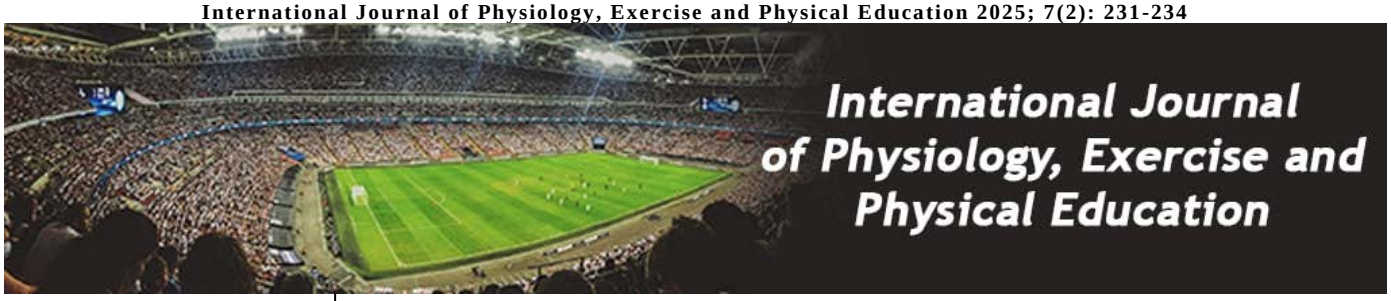

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Some bio-motor abilities and their relationship to the speed of the lung and the accuracy of touch in the Epee weapon for university fencers

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Abstract
The research aims to identify some biomotor abilities and their relationship to the speed and accuracy of the thrust. The researchers examined relevant theoretical and previous studies, and implemented a descriptive approach on (22) fencing students representing the College of Physical Education and Sports Sciences team. The researchers used appropriate tools and equipment, conducted a mini-exploratory experiment, and then conducted the prepared tests. Data was extracted and processed using statistical methods, after which it was presented, analyzed, and discussed. The researchers reached conclusions, the most important of which was that the use of training methods in training had an effective impact on the development of some biomotor abilities and their relationship to the speed and accuracy of the thrust and accuracy of the touch in the fencing Epee weapon in the sport of fencing among the experimental group. Training methods also played a role in refining skill performance and developing its accuracy, as they provided the fencer with opportunities to perceive the distance and time of the performance, which led the fencing student to correct their performance and avoid errors. In light of these conclusions, the researchers recommended the need to emphasize training on some of the skills and abilities of the fencing team. It also emphasizes the need for trainers to adopt exercises specific to training methods for speed of striking and accuracy of touch, in a way that coincides with the development of accuracy in performing skills.

Keywords: Bio-motor, abilities, speed, fencers.

Introduction
Fencing occupies a prominent global sporting position, for reasons most notably its many skills, which rely on physical aspects. Performance requires players to perform quickly and accurately, with no room for stagnation in attack or defense. In modern play, it has become essential to select the appropriate physical abilities to advance fencers to an advanced level. The process of implementing aspects of fencing depends on the balance between strength, speed, and accuracy. Strength, characterized by speed, plays a prominent and important role in sports, especially fencing, which "requires movements of strength and speed simultaneously, such as running, jumping, and others, whether for training or playing."[1]
Fencing schools across the world are established for age groups to select the best players based on functional, physical, and technical criteria related to practicing the game, through a set of technical and administrative procedures known to those involved in training and managing this beautiful and beloved sport among most members of society. Fencing skills are considered a special type of skill and possess high, distinct capabilities. In fencing, biomotor abilities and their impact and relationship to jabbing speed and touch accuracy are considered. Motor skill abilities, which are the foundations of fencing, are considered one of the special abilities among the creative and distinctive skills in fencing. Hence, the importance of this research lies in identifying some biomotor abilities and their relationship to jabbing speed and touch accuracy in the fencing sword.

Research Problem
The speed, strength, and touch accuracy that characterize modern fencing requires the use of physical and technical abilities and capabilities that have a direct and indirect impact on jabbing speed, touch accuracy, and the advancement of fencing skills.

The research problem centers on the fact that most fencing coaches do not scientifically focus on the degree of relationship between biomotor abilities, jabbing speed, and touch accuracy in fencing. This prompted the researchers to study this problem to benefit from it in planning and training, and to achieve the best for student fencers in Iraqi universities.

Research objectives

To identify the relationship between some biokinetic abilities and their relationship to lung speedand touch accuracy in the fencing sword.

Research hypotheses

1. There is a statistically significant relationship between biokinetic abilities, thrust speed, and touch accuracy.
2. There is a statistically significant correlation between some biokinetic abilities (explosive ability of the legs - strength characterized by speed of the legs and agility) and lung speedand touch accuracy in the fencing sword.

