POTENTIAL PHYSICAL ENDURANCE TRAINING SYSTEM FOR SWIMMERS

POTENCIAL SISTEMA DE TREINAMENTO DE RESISTÊNCIA FÍSICA PARA NADADORES

POTENCIAL SISTEMA DE ENTRENAMIENTO DE RESISTENCIA FÍSICA PARA NADADORES

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ABSTRACT

Introduction: Endurance and speed are fundamental to swimming. It is also essential for athletes to use the correct practice method during training to improve swimmers' level of strength, endurance, and speed. Standardized swimming exercises can also reduce the inability of conventional land sports to adapt to the transition process from land to water. At the same time, standardized swimming exercises can also reduce the inability of conventional land sports to adapt to the transition process from land to water. This total swimming ability is also the goal pursued by many coaches and players. Objective: This study analyzes the training methods to improve swimmers' strength, endurance, and speed. The results of this work can establish a theoretical basis for coaches to formulate training plans. Methods: This paper selects 20 swimmers as the object of research. There were ten males and ten females. All athletes participate in an endurance training program. This paper records the training intensity and endurance data during the athlete's training. This paper uses mathematical statistics for data analysis. Results: The athletes' human body's technical level improved significantly after the endurance system exercise. The data were statistically significant (P<0.05). Conclusion: Endurance training can improve swimmers' lower body strength. This training can make special training infinitely close to the demands of competition. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Swimming; Resistance training; Strength training; Athletes.

RESUMO

Introdução: Resistência e velocidade são fundamentais na prática da natação. Também é essencial que os atletas utilizem o método de prática correto durante o treinamento para melhorar o nível de força, resistência e velocidade dos nadadores. Os exercícios de natação padronizados também podem reduzir a incapacidade dos esportes terrestres convencionais de se adaptar ao processo de transição da terra para a água. Esta capacidade plena de natação é também o objetivo perseguido por muitos treinadores e jogadores. Objetivo: Este estudo tem como objetivo analisar os métodos de treinamento para melhorar a força, resistência e velocidade dos nadadores. Métodos: 20 nadadores voluntários foram selecionados como o objeto de pesquisa. Todos os atletas participam de um programa de treinamento de resistência. Este artigo registra a intensidade do treinamento e os dados de resistência durante o treinamento do atleta. Este artigo usa estatísticas matemáticas para análise de dados. Resultados: O nível técnico da função do corpo humano dos atletas melhorou significativamente após o exercício do sistema de endurance. Os dados foram estatisticamente significativos (P<0,05). Conclusão: O treinamento de resistência pode melhorar a força dos membros inferiores dos nadadores. Este treinamento pode fazer com que o treinamento dedicado alcance as exigências da competição. Os resultados apresentados podem estabelecer uma base teórica para que os treinadores formulem planos de treinamento. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

***Descritores*:** *Natação; Treinamento de Resistência; Treinamento de Força; Atletas.*

RESUMEN

Introducción: La resistencia y la velocidad son fundamentales en la práctica de la natación. También es esencial que los deportistas utilicen el método de práctica correcto durante el entrenamiento para mejorar el nivel de fuerza, resistencia y velocidad de los nadadores. Los ejercicios de natación estandarizados también pueden reducir la incapacidad de los deportes terrestres convencionales para adaptarse al proceso de transición de la tierra al agua. Al mismo tiempo, los ejercicios de natación estandarizados también pueden reducir la incapacidad de los deportes terrestres convencionales para adaptarse al proceso de transición de la tierra al agua. Esta capacidad total de nadar es también el objetivo que persiguen muchos entrenadores y jugadores. Objetivo: Este estudio pretende analizar los métodos de entrenamiento para mejorar la fuerza, la resistencia y la velocidad de los nadadores. Los resultados de este trabajo pueden establecer una base teórica para que los entrenadores formulen planes de entrenamiento. Métodos: Este trabajo selecciona 20 nadadores como objeto de investigación. Había diez hombres y diez mujeres. Todos los atletas participan en un programa de entrenamiento de resistencia. Este documento registra la intensidad del entrenamiento y los datos de resistencia durante el entrenamiento del atleta. Este documento utiliza la estadística matemática para el análisis de los datos. Resultados: El nivel técnico de la función del cuerpo humano de los atletas mejoró significativamente después del ejercicio del sistema de resistencia. Los datos fueron

estadísticamente significativos (P<0,05). Conclusión: El entrenamiento de resistencia puede mejorar la fuerza de la parte inferior del cuerpo de los nadadores. Los resultados presentados pueden establecer una base teórica para que los formadores formulen planes de entrenamiento.. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Natación; Entrenamiento de resistencia; Entrenamiento de fuerza; Atletas.*

