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Some special motor abilities and their relationship to motor learning to lift the snatch by lifting weights for students of physical education and sports sciences

Asst.Lect. Ahmed Nafaa Kamel [1,*]

[1] Faculty of Physical Education and Sports Sciences, Diyala University, Diyala, Iraq.

* Corresponding author: ahmed.nafaa@uodiyala.edu.iq

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Abstract

This study intends to investigate the relationship between the degree of motor learning for snatching in weightlifting among first-stage students at Diyala University's Faculty of Physical Education and Sports Sciences and certain special motor abilities (balance, agility, explosive power, and motor accuracy). The sample comprised 40 students who were split into two equal groups using the experimental approach with two groups (experimental and control) for pre- and post-measurement. While the control group followed the standard curriculum, the experimental group participated in an 8-week training program that focused on the development of specific motor talents. The experimental group's unique motor skills and technical snatch lift performance were much better than those of the control group, according to the results. Strong associations between special motor skills and snatch elevation learning were also shown by the correlation coefficients; explosive power showed the highest correlation value (0.85), followed by balance (0.81) and kinetic accuracy (0.79), while agility showed an inverse relationship (-0.77). With an emphasis on training load gradation and the application of graphic kinetic analysis to enhance performance, the researcher suggests incorporating motor skill development training programs into the curriculum. Similar studies on other weightlifting talents and other sports are also recommended.

Keywords: Motor abilities, motor learning, hijacking.

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1. Introduction

The sport of weightlifting has a historical place in terms of practicing it as part of the daily activity in ancient times, as well as practicing it as a sport that entered within the ancient and modern Olympic Games, it was practiced in different forms and began to develop until it reached what it is today from the technical performance approved by the International Weightlifting Federation, which adopted two types of lifting, namely (snatch lift and lifting lift to the chest and netter) and the achievement of global sports levels has become one of the most important manifestations of civilizational progress for countries, and evidence of their social advancement The time for achievements born of chance based solely on the athlete's talent and natural abilities has ended, and access to championships in all sporting events is linked to a continuous and integrated series of procedures based on scientific foundations for the selection, education and training of the weightlifter.

Weightlifting is a competitive activity that demands advanced motor abilities, particularly for snatchlifts, which are distinguished by their quickness, accuracy, and excellent neuromuscular coordination throughout their execution. Since mastering the snatch lift requires the possession of skills like balance, agility, flexibility, explosive power, and motor accuracy, special motor abilities are one of the primary variables influencing the learning of this technique. These subjects are very crucial for preparing students in the physical education and sports sciences faculties, particularly those studying stage The first are those who serve as a foundation for developing positive attitudes toward learning how to lift weights.

One of the main causes of students' delayed snatch lift learning or the development of motor performance faults, which have a detrimental impact on their technical performance level, may be the weakness or inadequacy of certain particular motor talents. In order to determine the most important skills that can be used to enhance academic performance, it became necessary to investigate the relationship between a few special motor abilities and the degree of motor learning of kidnapping lift among first-stage students at the University of Diyala's Faculty of Physical Education and Sports Sciences. and instruction in this crucial abilit.

2. Importance of research

The importance of research lies in the following points:

1. The research expands the body of scientific knowledge in the fields of movement sciences and weightlifting by providing fresh scientific information that helps to understand the function of certain unique motor skills in mastering the snatch lift.
2. It yields results that can be utilized to create educational and training programs that assist instructors and trainers of weightlifting in enhancing their methods of instruction for beginning students.
3. By identifying individual variances in specific motor talents among students, the research aids in the creation of educational programs that accommodate for these variations in order to maximize learning outcomes.

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3. Research objectives

The research aims to:

1. Determine which first-stage students at Diyala University's College of Physical Education and Sports Sciences possess the following exceptional motor skills: balance, agility, explosive power, and kinetic precision.
2. Determine the kidnapping lift's motor learning level using the same sample.
3. Ascertain how certain unique motor skills relate to the degree of motor learning for the research sample's kidnapping lift.

