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SPECIAL ISSUE ARTICLE

The Effect of Proposed Exercises on Developing Motor Reaction Speed in Foil Fencers Aged 10–12 Years

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Abstract

The significance of this research lies in the use of targeted and varied exercises aimed at developing specific motor abilities, particularly reaction speed. Enhancing this ability contributes directly to improving skill performance in the sport of fencing. This is especially important during this developmental stage, as it marks a critical period for the maturation of both the body and the nervous system. At this age, physical and motor capabilities begin to reach full development. Moreover, the refinement of such abilities requires a well-functioning nervous system, which must be trained through carefully timed and appropriately designed exercises. These exercises should incorporate elements of novelty and stimulation to effectively achieve the developmental objectives appropriate for this important age group. The aim of the study was to examine the effect of the proposed exercises on developing motor reaction speed among foil fencers aged 10 to 12 years. The research population consisted of athletes from the Iraqi Central Fencing Federation located in Baghdad, within the Youth and Sports Ministry Complex. The sample was intentionally selected and included 16 foil fencers within the specified age group. The sample was then divided into two equal groups: an experimental group and a control group, with eight participants in each. Homogeneity within the research sample was verified, in addition to ensuring the equivalence of the experimental and control groups. and this achieves one of the sustainable development goals of the United Nations in Iraq which is (Quality Education).

Keywords: Batac micro motor reaction speed test, Fencing, Reaction speed

1. Introduction

The field of sports has witnessed significant advancement across various domains, which has been reflected in the development of physical and motor abilities, as well as the enhancement of athletes' technical and tactical performance at all levels. In many competitions, it is common to observe athletes executing movements and skills with remarkable precision and fluidity—almost entirely error-free—with extraordinary movement patterns and speeds that are often too fast for the eye to follow. At times, it becomes difficult to determine how a particular movement was executed, raising several questions about how an athlete is able to perform such actions and skills with extraordinary speed, resulting in highly precise and fluid motor sequences. Such athletes demonstrate an exceptional level of skill performance, which stems from the nervous system's full control over the muscle groups involved in physical execution, as well as the efficiency of cognitive processes that deliver rapid and precise signals to these muscle groups at carefully timed intervals. These responses result in quick and accurate motor reactions that manifest in the athlete's refined execution of movements and skills.

He stated that the fencer's movements must be fast and precise in order to achieve the correct touches (Al-Janabi, 1989, p. 23).

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A prime example of this phenomenon can be observed in the sport of fencing, where performance relies on the ability to initiate sudden and unexpected offensive movements toward the opponent. This requires explosive muscular strength exerted at maximum intensity within a very short period of time, in addition to other physical and motor skills. Given the short distance between opponents and the complexity of the motor skills required in fencing, athletes must continually develop their physical and motor attributes while advancing their skill level. Furthermore, fencers must build specialized offensive and defensive strategies characterized by rapid and precise motor responses, as these are critical factors in determining outcomes in this sport.

The significance of this study lies in the use of targeted and varied exercises designed to develop specific motor abilities, particularly motor reaction speed. Enhancing this capability contributes directly to the advancement of skill performance in the sport of fencing. This age group represents a critical developmental stage for improving motor reaction speed, as the body and nervous system are approaching full maturation, accompanied by the growth of physical and motor potential. Moreover, the development of such abilities requires a well-functioning nervous system and must be addressed through appropriately timed and structured training. These exercises should incorporate elements of novelty and stimulation to effectively achieve the intended objectives for this vital stage of development.

1.1. Research problem

Each sport possesses its own distinct physical and motor attributes, which can serve as fundamental factors for achieving excellence and success. Among these attributes is motor reaction speed, which is considered one of the most critical requirements in the sport of fencing due to the nature of the game, which demands a high level of this specific ability. The researcher observed that offensive and defensive movements in fencing vary in their execution speed, which can significantly influence a fencer's ability to gain priority in touches and ultimately achieve victory. This observation is supported by competition outcomes, which revealed that athletes often fail to advance to higher stages, display fluctuating performance levels, and that coaches do not consistently enhance training programs. Moreover, there is limited attention given to the development of this vital ability in fencing, and a lack of use of varied training tools and exercises designed specifically to improve motor reaction speed among athletes in this age group. Therefore, the researcher found it necessary to examine this issue through a scientific and objective study. The aim is to design and implement proposed exercises using supportive tools, with the intention of developing motor reaction speed, avoiding the monotony of traditional training routines, and determining their impact on skill performance in the sport of fencing.

