

THE REACTION SPEED OF DIFFERENT TYPES OF TRAINING ON FENCING ATHLETES

O TEMPO DE REAÇÃO DE ATLETAS DE ESGRIMA EM DIFERENTES TIPOS DE TREINAMENTO

EL TIEMPO DE REACCIÓN DE ATLETAS DE ESGRIMA EN DIFERENTES TIPOS DE ENTRENAMIENTO



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ABSTRACT

Introduction: Fencing is a combat sport with fierce confrontation and variations in offense and defense. To a certain extent, speed is the decisive factor in winning the game. **Objective:** To explore the influence of different training methods on the reaction time of fencers. **Method:** 20 fencers were selected and divided into three groups with different fencing levels, in addition to one control group. The experimental groups trained in three 10-minute sessions a week. The control group trained for 3 hours in the afternoons, from Monday to Saturday. **Results:** After training, the experimental group fencers showed a highly significant difference in the selective response to foot movement ($t=4.004$, $P=0.001<0.01$). The simple reaction test of the fencers in the control group improved slightly after training, but it was not statistically significant ($t=2.223$, $P=0.09>0.05$). In the selective reaction time test without foot movement, the reaction time of the control group was significantly lower after training ($t=3.450$, $P=0.026<0.05$). **Conclusion:** Regardless of the student's fencing level, different training methods can significantly improve their reaction time. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

Keywords: Response; Training; Reaction Time.

RESUMO

Introdução: A esgrima é um esporte de combate em que ocorre um confronto intenso e variações no ataque e na defesa. Até certo ponto, a velocidade é o fator central para vitórias nesse esporte. **Objetivo:** Explorar a influência de diferentes métodos de treinamento no tempo de reação de esgrimistas. **Método:** 20 esgrimistas foram selecionados e divididos em três grupos, segundo seu nível de habilidade no esporte, além de um grupo controle. Os grupos experimentais treinaram em três sessões de 10 minutos por semana. O grupo controle treinou por três horas em todas as tardes de segunda a sábado. **Resultados:** Após seu treinamento, os esgrimistas do grupo experimental demonstraram uma diferença significativa na resposta seletiva do movimento dos pés ($t=4,004$, $P=0,001<0,01$). O teste de reação simples dos esgrimistas no grupo controle melhorou levemente após o treino, mas sem diferença estatisticamente significativa ($t=2,223$, $P=0,09>0,05$). No teste de tempo de reação seletiva, sem movimento dos pés, o tempo de reação do grupo controle foi significativamente menor após o treinamento ($t=3,450$, $P=0,026<0,05$). **Conclusão:** Independentemente do nível do estudante na esgrima, diferentes métodos de treinamento podem melhorar significativamente seu tempo de reação. **Nível de evidência II; Estudos terapêuticos – investigação do resultado de tratamentos.**

Descritores: Resposta; Treinamento; Tempo de Reação.

RESUMEN

Introducción: La esgrima es un deporte de combate en que ocurre un enfrentamiento intenso y variaciones en el ataque y en la defensa. Hasta cierto punto, la velocidad es el factor central para las victorias en este deporte. **Objetivo:** Explorar la influencia de diferentes métodos de entrenamiento en el tiempo de reacción de esgrimistas. **Método:** 20 esgrimistas fueron seleccionados y divididos en tres grupos, según su nivel de habilidad en el deporte, además de un grupo control. Los grupos experimentales entrenaron en tres sesiones de 10 minutos por semana. El grupo control entrenó por tres horas en todas las tardes de lunes a sábado. **Resultados:** Después de su entrenamiento, los esgrimistas del grupo experimental demostraron una diferencia significativa en la respuesta selectiva del movimiento de los pies ($t=4,004$, $P=0,001<0,01$). La prueba de reacción simple de los esgrimistas en el grupo control mejoró levemente después del entrenamiento, pero sin diferencia estadísticamente significativa ($t=2,223$, $P=0,09>0,05$). En la prueba de tiempo de reacción selectiva, sin movimiento de los pies, el tiempo de reacción del grupo control fue significativamente menor después del entrenamiento ($t=3,450$, $P=0,026<0,05$). **Conclusión:** Independientemente del nivel del estudiante en la esgrima, diferentes métodos de entrenamiento pueden mejorar significativamente su tiempo de reacción. **Nivel de evidencia II; Estudios terapéuticos – investigación del resultado de tratamientos.**

Descriptorios: Respuesta; Entrenamiento; Tiempo de Reacción.



