

THE SPEED OF ATHLETES' RESPONSES TO DIFFERENT TRAINING METHODS



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A VELOCIDADE DE RESPOSTA DE ATLETAS EM DIFERENTES MÉTODOS DE TREINAMENTO

LA VELOCIDAD DE RESPUESTA DE ATLETAS EN DIFERENTES MÉTODOS DE ENTRENAMIENTO

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ABSTRACT

Introduction: Taekwondo is a complex reactive sport that requires training in various tactics. Due to its significant impact and antagonism, athletes must master the tactics in the shortest time. **Objective:** To compare the impact of password and simulation training methods on athletes' reaction times. **Methods:** Taekwondo athletes' reactions and striking abilities were studied. The difference between the two training methods on taekwondo athletes' reaction and striking ability was analyzed by comparing the data before and after the athletes' training. **Results:** The mean reaction times of down kick, sidekick, and cross kick after training in the password and simulated training groups were compared, with P values of $P=0.020<0.05$, $P=0.046<0.05$, and $P=0.028<0.05$, respectively, showing statistical difference. In regard to the mean strike time of down kick, sidekick, and cross kick, a comparison of the password training group and the simulated training group resulted in $P=0.950>0.05$, $P=0.417>0.05$, $P=0.552>0.05$, respectively, with no significant statistical difference. **Conclusions:** The password training method is significantly better than the simulation training method for improving the reaction time. The training methods have no significant effect on strike strength. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

Keywords: Reaction Time; Martial Arts; Teaching.

RESUMO

Introdução: O taekwondo é um esporte complexo e reativo, que exige treinamento em várias táticas. Graças a seu impacto significativo e antagonismo, os atletas precisam dominar tais táticas no menor tempo possível. **Objetivo:** Comparar o impacto dos métodos treinamento password e treinamento por simulação no tempo de reação dos atletas. **Métodos:** A velocidade da reação e dos golpes de atletas do taekwondo foram estudadas. A diferença nos resultados entre os dois métodos de treinamento foi analisada, comparando-se os dados antes e depois do treinamento dos atletas. **Resultados:** Comparou-se os tempos de reação dos grupos password e simulação para o chute baixo, o chute lateral e o chute cruzado após os respectivos treinamentos, obtendo-se os valores $P=0,020<0,05$, $P=0,046<0,05$, e $P=0,028<0,05$, respectivamente, demonstrando assim diferença estatística. Quanto ao tempo médio dos golpes chute baixo, chute lateral e chute cruzado, a comparação entre os grupos password e simulação resultou em $P=0,950>0,05$, $P=0,417>0,05$, e $P=0,552>0,05$, respectivamente, indicando ausência de diferença significativa. **Conclusões:** O método de treinamento password é significativamente melhor que o método de treino por simulação na melhoria do tempo de reação. Não houve diferença significativa no efeito dos métodos de treinamento sobre a força dos golpes. **Nível de evidência II; Estudos terapêuticos - investigação do resultado de tratamentos.**

Descritores: Tempo de reação; Artes Marciais; Ensino.

RESUMEN

Introducción: El taekwondo es un deporte complejo y de reacción, que exige entrenamiento en varias tácticas. Gracias a su impacto significativo y antagonismo, los atletas necesitan dominar tales tácticas en el menor tiempo posible. **Objetivo:** Comparar el impacto de los métodos entrenamiento password y entrenamiento por simulación en el tiempo de reacción de los atletas. **Métodos:** La velocidad de la reacción y de los golpes de atletas del taekwondo fueron estudiadas. La diferencia en los resultados entre los dos métodos de entrenamiento fue analizada, comparándose los datos antes y después del entrenamiento de los atletas. **Resultados:** Se compararon los tiempos de reacción de los grupos password y simulación para la patada baja, la patada lateral y la patada cruzada después de los respectivos entrenamientos, obteniéndose los valores $P=0,020<0,05$, $P=0,046<0,05$, y $P=0,028<0,05$, respectivamente, demostrando así diferencia estadística. En cuanto al tiempo promedio de los golpes patada baja, patada lateral y patada cruzada, la comparación entre los grupos password y simulación resultó en $P=0,950>0,05$, $P=0,417>0,05$ y $P=0,552>0,05$, respectivamente, indicando ausencia de diferencia significativa. **Conclusiones:** El método de entrenamiento password es significativamente mejor que el método de entrenamiento por simulación en la mejoría del tiempo de reacción. No hubo diferencia significativa en el efecto de los métodos de entrenamiento sobre la fuerza de los golpes. **Nivel de evidencia II; Estudios terapéuticos - investigación del resultado de tratamientos.**

Descriptorios: Tiempo de reacción; Artes Marciales; Enseñanza.