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INTRODUCTION

Swimming is a speed endurance sport. Its main advantages are high exercise intensity, long game time, and fierce competition on the field. It has high requirements on the function of the players' cardiovascular system. Moreover, the swimming competition practice also requires the players to practice scientifically, which is also necessary to improve the overall technical level of the entire Chinese swimming event. Due to the constraints of many conditions, the practice level of Chinese swimmers is not scientific enough.[1] Therefore, improving the level of practice skills and training methods are the most urgent problems to solve in training Chinese swimmers. Chinese swimming belongs to the speed and endurance sports group based on physical strength. The physical strength of the Chinese swimming competition is one of the essential factors in the whole swimming event. Good motor skills also need to be reflected with the help of reasonable scientific and technical conditions.[2] It is precise because the gap between the skills of the masters in Chinese swimming is too small, so the physical factor can be regarded as the key to victory. Swimming is a technology-driven sport. The right skill level is the key to keeping a player in competitive shape for a long time. Chinese swimmers may not be able to achieve corresponding results in the actual training process due to their differences in primary physical conditions from those of the United States and other countries.

For this reason, this article will use conventional strength exercises, competition strength tests, and muscle fatigue relief with fascia guns to improve players' strength and endurance levels. This can overcome insufficient strength training, technical optimization, etc. At the same time, it can also play the purpose of improving sports performance.

METHOD

Research objects

This paper selects 20 swimmers as the research object.[3] There were ten males and ten females. There was no significant difference in the athletes' age, height, training years, and physical quality (P<0.05).

Research methods

Pre-competition exercise method: The athlete's serum creatine kinase needs to be monitored in the morning before the competition. The monitored physiological indicators include the athlete's heart rate, lactic acid, etc. After intense exercise, this paper also needs to conduct further tests on the corresponding indicators of athletes.

Competition intensity: In this paper, six items of blood cells are selected for the fingertip blood test 3 minutes after the preliminary, semi-final, and final. Then we measure post-match lactate.

The fascia gun's strength and endurance practice of the fascia gun: The 100-meter runners in the main event will kick for one minute per group.[4] 200m runners kick for two minutes per group in the main event. The frequency stabilized at one hundred and twenty beats/min. We stipulate that the maximum resistance of male athletes is 8% of body weight, and the maximum resistance of female athletes is 4% of body weight.

High-power swimming practice: make adjustments on the day before the athlete's strength and endurance training.[5] Keep your training volume low throughout the activity because the athletes on the test day stopped participating in other heavy-duty activities after breakfast.

Swimmer training image recognition

In this paper, the segmentation block matching function is obtained by combining the critical action feature point extraction model of the video image in the whole process of training:

$$z(x) = 1 - \min_{y \notin \varnothing}\left(\frac{I_y(x)}{A_y + I_y}\right) \quad (1)$$

Among them, $I_y(x)$ is the local trajectory of the video surveillance of the whole process of athlete training. A_y represents the scale information of the video images during the whole process of the athlete training.[6] In this paper, a parametric information analysis model of the video images of swimmers training in the whole process is established by local ambiguity detection. It is expressed as:

$$D(x,y) = \sum_{i=1} \frac{D_i(x+1,y+1)}{D_i(x-1,y-1)} - \frac{D_i(x,y)}{D_i(x,y)} \quad (2)$$

In the formula, x, y represents the graphic data and basic three-dimensional parameters. Combining the statistical fuzzy frame difference sorting method, we realized the three-dimensional analysis of the feature points of the training movements of the swimmers.[7] In this way, the three-dimensional distribution function of the motion trajectory of the exercise activities can be obtained:

$$\theta(x,y,z) = D(x,y,z) + \sqrt{\frac{L(x+1,y+1,z+1)}{L(x,y,z)} - \frac{L(x,y,z)}{L(x-1,y-1,z-1)}} \quad (3)$$

Where L represents the sum of fuzzy frame difference sequence coefficients.[8] According to the distribution features of video images, a three-dimensional reconstruction model of swimming swimmers' training behavior can be constructed. It manifests as:

$$G(x,y,z) = \frac{n}{u(x,y,z)} + \sqrt{\frac{u(x,y,z)+1}{u(x-1,y-1,z-1)+1}} \quad (4)$$

r represents the three-dimensional sequence path ratio of video images. n represents the distribution feature quantity coefficient of the video image.

Mathematical and statistical methods

The test method used in this paper is the data statistics method, and the software used in this method is SPSS for windows 13.0. This paper uses the t-test for the measurement data.[9] In this paper, variance is used to analyze the significant differences. This paper uses P<0.05 for

testing. Finally, we performed a t-test on the baseline conditions before and after the athlete.

There is no need for a code of ethics for this type of study.

RESULTS

Comparison of lactate levels before training

It can be seen from Table 1 that there is no significant statistical difference in the lactate levels of various exercise methods during exercise, P<0.05.