1.2. Research objective

To examine the effect of the proposed exercises on developing motor reaction speed in foil fencers aged 10–12 years.

1.3. Research hypotheses

1. There are statistically significant differences between the control and experimental groups in favour of the experimental group.
2. There are statistically significant differences between the pre-tests and post-tests in motor reaction speed among foil fencers aged 10–12 years, in favor of the post-tests.

1.4. Research scope

1. **Human Scope:** Foil fencers aged 10–12 years affiliated with the Iraqi Fencing Federation.
2. **Spatial Scope:** Iraqi Fencing Federation Hall, located in the Ministry of Youth and Sports Complex.
3. **Temporal Scope:** From June 12, 2024, to August 21, 2024.

2. Methodology and procedures

The researchers employed the experimental method, as it is well-suited to the nature of the research problem and is considered one of the most effective approaches for obtaining reliable and validated results.

2.1. Research sample

The research population consisted of foil fencers affiliated with the Iraqi Fencing Federation, located in Baghdad at the Ministry of Youth and Sports Complex. The sample was purposively selected and included 16 foil fencers between the ages of 10 and 12. The participants were divided into two groups: an experimental group and a control group, with 8 athletes in each. The researchers ensured the homogeneity of the sample and the equivalence between the experimental and control groups.

2.2. Instruments, tools, and supporting materials

To carry out the field procedures of the research, the following instruments, tools, and supporting materials were utilized: a SONY video camera, an HB computer, a whistle, adhesive tape, tennis balls, a pen, Arabic and foreign references, internet information sources, and an electronic device for measuring reaction time and motor response speed of the arms (British-made, Bata Micro).

2.3. Field procedures: Batak micro motor reaction speed test

Test Name:

Batak Micro Device for Measuring Motor Reaction Speed See Fig. 1.

Purpose of the Test:

To measure motor reaction speed of the upper limbs.

Instruments Used:

A British-made Batak Micro device and a result recording form.

2.4. Device description

The Batak Micro is a lightweight electronic panel equipped with a main display screen for showing test results and a secondary screen for device settings. It features 12 evenly distributed, circular, pressure-sensitive buttons. The device operates via either a rechargeable battery or a direct power connection. Internally, it contains a central processing unit and a rechargeable battery capable of functioning for several hours without external power. Each button is fitted with an internally mounted high-intensity LED light. The device is programmed with a wide array of randomized activation and deactivation sequences to prevent test subjects from memorizing specific light patterns. The Batak Micro supports up to 17 configurable testing modes, depending on the type of assessment being conducted, as illustrated in the Fig. 1.

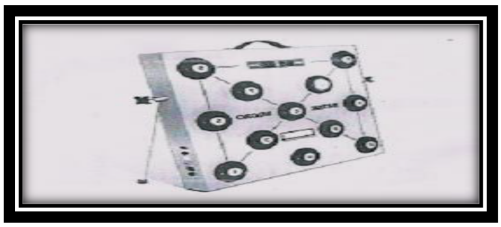

Fig. 1. Batak micro device.

2.5. Test execution procedure

The device is mounted on the wall and securely fixed at an appropriate height from the floor. It may also be placed on a table of varying heights depending on need. The test can be conducted using both arms or one arm—whether preferred or non-preferred. In this study, the researcher conducted the test using only the armed (dominant) arm. Once the device is set for initiation, a flashing light and a readiness sound appear. Upon starting, the buttons begin to illuminate, and the player must deactivate them by pressing on each illuminated button. As soon as one light is turned off, another lights up, based on the player's speed in turning off the lights. This continues until the preset duration (30 seconds) is completed. The main screen then displays the number of responses made during the 30-second interval. The recorder writes down the score achieved by the player and resets the device to test the next participant.