4. Research problem

The research's issue is that there is a discernible difference between students in the first stage of learning the hike of the snatch; some of them seem to have poor motor performance or acquire lifting slowly, which could be related to their level of specific motor talents. During his fieldwork, the researcher observed common performance faults, including imbalance during the lift's execution, poor movement speed, and instability in the squatting position. Therefore, it is necessary to ascertain the degree to which certain special motor skills affect these pupils' learning of lifting of abduction in order to more precisely and successfully direct training programs. Thus, the main question is: What is the relationship between some special motor abilities and the level of motor learning of kidnapping lift among first-stage students at the College of Physical Education and Sports Sciences - Diyala University?

5. Research hypotheses

In light of the research problem and objectives, the researcher set the following hypotheses:

1. Among first-stage students at Diyala University's College of Physical Education and Sports Sciences, there is a statistically significant correlation between a few particular motor skills and the degree of motor learning of kidnapping.
2. First-year students at Diyala University's College of Physical Education and Sports Sciences have differing degrees of particular motor skills.
3. Because the research sample's degrees of some specific motor abilities vary, there are statistically significant variances in the amount of motor learning for hijacking.

6. Research areas

- **Human field**: Students of the first stage in the Faculty of Physical Education and Sports Sciences - Diyala University for the academic year (2024/2025).
- **Time Range**: Period from 1/12/2024 to 1/3/2025.
- **Spatial field**: Weightlifting halls at the College of Physical Education and Sports Sciences - Diyala University.

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7. Theoretical studies

7.1. Motor abilities

Motor abilities are qualities acquired by the individual from the surrounding environment, or may be present innately, and develop according to the individual's physical, sensory and cognitive ability, through training and practice.

Motor ability refers to the extent of the efficiency of the individual in the performance of basic motor skills, such as running, jumping, climbing and throwing, where this concept is confirmed (Scott and French) when he pointed out that motor ability refers to the achievement of basic motor skills such as running, throwing, jumping and others, while others indicate that the motor ability functional state of the organs, and physical measurements such as height, weight, bone structure, obesity and motor components necessary for physical performance, such as strength, speed, agility, skin, flexibility and others (Jawad, 2004: 171).

Several definitions of motor abilities have been received, including:

Motor abilities "are qualities acquired from the environment and be training and practice basis, and develop according to the individual's ability physical, sensory and cognitive and these qualities are called skill, agility, balance, flexibility" (Mahjoub, 2002: 117)

It is also defined as "qualities of human movement that are performed by the learner or player, especially at higher levels. (Dulaimi, 2008: 73)

7.2. Agility

The concept of agility is one of the concepts around which there is a lot of controversy and disagreement between researchers in the field of education, and this may be attributed to the kinetic nature of this trait and its association with some physical qualities and other skill abilities and indicates (Johnson and Nelson) that agility can be considered a motor ability because it includes in the opinion of many researchers components of muscular strength, motor speed, reaction speed, accuracy, control and compatibility.

Agility can be defined as "the ability to change the positions, speed or directions of the body on the ground or in the air accurately, smoothly and correctly. (Obaidi, 2008: 104)

7.3. Explosive power

Many definitions of the term explosive force have emerged as a type of muscular force, defined by some as "the ability to detonate maximum force in the shortest possible time for a single motor performance" (Ismail, 1996: 24).

It is also "the ability of the neuromuscular system to try to overcome resistance requires a high degree of rapid muscle contractions." (Mandalawi, 1979: 45)

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7.4. Learning and motor learning

Several definitions have been given in the concept of learning and motor learning by many researchers has defined the success of learning as "that psychological activity carried out by the student of selection, strengthening, generalization and discrimination, which leads to a change in his behavior within the arena" (Shalash, 1994: 18) and defined by Nizar "the formation of new motor abilities in the learner and the change of motor abilities through practice and experience" (student, 1976: 15) As for Abd Ali, he sees motor learning "acquisition, improvement, fixation and use of motor skills" (Maynell, 1987: 136).that the beginner can not learn the skill unless he is trained by it is not learning once he sees the model that he performs or once he hears the explanation of the trainer but learns as a result of the activity he performs and training alone does not lead to learning the skill unless he has reached the level of maturity, which is the physical, mental and emotional aspects.