Research areas

- **Human area:** A sample of (22) third-year students from the College of Physical Education and Sports Sciences on the fencing team, on February 24, 2024.
- **Temporal area:** The research was implemented during the second semester of the 2024-2025 academic year. The main experiment was conducted on February 24, 2024.
- **Spatial area:** The fencing hall at the College of Physical Education and Sports Sciences, University of Babylon.

Research Methodology

The researchers adopted a descriptive, correlational approach, as it suited the nature of the research to understand the objective of some biomotor abilities and their relationship to the lung speed and touch accuracy in the fencing sword.

Research Population and Sample

The researchers defined the research population as all fencing players (students from the College of Physical Education and Sports Sciences, University of Babylon). The researchers intentionally selected a team of (22) third-stage fencing players to represent the research sample.

Devices and Tools Used in the Research:

- Arabic and foreign sources.
- Observation and questionnaire.
- Measuring tape.
- Adhesive tape.
- (22) fencing sword weapons.
- Signs and flags.
- Stopwatches (3).
- Multiple ropes.
- Weight measuring device.
- Handheld electronic calculator.
- Camera.
- Laptop.

Field Research Procedures

Scientific sources and research related to fencing and sports training were reviewed. The researchers selected a set of tests, including:

1. Agility Test [2]

Agility is defined as "the ability to change direction quickly and with a high degree of accuracy, coordination, and balance."

- **Test Objective:** To measure agility.
- **Equipment:** A stopwatch, six markers (taking into account the start and finish lines, with the starting line 5 feet away from the first marker and the distance between the markers 8 feet), a whistle, and a scoring form.
- **Test Procedure:** The tester stands behind the starting line and, after hearing the signal (whistle), runs at maximum speed between the markers back and forth.
- **Recording:** The time is recorded from the moment of departure until the tester crosses the starting line (start-finish-start). The tester is given only one attempt.

2. Explosive Leg Strength Test [3]

- Explosive leg strength (the ability to generate force at maximum speed, and it is the ability of the nervous and muscular systems to attempt to overcome resistance that requires a high degree of muscle contraction speed).
- Explosive leg strength can be tested by jumping over a high obstacle. 25 cm is not a distance, and is measured in meters and parts thereof.
- Equipment used: A 25 cm high barrier, a measuring tape, and adhesive tape.
- Performance method: The player stands behind the jump line with the toes touching the line in the center of the court, 70 cm from the barrier. He then jumps over the barrier for the farthest possible horizontal distance.
- Requirements

a) The player stands facing the net.
b) The player must cross the barrier.

- **Scoring:** The distance is measured from the starting line to the last mark left by the player's foot.
- **Number of attempts:** Each player is given three attempts, and the best attempt is considered.

3. Speed-specific strength test for leg muscles:[4]

- **Purpose of the test:** To measure the speed-specific strength of the leg muscles.
- **Equipment used:** Badminton court, measuring tape, tape measure, and stopwatch.
- **Method of performance:** The player stands at the starting point in the center of the court. Upon hearing the command, the player hops to station number (1), returns to the start, then hops to station number (2), returns to the start, then continues hopping to the remaining stations and returns to the start. The performance continues for (10) seconds, noting that the distance between stations is (3) meters.
- Test conditions:

a) The station must be reached using a hop similar to the hop during the match.
b) Touch the station with the hand.
c) Use the stabbing movements used in the match to touch the station with the hand.
d) The player must also return to the starting point using the hop and then move to the next station.

- **Recording**

a) The number of times the player hops to the station and returns to the start is counted, with one point awarded for each return within (10) seconds.
b) The attempt is not counted if the arm does not touch the station.

4. Lunge Motor Ability Test [5]

- **Purpose of the test:** To measure the motor ability of the lunge.
- **Performance Specifications:** The player stands in a ready position at an appropriate distance from the suspended bar, such that the bar's height is appropriate for the player's height. At the start signal, the player begins performing (10) continuous lunges at the bar, and the referee records the time taken to perform the lunges.
- Scoring Method

a) The time taken for the player to perform (10) lunges at the bar is recorded.
b) The player is given two attempts, and the best attempt is recorded.

Lunge Accuracy Test [6]

- **Purpose of the test:** To measure the accuracy of the lunge.
- **Performance Specifications:** The marker is placed on the field and then electricity is connected to it. A line is drawn at a distance proportional to the length of the player's thrust, from which the player begins performing the thrust. The player stands in front of the marker in a ready position, holding the weapon (the foil), which is also connected to electricity, behind the aforementioned line. The player begins performing the straight thrust toward the target (the circles on the vest) designated for him by the coach.
- **Recording Method:** The player records the number of correct attempts in which he is able to touch the circles within the specified time.
- The player is given (10) attempts within (15) seconds.

