

MARTIAL ARTS FITNESS TRAINING IN UNIVERSITIES

TREINAMENTO DE APTIDÃO FÍSICA NAS ARTES MARCIAIS EM UNIVERSIDADES

ENTRENAMIENTO DE APTITUD FÍSICA EN ARTES MARCIALES EN LAS UNIVERSIDADES



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ABSTRACT

Introduction: Physical fitness training is essential for performing tactical training and improving performance in martial arts competitions, and is a critical element in improving the speed, strength, and endurance of its athletes. **Objective:** This paper explores the effect of physical fitness training on the main tasks of university martial arts practitioners. **Methods:** By selecting 16 university martial arts practitioners as volunteers, they received 12 weeks of physical fitness training, whereas only the experimental group received the specially designed martial arts fitness training. The athletes' stability and strength were measured before and after the training application, and their data were analyzed through the statistical method. **Results:** In the eight-level abdominal bridge test, the experimental group's results were significantly improved compared to the control group ($P < 0.05$). There were significant differences in the pre and post-tests of athletes of different levels in the eight-level abdominal bridge test ($P < 0.05$). Exercise training significantly improved the performance of both groups of athletes ($P < 0.05$). **Conclusion:** The specially designed martial arts fitness training combined with routine training can effectively improve university students' fitness and technical level. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Physical Conditioning, Human; Martial Arts; Sports; Athletes.

RESUMO

Introdução: O treinamento físico é essencial para realizar treinamentos táticos e melhorar o desempenho nas competições de artes marciais, sendo um elemento crítico para o aperfeiçoamento da velocidade, força e resistência de seus atletas. **Objetivo:** Este artigo explora o efeito do treinamento de aptidão física sobre as principais tarefas dos universitários praticantes das artes marciais. **Métodos:** Selecionou-se 16 universitários praticantes de artes marciais como voluntários, eles receberam 12 semanas de treinamento físico onde apenas o grupo experimental recebeu o treinamento especialmente elaborado para a aptidão física das artes marciais. A estabilidade e a força dos atletas foram mensuradas antes e depois da aplicação do treinamento e seus dados foram analisados através do método estatístico. **Resultados:** No teste de oito níveis da ponte abdominal, os resultados do grupo experimental foram significativamente melhorados em comparação com os do grupo de controle ($P < 0,05$). Houve diferenças significativas nos testes pré e pós-testes de atletas de diferentes níveis no nível da ponte abdominal de oito níveis ($P < 0,05$). O treinamento para o exercício melhorou significativamente o desempenho dos dois grupos de atletas ($P < 0,05$). **Conclusão:** O treinamento de aptidão física especialmente elaborado para artes marciais aliado ao treinamento de rotina pode efetivamente melhorar a aptidão física e o nível técnico dos universitários. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Condicionamento Físico Humano; Artes Marciais; Esportes; Atletas.

RESUMEN

Introducción: El entrenamiento de la condición física es esencial para realizar la formación táctica y mejorar el rendimiento en las competiciones de artes marciales, siendo un elemento crítico para la mejora de la velocidad, la fuerza y la resistencia de sus atletas. **Objetivo:** Este artículo explora el efecto del entrenamiento físico en las principales tareas de los estudiantes universitarios que practican artes marciales. **Métodos:** Se seleccionaron dieciséis practicantes universitarios de artes marciales como voluntarios, que recibieron 12 semanas de entrenamiento físico donde sólo el grupo experimental recibió el entrenamiento físico de artes marciales especialmente diseñado. La estabilidad y la fuerza de los atletas se midieron antes y después de la aplicación del entrenamiento y sus datos se analizaron mediante el método estadístico. **Resultados:** En la prueba de puente abdominal de ocho niveles, los resultados del grupo experimental mejoraron significativamente en comparación con el grupo de control ($P < 0,05$). Hubo diferencias significativas en las pruebas previas y posteriores de atletas de distintos niveles en la prueba de puente abdominal de ocho niveles ($P < 0,05$). El entrenamiento con ejercicios mejoró significativamente el rendimiento de ambos grupos de atletas ($P < 0,05$). **Conclusión:** El entrenamiento de aptitud física de artes marciales especialmente diseñado, combinado con el entrenamiento rutinario, puede mejorar eficazmente la forma física y el nivel técnico de los estudiantes universitarios. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descritores: Acondicionamiento Físico Humano; Artes Marciales; Deportes; Atletas.