INTRODUCTION

Fencing sport is a fierce confrontation, a variety of offensive and defensive combat sports.¹ In recent years, although China's fencing event has made major breakthroughs in the world competitions, however, as can be seen from some world competitions, our national athletes are in technical, there is still a certain gap between the tactics and physical abilities of foreign outstanding players, especially in terms of physical fitness and strength, foreign athletes show obvious advantages.² Although the main body of fencing training is technique, however, strength ability has an important role and significance for fencers that cannot be ignored: At the technical level, the important components of strength are speed and endurance, it directly affects the technical performance of athletes; In the training process, strength is related to the probability of athletes' sports injuries. Therefore, strength training should be physical training.³ And fencing, which is a fighting sport, speed is a decisive factor in fencing to a certain extent, as the level of competition continues to improve, as a result, the competitive load continues to increase, at the same time, it also brings a corresponding increase in training load.⁴

METHOD

Training object

A total of 20 trainees participated in this study: 10 members of the women's foil team third team, there are 5 members of the first team and 5 female college students in the public major of the school of physical education. The average age is 16 years old, the maximum age difference is not more than 2 years old. Before the start of the study, 10 members of the third-line team were observed, questioned, and measured, and based on the coach's analysis of his sports performance, divide them into an experimental group (5 people) and a control group (5 people), female students (5 people) in the physical education school were used as the 2 experimental groups, the first team members (5 people) served as the 3 experimental groups.

Training method

The trainees in the three experimental groups all used mode 3 and mode 4 of the fencing optokinetic response test training instrument for 8 weeks of training. Training is conducted 3 times a week (Monday, Wednesday, Friday), each time about 10 minutes.⁵ The specific training content is: Mode 3 and Mode 4 are random flashing lights, the time intervals are 0.5 s and 1 s, respectively. The distance between the sword head of the trainee and the bull's eye is set to 2 m, the distance between the front toe and the target is 3.2 m, the trainees are required to move their steps quickly and touch the target in the shortest time after the random lights are flashing. You need to return to the original place immediately after touching the target, after the random light flashes next time, repeat the above actions, a total of 20 times. Once the target is wrong, the system will automatically jump to the next light flashing state, athletes do not have to go back and re-correct the target. The trainees in the control group only received special technical training of foil for 3 hours in the afternoon from Monday to Saturday.

Evaluation method

Test the simple reaction time and selective reaction time of all trainees every week, take the reaction time as the evaluation index.⁶ In each test, each trainee is required to complete 2 sets of test tasks, each group contains 20 single tests. The first group serves as a training instrument for familiarity with optokinetic response testing, scores are not counted, group 2 is a formal test and is included in the test Table. There is a 15 s time buffer adjustment between the 2 sets of tests, there is a 15 s break between each test. The 3 test arrangements are as follows. Simple reaction time test: Set the fencing visual kinematic response

test training device to mode 2, the light flashing mode is fixed (specify a certain light to flash), the light flashes at random intervals, the trainees are required after the light flashes, touch the target in the shortest time, the initial horizontal distance between the sword head and the vertical target rod is set to 20 cm.

RESULTS

When the trainee reacts before training

Before the implementation of the training plan, the trainees in the experimental group and the control group were tested, independent sample analysis was performed on the data obtained. (Table 1) It can be seen from Table 1, before training, the experimental group and the control group are in simple reaction time, there was no significant difference in the three indicators between the selective reaction without foot movement and the selective reaction with foot movement ($P>0.05$).

Reaction time changes before and after training

We separately analyzed the training effects of the three different reaction times in the experimental group (Figure 1). It can be seen from the changes before and after training during the simple reaction, the simple reaction time of the experimental group after training was significantly lower than before training.⁷ The t test result shows that, there was a highly significant difference in the simple reaction time of the experimental group before and after training ($t = 3.107, P = 0.008 < 0.01$). The selective reaction time without foot movement after training is also significantly smaller than before training, the t test result shows that, when the experimental group chooses the reaction before and after training (no foot movement) there is a highly significant difference ($t = 3.216, P = 0.006 < 0.01$). The changes before and after training when there is a selective reaction of foot movement are shown in Figure 1, after training, the selective reaction time of the trainees in the experimental group with foot movement was less than before training.

