



The effect of educational exercises for dual tasks on the development of some motor abilities and the test of the motor chain (with the ball tool) among students of the Faculty of Physical Education and Sports Sciences

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#### Abstract :

This research aims to study the impact of educational exercises dedicated to dual tasks, in the development of some motor abilities and performance of the series test, using the ball instrument in female students of the Faculty of Physical Education and Sports Sciences. The research problem started by observing that there is a noticeable disparity that tends to weaken among students when implementing the motor chain. This weakness may be attributed to a lack of coordination between the movements and the accurate use of the ball, whether it is in the coordination between the hands or between the hands and feet, in addition to the poor ability to control the ball while performing complex movements. The researcher relied on the experimental approach to apply these exercises to two groups of students. The experimental group was characterized by the use of educational exercises for dual tasks, focusing on improving motor coordination and the ability to control the ball while performing complex movements. By incorporating more than one motor task into one exercise, these exercises helped students develop multiple skills such as hand-to-toe





coordination, accuracy of ball use, and the ability to control the ball on the go and react to different situations. These exercises provided additional challenges for the students, which helped them improve motor performance in general and increase the level of movement control, especially in situations that require high coordination between different members. The results concluded that educational exercises dedicated to dual tasks proved effective in developing the motor abilities of the students, which enhances their performance in tests in the field of physical education and sports sciences.

Keywords: Dual Tasks. Developing motor capacities Ball Chain

#### 1-1 Definition of research

#### 1-Introduction and importance of research

Rhythmic gymnastics is one of the sports disciplines that combine strength, flexibility, kinetic flow and kinetic rhythm in the implementation of artistic movements. Perhaps one of the most practiced skills is the kinetic chain using the ball. It raises the suspense factor during its uses and needs a lot of accuracy, especially when performing throwing and receiving skills. It is also one of the most difficult tools for female students faculties of physical education and of the sports science in gymnastics lessons. It is an integrated series of sequential movements in a smooth and organized manner. The ball tool in this test is used to enhance coordination between movements and to achieve better performance. Thetest usually includes a series of exercises that require students to perform specific movements with flexibility and accuracy, such as throwing, picking up the ball, and passing. This series requires some motor abilities such as compatibility, balance, and agility, which play a crucial role in achieving optimal performance from the basic foundations that contribute to achieving



outstanding performance in rhythmic gymnastics. By improving these abilities, students can implement the movement chain in the ball more effectively, within the lesson, which enhances the quality of performance and contributes to achieving success in the performance of the chain. The ability to coordinate different movements consistently and effectively to achieve optimal performance in sports activity. In rhythmic gymnastics, motor compatibility requires the coordination of movements between hands, feet, and the entire body with the use of a ball. Maintaining physical stability while performing movements, whether during stability or movement. In rhythmic gymnastics, balance requires the ability to precisely control the body while performing complex movements using the ball, such as jumps or rotations. As well as the ability to move quickly between different movements and interact effectively with the ball. Double exercise is an effective tool in learning the ball's motor chain, as it contributes to improving motor coordination, controlling the ball, and enhancing strength and flexibility. By integrating these exercises into learning programs, the importance of researching the use of educational exercises for dual tasks in developing some motor abilities and testing the motor chain (with the ball tool) in students and enabling them to improve their performance and learn the motor chain faster and more effectively. Through the application of double-targeted exercises regularly and monitoring progress, which includes the implementation of two simultaneous or consecutive movements using the ball to achieve the best results in learning

## Research problem:

The movement chain with the ball is one of the basic skills in the lessons of rhythmic gymnastics, and it is one of the most difficult skills facing students. Through the work of



the researcher in this field, she noticed that there is a disparity that tends to the degree of weakness among students when carrying out his tests. The reason may be poor coordination between movements and accurate use of the ball, coordination between hands or between hands and feet, as well as the ability to control the ball during complex movements, which makes it slow to learn and develop. This situation attracted the attention of the researcher and tried to find practical solutions through the use of educational exercises for double tasks in the basic lessons, which are exercises that involve the implementation of two synchronous or consecutive movements using the ball in order to develop compatibility, motor balance and agility, and improve coordination between movements and its reflection on the implementation of the movement chain with the ball through the practice of double exercises. Students gain the ability to coordinate their movements better, which helps in learning the movement chain faster.