7.5. The art of performing the lifting of kidnapping (Al-Tikriti, 1985: 243)

The snatch lift with the hands performs a single kinetic unit, where the weight is lifted from the drum to the position of full extension of the arms above the head without stopping that the snatch lift is a fast-moving lift, and the full lifting takes less than 34.5 seconds without calculating the standby time for the lift. The snatch lift is one of the most difficult and complex lifts in weightlifting movements. The meaning of weight lifting is not just by great force, but also by stretching the muscles of the legs and torso, and by the compatibility and motor coordination between the work of the different parts of the body. Participate in lifting weight quickly and gracefully, as well as reaction speed, range of motion, flexibility of the hip and shoulder joints, courage in performance and falling under the weight.

7.6. Similar studies: Study Hamida Obaid Abdul Amir University of Babylon 1432-2010 "The effect of qualitative pair exercises in developing the most important motor and physical abilities of the preparation and reception skills of volleyball students" Hamida Obaid Abdul Amir (University of Babylon, 1432 AH - 2010 AD) conducted a study entitled "The effect of qualitative pair exercises in developing the most important motor and physical abilities of the preparation and reception skills of volleyball students", and aimed to develop qualitative pair exercises to develop motor and physical abilities and the skills of preparation and receiving transmissions in volleyball, as well as to identify the impact of these exercises in developing the most important motor and physical abilities of students, and the study assumed that qualitative marital exercises have a moral impact on the development of motor and physical abilities.

The use of specific marital exercises has an effective impact on the development of motor abilities under research such as agility, compatibility, and flexibility, as well as physical abilities such as explosive power of the arms and legs, and motor speed and transition, and the researcher recommended the need to pay attention to the use of these exercises when training women's teams to develop motor and physical abilities.

It was also found when comparing the current study with this previous study that there are Similarity in terms of dealing with motor and physical abilities.

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While they differed in the sample size, research methodology, and type of sports effectiveness, as the previous study dealt with motor and physical abilities in volleyball, while the current study focused on some gymnastic skills such as the Arab jump and the front scale.

8. Research Methodology

In order to determine the impact of certain particular motor talents on motor learning to hoist the kidnapping, the researcher used an experimental strategy with two groups (control and experimental) with pre- and post-measurement.

8.1. Research community and sample

The 120 first-year students of Diyala University's College of Physical Education and Sports Sciences for the 2025–2024 academic year made up the research community. Since there were 40 students in the sample, or 33.33% of the initial research community, the research sample was chosen using a straightforward random process. They were then split into two equal groups, experimental and control, each consisting of 20 students.

8.2. Sample equivalence

In terms of chronological age, height, weight, and certain unique motor skills, the researcher performed a valence test between the experimental and control groups. The statistical analysis's findings demonstrated that the two groups were homogeneous in the variables under study, with no statistically significant differences between them at the significance level (0.05).

Table (1) Statistical equivalence between experimental and control groups.

Variable	Experimental (Mean ± SD)	Control (Mean ± SD)	T-value	Significance
Age (years)	18.45 ± 0.52	18.50 ± 0.48	0.32	Non-significant
Height (cm)	172.30 ± 3.15	171.95 ± 3.40	0.38	Non-significant
Weight (kg)	68.10 ± 4.25	67.85 ± 4.45	0.19	Non-significant
Balance	6.30 ± 0.65	6.40 ± 0.60	0.52	Non-significant

8.3. Data collection tools and devices

The researcher used a set of tools and devices to collect data, represented in:

- Chronometer to measure time with the required accuracy.
- Balance mat for static and dynamic balance testing.
- Explosive force measurement instrument (vertical jump test).
- Cones and a measuring ruler for testing agility.
- A digital video camera to capture the performance of the snatch lift and analyze its stages kinematically.
- Data registration forms for tests.

