IMPROVEMENT OF PHYSICAL FITNESS BY THE MARTIAL ARTS TRAINING PROGRAM

APRIMORAMENTO DE APTIDÃO FÍSICA POR PROGRAMA DE TREINAMENTO EM ARTES MARCIAIS

MEJORA DE LA APTITUD FÍSICA MEDIANTE PROGRAMA DE ENTRENAMIENTO DE ARTES MARCIALES

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ABSTRACT

Introduction: Competitive martial arts athletes cannot achieve good results based only on a specific competitive skill in today's intense competition. A specific training program that emphasizes the physical fitness required by the characteristics of the sport is necessary. Objective: Study the martial arts training index system to improve athletes' physical fitness. Methods: The author adopts the research methods such as the literature data method, questionnaire survey method, and mathematical statistics method. The composition of the special indicators related to physical training for martial arts athletes is comprehensively discussed. Results: Through interviews and investigations, the contribution rate of morphological indicators proved to be higher, accounting for 37.61% of the total contribution. Considering the index with the highest load, 29 special physical training indicators were determined for martial arts athletes. Conclusion: Martial arts athletes show a solid basis in training regarding the quality of special movements and sports performance. These data provide an important reference for scientific and dedicated martial arts training. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Training Program; Exercise; Physical Fitness.

RESUMO

*Introdução: As atividades de artes marciais de competição dos atletas não podem alcançar bons resultados nas disputas intensas atuais baseando-se apenas em uma habilidade competitiva específica. É necessário um programa de treinamento específico que enfatize a aptidão física requisitada pelas características do esporte. Objetivo: Estudar o sistema de índice de treinamento das artes marciais para melhorar a aptidão física dos atletas. Métodos: O autor adota os métodos de pesquisa como o método de dados da literatura, método de levantamento de questionários e método de estatística matemática. A composição dos indicadores especiais relacionados ao de treinamento físico para atletas de artes marciais é discutida de forma abrangente. Resultados: Através de entrevistas e investigações, a taxa de contribuição dos indicadores morfológicos mostrou-se superior, representando 37,61% de toda a contribuição total. Considerando o índice com a maior carga, foram determinados 29 indicadores especiais de treinamento físico para os atletas de artes marciais. Conclusão: Os atletas de artes marciais demonstram uma base sólida no treinamento quanto a qualidade de movimentos especiais e no desempenho esportivo. Esses dados fornecem uma referência importante para o treinamento científico e dedicado às artes marciais. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores: *Programas de Treinamento; Exercício Físico; Aptidão Física.*

RESUMEN

*Introducción: Las actividades de artes marciales de competición de los atletas no pueden lograr buenos resultados en las intensas disputas actuales basándose únicamente en una habilidad competitiva específica. Es necesario un programa de entrenamiento específico que haga hincapié en la aptitud física requerida por las características del deporte. Objetivo: Estudiar el sistema de índices de entrenamiento de artes marciales para mejorar la aptitud física de los deportistas. Métodos: El autor adopta los métodos de investigación como el método de datos bibliográficos, el método de encuesta por cuestionario y el método de estadística matemática. La composición de los indicadores especiales relacionados con el de la formación física de los atletas de artes marciales se discute exhaustivamente. Resultados: A través de las entrevistas y las investigaciones, la tasa de contribución de los indicadores morfológicos resultó ser mayor, representando el 37,61% de toda la contribución total. Teniendo en cuenta el índice con mayor carga, se determinaron 29 indicadores especiales de entrenamiento físico para los atletas de artes marciales. Conclusión: Los atletas de artes marciales demuestran una sólida base en el entrenamiento cuanto la calidad de los movimientos especiales y en el rendimiento deportivo. Estos datos proporcionan una importante referencia para el entrenamiento científico y dedicado de las artes marciales. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Programas de Capacitación; Ejercicio Físico; Aptitud Física.*

INTRODUCTION

With the development of competitive martial arts, the rules are constantly revised, encourage athletes to continuously develop in the direction of "high, difficult, beautiful and new", such development requirements not only increase the complexity of technology, but also put forward higher requirements for the special physical fitness level of competitive martial arts athletes. Competitive martial arts routine athletes cannot achieve good results in today's fierce competitions simply by relying on a specific competitive skill.[1]

In the selected article by Novianto F, he conducted in-depth interviews with experts related to the research ideas and the design of material selection indicators, and conducted targeted tests on the physical shape and physical quality of Sanda athletes by using principal factor analysis and other methods.[2] In Khan K M's doctoral dissertation, in the index establishment of the physical training evaluation system for high-level athletes, the characteristics of the project were combined, according to literature research, expert survey and statistics, an index system for the evaluation of athletes' specific physical fitness level was established.[3] From the above related studies, it can be seen that, scientific and effective analysis methods are used to establish an evaluation system or model in the actual work of athletes' competitive ability and selection of materials, and they have certain accuracy and effectiveness in empirical research or back-substitute testing, moreover, they also have their own strengths in the evaluation of physical fitness indicators, these previous research literatures are of great help to the author.[4,5]

METHOD

Research object

There are 32 martial arts routine athletes above the second grade in colleges and universities, with an age of 20.2±2.6, as shown in Figure 1.