## . Research objectives:

- Identifying educational exercises for dual tasks and some motor abilities and testing the motor chain (with the ball tool)
- Identifying the impact of educational exercises for dual tasks on some motor abilities and testing the motor chain (with the ball tool) among students of the Faculty of Physical Education and Sports Sciences

## 1-4 Research Hypotheses





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- There are statistically significant differences between the pre and post measurements in some motor abilities and the motor chain test (with the ball tool) and in favor of the post measurement.
- There are statistically significant differences between the experimental group and the control group in favor of the experimental group

#### 1-5 Research Areas

1-5-1 Time Range: Duration from 10/3/2024 to 24/4/2024

1-5-2 Spatial Scope:Baghdad

1-5-3 Human field: (24) female students – University of Baghdad

The current study has adopted the experimental approach in the research in order to suit the requirements of the study and its conduct. The selection of the curriculum is one of the most important steps that result in the success of the research in order to achieve the objectives.

The research community is defined as " all the vocabulary of the phenomenon that the researcher is studying, or all the individuals, people or things that are the subject of the research problem." The research community was intentionally identified (female students of the Faculty of Physical Education and Sports Sciences for Girls) and the sample was selected from female students and then the sample was divided into two experimental groups: (12) female students from Division (A) and (12) female students from Division (B) of the research. The sample was randomly divided.



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## 2-3 Means of information collection, data collection and tools: -

- A. Arabic Sources and References
- Interviews
- Internet scanning
- Test and Measuring Instruments

#### 2–4 Devices andtools used in the research:

- Rhythmic gymnastic balls (12).
- Small rubber balls (24) balls
- 12 poles
- Auditorium
- A medical scale with a ruler to measure height and weight (peas personae) (Italian—made).
- Dell Laptop

## 1. Motion chain test (with ball tool):

The researcher relied on the movement chain test (with the ball tool) adopted in the Gymnastics lessons. The movement chain test included five basic skills:

- Circular swing in the ball with one arm and two arms at the front and side levels. Rotation of the ball in the form of a number &. The rotation in front of the body above the head and linking it with the rotation of the body.
- Ball clip of walking and jumping Cat jump Scissor jump Intersection step Front
   balance Rear balance –



- Throwing and receiving the ball with one arm and two arms from standing. Lifting the ball by making an arch over the head and receiving the ball with the other hand. Front triple step (Front waltz)
- The ball rotates with one hand and two hands and is around its axis .Rotation around the wrist .Rotate around the waist.
- Rolling the ball with one arm and two arms, on the chest and on the back. Rolling the
   ball from the chest to the back behind and vice versa from the back to the chest.

The assessment form for the motor series, consisting of the five skills shown in Appendix (1), consisting of (15) grades, was adopted as the subject school evaluates the grades of the students. After completing the educational units.

## 2- Testing numbered circuits

- Objective of the test: Measuring the compatibility between the eyes and the legs
- Used tools: An hour, eight circles are drawn on the ground, each with a diameter of (60) centimeters, the circles are numbered

Performance: The student stands inside the first circle, and at the start signal, jump, feet together to the other circle (2) and then to the other number (3) and so on.......To the Circuit No. (8), this is done quickly

- Registration: The student registers a time from the moment of commencement to the moment of arrival in the last circle
- آ 3– Bass Modified Dynamic Balance Test (B. et.al، 2000، صفحة 19)
- Purpose of the test: measuring moving equilibrium