INTRODUCTION

Taekwondo is a complex reactive sport in which many tactics are trained, because of its great impact and antagonism, it requires athletes to capture tactics in the shortest time, and then change tactics in real time according to the actual situation.¹ The preparation time of taekwondo varies, and the structural reaction of athletes' psychology often needs to go through the stages of preparation, center and end, they are also required to have different reactions, so many athletes will take the initiative to attack due to the influence of the length of the reserve period and the speed of reaction.² In addition, there is a close relationship between the reaction of the athlete's body and the stimulus signal, which often requires athletes to constantly adjust their own form and rhythm, false signals are used to create the illusion of a response, but if the intensity of the signal stimulus exceeds the tolerance range, the response speed will be reduced. In the quality evaluation of taekwondo athletes, reaction speed is the core factor, a good reaction speed is conducive to athletes according to the opponent's attack and defense situation, accurate and rapid response.³

METHOD

Research Objects

Forty male taekwondo athletes of sport training major in a physical education institute were randomly divided into two groups: password training group and simulation training group, 20 in each group. (Figure 1)

Mathematical statistics

Spss17.0 was used for statistical analysis of the relevant data of various indicators in the test results, independent sample T test was used between groups, and paired T test was used before and after the intra-group experiment.

Experimental method

The experiment was conducted in a physical education college from May 2020 to August 2020. Forty male taekwondo athletes from the sport training major of the Institute of Physical Education were selected and divided into two groups for training, with 20 in each group, the training intervention was conducted twice a week for 16 weeks by using password training method and simulation training method respectively.⁴⁻⁵ The test results of the password training group and the simulation training group after the experiment were compared and analyzed, as well as the test results of the two groups before and after the experiment.⁶

(1) Password training method

Use the password training practice with the target, according to the slogan of the coach to practice the corresponding movements, according

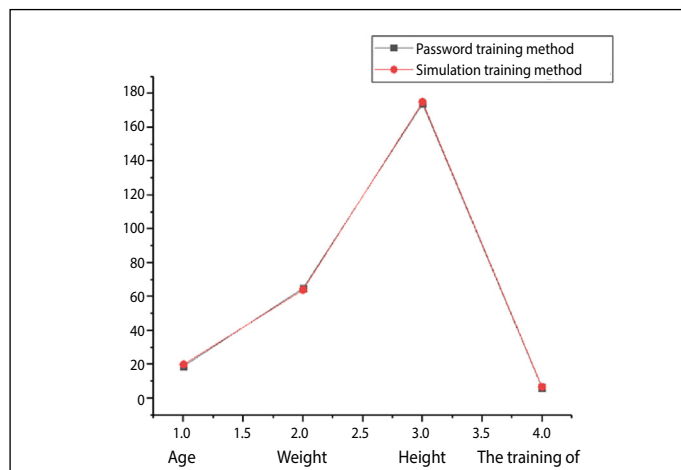


Figure 1. Statistics of members of the two groups.

to the different passwords issued by the coach, the athletes make the corresponding hitting or defensive movements.⁷ A single action can be divided into decomposition practice and complete practice, decomposition practice password refers to the number of stages divided into an action. In the combined action, the number of passwords refers to the number of actions in the combination, one password represents one action, or one password corresponds to a group of complete combined actions. This training method is called password training.⁸

(2) Simulation training method

The simulated training group was trained by combining simulated exercise with imaginary exercise. Athletes in the training process, the first use of imaginary enemy movement training, all kinds of leg training. On the basis of this training, simulated real combat practice is carried out, in which the athlete stands opposite to his partner (or two team members), during training, according to the training content, the sparring partner carries out action suggestion purposefully or randomly, requiring the athlete to quickly perceive and make judgment according to the specific situation, quickly move out the leg and hit the corresponding exposed vacant part.⁹

RESULTS

Comparative analysis of reaction ability between the two groups

(1) Comparative analysis of pre-training reaction time between the two groups

It can be seen from Table 1 that the reaction time measured before training of the two groups is compared and analyzed: it indicates that there is no significant statistical difference in response time measured before training between the password training group and the simulation training group.¹⁰

(2) Comparative analysis of hitting time between the two groups before training

It can be seen from Table 2 that the striking time measured by the two groups before training is compared and analyzed: it indicates that there is no significant statistical difference in the measured strike time before training between the password training group and the simulation training group.