INTRODUCTION

Physical fitness refers to the overall ability of an athlete. Maximizing physical fitness is also a hallmark of an athlete's aerobic capacity. It is an essential indicator of the body's energy metabolism. Various physical indicators reflect physical fitness. A martial arts routine is a series of movements.¹ It contains a series of attacks and defenses. The training time of the competitive martial arts routine is 1 minute, with 50-70 movements. Wushu routines include high-difficulty movements such as jumping, balancing, and falling. Wushu players must complete high-quality movements within the specified time.

Martial arts is high-intensity physical training. Its energy source is mainly anaerobic. Therefore, strength, speed, and endurance are the necessary qualities for an excellent martial arts player.² The targeted load stimulation of the athlete by the coach is the process of biological modification of the body. Continuous, systematic load stimulation will cause adaptive changes in the athlete's body. This enhances the function of various organ systems of the body. With the continuous improvement of physical fitness, athletes' demands for exercise load are also increasing.

This paper takes 16 martial arts masters as the research object. The study subjects underwent 12 weeks of special physical training. This paper takes the stability of the core area as the leading indicator. There are two evaluation indicators for the rapid intensity of the core area.³ This paper compares the pre-intervention and post-intervention data and examines the effect of physical fitness on improving core function.

METHOD

General information

This paper takes 16 martial arts masters as the research object. In this paper, they were randomly divided into a control group and an experimental group. The experimental group was given physical training, while the control group was given general training. This paper takes the physical training program as the independent variable and the function of the core part as the dependent variable. This article evaluates the stability and rapid strength of the core area. During the experiment, care should be taken to avoid irrelevant factors.⁴ This study should comprehensively consider the impact of differences in core abilities of athletes of the same level on athletes. In this paper, the horizontal test method is used to conduct the test, and the purpose is to determine the changes in each index of the subjects before and after the test. Finally, compare the performance of each phase to determine the impact of physical training on the body.

Inspection standard

The eight-level abdominal bridge is a classic indicator for evaluating the stability of the core area. Eight-level abdominal bridge training, the synergy of the deep and superficial muscles of the core parts such as the rectus abdominis, transverse abdominis, and multifidus. It can better reflect the stability of the core region. Secondly, it can evaluate without equipment and more scientifically reflect a person's true core reliability.⁵ The authors used the eight-layer web bridge as an index to evaluate the stability of the core area.

The author of this article used a medicine ball to test rapid strength in the core area. In this paper, the best performance of each subject completing more than three times in the same action is taken as the test score. Subjects lie flat on the ground with their legs bent. This article lifts a 2kg ball high, then throws the ball forward with the strength of the waist. The athlete records where the medicine ball falls.⁶ The subject's arms were kept straight, and both feet were in constant contact with the floor during the test. Athletes can have some standing-up movements.

Simulation of behavioral decision-making models in martial arts competitions

α_{ij} represents stressful psychological factors and β_m represents physiological factors.⁷ In this paper, a fuzzy judgment matrix of the influence of nervousness on the decision-making of martial arts competitions is established;

$$Q = (X_{ij})_{m \times m} \times \sigma(\alpha_{ij} \cdot \beta_m) \quad (1)$$

σ represents the effect of nervousness on behavioral decisions. The extent to which stress affects different influencing factors in different situations

$$X_{ij} = \begin{cases} 0.5 & \omega(i) = \omega(j) \\ 1.0 & \omega(i) > \omega(j) \\ 0.0 & \omega(i) < \omega(j) \end{cases} \quad (2)$$

Among them $\omega(i)$ represents the nervousness caused by the transitional excitation of the central nervous system. $\omega(j)$ stands for nervousness caused by changes in the competitive environment. The weight coefficient of the decision-making factors is

$$Y_i = 2Y_i / [m(m-1)] \quad (3)$$

Y_i represents the influence of psychological stress on decision-making in martial arts.

$$g_{s(i)} \{2Y_i / [mm-1]\} \quad (4)$$

ζ_i represents the nervousness of the players due to poor coordination.

Statistics

This paper uses SPSS20.0 data statistics software to sort out the collected data. This paper expresses the interaction between the two data in terms of mean and standard deviation.⁸ The difference was significant when $P < 0.05$. Significant differences were shown at $P < 0.01$.

Ethical Compliance

Research experiments conducted in this article with animals or humans were approved by the Ethical Committee and responsible authorities of Southwest Minzu University following all guidelines, regulations, legal, and ethical standards as required for humans or animals.