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-Description of the performance of the test: The laboratory stands at one—foot at the starting point and then begins to jump to the first mark with its other—foot to try to balance and prove in a position on the metatarsal with a maximum of 5 seconds after proving the laboratory moves to the second mark with its foot. Thus, the transfer of thefoot, from one sign, to another in the landing, as well as the resting, on the foot with the observation that the metatarsals are on the sign and the test is supposed to be within 50 seconds, but when any error occurs in the instability, the first descent over the sign decreases the time of 5 seconds, so the more time, the better the balance

**Recording:**Records the time taken by the laboratory from the beginning of the test to the end line

#### 4- Multidirectional Running Test<sup>1</sup>

Objective of the test: Measuring agility

The tools are five poles, and a timer (clock) distributes the poles (5) in the form of a plus sign (+) with dimensions of (5) m from the center for each side





**Recording:** The time is calculated in seconds from giving the start signal, until the teacher reaches the finish line

## 2.6 The Exploratory Experiment

The researcher conducted the exploratory experiment on Sunday 10-3-2024 at nine o'clock on a sample of (3 female students) other than the research sample, and on the internal hall in order to train the assistant team on the tests in an attempt to stay away from the errors that may face the research experiment as much as possible. Identify all the disadvantages and obstacles .

## 2-7 Steps of Conducting Research Main Experiment

#### 2-7-1 Pre-tests

The researcher conducted pre-tests on the research sample on Tuesday 12/3/202 4 and on the internal hall of the Faculty of Physical Education and Sports Sciences for Girls – University of Baghdad by conducting some anthropometric measurement. These measurements included (age in years), (weight in kilograms), (height in centimeters) and then tests. The sequence of tests was as follows:

- 1-Kinematic Compatibility Test
- 2-Dynamic Balance Test
- 3-Kinematic agility test
- 4-Ball Chain Test

#### 2-7-2 Normal Distribution

Table No. (1)





Shows the torsion coefficient values calculated for the tests to prove the normal distribution of the research sample

Modulus of torsion	w	Mediator	You will	t of measure	Measurements
0.221	.868	162.5	163	cm	Length
0.235	3.588	62.5	714	kg	Weight
.699	0.685	20.5	20.60	Year	Age
999.	0.212	11.35	392	Second	Kinematic Compatibility Test
.504	0.129	700	714	Second	Dynamic balance
.032	195	16.60	16.61	Second	Kinetic agility
441	0.503	3	3.428	Degree	Ball Chain

# 2-7-3 Takaful between the research , experimental, and control groups

Table (2)

Explains the symbiosis fortwo groups. Experimental , and Control Group

Skill	perimen	tal group	Control group		value	nificance	⁄loral
OKIII	ds <sup>.</sup>	stponed	ds <sup>·</sup>	stponed	value	level	noral
Kinematic	11.335	0.190	11.45	0.224	1/452	.158	Random



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Compatibility Test							
Dynamic balance	700	.135	728	0.126	0.576	570.	Random
Kinetic agility	16.600	0.203	621	0.192	0.286	0.777	Random
Ball Chain	3.428	0.513	3.500	518	0.366	0.717	Random

 $\bullet$  Below the significance level (0.05) and the degree of freedom 10.

## 2-7-4 The main experiment (educational exercises for dual tasks)

- I started applying the exercises from Wednesday 13/3/ 2024 untilMonday 22/4/2024 in the lessons of rhythmic gymnastics. The researcher adopted educational exercises for dual tasks , designing integrated exercises that integrate multiple tasks: exercises that combine several tasks must be designed simultaneously. Exercises can involve running and jumping together to develop the ability to quickly shift between tasks. Integrate multiple tasks and design exercises that combine several tasks at once. For example, exercises can involve running and jumping together to develop the ability to quickly shift between tasks.
- Executed the educational exercises for the double tasks of the experimental group
- It contained (6) weeks and two units per week,
- Total number of units: 12 units.
- Weekly training days: Monday and Wednesday
- The time of educational exercises is between (25-30) minutes. In the main section of the experimental group training