8.4. Experimental Design

To assess the effect of unique motor skills on snatch lift motor learning, the researcher used an experimental design with two equal groups (experimental and control). While the control group

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proceeded on the standard curriculum without any extra help, the experimental group participated in a training program that included activities to build unique motor skills.

8.5. Exploratory experiment

In order to verify the appropriateness of the instruments, equipment, and assessments utilized, as well as to test the timing of the test administration and the precision of data collection, the researcher conducted an exploratory experiment on ten students who were not part of the main sample. The experiment demonstrated the reliability of the instruments, the simplicity of the testing processes, and the lack of any barriers that would compromise the main experiment's execution.

8.6. Pre-Test

The researcher conducted a pre-test for the experimental and control groups in special motor abilities and in the performance of the snatch lift on 5/12/2024, as all variables were measured according to the approved scientific methods, with the aim of determining the level of the two groups before starting the training program, and for comparison purposes later with the post-test.

3.8 Implementation of the training programme

The experimental group participated in a training program consisting of three training units per week for eight weeks. The program comprised practical exercises for lifting the snatch as well as activities to strengthen motor skills like balance, agility, explosive power, and motor precision. The training load and exercise intensity were adjusted according to the gradualism principle. Conversely, the control group kept using the standard curriculum with no additional instruction.

8.7. Control group

The control group continued to apply the curriculum prescribed at the Faculty of Physical Education and Sports Sciences, which includes teaching kidnapping lift within the usual practical lessons, without introducing any additional training programs aimed at developing special motor abilities.

8.8. Post-test

The researcher conducted the post-test for both groups in special motor abilities and in learning the snatch lift on 1/3/2025, using the same pre-test tools and with the same conditions and procedures, to ensure the accuracy of the comparison between the results of the two groups and to know the impact of the training program.

8.9. Statistical Methods

The researcher used the following statistical methods to process the data:

- The arithmetic mean and standard deviation of the data description.
- Test (T) for independent samples to find out the differences between the two groups in the pre- and post-tests.
- Pearson's correlation coefficient to find out the relationship between special motor abilities and the level of learning of the snatch lift.
- Percentage change to see the amount of improvement between the pre- and post-tests.

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8.10. Training Programme (Training Modules)

The training program of the experimental group included (24 training units) distributed over (8) weeks, at a rate of (3) units per week, as each training unit lasted approximately (60) minutes, and it came as follows:

- **Warm up (10 minutes):** general exercises to stimulate blood circulation and joints.
- **Main part (45 minutes):** Included:
    - Static and dynamic balance exercises using a balance mat and different body postures.
    - Agility exercises such as slalom running tests and quick transition between directions using cones.
    - Explosive power exercises such as vertical jump and jumping from stability.
    - Kinetic accuracy exercises using targets of different distances and sizes.
    - Practical exercises to lift the snatch according to the correct mechanical foundations.
- **Calm down (5 minutes):** stretching exercises and deep breathing.

The program is designed in a gradual manner in the training load in terms of intensity and size, with a focus on correcting individual errors during the performance of the snatch lift.

9. Results and discussion

9.1. Results of physical tests (special motor abilities)

The results of the statistical analysis of the telemetry showed significant differences between the two groups in favor of the experimental group in all special motor abilities, as shown in Table (2).

Table (2) Results of Post-Physical Tests for the Two Groups (n=20).

