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Barre exercises combined with gyrokinesis affected the flexibility of the trunk and some motor abilities of first-stage female students

Rusl Shallan Ghannam
University of Wasit / College of Physical Education and Sports Sciences
ruslshallan@gmail.com

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ABSTRACT

The research aimed to prepare Barre exercises (which focuses on strength, stability, and rectitude) combined withgyrokinesis (which focuses on spinal fluidity and rotational movements). The research also aimed to identify the effect of these exercises on torso flexibility and motor abilities (motor balance, agility, and coordination) in female students of the first stage, and the researcher adopted the experimental method by designing the two equal groups (experimental and control). The research sample consisted of (10) female students from the Faculty of Physical Education and Sport Sciences at Wasit University. The training program lasted for (9) weeks with (18) training units, at the rate of two units per week. The low- and medium-intensity interval training method (50%-75%) was used, with a focus on motor accuracy and maximum range of motion, and statistical treatments showed that there were statistically significant differences ($p \leq 0.05$) between the pre- and post-tests of the experimental group in all variables and in favor of the post-test. The results also showed the superiority of the experimental group over the control group in the post-tests of trunk flexibility, motor balance, agility and coordination, and the most important conclusions of the study were that the combination of Barre exercises and gyrokinesis proved to be highly effective in treating "motor sclerosis" and increasing the elasticity of the tissues surrounding the spine. It provides a stable anchor that helps control the body's center of gravity, while gyrokinesis movements have improved the aerodynamic alignment between the torso and limbs.

Introduction to the Research:

1-1 Introduction and Importance of the Research:

Fitness is the cornerstone of the sports preparation system, it is not just an end in itself, but it is the primary means that enables an individual to respond to the demands of motor performance efficiently. Physical fitness consists of several vital elements such as flexibility, strength, balance, agility and coordination, each of which plays an essential role in improving the quality of movement.) of the joints, while balance and compatibility ensure smooth and precise performance. Any deficiency in one of these elements is directly reflected on general motor performance, leading to an increase in wasted physical effort and the appearance of stiffness in movement, especially in groups that are going through transitional stages in physical building, such as university students.

In light of the constant pursuit of developing these elements, recent trends have emerged in training sciences that rely on the integration of qualitative training methods aimed at the comprehensiveness of the effect, most notably the Barre exercises, which focus on muscular strength , stability and straightness, and the Gyrokinesis method, which focuses on spinal flexibility and fluid rotational movements. The integration of these two methods represents an advanced approach to target torso flexibility and motor abilities such as balance, coordination, and agility. Elements that give students the ability to perform motor tasks with agility and stability, reducing the chances of stress or injury.

The importance of the research is highlighted in adopting an innovative training approach based on the integrative integration of Barre and Gyrokinesis exercises, as this integration is not just a quantitative addition, but a mechanical and kinetic necessity to achieve the optimal physical response in female students, and the importance is the functional integration between stability and fluidity.

1-2 Research Problem:

Through the field experience and the close follow-up of the researcher as a teacher at the Faculty of Physical Education and Sport Sciences for the performance of the first stage students, a scientific observation emerged represented in the existence of a clear weakness in the level of structural flexibility, especially the torso area, which is embodied in the appearance of a state of motor stiffness and their lack of the ability to link the movements of the limbs and the trunk path smoothly, and the problem does not stop at the limits of flexibility only, but extends to include the loss of the balance required to control the center

of gravity of the body, especially in movements that require Hence, the urgent need to employ Barre exercises because its method is based on strength and straightness combined with rotational and fluid gyrokinesis movements as an innovative training solution that aims to address this deficiency and develop these abilities in a comprehensive and integrated manner that ensures the improvement of the motor level of female students.

1-3 Research Objectives:

- Preparing Barre exercises combined with gyrokinesis that are specifically designed to suit the physical characteristics of the first stage students.
- Identifying the Effect of Exercise on Trunk Flexibility in Female Students of the First Stage.
- Identifying the Effect of Exercise on the Development of Some Motor Abilities in Female Students of the First Stage.

1-5 Research hypothesis:

- Barre exercises combined with gyrokinesis have a positive effect on developing trunk flexibility and some motor abilities.
- There are differences in the effect between the experimental and control groups in trunk flexibility and some motor abilities (motor coordination, agility, balance) and in favor of the post-test.