- The exercises aim to improve motor coordination by choosing exercises that focus on improving coordination between the hands and eyes, and the ability to control the ball while maintaining body balance. Developing speed and accuracy bycoordinating different body movements in an integrated and harmonious manner
- Exercises contribute to enhancing mental abilities and the ability to make decisions quickly and accurately
- Harmonic exercises are smoother and more efficient
- Basic exercises: Repetitions range from 8 to 12 repetitions per exercise.
- Complex exercises: Repetitions range from 4 to 8 repetitions per exercise.
- Rest between repetitions: Rest between repetitions should be between 30 to 60 seconds, depending on the intensity of the exercise.
- Basic Exercises: 2 to 3 exercises in each module
- Complex Exercises: 2 to 3 exercises in each module.
- Take care to diversify the exercises to prevent excessive adaptation of the body to a certain type of movement, which contributes to improving overall performance
  - Educational exercises for dual tasks contribute to enhancing basic motor abilities such as compatibility, balance, agility and motor accuracy.
  - Dual task exercises include a range of overlapping traits such as balance, sense of rhythm,
     agility, ability to relax voluntary muscles, and motor coordination
  - Appendix (1) shows some examples of exercises for dual tasks





- The control group followed the traditional exercises

## 3-7 - 4 Post-tests

2- The researcher conducted post-tests on the research sample on Wednesday, 24/4/2024 and on the internal hall of the Faculty of Physical Education and Sports Sciences for Girls – University of Baghdad in the same way and procedures in pre-tests.

#### 3-8 Statistical means

The data were processed to achieve the research objectives and hypotheses using statistical means. The researcher used the SPSS statistical bag and the statistical laws:

- 3-Presentation, analysis and evaluation of results: -
- 3-1 Presentation and analysis of the results of pre-tests for the members of the two groups: -

In light of what the researcher obtained from the result of the analysis and the statistical treatments followed, and with regard to achieving the second objective of the study, the results were shown as follows: –

## Table (3)

Shows the values of the arithmetic mean, the standard deviation, and the statistical calculated and tabular value(T) between the dimensional and pre-dimensional measurements of the members of the control and experimental groups





Variables	SPG	Pre	Pre		Post		BRB.	Т	Error	Significance
		ou will	W	u will	W			Calculated	Level	
Perceptual motor	perimental	11.335	0.190	921	0.171	.414	.086	932	0.000	Legal
coordination	egulator	11.45	0.224	.292	0.177	.157	0.085	.904	0.000	Legal
/namic balance	perimental	700	.135	.135	.253	564.	0.230	9.150	0.000	Legal
	egulator	728	0.126	485	0.203	0.242	0.128	0.078*	0.000	Legal
Kinetic	perimental	16.600	0.203	.121	.118	478	0.097	366	0.000	Legal
agility	egulator	621	0.192	435	0.133	0.185	.086	8.039	0.000	Legal
Kinetic Chain	perimental	3.428	0.513	11.50	0.854	8.071	1.206	.028	0.000	Legal
Ball	egulator	3.500	518	357	633**	857	770.	28,44	0.00	Legal

 $\clubsuit$  Below the significance level (0.05) and the degree of freedom 11.

# 3-2Presentation and analysis of the results of post-test differences between the two experimental groups and the control group: -

In light of what the researcher obtained from the result of the analysis and the statistical treatments followed, and with regard to achieving the second objective of the study, the results were shown as follows: –





Shows the mean and standard deviation values and the value of(T) calculated between the experimental groups and the control group

Skill	perimental group		Control group		value	level	nificance	
	ds <sup>·</sup>	stponed	ds <sup>·</sup>	stponed	value	Error	, miounioc	
Kinematic Compatibility Test	921	0.171	.292	0.177	627	0.00	Legal	
Dynamic balance	.135	.253	485	0.203	4.035	0.00	Legal	
Kinetic agility	.121	.118	435	0.133	576	0.00	Legal	
Ball Chain	11.50	0.854	357	633**	532	0.00	Legal	

 $\diamond$  Below the significance level (0.05) and the degree of freedom 22.