Comparison of lactate levels after training

As shown in Table 2, the lactic acid levels in the athletes increased very rapidly after intense competition. Its value has significantly exceeded the conventional value (P<0.01). The athlete then uses the fascia gun muscle fatigue relief training. Athletes' lactate levels were tested after exercise and found to be above average (P<0.05). It has a generally significant statistical difference.[10] Therefore, we can conclude that anaerobic power does not show a significant increase in lactate levels after training under the intense confrontation intensity of the automatic car. Anaerobic power is significantly related to the duration of exercise.

Comparison of creatine kinase levels

From Table 3, it can be found that the use of the fascia gun by the researchers in this paper can significantly relieve the muscle fatigue of athletes. It can effectively reduce the level of creatine kinase.[11] There is no statistically significant difference in this value. The levels of CK within 6 hours after the completion of the two exercise methods were significantly higher than the quiet average in the morning of the training day (P<0.01). These exercises have a significant effect on the skeletal muscle groups of athletes. There was a significant difference in CK after 6 hours of general strength training and fascia gun muscle fatigue relieving exercise (P<0.05). This indicates that the fascia gun muscle fatigue relief exercise has a more prominent effect on the relevant muscle groups than the general routine exercise. After the fascia gun muscle fatigue relief exercise, we found that the CK value in the athletes decreased significantly on the second day. Athletes had a significant decrease in CK value after training (P<0.05). After regular training, there were no relevant links.[12] The value of CK decreased significantly (P<0.05). There was no significant change in the CK value of athletes in routine training and intense training (P>0.05).

Table 1. Athletes' blood lactate levels before the experiment.

	Male	Female
Before the game	2.57±0.89	2.13±0.75
Fascial gun muscle relaxation training	1.84±0.74	1.73±0.71
Power bike training	2±0.88	1.9±0.83
Regular strength training	1.97±0.8	1.88±0.7

Table 2. The blood lactate levels of athletes after the experiment.

	Male	Female
Before the game	14.66±1.87	13.7±1.64
Fascial gun muscle relaxation training	13.07±1.65	11.9±1.29
Power bike training	12.33±3.11	10.96±2.47
Regular strength training	10.34±2.24	9.08±2

Table 3. Athlete Creatine Kinase Levels After Fascial Gun Training and Regular Training.

	Fascia Gun Muscle Fatigue Relief Training		Regular strength training	
	Male	Female	Male	Female
This morning	174.09±47.99	130.41±54.92	160.23±53.34	120.54±52.19
After 6h	299.99±61.11	250.64±63.32	236.67±59.54	211.37±56.28
Next morning	208.53±59.64	175.88±58.38	231.42±51.77	216.09±52.92

DISCUSSION

Human society generally agrees that the amount of practice limits the fitness level of physical development. Many coaches and players think that the more you practice, the better your results. The training program formulated by the coaches under the guidance of this kind of thinking is likely to be infeasible.[13] The adaptability of the human body to the training process is also limited. Too much practice can sometimes even lead to sports injuries and chronic fatigue. The body can also develop adaptations to moderately beyond its capacity stimuli. The extent to which exercise affects mechanistic formation may also depend on genetic factors. Individuals also vary in their adaptations to exercise.[14] Athletes most need endurance training methods are high oxygen uptake and low human lactate threshold training. Only exercise with appropriate intensity and interval time can also achieve this goal. If the continuous training time is too long, blood lactate accumulation will lead to physical fatigue and decreased oxygen uptake. Personal lactate threshold practice is critical for athletes. The primary purpose of middle and long-distance training is to continuously increase the personal lactate threshold level. This is also the successful experience of many advanced middle and long-distance players. There are also many ways to practice.[15] The most suitable method for athletes is freestyle 1 x 150 meters. At the same time, to enhance the athletes' sprint strength in the later stages of the game, the coach must also carry out corresponding individual lactic acid tolerance exercises. Never overdo it.

Athletes can effectively improve physical fitness tolerance through continuous training of lower and upper limbs.[16] This slows down the release of lactic acid. At the same time, the method can also improve muscle tissue structure and effectively enhance the performance of athletes. This results in improved exercise performance.

CONCLUSION

Using the fascia gun muscle fatigue relief training can enhance swimmers' strength, endurance, and specific sports ability. The muscle fatigue relief training of the fascia gun is of great significance to consolidating and improving the players' specific physical ability. Through fascial gun muscle fatigue relief training, people can also overcome the lack of specific physical strength between the trunk and lower extremities in athletes' training. The method of this paper can not only carry out the extraordinary energy and endurance exercise of swimmers but also evaluate the swimmers' extraordinary strength. The fascia gun muscle fatigue relief exercise can also increase the intensity of a swimmer's practice. This enables specific-intensity load exercises to meet and exceed competition-intensity needs.

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