1-6 Research Areas:

1-6-1 **Human Field:** First Stage Students of the Faculty of Physical Education and Sport Sciences.

1-5-2 **Temporal Domain**: Period from 15/2/2025 to 1/7/2025

1-6-2 **Spatial Field** : The closed hall of the Faculty of Physical Education and Sport Sciences.

2 – Research methodology and field procedures:

2-1 Research Methodology:

The researcher adopted the experimental method, and chose the design of the two equal groups (experimental and control) with pre- and post-tests, to suit the nature of the research problem and its objectives.

2-2 Research Population and Sample:

The researcher identified the research population, which is the (52) female students of the first stage distributed over two divisions (A-B).

As for the research sample, the researcher selected the researcher by simple random method, as the students of the (A) division (26) were female students, then the researcher excluded (6) female students for the purposes of the first survey experiment and the remaining number of 20 female students who were divided into two experimental and control groups of (10) female students each, where the sample percentage reached (38.4%) of the total research population.

To ensure the homogeneity of the research sample, the researcher verified the normal distribution in the variables (mass - height - chronological age - training age) using the torsion coefficient, where the values reached (-0.735, 0.723, 0.782, and 0.642) respectively, and these values fall within the standard range (±1), which indicates that the distribution of the sample data is close to the moderate curve.

The researcher verified the parity of the two groups (experimental and control) in the pre-tests using the (T-test) test for the independent samples to ensure the parity of the two groups and start with one starting point, and Table (1) indicates that there are no statistically significant differences between the two groups, where all the values of the significance level were greater than (0.05), which is a statistical indicator of the parity of the members of the two groups.

Table (1)
Shows the parity of the two research groups

Type of indication	Confidence level	Calculated value (T)	Control Group		Experimental Group		Unit of Measurement	Variables	t
			on	Going to	on	Going to			
Non-D	0.745	0.356	2.299	7.201	2.356	7.150	Poison	Trunk flexibility	4
Non-D	0.652	4.258	3.351	22.879	3.237	22.687	Tha	Agility	5
Non-D	0.682	0.417	2.157	11.034	2.237	11.235	Tha	Motor coordination (two legs – eyes)	6
Non-D	0.665	0.455	0.021	0.208	0.022	0.210	%	Motor balance	7

Significant at the confidence level (0.05) if the error level is ≤ (0.05).

2-3 Means of Information Collection, Devices and Tools Used in the Research:

2.3.1 Means of Information Collection:

- Scientific observation.
- Objective tests and measures.
- The Internet.
- Arabic sources.

2.3.2 Devices used in the research:

- Multi-Function Digital Sport Stopwatch, (2)
- Digital smart weighing scale.
- MFT challenge disc
- Budget laptop from Lenovo/HP/Acer.

2.3.3 Tools used in the research:

Tape measure (10) m.

Horizontal Kickstand (Barre).

Wooden chairs without a stool for gyrokinesis

Mathematical Rugs (Mats)

Cones (20).

Whistle number (2).

2.4 Field Research Procedures:

2.4.1 Determining the tests of (trunk flexibility) and motor abilities (motor coordination, agility, and motor balance):

By reviewing the sources and scientific researches , and based on the researcher's experience and in accordance with the age group of the sample , the tests were determined, which are:

First: Trunk Flexibility Test (Hassanein, 1995)

Test Name: Sit and Reach Test.

Purpose of the test: Measure the flexibility of the muscles of the lower back and hamstrings.

Instruments used: Included flexibility test box (or a Swedish bench with a measured ruler attached so that it starts from scratch and heads towards the student, and the 23 cm or 15 inch mark is aligned with the level of the feet according to the protocol used).

Procedures for performing the test: The student sits for a long time (the feet are fully extended) with the soles of the feet facing the box, and the knees are completely extended and touching the ground, the student places the palm on top of the other (identical), then begins to extend the torso and arms forward slowly and quietly to the maximum possible distance above the listed ruler and without bending the knees during the stretch, and the maximum point must be reached and held steady for at least (2 seconds) to ensure the accuracy of the measurement.

Recording: Record the distance reached by the tip of the middle finger (in centimeters).