Research methods

Literature data method; (2) Expert interview method; (3) Anthropometric method; (4) Mathematical statistics method.

In this study, the determination of specific physical fitness training indicators is very strict and careful. Through the reading and sorting of related books, and the observation and consultation of the training of many sports teams, collect as many specific physical fitness training indicators as possible, after the first round of expert consultation, after eliminating inappropriate items, the initial training indicators of specific physical fitness were determined.[6] (Table 1)

Ethical Compliance

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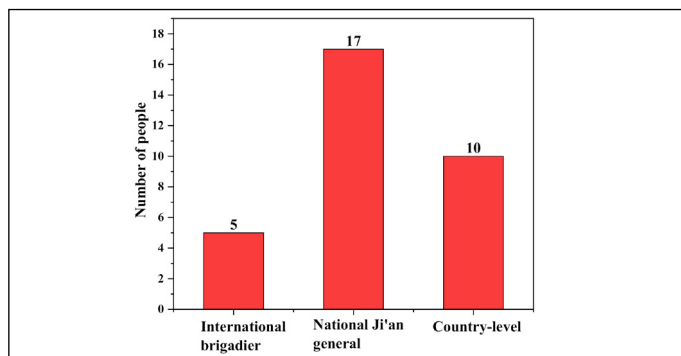

Figure 1. List of basic information of subjects.

RESULTS

There are many physical indicators, and there is a large correlation between different indicators. A complete measurement requires a lot of energy and equipment, in order to screen out the indicators that affect the special performance of martial arts routine athletes from among the many indicators.[7]

The test method refers to the methods listed in the anthropometric measurement and evaluation compiled by the anthropometric and evaluation writing group, in order to find the representative indicators of martial arts routine athletes, using as few indicators as possible to reflect the physical fitness of athletes, using SPSS statistical software, the author performed a key analysis of the number of physical fitness measures in this study, set the correlation matrix, and found the proportion.[8] The results of the R matrix are shown in Table 2.

It can be seen from Table 2 that, the factor analysis of physical fitness indicators of martial arts routine athletes shows that, the first two components have the largest decline, and the principal component factors with eigenvalues greater than 1 have a total of 5 cumulative contribution rates of 77.37%, which includes 77.37% of the original variable information, therefore, it is sufficient to take 5 principal components. The principal component analysis method was used to extract factors for the 22 index numbers of the physical fitness test of excellent martial arts routine athletes, since all index loads were above the 0.6 level, the maximum orthogonal rotation was performed on these indexes, and the results were obtained: The contribution of the first principal is 37.61%, the eigenvalue is 8.27, and the value of the coefficient is greater than that of waist circumference, weight, waist circumference, chest circumference, height, finger distance, and arm circumference. Vital capacity, anaerobic activity of the lower legs, shoulder width, calf circumference, forearm circumference and 12 other parameters; Only the life ability, all are morphological indicators, of the hip circumference index has the highest load of the morphological index, and the absolute value is 0.8884, that is, the waist circumference is the best along with the first main point; The contribution of the second principal is 16.29%, the eigenvalue is 3.58, the true value of the coefficient is large, and the three parameters are vertical jump, back power, and grip power, all of this is a good measure; The value of the third principal is 9.24%, the eigenvalue is 2.03,

Table 1. The initial index of special physical fitness of Wushu Changquan athletes.

Index	Content
special force	Supine "both from both ends" double foot, supine "both from both ends" single foot, supine "both from both ends" with legs together, hanging leg raise, hitting step to reach high, hitting step to the top lob, run-up knee-raising single-leg jump, continuous flying foot, whirlwind foot jump, in-situ cyclone foot followed by horse step, back leg jump followed by foot step, double flying foot, closed leg jump, swivel jump followed by horse step, leg control, stance stance
special speed	Quick punches, quick palm pushes, quick arm swings, footsteps and slaps (Oolong pan hits), quick positive kicks, quick single foot taps, turn around in place, close legs in place, swing legs out of place, fast mechanical basic skills, fast routines combination
specific endurance	1 minute or 1 minute and 20 seconds of footsteps and punches, 1 minute or 1 minute and 20 seconds of flying feet, half set of exercises, three-stage exercise, full set of exercises, super set of exercises
Special flexibility	Turning shoulders, bending forward, lowering waist, turning waist, rinsing waist, splitting legs (vertical fork, horizontal fork, etc.), splitting and jumping, sitting on a plate, flexibility in footsteps, ankle flexion and extension in sitting position, balance flexibility (various lifting legs, etc.)
Special sensitivity	Quick walk through palms, step slaps (Oolong pan fight), Oolong twist, back grab, fall and roll, stand-up push-ups

Table 2. Interpretation of total variance of physique index factors.