RESULTS

Analysis of the stability test data of the core area

Eight levels of abdominal bridge testing were performed in both groups over 12 weeks. (Table 1)

Physical training is of great help in improving the test results of athletes, and physical training can also improve the stability of the athlete's center of gravity.⁹ From the results before and after the eight-level abdominal bridge test, the changing trend of the experimental group was significantly better than that of the control group, and physical training had a better effect on the experimental group.

Table 1. Comparison of scores for eight-segment abdominal bridges.

Group	Score	
	Before experiment	After the experiment
Control group	28.31±1.701	29.26±1.701
Test group	26.98±1.967	30.59±1.235

Table 2 shows the stability of the experimental and control groups. There was a statistically significant difference in the performance of the 8-level abdominal bridge exercise before and after the test ($P < 0.01$), and the training plan had a significant impact on the training effect of the entire 8-level abdominal bridge exercise.¹⁰ The interaction between different levels of the eight-level abdominal bridge level and the pre-and post-test was statistically significant ($P < 0.05$). This shows that the grade 8 abdominal bridge scores of the two groups show a significant trend of change in each group and at different time points, and the difference between the two groups is significant.

Analysis of rapid dynamic test data in the core area

The results of 2 experiments are shown in Table 3. Physical training can effectively improve the performance of forwarding throw medicine in two items, and physical training can improve the performance of forwarding throw medicine for players of different levels.¹¹ The training effect of throwing medicine balls in the experimental group was more significant. Because the control group performed better than the experimental group before the experiment, the real boost was lower than the experimental group. At this point, the paper concludes that the experimental group has made more progress.

Table 4 shows the fast strength difference between the experimental and control groups. There was no statistical significance in the sports performance of the two groups of players ($P > 0.05$). After exercise, there was a statistically significant difference in the sports performance of the two groups of players ($P < 0.01$). There was no significant difference in the performance of the two groups of players in the front throw of the medicine ball ($P > 0.05$).

DISCUSSION

The physical fitness of martial arts athletes is the basis for technical and tactical training. In martial arts sports training, athletes should learn and master a variety of flexible boxing, footwork, legwork, grappling, holding, and throwing techniques.¹² Athletes must also have speed, absolute strength, explosiveness, and endurance. These essential qualities and abilities are acquired through physical training.

Physical accumulation is also a prerequisite and necessary condition for martial arts players to use and change tactics in the competition flexibly. Athletes must adjust according to the coach's instructions in martial arts competitions. These include variations of movements, combined use of punches, and legwork. When the physical reserve does not reach the technical and tactical changes, it will give the opponent an opportunity.¹³ The coaches introduced "anti-strike" and "quick response" into the physical training content system. In the absence of technical and tactical training, coaches should integrate it into physical training. This ensures the development of physical

Table 2. Comparison of Core Layer Stability.

Source of variation	DF	SS	MS	F	P
Group	1	0.000	0.000	0.000	1.000
Pre and post test	1	27.36	27.36	64.37675	0
Groupx pre- and post-test	1	9.31	9.31	21.90605	0.00095

Table 3. Comparison of front throw medicine.

Group	Distance/m	
	Before experiment	After the experiment
Control group	6.289±1.539	6.384±1.501
Test group	6.213±1.359	6.46±1.273

Table 4. Comparison of fast forces within regions.

Source of variation	DF	SS	MS	F	P
Group	1	0.00004275	0.00004275	0	0.9481
Pre and post test	1	0.1558	0.1558	23.6949	0.00095
Groupx pre- and post-test	1	0.02945	0.02945	4.51345	0.05795

technique and an unexpected victory in the competition. Physical training is a necessary prerequisite and guarantee for preventing sports injuries. Long-term, systematic physical training can keep the exercise capacity of the athlete's muscle and visceral system at a high level. Athletes respond and adapt well to strength, speed, and range of motion changes. This can effectively prevent fast and slow movement injuries of the body.

CONCLUSION

After 12 weeks of physical training, the 16 outstanding martial arts routine players had significant differences in core stability and other indicators ($P < 0.01$). Physical training can effectively improve the performance of the eighth abdominal bridge. This shows that physical training can well exercise the stability of the athlete's center of gravity. After 12 weeks of specific physical training, there was a significant difference ($P < 0.01$) in participants' core rapid strength test indicators. Physical training can effectively improve an athlete's forward-throw medicine performance. This shows that physical training has a good effect on improving the rapid strength of the core area, and the front throw medicine ball training in the experimental group has a better effect.

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