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Motor Coordination and Its Relationship to Learning Jump Shooting Accuracy in Handball among Second-Year Students at the College of Physical Education and Sports Sciences

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Abstract

Shooting is considered one of the most fundamental and essential skills in handball, requiring a high degree of accuracy and motor coordination. Based on their teaching experience in the handball course, the researchers observed that some students possess adequate physical strength yet struggle with shooting accuracy. This raises questions regarding the factors influencing shooting performance, including motor coordination. Accordingly, the problem of the current study arises from the need to identify the relationship between the level of motor coordination and the accuracy of jump shooting among second-year handball students. The study aims to reveal the nature of this relationship. The researchers hypothesized that there are statistically significant differences in motor coordination that influence shooting accuracy. The descriptive correlational method was used due to its suitability for the research problem. An intentional sample of 42 students from Section (W) was selected: 30 students for the main sample, 5 for the pilot study, and 7 excluded for non-attendance or previous academic failure. Standardized tests were used, including a motor coordination test and a jump shooting accuracy test. Data were processed using the SPSS statistical package. Results showed a statistically significant correlation between motor coordination and jump shooting accuracy. The researchers recommended incorporating progressively structured motor coordination exercises to improve shooting performance and encouraged conducting similar studies on other skills and sports activities.

Keywords: motor coordination, overhead jump shooting, handball, second-year students.

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Introduction

Lately, the sport sciences have shown significant increase in many sports activities. Many researches have examined motor learning process and development in aiding the enhancement of sport performance. Sports motor learning is the way in which motor skills are learned through practice, repetition and experience, encompasses physical capabilities development, coordination enhancement and behavioral traits related to performance gain.

Motor learning is considered as the relatively permanent process and result of several experiences to obtain, stabilize or perform movements and motor skills and for their use and retention. Motor coordination is one of the basic motor skills to play handball, a sport with many simple and complex technical activities with or without a ball. Wajeeh Mahjoub (2000, 34) described it as "donning of the internal functional and motor complexity with the surrounding environment to secure an intended purpose. Handball is a game that is extremely challenging as it demands high levels of work ethic, synchronization, and focus when developing your foundation skills. The inside coordination and the sequence of these motor skills makes it necessary to use a systematic scientific method in learning them. Motor co-ordination: is important in sports. It is defined as the ability to carry out movements with accuracy this grace and at a minimum of effort than individual adjustments, (Al-Hadithi, 2017, p.45). Jumping throws in handball are not only sports techniques, which demand motor skills and great perception. The influence of motor coordination on this ability has not yet been documented in second year students, which justified the present study. The significance of this study is that --Shooting accuracy in particular and some skills in general- learning basic handball skills needs good enough motor coordination, especially for this learner group.

Shooting is one of the basic skills in handball that involves a great degree of precision and motor control. 'Relating to their experience as handball lecturers (in the college), they realized that some students, despite their power and speed ability, were facing difficulty in achieving a shooting accuracy at the qualitative level. This leads to the question of what might be driving this, including motor coordination. Therefore, the research problem of this study is to determine the link between motor coordination and shot accuracy in high jump shots among handball second-year students.

Research Objectives

1. Identify motor coordination levels among second-year students.
2. Measure the accuracy of jump shooting in handball among second-year students.
3. Determine the relationship between motor coordination and jump shooting accuracy.

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Research Hypotheses

There is a statistically significant correlation between motor coordination and jump shooting accuracy.

Research Areas

Human Field: Second-year students, College of Physical Education and Sports Sciences, University of Baghdad.

Time Field: Second semester of the academic year 2024–2025.

Place Field: Indoor handball court, College of Physical Education and Sports Sciences – University of Baghdad.

Methodology

The descriptive correlational method was due to its suitability in determining the relationship between two variables: motor coordination as the independent variable and jump shooting accuracy as the dependent variable among second-year students.

Research Sample

The research population consisted of 579 second-year students (428 males, 151 females). The sample was selected intentionally from Section (W), totaling 42 students: 30 students for the main experiment (5) for the pilot study (7) excluded (6 for poor attendance, 1 due to previous failure).