(3) Comparative analysis of time interval of combined movements between the two groups before training

It can be seen from Table 3 that the interval time measured before training of the two groups is compared and analyzed: The average interval time of pre-lateral kick -- down chop, lateral kick -- side kick, mid-lateral kick -- high lateral kick in the command training group was 1.21 ± 0.03 , 0.72 ± 0.02 , 0.67 ± 0.21 respectively, the average interval time of the simulated training group was 1.22 ± 0.04 , 0.70 ± 0.02 and 0.68 ± 0.26 , respectively, the analysis results showed that $P=0.110 > 0.05$, $P=0.213 > 0.05$,

Table 5. Statistical table of striking power comparison between the two groups after training (unit: Kg).

	Password training method	Simulation training method	T	P
The split	102.18±12.2	102.18±4.7	0.023	0.982
Side to play	144.72±10.6	148.40±12.3	-1.578	0.128
Kicked him	169.46±11.5	166.40±5.4	-0.571	0.623

Table 2. Comparison of strike time between the two groups before training (unit: s).

	Password training method	Simulation training method	T	P
The split	0.16±0.01	0.16±0.04	-2.133	0.238
Side to play	0.18±0.01	0.17±0.01	1.245	0.674
Kicked him	0.02±0.001	0.02±0.03	-0.180	0.148

$P=0.458>0.05$, the results showed that there was no significant statistical difference in the interval time of combined movements between the password training group and the simulation training group.

Comparative analysis of the striking ability of the two groups

(1) Comparative analysis of the striking ability of the two groups before training

It can be seen from Table 4 that the striking power measured before training of the two groups is compared and analyzed: it indicates that there is no significant statistical difference in the striking force measured before training between the password training group and the simulation training group.

(2) Comparative analysis of the striking ability of the two groups after training

It can be seen from Table 5 that the striking power measured by the two groups after training is compared and analyzed: indicating that there was no significant statistical difference in the measured striking force between the password training group and the simulation training group after training.

Table 3. Comparison of time interval of combined movements between the two groups before training (unit: s).

	Password training method	Simulation training method	T	P
Cross kick - Chop down	1.21±0.03	1.22±0.04	-0.036	0.110
Cross kick - a side kick	0.72±0.02	0.70±0.02	0.088	0.213
Center cross kick - High cross kick	0.67±0.21	0.68±0.26	0.050	0.458

Table 4. Comparison of striking power between the two groups before training (unit: Kg).

	Password training method	Simulation training method	T	P
The split	96.08±9.4	98.72±2.99	-0.275	0.268
Side to play	145.42±9.5	145.60±8.7	-0.141	0.112
Kicked him	167.76±7.8	170.14±10.3	-0.919	0.116

Table 1. Comparison of pre-training reaction time between the two groups (unit: s).

	Password training method	Simulation training method	T	P
The split	1.32±0.01	1.38±0.09	4.511	0.704
Side to play	1.35±0.06	1.30±0.01	2.649	0.531
Kicked him	1.35±0.06	1.33±0.01	1.409	0.165

DISCUSSION

In the athlete muscle speed training, mainly including leg training and footwork training. In leg training, athletes not only need to lower limb strength, but also need their legs out quickly. Offensive kicking mainly includes cross kick, jump kick, side kick and spin kick, etc, in the training of kicking, it should be carried out according to scientific plan, and it is not a short term to achieve the training effect, athletes need long-term persistence and repeated training to form muscle memory. The intensity of exercise is generally required to be carried out three times a week, and the agility of legs can be trained by skipping rope and jumping hurdles, at the same time, it can also use the method of prone and double leg jump to train, to improve the strength of the buttocks and thighs of the athletes, so as to provide support for the speed of the reaction of the legs. In footwork training, taekwondo footwork mainly includes backward step, up step, forward and backward sliding step, left and right moving step, forward and backward crossing step, jump step and jump change step. Athletes need to have their own footwork routine, which requires steps ranging from 1 to 1.5 arms wide. In the actual training, you can use slow and fast repetitions, slow repetitions and other methods to practice the movement standard, and train the arm position, footwork movement, movement line and the location of the hit, etc, in this way, the athletes can master the technical points and better play the movement reaction. In the training, we also need to be based on actual situation, to the body and footwork to effectively combine, realize the connection between technology and actual combat, such as practice step forward and then kick, step back and then kick, shaking the body and then attack, to master the quick response to combat footwork.

CONCLUSION

Taekwondo is a very comprehensive type of sport, which requires very high reaction speed of athletes, however, due to the influence of many factors, there are certain differences in the reaction speed of athletes, in order to ensure that they have a good reaction speed, it is necessary to adopt effective training methods to strengthen their reaction speed training, which is also a necessary way to improve the performance of athletes.

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