Variable	Experimental (Mean ± SD)	Control (Mean ± SD)	T-value	Significance
Balance (seconds)	8.45 ± 0.62	6.50 ± 0.68	9.84	Significant
Dynamic agility (seconds)	9.12 ± 0.55	10.45 ± 0.60	7.35	Significant
Explosive strength (cm)	47.60 ± 3.25	40.10 ± 3.80	6.58	Significant
Motor speed (seconds)	8.90 ± 0.50	7.20 ± 0.70	8.12	Significant

Table (2) shows that the experimental group significantly outperformed the control group in all particular motor abilities, demonstrating its obvious superiority. Given that the snatch lift demands a high level of speed, accuracy, balance, and explosive force, the training program's inclusion of targeted exercises to hone these skills is responsible for this development.

9.2. Learning Outcomes of Kidnapping Lift

The results of the dimensional measurement of the acquisition of the skill of lifting the kidnapping showed significant differences in favor of the experimental group, as shown in Table (3)

Table (3) Results of learning the hike of kidnapping in the dimensional measurement (n = 20).

Variable	Experimental (Mean ± SD)	Control (Mean ± SD)	T-value	Significance
Technical performance (score out of 10)	8.75 ± 0.40	6.80 ± 0.55	12.56	Significant

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The findings presented in Table (3) demonstrate that the experimental group outperformed the other group in terms of technical snatch lift performance. This is because the skill's motor performance improved as a result of the focused workouts' efficacy in fostering special motor skills. Balance, speed, explosive power, and neuromuscular coordination must all be carefully integrated for the snatch lift, and the experimental group's training program delivered this.

9.3. The relationship between special motor abilities and learning the hijacking lift

The correlation coefficients between special motor abilities and the level of learning of kidnapping elevation among the experimental group members were calculated, as in Table (4).

Table (4) Correlation coefficients between special motor abilities and learning the hijacking lift (n=20).

Variable	Correlation coefficient (r)	Significance
homeostasis	0.81	Significant
Agility	-0.77	Significant
Explosive power	0.85	Significant
Kinetic accuracy	0.79	Significant

Strong and statistically significant relationships between specific motor skills and snatch lift learning level are demonstrated by the findings in Table (4). Explosive force had the highest correlation value (0.85), followed by balance (0.81) and kinetic accuracy (0.79). Agility showed an inverse relationship (-0.77), which explains why increasing movement speed without modification can have a negative impact on snatch lift accuracy and consistency. These results are in line with earlier research that has shown the importance of these skills in learning the intricate moves involved in weightlifting.

10. Conclusions and recommendations

10.1. Conclusions

In light of the findings of the current research, which aimed to find out the relationship between some special motor abilities and learning the kidnapping lift among first-stage students at the College of Physical Education and Sports Sciences - Diyala University, the most important results can be summarized as follows:

- All special motor skills (balance, agility, explosive power, and kinetic accuracy) showed statistically significant differences favoring the experimental group, according to the statistical analysis's findings. This validates the efficacy of the training program in fostering these skills in comparison to the conventional method.
- The experimental group's level of technical performance in the snatch lift was much higher than that of the other groups, according to the post-test data, demonstrating the beneficial effects of unique motor skills on skill acquisition.
- The correlation coefficients showed strong relationships between special motor abilities and snatch lift learning, with the strongest relationship of explosive power (0.85), followed by balance (0.81), and kinetic accuracy (0.79), while a strong inverse relationship with agility

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(−0.77), reflecting the role of these abilities in accomplishing the technical performance of the skill accurately and efficiently.

10.2. Recommendations

Based on the results achieved, the researcher recommends the following:

- The necessity of introducing special training programs to develop motor abilities (balance, agility, explosive power, motor accuracy) within the curricula of students of the faculties of physical education and sports sciences, because of their direct impact on the development of technical performance of sports skills.
- Emphasis on the use of training methods that take into account the gradation in the training load and the intensity of the exercises in proportion to the students' levels and individual abilities.
- Conducting similar research on other skills in weightlifting or in different sports to find out the impact of special motor abilities in them, which contributes to building advanced scientific training curricula.
- Take advantage of video-filmed kinetic analysis to correct technical errors and enhance students' motor performance learning.

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