## 3-3 Discussing the results of post-test differences between the two experimental groups and the control group :

By reviewing the results of Table (4), we showed that there are significant differences in the statistical significance of the results of the post-tests between the two experimental groups and the control group in motor abilities (motor compatibility, dynamic balance and motor agility) and the motor chain of the ball in the rhythmic gymnastics and in favor of the experimental group. Motor abilities are related to the ability of students to motor accuracy of motor performance and control and control of the muscles of players in order to take the required motor paths. The researcher attributes these results to the educational exercises for dual tasks ,which worked to enhance basic motor abilities such as compatibility, balance, agility and motor accuracy. It is an effective tool in developing many of the necessary motor



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skills in rhythmic gymnastics. By stimulating the nervous system, developing motor and cognitive abilities, and improving overall artistic performance, which enables students to perform complex movements efficiently and with high coordination. Through the distribution of exercises and the use of educational systems and tools and changing their forms and quality in line with the goal of theskill for . Accurate motor performance, which is reflected in the development of the experimental group effectively by integrating sensory and mental tasks with physical training, which helps to achieve better skill performance. It is one of the tools that can be used to promote excellence and success. The kinetic chain of the ball requires a high degree of kinesthetic perception in terms of movement in space or in terms of estimating the strength necessary for performance and even the sense of time. It forms elements that are linked to the accuracy of performance, and contributes significantly to improving the motor compatibility of the rhythmic gymnastics learners. Motor compatibility is the ability to perform multiple movements in careful coordination between different body organs. By integrating multiple learning tasks into a single exercise, learners 'ability to control and coordinate multiple movements can be enhanced, reflecting positively on overall performance. This is consistent with what ( Mohamed Lotfy ) pointed out that "the motor experience that is generated by the development of muscular-motor sensation is of great importance, as the degree of performance improves based on this experience. The greater this experience, the greater the (طه، 1982 طه، طهر) degree of performance." Dual tasks are integrated by directing attention to multiple elements, such as focusing on a specific point in the track or maintaining a certain rhythm while running. Double exercises contribute to enhancing the ability of learners to maintain balance while performing complex movements. practicing tasks that require balance while performing simultaneous or consecutive By





movements , it is possible to improve the control of the balance of the learners under different conditions andthis helpsthem to improve their ability to balance and motor organization. This enhances the ability to process sensory and visual information during the application of the skill, and here (Qasim Hassan Hussein ) confirms that "motor skills are significant attributes of performance effectiveness(مصفحة 1990، "Dual task exercises also significantly develop the sensory abilities of female learners. It improves focus and attention, thereby enhancing the ability to make quick and accurate decisions during performance. Dual exercises require learners to move quickly , balance, and accurately at the same time, which enhances motor agility. Agility is the ability to change direction and movement quickly and efficiently, a key skill in rhythmic gymnastics where the performance of different movements requires a constant change in directions and speeds. , which directly contributes to improving the ball's mobility and the results were logical

#### Conclusion and recommendations

#### 4.1 Conclusion

- 1. The research showed the effectiveness of educational exercises for dual tasks in developing some of the students' motor abilities
- The use of educational exercises for dual tasks develops motor compatibility among students. The use of educational exercises for dual tasks develops motor balance among students of the Faculty of Physical Education and Sports Sciences
- The use of educational exercises for dual tasks develops motor agility among students of the Faculty of Physical Education and Sports Sciences





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4. The use of educational exercises for dual tasks develops the motor chain of the ball in the rhythmic gymnastics lessons of the students of the Faculty of Physical Education and Sports Sciences

#### 4.2 Recommendations

- 1. The need to use educational exercises for double tasks in the lessons of rhythmic gymnastics for students
- 2. The need to design educational programs based on transforming scientific theory into practical application
- Emphasize the placement of exercises Educational exercises for dual tasks in educational programs
- 4. The researcher suggests conducting similar studies

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## Illustrates the evaluation form

