state of the athlete's body during muscle contraction. σ^2_m represents the duration of physiological load during intensity training for young athletes. I represents the physiological load of the athlete during training.[9] m represents the effect factor of training. We extract the change characteristics of the energy supply of phosphate and glycolysis

in the energy supply of muscle contraction during training. Use the following formula to express

$$P(x^1 \mid BC) = \frac{C_{th}}{P(x^t \mid x_T, BG)} \quad (5)$$

C_{th} represents the maximum lactic acid steady-state load intensity range threshold during intensity training for young athletes. Calculate C_{th} using the following formula.

$$C_{th} = \frac{P(x^t \mid FC)P(FG)}{P(x^t \mid BC)} \quad (6)$$

$P(x^t \setminus FC)$ represents the maximum oxygen consumption of young athletes during intensity training. $P(FG)$ represents the critical speed during intensity training for young athletes.

Use the following formula to obtain 8 biochemical indexes related to myocardial function after intensity training of young athletes.

$$(x_1, \cdots, x_M)^T = \frac{\partial \in R^{M \times D}}{C_{th}(W \times C)} \quad (7)$$

W represents the obtained sparse coding coefficient of athlete training. C represents the maximum training speed in the intensity training of young athletes. ∂ represents the abnormally high value of creatine kinase in the athlete after training.

Mathematical Statistics

Compare the data of the two groups of samples after the experiment. A sample test was performed on the physical training and control groups' data.[10] Judge the statistical significance to get the result of the influence of physical training on the physical fitness of adolescents.

RESULTS

After the experiment, the sitting postures of males and females in the two groups increased to a certain extent. The average value of boys in the physical training group increased from 3.67±5.71cm to 6.98±6.11cm. The average value of girls in the physical training group increased from 9.63±6.88cm to 11.88±6.01cm. There is a significant difference in the comparison between the groups. The difference between the physical training group before and after the experiment was statistically significant. (Table 1)

After the experiment, boys' and girls' standing long jump scores in the two groups increased to a certain extent.[11] The increase in boys in the physical training group was even greater. The average value of boys in the physical training group increased from 148.01±10.11cm to 169.11±15.69cm. The average value of girls in the physical training group increased from 151.33±10.10cm to 161.51±13.31cm. There is a significant difference in the comparison between the groups. The difference between the physical training group before and after the experiment is statistically significant.

After the experiment, the 50m scores of boys and girls in the two groups increased to a certain extent. The increase in boys in the physical training group was even greater. The average value of boys in the physical training group increased from 9.69±0.59s to 8.57±0.38s. The average value of girls in the physical training group increased from 10.61±1.10s to 9.51±0.71s. There is a significant difference in the comparison between the groups. The difference before and after the experiment in the physical training group was statistically significant.

Table 1. Comparison of test indicators between the control group and the physical training group.

Project	Group	Before the experiment	After the experiment	*P*1	P2
Do three-dimensional forward bending/cm	Control male	3.39±6.66	6.01±6.51	>0.05	<0.05
	Physical Fitness Group Male	3.67±5.71	6.98±6.11	<0.05	
	Control female	9.79±6.60	10.11±6.18	>0.05	<0.05
	Physical Fitness Group Female	9.63±6.88	11.88±6.01	<0.05	
Standing long jump/cm	Control male	167.81±11.79	155.11±11.88	>0.05	<0.05
	Physical Fitness Group Male	148.01±10.11	169.11±15.69	<0.05	
	Control female	166.88±10.91	150.11±18.76	>0.05	<0.05
	Physical Fitness Group Female	151.33±10.10	161.51±13.31	<0.05	
50m run/m	Control male	9.51±0.68	9.36±0.51	>0.05	<0.05
	Physical Fitness Group Male	9.69±0.59	8.57±0.38	<0.05	
	Control female	10.51±0.79	10.11±0.71	>0.05	<0.05
	Physical Fitness Group Female	10.61±1.10	9.51±0.71	<0.05	
Throw a solid ball/m	Control male	7.69±1.11	7.89±1.01	>0.05	<0.05
	Physical Fitness Group Male	7.50±1.09	9.11±0.88	<0.05	
	Control female	5.36±1.11	5.55±1.13	>0.05	<0.05
	Physical Fitness Group Female	5.33±1.11	6.81±0.79	<0.05	

After the experiment, boys' and girls' solid ball throwing performance between the two groups increased to a certain extent. The improvement of girls is not obvious. The increase in boys in the physical training group was even greater. The average value of boys in the physical training group increased from 7.50±1.09m to 9.11±0.88m. The average value of girls in the physical training group increased from 5.33±1.11m to 6.81±0.79m. There is a significant difference in the comparison between the groups. The difference before and after the experiment in the physical training group is statistically significant.

DISCUSSION

The physical fitness indicators of Chinese adolescents presented in the National Student Physical Fitness and Health Survey conducted by the Ministry of Education each year have gone from bad to worse. Cardiopulmonary function declines, exercise capacity is insufficient, and obesity rates are soaring. At present, it is urgent to improve young people's physical fitness. Starting from the current status quo, enrich the content of extracurricular physical exercises in schools. Responding to the sunshine sports slogan of "1 hour a day exercise" and improving physical fitness indicators are important physical education topics. Physical training can effectively improve the physical fitness of young athletes and effectively improve the functions of various body organs. Training can promote the function of adolescents' motor organs such as bones, muscles, tendons, and ligaments.

CONCLUSION

Physical training intervention Training has little effect on height and weight. The experimental results show that physical training methods and methods have certain application prospects in school physical education. Therefore, schools should increase physical training interventions to improve physical fitness indicators.

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