Devices and Tools

Handball court, Handball goal, 8 handballs, Stopwatch, 7 markers, Fox whistle, Tape measure, Four 60×60 cm scoring squares, Colored tape, Laptop (Dell)

The tests used

1. Motor Coordination Test: Numbered Circles Test

(Mohammed Sobhi Hassanein, 1995)

Purpose: Measure eye–foot coordination

Tools: 8 circles (diameter 60 cm) numbered from 1 to 8

Performance: The student jumps with both feet from circle 1 to 8 sequentially at maximum speed.

Score: Time taken to complete the sequence.

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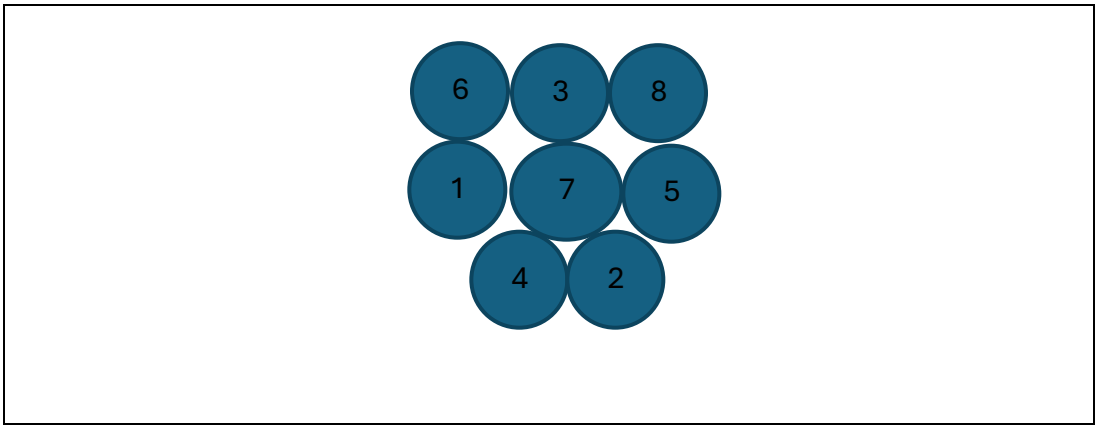

Figure1. *Measuring the coordination between the legs and eyes*

2. Jump Shooting Accuracy Test (Dhiaa Al-Khayyat & Abdulkarim Qasim, 1988)
Purpose: To measure shooting accuracy from a high jump.
Tools: Handball court, handball goal, four (4) 60x60 cm metal shooting accuracy squares, seven (7) stakes, eight (8) regulation handballs, whistle.
Performance: The student stands behind the first stake, positioned vertically towards the goal (1 meter apart). Upon receiving the command, the student dribbles between 7 markers, jumps over a 40 cm barrier, and shoots at four scoring squares placed at the goal's corners. Starting with the top right corner, then the top left corner, then the bottom right corner, and finally the bottom left corner, this is repeated twice.
Test Administration: A recorder calls out the students' names and records the results.
Scoring: Two points are awarded when the ball enters any square, one point when it touches the boundaries of the square, and zero if the ball is outside the square. The total score represents the overall accuracy score for the laboratory, which ranges between (0-16) points, as shown in Figure (2).

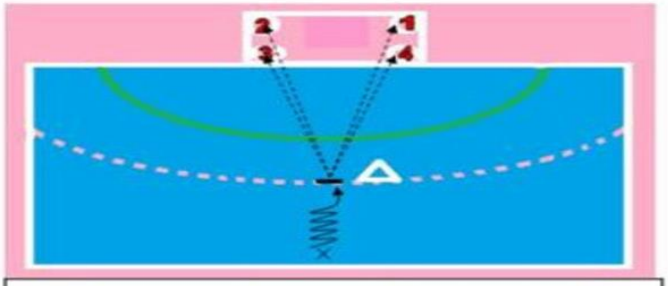

Figure 2. *Demonstrates the test of shooting accuracy from a high jump*

The Pilot Study

It was conducted on Tuesday, March 4, 2025, at 10:30 AM in the indoor handball hall at the College of Physical Education and Sports Sciences. The pilot study sample consisted of five

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(5) second-year students from section (W), who were not part of the main research sample. The purpose of the study was to identify any obstacles or challenges the researchers might encounter during their work. This included determining the time required to conduct the research tests (physical and skill-based), assessing the safety and suitability of the equipment and tools used, and confirming the competence and efficiency of the support team and training them on how to administer the tests.