Student: Final Grade:

Degree of skill	Transactions	Skill



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Wagging the arm in front and throwing the ball high in	Ball Weighted
front of the body and receiving it	Figure No. ( )
Rotation of the ball in the form of a number & in front of	4°
the body above the head with the body rotating a full	4
cycle	
With the scissor jump, medicine the ball on the ground	Ball dribbling
and receive it	4°
With the cat jumping, medicine the ball on the ground	
and receiving it	
The front balance with the ball chucks 3 times on the	
ground and receiving it	
Throwing and receiving the ball with one arm and two	Throwing and receiving the
arms from standing	ball
Throwing the ball over the head in the form of an arc and	(2 marks).
receiving it with the other hand	
With body rotation 3 ball rotations around the waist	Rotation of the ball
Rotation of the ball around the wrist of the hand	(2 marks).
Roll the ball on the chest and then behind the back	Rolling the ball
	3°
Final Grade	

## Annex (2)

## Samples of Double Exercises

1. Ball Throw with Reverse Rotation and Reciprocal Jump





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Description: Start in an upright position, throw the ball up with one hand, then make a reverse rotation (180 degrees back), during the rotation, make a reciprocal jump (jump on one foot and then the other). After spinning, pick up the ball with the other hand before it touches the ground.

Benefit: This exercise enhances complex motor coordination, developing agility and the ability to control both the body and the ball.

2. Backward Ball Pass with Body Rotation and Front Jump

Description: Start by passing the ball behind your back with one hand, and at the same moment make a full body rotation (360 degrees) followed by a front jump with a half full rotation (180 degrees). After the jump, pick up the ball with your other hand.

Benefit: This exercise develops balance and precision in movement on the go, while enhancing the ability to quickly transition between movements.

3. Ball Throw with Circle Jump and Pivoting Feet

Description: Begin in an upright position, throw the ball up, and then jump circularly (360 degrees) with the feet rotating around the axis of the body in two different directions. After the jump, try to catch the ball before it touches the ground.

Benefit: Exercise enhances body control during circular motion and develops general motor coordination, while improving the ability to control the ball during jumping and spinning.

4. Ball Throw with Side Rotation and Cross Jump



Description: Throw the ball up, then make a side rotation  $(360^{\circ})$  followed by a cross jump (feet cross in the air). After spinning and jumping, pick up the ball with one hand and continue spinning.

Benefit: This exercise develops the ability to balance and control complex movements that require rapid changes in directions.

#### 5. Double Spin Reverse Jump Ball Pass

Description: Start by passing the ball from one hand to another behind your back, then do a double rotation (720 degrees) followed by a reverse jump (backwards jump) catching the ball with one hand during the jump.

Benefit: This exercise enhances strength and agility, and develops the ability to control the ball while performing multiple and sequential movements.

#### 6. Ball Throw with Full Wrap Jump and Head Rotation

Description: Throw the ball up with one hand, then make a full wrap jump  $(360^{\circ})$  followed by a quick head rotation  $(180^{\circ})$  rotation in the opposite direction). Next, pick up the ball with your other hand.

Benefit: This exercise develops careful coordination between the upper and lower body movements, while improving ball control while balancing on the head.

## 7. Alternating Jump and Body Rotation Ball Pass

Description: Start by passing the ball in your hands in front of your body, then make a full body rotation (360 degrees) followed by an alternating jump (jumping on one foot





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and then the other in a row). After the jump, try to catch the ball with one hand while maintaining balance.

Benefit: Exercise enhances the ability to coordinate complex and control multiple and simultaneous movements, while improving the ability to maintain balance during movement.

#### 8. Rear Scroll with Triple Jump and Pelvic Rotation

Description: Pass the ball behind your back, then jump three jumps in a row ( alternating feet), and in the third jump rotate the pelvis at a speed of 360 degrees and catch the ball with one hand.

Benefit: This exercise develops strength and flexibility, and enhances the ability to execute complex and precise movements at the same time.