Second: Numbered Circles Test (Hassanein, 1995)

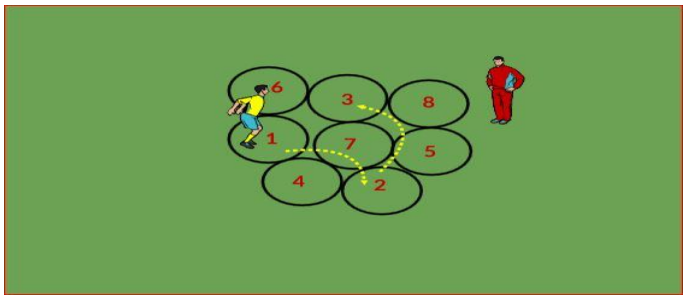
Purpose of the test: Measure the motor coordination between the eyes and legs, as well as agility and responsiveness.

Tools used: Stopwatch, flat floor with (8) circles drawn on it, each circle diameter (60 cm), circles numbered from (1 to 8) non-consecutively (distributed in a way that requires jumping and changing direction).

Procedures for taking the test: The student stands inside Circle No. (1) and at the start signal, the student jumps with both feet to Circle No. (2), then (3), and so on in numerical sequence until Circle No. (8) as quickly as possible.

Exam Conditions: The feet must land together inside each circle in the correct order of the numbers in case of a mistake in the sequence or landing outside the circle, the student must return to the previous circle and correct the path (while counting the time).

Registration: The time taken by the student from the moment of departure from Circle (1) to Circle (8) is calculated.



Shows the numbered circuit test for compatibility

Third: Moving Balance Test (Petranek, & Gatterer2014)

Test Name: Challenge Disc (Level 3).

Objective of the test: Measuring motor balance.

Tools: Challenge Disc, Laptop.

Method of Performance: The player stands on top of the challenge disc and faces the computer, two circles appear in each stage of level (3), and the player must enter the small circle (green) inside the large circle (red) by moving the disc through the feet, and with the help of looking at the computer screen, and the method of performance varies after each stage until it reaches stage (13), which is the last, although the time of each stage for moving balance is (20) seconds, fixed (10) seconds, and the rest time between stages is (7) seconds.

Registration: The device gives the value of the player's percentage of motor balance.

Number of attempts: One attempt is given to each player after making trial attempts to adapt to the requirements of the test, noting that the test time is (4.54) minutes.

Figure (2) Challenge Disc

Fourth: Test Name: Zig-Zag Run (Hassanein, 1995)

Purpose of the test: Measure general agility.

Tools: Stopwatch - Five cones - Blank area (4.85 meters) long and wide (3 meters).

Method of Performance: The student starts from behind the starting line next to the first funnel at the start signal, she runs fast in a zigzag path around the middle funnel, then the outer cones, Problem No. (8) in English or an alternating path that passes through all the cones and the student must not touch or skip the cones.

Registration: Calculates the time it takes for the student to complete the track, and the time is recorded to the nearest 0.1 seconds.

2.4.2 Exploratory Experiments:

2.4.2.1 First exploratory experiment

The researcher conducted a first exploratory experiment on a group of (6) female students from the research community and outside the sample of students, on Sunday (2/3/2025), and aimed to:

- Determine the exact amount of time required to perform the test.
- Evaluate the efficiency of the assistant team and determine the tasks of each individual to ensure the proper implementation of the test.
- Ensure the validity of the tools and devices used in the research.
- Verify the suitability of the selected tests for the research sample.
- Identify and address any obstacles or difficulties that may be encountered in the performance of the test prior to the implementation of the main experiment.
- Extracting the scientific parameters of the test.

2.4.2.2 Second Exploratory Experiment:

This experiment was conducted on the research sample, in which the researcher conducted a training module for the combined Barre exercises with Gyrokinesisthat was prepared for the main experiment on Tuesday, 4/3/2025, and aimed to find out the following:

Verify the suitability of the suggested exercises for the level of the research sample.

Ensure the validity and efficiency of the means and tools used in the implementation of the exercises.

Determine the appropriate maximum intensity for each of the exercises approved in the training program

2.4.3 Pre-Test:

The pre-tests of the research sample were conducted on Thursday (6/3/2025), the conditions associated with the test were controlled in terms of time, place, tools and aids, to ensure the provision of an appropriate testing environment as possible, while standardizing these conditions and reapplying them in the post-test, in order to obtain more accurate and objective results.