Training effect of third-line players

The experimental group 1 and the control group were five third-line fencing athletes matched by coaches. Comparison of the two before and

Table 1. The difference test of different reaction times between the two groups before training.

Group	n	Simple reaction			When choosing a reaction (no steps)			When choosing a reaction (with steps)		
		Mean	Standard deviation	P	Mean	Standard deviation	P	Mean	Standard deviation	P
Test group	15	297.00	46.65	0.524	439.80	48.23	0.265	602.80	62.84	0.458
Control group	5	326.60	52.70		450.20	26.74		594.60	50.98	

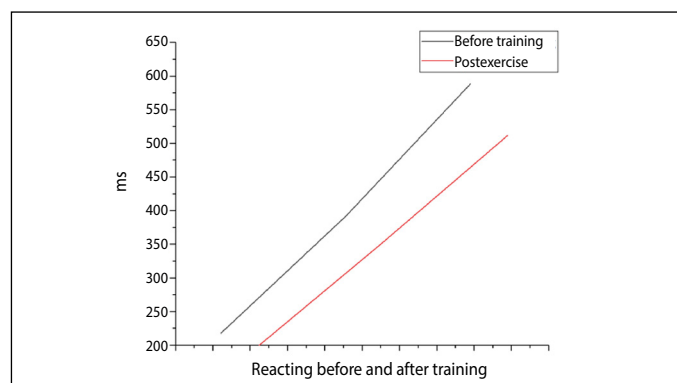


Figure 1. Changes in reaction time of the experimental group before and after training.

after tests, it can well illustrate the training effect of the fencing visual kinematic response test training instrument on the reaction ability of the third-line players.⁸⁻⁹ The independent sample t-test results show that the experiment 1 group and the control group simply reacted (Table 2), compared with the simple reaction time of the experimental group and the control group, the difference was not statistically significant.

The independent sample t-test results of the experimental group and the control group when the reaction is selected (without foot movement) are shown (Table 3), the difference between the experimental group's selective response time and the control group's selective response time (without foot movement) is highly significant.

The above results indicate that the ability training tools that hit the sword light dynamics response test training tool to make judgments before the reaction.

DISCUSSION

Training effects of trainees at different levels

After 8 weeks of training on the fencing optokinetic response test trainer, in the simple reaction time test, the scores of experiment 1, experiment 2, and experiment 3 all improved to a certain extent, among them, the experiment 1 group (third-line team members) had the largest reduction in simple reactions, experiment 3 (first-line team members) followed by, experiment 2 (female college students in the Physical Education College) had the smallest reduction in simple reaction time.¹⁰ The analysis of variance in the simple reaction between the experimental groups showed (Table 4), there is a highly significant difference in simple reaction time between experiment 1 group and

Table 2. Comparison of simple reaction time between experimental group 1 and control group after training.

Group	n	Mean	Standard deviation	t	p
Experiment 1 group	5	251.20	24.45	-1.387	00.203
Control group	5	274.20	27.88		

Table 3. Comparison of the experimental group 1 and the control group in response time (no foot movement) after training.

Group	n	Mean	Standard deviation	t	p
Experiment 1 group	5	375.80	5.45	-3.721	0.006
Control group	5	397.40	11.78		

Table 4. Comparison of simple response time analysis of variance between experimental groups.

Test group	Mean	Standard deviation	p
1	2	37.6000	9.19928
	3	23.2000	9.19928
2	1	-37.6000	9.19928
	3	-14.4000	9.19928
3	1	-23.2000	9.19928
	2	14.4000	9.19928

experiment 2 ($P < 0.01$); But there is no significant difference between experiment 1 group and experiment 3 group, experiment 2 group and experiment 3 group.

CONCLUSION

The core of fencing is stability and speed, the training of rapid reaction speed can improve the physical fitness, thinking and physical reaction ability of the fencer, this is very helpful for physical and mental development and flexibility of thinking. According to the results of this study, this kind of training method is effective. Whether it's simple reaction speed, select reaction speed without footsteps, it's the choice reaction speed that accompanies the movement of footsteps, both can be improved through the training of the fencing optokinetic response test training instrument; Regardless of the fencing level of the trainee, the reaction speed can be significantly improved through training.

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