Main Experiment

The main test was conducted on Tuesday, March 11, 2025, at 10:30 AM in the indoor handball hall at the College of Physical Education and Sports Sciences. The sample included (30) students from the second stage, section (W), the research sample, where the sample performed a full body warm-up, and the tests were explained and presented by the two researchers. Afterward, the motor coordination test was carried out for all members of the sample, then the accuracy test of high jump shooting was applied to all members of the sample as well. After that, the raw data were recorded and statistically processed.Post-tests

After completing the main experiment, the post-tests for the research sample were conducted on (15/9/2025) to achieve accurate results, as "one of the most important ways to determine quality is to conduct tests to ensure the validity of the training program" (Lazem, 2005, p.156). The same procedures in terms of time, place, and tools used were adopted, and all conditions surrounding the pre-tests were prepared to avoid variables that could affect the results of the post-tests.

Statistical Methods

The Statistical Package for the Social Sciences (SPSS) was used to perform the statistical analyses and display the results using the following formulas: Mean, Standard deviation, and Pearson correlation coefficient.

Results

Table 1. *Shows The Correlation Between Motor Coordination And Shooting Accuracy*

Tests	Mean	SD	r-value	p-value	Significance
Motor Coordination	11.76	0.95	0.85	0.0001	Sig
Shooting Accuracy	10.47	1.79			

Degrees of freedom = 28, significance level = 0.05

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Discussion

Results The time of testing on the motor test of coordination and accuracy of the jump shot in handball were inversely strongly significantly correlated (-0.85). This finding suggests that the fast you pass the coordination test (i.e., the better is your motor coordination), the more accurate will be in shooting performance.

Motor control is a basic constituent that forms the successful performance of complex skills in sports, like handball jump shot, where specific fine neuromuscular coordination between upper and lower extremities is needed.

Abdul Hamid Shawqi (2004) described coordination as "the efficiency to perform an organized movement efficiently by himself, and it is a factor that has a great impact on the player's performance of complex movements in terms of speed and accuracy or reducing the power required for their execution immediately, especially in sports that are able to turn into separate parties using several body parts ". This is in line with the findings of the present study where students with high coordination had more accurate shooting values. The biological relationship between motor coordination and the quality of skill performance is associated with the efficiency of nervous intruction in organizing motor commands. As Nasr al-Din Azzam (2010) argued, “Neuromuscular control of fine motor skills is a critical factor in the performance of high accuracy-requiring skills such as shooting in team sports. It's why the study found such a striking correlation: The faster players performed on their coordination test, the more accurate they were in shooting.

The findings of this study are in agreement with:

1. The study by Hussein et al. (2017) concerning handball, reported a strong relationship of some offensive skills with motor coordination, namely that applied to shooting and passing.
2. A direct link was also evident between motor coordination and accurate shooting by middle school handball students in the research by Ali Al-Jubouri.(2015)

Abdul-Hadi Mansour’s study (2019) revealed that motor coordination is one of the strongest predictive factors to success in performing accurate skills in team sports, mainly under pressure or movement conditions.

In essence, findings support that motor coordination has an influential effect for providing the fundamental base of developing difficult skills as jump shooting. Well, Better coordination results in better shooting.

Conclusions

1. There is a significant negative correlation between motor coordination time and shot accuracy. The time that the motor coordination test was performed in (the less time spent on time), and arrow of jumping shot accuracy is increased in order to perform quickly.

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2. Motor coordination is an immediate inducer, which contributes to the accuracy of jump shot in handball and also gives a clue about the association between fundamental motor abilities and technical skill.
3. Highly motor coordinated spanning students can execute the fine and intricate movements necessary for jump shooting.
4. Proof of the beneficial effect of developing motor coordination is readily apparent in accuracy related skill performance, particularly for demanding skills which require intense concentration and neuromuscular control.

Recommendations

1. Prioritize the motor coordination training in handball skills in university teaching and practice courses, particularly for beginners learning basic handball techniques.
2. Include motor coordination tests as a component of the student´s abilities performance assessment and relate outcomes to an improvement strategy or learning plan.
3. Include certain exercises approximately enhancing motor coordination (working sessions, balance dimensional and perception kinesthetic) in lessons/teaching units (technical as well as physical).
4. Try to find exercises that include motor control and precision so they improve the performance in skills like shooting when jumping.
5.Replicate such studies for other determinants (e.g., balance, agility, and visual–motor perception) that may influence skill performance in handball.

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