Element	Principal component initial eigenvalues			Principal Component Extraction of Eigenvalues			Eigenvalues after principal component rotation		
	total	Variance Contribution %	Cumulative variance %	total	Variance Contribution %	Cumulative variance %	total	Variance Contribution %	Cumulative variance %
1	10.2	46.4	46.4	10.2	46.4	46.4	8.3	37.6	37.6
2	2.4	11.0	57.4	2.4	11.0	57.4	3.6	16.3	53.9
3	1.8	8.2	65.6	1.8	8.2	65.6	2.0	9.2	63.1
4	1.5	6.7	72.2	1.5	6.7	72.2	1.6	7.1	70.3
5	1.1	5.2	77.4	1.1	5.2	77.4	1.6	7.1	77.4
6	0.8	3.7	81.1						
7	0.7	3.2	84.3						
8	0.7	3.0	87.3						
9	0.5	2.3	89.6						
10	0.5	2.1	91.7						
11	0.4	1.9	93.6						
12	0.3	1.4	95.0						
13	0.3	1.2	96.2						
14	0.2	0.9	97.0						
15	0.2	0.7	97.8						
16	0.1	0.6	98.4						
17	0.1	0.5	98.9						
18	0.09	0.4	99.3						
19	0.08	0.4	99.7						
20	0.04	0.2	99.9						
21	0.03	0.1	100.0						
22	0.00	0.0	100.0						

the value of the coefficient is greater, the points are systolic blood pressure, diastolic blood pressure and pulse, which are all indicators of activity work; The fourth contribution is 7.12%, the eigenvalue is 1.57, and the total value of the coefficient is more than the independence of one leg with both eyes closed and thigh circumference.[9] (Table 3)

In real training, many factors affect the performance of ordinary athletes, and small characteristics play a big role in sports, but five main points extracted by the author can explain about 77.37% of the total quality and so on. measured and unknown sources that are not included include 22.63%. Table 2 shows that the main points are the same on the physical scale. According to the level of participation, the first group of morphological index of the principle can best explain the changes of all the fitness activities, followed by the measure quality, and the third in performance index. The heaviest measure has become important for its main points. When evaluating the fitness indicators of athletes, it is necessary to take into account the indicators of the main components, and among these indicators, the indicators of the main components with the maximum load is more important.

DISCUSSION

The main physical index factors affecting the performance of martial arts routine athletes are: Morphological indicators, quality indicators, and functional indicators, among which the morphological indicators contribute the most, which is 37.61%. The heaviest measure has become important for its main points. When measuring the physical fitness index of athletes, it is necessary to take into account the importance of the index that makes the largest item of the main item important.[10] Depending on the loading of the index of the principle, the index is usually represented in 5 groups of important items can be seen as follows: waist circumference, vertical jump, systolic blood pressure tall, thigh circumference, and front bend. Trainers should pay special attention to these five parameters when selecting equipment.

CONCLUSION

Competitive Wushu is an important part of Chinese Wushu, it promotes the progress of Wushu, promotes the spread of Wushu,

Table 3. Principal component load matrix after orthogonal rotation with maximum variance.

body mass index	Principal Component Contribution Rate				
	1	2	3	4	5
hip circumference	0.888*	-0.108	0.161	0.176	-0.119
weight	0.888*	0.163	0.162	0.236	0.068
waistline	0.886*	0.159	0.031	-0.142	-0.159
chest circumference	0.873*	0.292	-0.006	0.001	-0.128
height	0.842*	0.180	-0.079	-0.075	0.191
finger distance	0.808*	0.162	-0.133	-0.150	0.148
upper arm circumference	0.798*	0.245	0.185	-0.138	0.016
lung capacity	0.751*	0.352	0.169	0.143	0.216
lower extremity anaerobic work	0.749*	0.567	0.148	0.053	0.016
shoulder width	0.743*	0.310	0.018	0.062	-0.085
Calf circumference	0.674*	0.378	0.128	0.046	0.301
Forearm circumference	0.621*	0.575	0.054	-0.273	0.173
vertical jump	0.219	0.819*	0.081	-0.201	-0.078
back force	0.421	0.784*	0.079	0.150	0.008
Grip	0.495	0.759*	0.051	0.099	0.021
systolic blood pressure	0.193	0.108	0.778*	0.105	0.146
diastolic blood pressure	-0.047	0.152	0.759*	0.178	-0.210
pulse	0.084	-0.554	0.631*	0.077	0.055
thigh circumference	0.243	0.140	0.155	0.769*	-0.045
One-legged independence with eyes closed	-0.225	-0.207	0.154	0.741*	-0.094
standing forward bend	-0.074	-0.100	-0.251	0.215	-0.783*
When choosing a reaction	-0.038	-0.161	-0.382	0.063	0.755*

and promotes the excellent traditional national sports culture, it has played an irreplaceable role in the development of martial arts. Therefore, as a national traditional sports competition, competitive martial arts inevitably have to undergo the baptism of modern sports science. In studying the sustainable development of competitive martial arts, the training methods, means and directions of competitive martial arts talents are the key points we should consider, only when these are clarified, can the ideas be determined in a targeted manner, and the content can be enriched to discuss development.

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