2.4.5 Main experience:

The main trial started on Sunday (9/3/2025) and ended on Thursday (8/5/2025).

The researcher has prepared barre exercises combined with gyrokinesis, which focus on strength, rectitude, and muscular endurance from fixed positions, and gyrokinesis, which focuses on the fluidity and rotational movements of the spine (ripple, rotation, bending), and this works to increase the elasticity of the deep muscles around the waist, in addition to what itprovides. Barre exercises from a fixed base (backrest) to train the body to control the center of gravity of the body while lifting the limbs to develop motor abilities (motor balance, agility, coordination) and torso flexibility.

- The researcher used the method of low and medium intensity interval training (50%-75%) with a focus on specific intensity (motor accuracy and maximum range of movement), where low intensity was started in the first two weeks to focus on the technique and then gradually raise the intensity.
- The number of training units amounted to (18) training units distributed over (9) weeks per week, two training units (Sunday, Thursday) for each group, as one of the units was implemented within the scheduled scientific lecture, while the second unit was implemented outside the official schedule and in coordination with the sample members, taking into account the unification of time and the number of units between the experimental and control groups.

2.4.6 Post-Test:

The post-tests were conducted on Sunday (11/5/2025), and the researcher was keen to provide the same conditions that were available when the pre-tests were carried out.

2.5 Statistical Methods:

SPSS was used to obtain the results of the following laws:

Mean of Arithmetic, Standard Deviation, Mean, Torsion Coefficient, T-Test for Correlated Samples, T-Test for Samples Independent.

3 - Presentation and discussion of the results:

3-1 Presenting and analyzing the results of the test of trunk flexibility and motor abilities (compatibility, agility, and motor balance) in the pre- and post-tests of the experimental group and discussing them.

Table (2)

Shows the arithmetic media, standard deviations, and the calculated t-value between the results of the pre- and post-tests of the trunk flexibility and motor abilities of the experimental group.

Type of indication	Confidence level	Calculated value (T)	Post-testing		Pre-test		Unit of Measurement	Variables	t
			on	Going to	on	Going to			
D	0.000	3.493	2.111	9.359	2.356	7.150	Poison	Trunk flexibility	1
D	0.000	3.587	2.896	20.132	3.237	22.687	Tha	Agility	2
D	0.000	3.840	1.987	9.896	2.237	11.235	Tha	Motor coordination (two legs – eyes)	3
D	0.000	3.794	0.021	0.232	0.022	0.210	%	Motor balance	4

(*) Significant at the significance level (0.05) if the error level is ≤ or = (0.05).

3-2 Presenting and analyzing the results of the trunk flexibility and motor abilities test of the control group for the pre- and post-tests and discussing them.

Table (3)

Shows the arithmetic media, standard deviations, and the calculated t-value between the results of the pre- and post-tests of the trunk flexibility and motor abilities of the control group.

Type of indication	Confidence level	Calculated value (T)	Post-testing		Pre-test		Unit of Measurement	Variables	t
			on	Going to	on	Going to			
D	0.019	2.869	2.023	8.459	2.299	7.201	Poison	Trunk flexibility	1
D	0.029	2.424	2.798	21.721	3.351	22.879	Tha	Agility	4
D	0.034	2.532	2.142	10.603	2.157	11.034	Tha	Motor coordination (two legs – eyes)	3
D	0.011	3.191	0.019	0.221	0.021	0.208	%	Motor balance	4

Significant at the confidence level (0.05) if the error level is ≤ (0.05).

3-3 Presentation and analysis of the results of the trunk flexibility and motor abilities test in the post-tests of the experimental andcontrol groups

Table (4)

Shows the arithmetic medians, standard deviations , the calculated t-value, and the result of the differences between the experimental and control research groups to test trunk flexibility and motor abilities

Type of indication	Confidence level	Calculated value (T)	Control Group		Experimental Group		Unit of Measurement	Variables	t
			on	Going to	on	Going to			
D	0.002	2.946	2.023	8.459	2.111	9.359	Poison	Trunk flexibility	1
D	0.000	3.426	2.798	21.721	2.896	20.132	Tha	Agility	2
D	0.000	3.547	2.142	10.603	1.987	9.896	Tha	Motor coordination (two legs – eyes)	3
D	0.015	2.726	0.019	0.221	0.021	0.232	%	Motor balance	4

(*) Significant at the confidence level (0.05) if the error level is ≤ or = (0.05).