2.6. Pilot study

Prior to commencing the main experiment—and as a fundamental step in the fieldwork of scientific research—a pilot study was conducted by the researchers on May 23, 2024. The purpose of this pilot study was to identify potential obstacles and challenges that might arise during the implementation of the main experiment, in order to address them effectively. It also aimed to assess the research sample's ability to perform the proposed exercises and to determine the appropriate intensity in terms of repetitions and duration in alignment with the participants' age group. In addition, the pilot study served to train the supporting research team on their assigned duties and to ensure the safety of the athletes during task execution by testing some of the tools and devices intended for use in the main study.

2.7. Pre-test for the research sample

The pre-tests were conducted on the research sample on Saturday, June 1, 2024, at 10:00 a.m. in the fencing hall. All conditions related to the testing process—such as location, timing, and testing procedures—were standardized. The same supporting team and testing equipment were also used to ensure that these conditions could be replicated as closely as possible during the post-test phase.

2.8. Main experiment

After reviewing relevant sources, scientific literature, and consulting experts in the field, the

researchers developed a set of proposed exercises using locally manufactured supportive tools. These exercises were designed to achieve the research objective based on scientific principles. The researcher ensured a progressive increase in the difficulty level of the exercises by gradually adding more movements and involving additional body parts. These exercises are represented as follows:

(17) Proposed Exercises for Developing Motor Reaction Speed In Appendix 1. a.

A total of 30 training units were implemented using the proposed exercises, at a frequency of three sessions per week over a period of 10 weeks. Each session lasted between 20 and 30 minutes and was incorporated into the main section of the specific preparation phase. The training period extended from June 12 to August 19, 2024. Rest intervals between repetitions ranged from 15 to 55 seconds, while rest periods between sets ranged from 30 to 90 seconds.

2.9. Post-tests

Following the implementation of the proposed exercises, the researchers, with the assistance of the supporting team, conducted the post-tests while ensuring the same conditions and location as those used for the pre-tests. The post-tests were administered on Wednesday, August 21, 2024, at 10:00 a.m., in order to minimize the impact of environmental variables on the results of the post-tests for the research sample.

2.10. Statistical methods

The following statistical tools were employed: mean, median, standard deviation, skewness coefficient, *t*-test for two correlated samples of equal size, and *t*-test for two independent samples of equal size.

3. Results

3.1. Presentation and analysis of pre- and post-test results for the control group

Table 1 presents the results of the motor reaction speed test for the control group in both the pre- and post-test phases. The findings indicate that the mean value for the pre-test was 42.12 with a standard deviation of 3.52, while the post-test mean was 44.5 with a standard deviation of 4.56. The mean difference was 2.37, with a standard error of 0.67. The calculated *t*-value was 5.69, which exceeds the tabulated *t*-value of 2.365 at a degree of freedom of 7 and a significance level of 0.05. This result indicates statistically significant differences between the two tests in favor of the post-test.

3.2. Presentation and analysis of pre- and post-test results for the experimental group

Table 2 presents the results of the motor reaction speed test for the experimental group in both the pre-test and post-test phases. The findings show that the mean score for the pre-test was 44.87 with a standard deviation of 4.48, while the post-test mean reached 50.62 with a standard deviation of 3.24. The mean difference was 5.75, with a standard error of 1.01. The calculated *t*-value was 5.69, which exceeds the tabulated *t*-value of 2.365 at a degree of freedom of 7 and a significance level of 0.05. These results indicate

Table 1. Presents the means, standard deviations, mean differences, standard error, calculated t-value, and significance level for the motor reaction speed test of the control group.

Statistical Parameters / Variables	Unit of Measurement	Control Group								
		Pre-Test		Post-Test						
		M	SD	M	SD	MD	Mean Difference ± SE	Calculated *t*-value	Tabulated *t*-value	Significance Level
motor reaction speed test	Repetition	42.12	3.52	44.5	4.56	2.37	0.67	3.53	2.365	Significant

The tabulated *t*-value (2.365) corresponds to a significance level of 0.05 and a degree of freedom of 7 ($8 - 1 = 7$).

Table 2. Presents the means, standard deviations, mean differences, standard error, calculated t-value, and significance level for the motor reaction speed test of the control group.