Exploratory Experiment

It is "a small preliminary experimental study, similar to the main experiment, conducted by the researchers on a small sample before conducting their research. This study aims to select research methods and tools, and through this, a good quantity and quality of important observations can be obtained."[7]. On this basis, the researchers conducted an exploratory experiment on a small group of (12) fourth-stage fencers from outside the research sample. The researchers conducted this experiment for the following reasons:

1. To ensure the accuracy of data recording.
2. To identify the difficulties facing the tests and the possibility of avoiding them.
3. To determine the suitability of the equipment and tools necessary for performing the tests.
4. To determine the time required to perform the tests.
5. To ensure the work team's understanding of the nature of the tests and how to perform them.
6. To establish the scientific basis for the tests.

The Main Research Experiment

The researchers conducted the main research experiment on February 24, 2024, to apply the tests to the research sample and to the fencing hall.

Statistical Methods

The research results were processed using the Statistical Package for Statistics (SPSS) program.

Results and discussion

Presentation, Analysis, and Discussion of Results

- Presentation and Analysis of the Results of Some Biomotor Abilities and Their Relationship to Lung speedand Touch Accuracy in the Epee for the Research Sample

1. Presentation and Analysis of the Results of Some Biomotor Abilities and Their Relationship to Lung speed and Touch Accuracy in the Epee for the Research Sample

Table 1: shows the tests for some bio-motor abilities and their relationship to the speed of the lung and accuracy of touch in the fencing sword weapon for the sample under study

Variables + Biokinetics	Units	Results	Correlation*	Tabular significance	Significance
Explosive strength test for legs	Cm	0.743	0.698	0.412	Sig.
Leg motor speed test	Number	0.443	0.677		Sig.
15x10 Back and forth Agility Test	Distance + Time	0.448	0.649		Sig.
Legs speed strength test	Distance	0.533	0.698		Sig.
Lung speed test in fencing	Seconds	0.678	0.347		Sig.
Touch Accuracy Test	Number	0.610	0.648		Sig.

*It was calculated with a degree of freedom (20) and a significant significance of 0.412 more than 0.05.

Discussion of the Results

The results presented in Table (1) show some biokinetic abilities and their relationship to the lung speed and touch accuracy in the fencing sword. Following these variables labeled as biokinetic abilities, a correlation was found between the explosive power of the legs and the accuracy of receiving and shooting, with a correlation of (0.698). When compared to the semantic table, it was (0.412) at the significance level (0.05), and it was a slightly significant correlation.

A correlation was found between the motor speed of the legs and touch accuracy, with a correlation of (0.677). When compared to the semantic table, it was (0.412) at the significance level (0.05), and it was a slightly significant correlation.

Through the table, a correlation was found between agility and touch accuracy, with a correlation of (0.649). When compared to the semantic table, it was (0.412) at the significance level (0.05), and it was a slightly significant correlation. A correlation was found between the strength characterized by leg speed and touch accuracy, with a

correlation of 0.698. When compared to the semantic table, it was 0.412 at the significance level of 0.05, and it was a slightly significant correlation.

Consequently, the variables labeled as biomotor abilities were found to be a correlation between the explosive power of the legs and the stabbing speed, with a correlation of 0.678. When compared to the semantic table, it was 0.412 at the significance level of 0.05, and it was a significant correlation.

A correlation was found between the motor speed of the legs and the stabbing speed, with a correlation of 0.677. When compared to the semantic table, it was 0.412 at the significance level of 0.05, and it was a slightly significant correlation [8]

Through the table, a correlation was found between agility and stabbing speed, with a correlation of 0.649. When compared to the semantic table, it was 0.412 at the significance level of 0.05, and it was a slightly significant correlation. A correlation was found between the strength characterized by leg speed and the speed of the thrust with a correlation of (0.533). When compared to the semantic table (0.412) at the significance level (0.05), it was at a simple significant correlation. From these results, it became clear that the training process must address the interconnected relationships between them through precise and standardized tests in the training process, because one affects the other. This is what every fencer needs,[9] especially Epee fencers, as they excel in the precision of touch in assembling body parts, the speed of the lung, and the power of touch, especially in areas close to the opponent, such as the hand, forearm, lower forearm, foot, knee, and entire thigh, in addition to the head and chest. All of these areas require speed of movement in the thrust and precision of touch in order to win. This can only be achieved by developing all biomotor capabilities, given their role in improving the level of players and student fencers in local and international tournaments [10]

Conclusion

1. Some biokinetic abilities are an important factor in learning striking speed and touch accuracy in the fencing sword.
2. There is a relationship between biokinetic abilities, striking speed, and touch accuracy in the fencing sword.

Recommendation

1. The need for coaches to focus on developing biokinetic abilities and their relationship to striking speed and touch accuracy in fencing among fencing players, especially advanced fencing players, as well as younger age groups.
2. The need to focus on specific training for biokinetic abilities and their relationship to striking speed and touch accuracy in fencing during the training of fencing players in colleges. This should also include identifying the variables in the skill and biokinetic abilities specific to fencing and working on ways to develop them.
3. The need for fencing coaches in colleges to focus on providing training methods that develop skills characterized by difficulty and precision, as they require multiple biokinetic and physical abilities.
4. Conducting studies and research on different age groups and both genders in the sport of fencing.

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