Discussion of the results:

The results of Table (2) showed a statistically significant improvement in all the variables studied in the experimental group after applying the combined training program between (Barre) and (Gyrokinesis) exercises over a period of nine weeks at the rate of two training units per week, and the results of Table (3) showed that the control group that continued its usual traditional exercises also achieved a significant improvement, but it was the lowest level and the least significant in all variables, and this disparity was conclusively confirmed in the results of Table (4) which revealed Dimensional comparison between the two groups for significant statistical differences in favor of the experimental group in all the variables studied.

The experimental group's superiority in the trunk flexibility and agility variables is attributed to the dynamic and steady extension of the spine and pelvic muscles across a wide range of motion, coupled with fast, multi-directional kinetic movements that require rapid and precise body posture, while Gyrokinesis complements this effect through its circular, wavy and spiral movements inspired by yoga, dance, and tai chi, which work to release the muscle fascia and strengthen the elasticity of the connective tissues surrounding the trunk, as well as lifting Sensorimotor awareness level and reduced neural response time. These results support the findings of the study of Krasova and her colleagues conducted on (35) women divided between an experimental group that practiced Barre exercises and a control group that practiced dance fitness, where the experimental group achieved a statistically significant improvement ($p<0.05$-0.001) in physical fitness indicators, including flexibility, while the control group's indicators did not reach the level of statistical significance despite a positive trend (Krasova et al., 2023). In the same context, the Parhonlakan and Masodsai study applied to (30) female employees whose experimental group was trained in Barre exercises three times a week for eight weeks, proved a statistically significant improvement ($p<0.05$) in the endurance and strength indices of the muscles of the lower limbs and trunk that are organically associated with the development of functional agility (Parhonlakan & Masodsai, 2024).

The superiority of the experimental group in the motor coordination variables (legs and eyes) and the motor balance variables is explained by the visual-motor nature inherent in the Barre exercises, which necessitate careful synchronization between vision and movement of the lower limbs in various and successive monolithic positions that activate the tripartite balance system represented by the vestibular system and the efficiency of the proprioceptive receptorsControlling the body's center of gravity while moving at the same time, while Gyrokinesis enhances these two variables together through its three-dimensional kinetic sequence that continuously trains proprioceptors in the axial and peripheral joints, and increases the sensitivity of the receptors of the feet and ankles, enhancing motor coordination accuracy and improving dynamic balance. Kim and Min's study proved that two units of gyrokinesis exercises per week for eight weeks resulted in a statistically significant improvement in dynamic balance in favor of the experimental group, attributing this to the fact that the Awakening of the senses stimulates the skin mechanoceptors, while the spinal motion trains the proprioceptors in the joints in an integrated manner (Kim & Min, 2024).

In summary, what distinguished the experimental group and explained its superiority over the control group, which also achieved moral improvement as a result of its traditional exercises, was the training synergy resulting from the integration of two complementary methods;Barre) provides precision, rhythm and muscular employment controlled by multi-directional motor patterns, and (Gyrokinesis(Complemented by the flow of spiral and undulating motion)Spinal Wave) and depth of physical awareness,

together they produce a much higher neuromuscular adaptive response than traditional exercise alone, as consistently demonstrated by the results of the three tables.

4. Conclusions and Recommendations:

4.1 Conclusions

1. The combination of Barre exercises with gyrokinesis has proven to be highly effective in treating "motor sclerosis" in first-stage students, as it contributed to transforming movement from a restricted form to full fluidity by releasing the joints of the spine.

2. Barre exercises play a pivotal role as a fixed anchor that helps students to precisely control the body's center of gravity, which has been directly reflected in the development of motor balance and agility compared to traditional methods.

4.2 Recommendations

1. Adopting the Barre and gyrokinesis exercises integrated into the physical fitness classes for female students, due to their high ability to improve the body and structural flexibility.

2. Relying on modern technical devices such as the MFT Challenge Disc in evaluating balance, to distance them from subjectivity in evaluation and provide accurate digital results that enhance the quality of scientific research.

3. The researcher recommends conducting similar studies on the effect of this combined program on other variables such as (bearing the muscular strength of the core muscles, or improving the level of attention and mental concentration) in different age groups.

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