Statistical Parameters / Variables	Unit of Measurement	Control Group								
		Pre-Test		Post-Test						
		M	SD	M	SD	MD	Mean Difference ± SE	Calculated *t*-value	Tabulated *t*-value	Significance Level
motor reaction speed test	Repetition	44.87	4.48	50.62	3.24	5.75	1.01	5.69	2.365	Significant

The tabulated *t*-value (2.365) corresponds to a significance level of 0.05 and a degree of freedom of 7 ($8 - 1 = 7$).

Table 3. Displays the means, standard deviations, and calculated t-value for the post-test results of the control and experimental groups in the motor reaction speed test.

Statistical Parameters / Variables	Unit of Measurement	Control Group		Experimental Group		Calculated *t*-value	Tabulated *t*-value	Significance Level
		M	SD	M	SD			
motor reaction speed test	Number of Touches	44.5	4.56	50.62	3.24	3.12	2.145	Significant

The tabulated t-value (2.145) corresponds to a significance level of 0.05 and a degree of freedom of 14 ($8 + 8 - 2 = 14$).

statistically significant differences between the two tests in favor of the post-test.

3.3. Presentation and analysis of post-test results for the two research groups

Table 3 presents the following results: the post-test mean score for motor reaction speed in the control group was 44.5 with a standard deviation of 4.56, while the experimental group recorded a mean of 50.62 with a standard deviation of 3.24. The calculated t-value was 3.12, which exceeds the tabulated t-value of 2.145 at a degree of freedom of 14 and a significance level of 0.05. These findings indicate the presence of statistically significant differences between the two groups.

4. Discussion

A review of the statistical significance table comparing the pre- and post-test results for the research groups in the motor reaction speed test using the foil reveals that the experimental group demonstrated improvement in motor reaction speed. The researchers attribute these results to the specific exercises applied to the experimental group, which were designed with appropriate progression in training load and repetitions suitable for this age group. These exercises simulated the muscular performance in terms of movement direction and targeted the components of motor skills by enhancing the neural signals associated with motor reaction speed and reducing the latency period. It is important to highlight the essential and central role of the nervous system, which is responsible for regulating the magnitude of force and speed according to its physiological function in the body. As stated, "the development of cognitive processing and appropriate motor responses is achieved through specialized training" (Cojocariu & Honceriu, 2011 p. 139). This suggests an improvement in high-speed coordination influenced by exercises that replicate skill performance and optimize the use of certain visual abilities related to the sense of sight.

There are several essential conditions for developing motor reaction speed, including the capacity of the central nervous system, as well as the ability to maintain balance and motor coordination. Al-Dabbagh (2003, p. 32) emphasized that "the better the balance, the stronger the defensive capability."

In addition, Cojocariu and Honceriu (2011, p. 16) stated that "training programs derived from athletes' experiences and accumulated knowledge can enhance an athlete's ability to make accurate anticipations, thereby reducing reaction time. Furthermore, proper skill execution and specific physical abilities all contribute to improved performance."

This improvement is closely linked to adherence to structured training content, progressive exercise design, and significant effort to achieve noticeable development in movement frequency. Such conditions were present in the proposed exercises, which were required to be effective, impactful, and implemented under essential principles and considerations.

As Al-Bahadli (2011) pointed out, speed is a fundamental quality that a fencer must possess, as it is considered a decisive factor in the sport. The rules of fencing favor the faster player in awarding the touch, making speed a core principle in determining performance outcomes. This highlights the critical importance of speed as one of the key physical attributes required in fencing.

The exercises applied were diverse and varied, each differing in approach and structure. They were designed to have a comprehensive impact on the entire body and were characterized by elements of novelty and excitement. This aligns with the criteria emphasized by Abdullah (2006, p. 29), who stated that "exercises must vary in order to exert a comprehensive effect on the body, stimulate the individual, and prevent boredom."

The researchers attribute the observed improvements in performance to the combination of these factors, which contributed to both physical and physiological development. This, in turn, enhanced reaction speed and improved the regulation of the required force through better eye–hand coordination, increased focus, and visual tracking. These elements provided the brain with immediate feedback in real-time performance situations.

The exercises were diverse and varied in structure, each differing from the others in form and focus. They

were characterized by their comprehensiveeffect on all parts of the body and included elements of novelty and engagement in some instances. This aligns with the essential conditions that must be met in exercise design, as Al-Azzawi (2006, p. 29) emphasized: "Exercises must be varied in order to achieve a comprehensive effect on the body, stimulate the individual, and avoid monotony."

The researchers attribute the observed physical and physiological development to the combination of these factors, which contributed to improvements in motor reaction speed and greater control over the amount of force exerted. This was achieved through enhanced eye–hand coordination, increased focus, and improved visual tracking, all of which provide the brain with immediate sensory feedback during performance situations.

5. Conclusions

Based on the experimental results, the researchers reached the following conclusions:

1. The proposed exercises had a positive effect on developing the targeted variable, namely motor reaction speed.
2. There were statistically significant differences between the experimental and control groups in the post-tests for motor reaction speed, in favor of the experimental group.

6. Recommendations

The researchers propose the following recommendations:

1. The use and application of the proposed exercises for players aged 10–12 years.
2. Conducting similar studies on other fencing weapons, different age groups, and in both individual and team sports activities.

Conflict of interest

The authors declare no conflict of interest.

Authors' contributions

- **Prof. Dr. Thaera Abdul Jabbar Saleh** conducted the post-test and participated in the discussion of the result after data analysis.
- **Asst. Lect. Muna Ihsan Muhammad Baqir** proposed the research idea, drawing on her background as a fencing athlete, conducted both the pre-test and post-test for the research sample, and wrote the main body of the study.
- **Lect. Dr. Lubna Abdul Rasool** conducted the pilot study and contributed to drafting the research introduction and abstract.

Funding statement

This research received no external funding.

Data availability

The data that support the findings of this study are available on request from the corresponding author.

References

Al-Azzawi, Abdullah. (2006). The effect of suggested exercises in developing the speed of motor response among tennis players and its relationship to returning the serve, (Master's thesis), University of Baghdad, College of Physical Education.

Cojocariu, A., & Honceriu, C. (2011). The effect of specific training upon the values of the choice reaction time at the level of the upper limbs in lawn tennis (16–18-year-olds). *Sport şi Societate*, *1*, 30–35. OALib+2Google Scholar+2Sport UAIC+2.

Al-Dabbagh, A. A. G. (2003). The relationship between the flexibility of some joints of the body and the speed and accuracy of stabbing in foil. *Al-Rafidain Journal of Sports Sciences*, *9*(35), 112–125.

Al-Bahadli, I. J. S. (2011). *The effect of special skill exercises on the accuracy of performing some basic skills and the electrical potential activity of the working muscles of advanced Muay Thai players* (Master's thesis, University of Baghdad, College of Physical Education).

Al-Azzawi, A. (2006). *The effect of suggested exercises in developing the speed of motor response among tennis players and its relationship to returning the serve* (Master's thesis, University of Baghdad, College of Physical Education).

Al-Janabi, A. K. F. A. (1989). A Method for Developing the Speed-Distinguished Strength of the Upper Limb Muscles of Young People, Master's Thesis, University of Baghdad, College of Physical Education.

Quotronics Ltd. (2011). *Batak reaction training systems*. https://www.batak.com/

Appendix 1

Samples of motor reaction speed exercises

The performance in each drill is determined by the coach based on the colour of the visual stimulus (light signal):

First:

- **Red light**: Step forward.
- **Yellow light**: Step backward.
- **Green light**: Step forward, then step back.

Second:

- **Red light**: Take two steps forward.
- **Yellow light**: Take two steps backward.
- **Green light**: Take two steps forward, then two steps back.

Three:

- **Red light**: Step forward, then perform a lunge.
- **Yellow light**: Step backward, then perform a lunge.
- **Green light**: Step backward, then step forward and lunge.

Four:

- **Red light**: Take two steps forward.
- **Yellow light**: Perform a lunge and return forward.
- **Green light**: Step backward.

Five:

- **Red light**: Step forward, lunge, then step back.
- **Yellow light**: Step forward, lunge, then return forward.
- **Green light**: Step backward, step forward, lunge, then step back.

Sex:

- **Red light**: Lunge, return forward, then lunge again.
- **Yellow light**: Lunge, return backward, step forward, then lunge.
- **Green light**: Lunge, step back, step back again, then step forward and lunge.

Seven:

- **Red light**: Extend the arm, step forward, then lunge.
- **Yellow light**: Step forward, extend the arm, then lunge.
- **Green light**: Extend the arm, lunge, then step backward.

Eight:

- **Red light**: Step backward, then step forward, then extend the arm.
- **Yellow light**: Extend the arm, then step forward, then step back.
- **Green light**: Step backward, step forward, extend the arm, then perform a lunge.

Nine:

- **Red light**: Step forward, then perform a straight parry.
- **Yellow light**: Step backward, then perform a straight parry.
- **Green light**: Perform a straight parry, step forward, step backward, then lunge.

Ten:

- **Red light**: Perform a vertical parry, step forward, then lunge.
- **Yellow light**: Step backward, perform a vertical parry, then lunge.
- **Green light**: Step backward, perform a vertical parry, step forward, then lunge.

Eleven:

- **Red light**: Perform a straight parry, step backward, perform a vertical parry, then step forward.
- **Yellow light**: Step forward, lunge, return forward, perform a vertical parry, step back, then lunge.
- **Green light**: Step forward, perform a straight parry, step backward, perform a vertical parry, then lunge.

Twelve:

- **Red light**: Step forward, perform a circular parry, then lunge.
- **Yellow light**: Perform a diagonal parry, step forward, perform a circular parry, then step back.
- **Green light**: Lunge, perform a diagonal parry, step backward, perform a circular parry, step forward, then lunge.

Thirteen:
Ready position: One player stands facing another. One player throws a ball toward the ground, and the other player must catch it on the rebound.

Fourteen: Targeting Exercise Between Two Nets Using Cups
Equipment used: Two stands, a secondary net positioned 15 cm above the first net, 10 foam cups, and a foil weapon.
Execution: The athlete stands facing the device and performs thrusts between the two nets, aiming to knock down as many cups as possible using the foil.

Fifteen: Tennis Ball Wall Reaction Exercise
Equipment used: A wall, a tennis ball, adhesive tape, and a stopwatch.
Execution: The athlete stands one meter away from a smooth wall, facing it, while a teammate stands behind. The teammate throws a tennis ball at the wall from behind the athlete in a random direction. The athlete must catch the rebounding ball with one arm only, then retreat to the original position, allowing the next player to take their turn.

Sixteen: Glove Reaction Exercise (Step and Catch)
Ready position: The athlete places a glove on the weapon arm, throws the glove upward, steps forward, and catches the glove before it touches the ground.

Seventeen: Glove Reaction Exercise (Thrust and Catch)
Ready position: The athlete places a glove on the weapon arm, throws the glove upward, performs a thrust, and then catches the glove before it lands.

Appendix 2

Model of the proposed exercises for the experimental group

Session Number: 1 + 2 **Training Session Duration**:
Objective of the Exercises: Developing motor reaction speed **Day and Date**:

Sections of the Training Unit	Duration	Training Unit Details	Number of Repetitions	Rest Between Repetitions	Number of Sets	Rest Between Sets	Notes
Preparatory Phase							
Main Phase	26,2						
	4,5	1. Red light: Step forward Yellow light: Step backward Green light: Step forward, then step backward (10 light signals within 15 seconds)	2 × 10	40 Sec.	2	65 Sec.	The cue is given visually through the coach's arm for each movement on a specific side. Moving the coach's arm to the right prompts the athlete to perform the first movement; moving the arm to the left prompts the second movement; and moving the arm downward prompts the third movement.
	8,6	2. Red light: Step forward then lunge Yellow light: Step backward then lunge Green light: Step backward then step forward then lunge (10 light signals within 30 seconds)	3 × 10	50 Sec.	2	70 Sec.	
	6,6	3. Red light: Step forward then lunge and return backward Yellow light: Step backward then lunge and return forward Green light: Step backward then step forward then lunge and return backward (10 light signals within 35 seconds)	2 × 10	55 Sec.	2	75 Sec.	
	6,5 Sec.	4. Red light: Step forward then lunge and return backward Yellow light: Step forward then lunge and return forward Green light: Step backward then step forward then lunge and return backward (10 light signals within 35 seconds)	2 × 10	55 Sec.	2	70 Sec.	
Concluding Phase							