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The effect of harmonic exercises on the development of movement of the arms and legs for the start moment at the low start (start) and the completion of running 100 m for female students

Ahlam Shaghati Mohsen
College of Physical Education and Sports Sciences / University of Baghdad
ahlam.mhsen@cop.uobaghdad.edu.iq

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Corresponding Author :

ahlam.mhsen@cop.uobaghdad.edu.iq

ABSTRACT

Compatibility is one of the physical abilities that once acquired by the athlete available to him the possibility of motor which is the product of mixing and collecting the components of the various physical fitness, and can not any athlete perform the required skills only if I represent you compatibility between the work of the nervous system on the one hand and the muscles working on the one hand and through the experience of the researcher noted in practical lessons the need to raise the level of the starting moment in the performance of running 100 m for the presence of poor compatibility to perform effectiveness. Therefore, the importance of the research was evident in the student's access to the level of development and improving the technique of the rapid start of running because of its importance in the joints and requirements of the 100-meter race through the development of the movement of the arms and legs and work on their compatibility and flow to achieve the best performance. The study aimed to prepare harmonic exercises to develop the movement of the arms and legs and agree on a sample of first-stage students. The researcher concluded the emergence of significant differences in the jump test of stability and achievement test to run (100 m), and the emergence of significant differences in the test (30 m).

Introduction and importance of research:

Sports is one of the most important forms of the human kinetic phenomenon that wins the organized competition to know the capabilities of the individual athlete in sports and its essence lies in obtaining the best result in sports competitions, so we find that sport depends mainly on the capabilities, abilities and physical and motor qualities that result from a good employment of the requirements of sports training.

Motor compatibility is one of the most important motor abilities that must be focused on in training since childhood, as the development of motor compatibility to a sufficient extent improves the motor and functional state of the individual in the performance of sports movements in the best way. Motor compatibility also depends on the integrity and accuracy of muscle and nerve function together in the performance of a particular work. Therefore, the development of compatibility in appropriate ways, including exercise, in light of the goals and duties contained in the education plans, leads to raising the ability to perform in all aspects of movement and skill. In a 100-meter race, the runner in the first meters needs high compatibility, especially at the beginning of the start, to achieve the least time. Turki points out that the higher the degree of skill performance, the higher the level of compatibility between the muscles and the improvement of the temporal and dynamic distribution of performance (70:5).

From the above, the researcher defines compatibility as the organization of motor performance and economy of effort through the flow of movement and that repetition in the learning process leads to the flow and compatibility of movement, which leads in turn to achieve the best result. And the fact that the researcher is a teacher of the arena and the field subject noticed during the practical lessons the need to raise the level of performance during the starting moment in the fast running, especially the incompatibility and synchronization of the movement of the arms with the two legs, so the researcher saw the use of appropriate harmonic exercises to develop the level of running performance in the belief that it helps to develop the movement of the arms and legs during the start and start moment and as a result of the completion of running 100 m. The importance of research in developing the movement of the arms and legs to improve the performance of the starting moment at the low start of the 100-meter run for female students by preparing harmonic exercises that serve effectiveness and performance to obtain the best achievement.

Search problem:

The high level of achievement of athletes and the achievement of records depended in one aspect on the significant increase in training methods of athletes, which prompted researchers and scientists to pay attention to studying the means of developing the level of achievement and visiting its effectiveness, and through the experience of the researcher found the need to raise the level of performance of the effectiveness of 100 m to the starting moment from the beginning, because there is a weakness in the compatibility of the movement of arms and legs among students,

which prompted the researcher to prepare harmonic exercises and use them to develop the movement of compatibility and smooth performance for the starting moment.

Research Objectives:

- Preparing harmonic exercises in developing the movement of the arms and legs to start from the low start.
- Knowing the effect of harmonic exercises in developing the achievement of running 100 m for female students

Research hypotheses:

- The existence of statistically significant differences between the pre- and post-tests of the experimental research sample group

Method and tools:

The researcher used the experimental method to suit it with the research method, where the research sample was selected from the students of the College of Physical Education and Sports Sciences / University of Baghdad for the academic year 2024-2025 from the students of the first stage, numbering (130) students representing the people of (A - B - C - D), (20) students were selected for the research sample representing (15.38%) of the original community. Failed students and players of clubs and national teams were excluded.

Where the appropriate tests form for the study was distributed to the experts from the competence of training, measurement, evaluation and athletics, Appendix (1), and the most important tests were identified and selected, including: -

First: Long jump test of stability (to measure explosive power)

Second: Running test (30 m) from the flying position (to measure the transitional speed)

Third: Achievement test running (100 m) from sitting (to measure achievement)

The researcher prepared the most important harmonic exercises for the study and appropriate to the capabilities and capabilities of the sample for the effectiveness of running (100 m) intended to improve and develop the movement of arms and legs harmonic to reach the best result of running (100 m) The exercises included some physical qualities (speed and strength), which is one of the most important requirements for this effectiveness, where the diversification and gradation in giving the exercises and applying them from easy to difficult because the sample is raw and easy to apply by the student.

Tests used in the research:

First: the wide jump test of stability (30:3).

- Purpose of the test: to measure the explosive power of the muscles of the legs.

- Tools: tape measure, convenient place free of obstacles.
- Performance specifications:
- The tester stands behind the starting line with his feet slightly apart.
- Swing the arms back with the knees bent and tilt forward slightly and then jump to the maximum possible distance forward by extending the knees and pushing them with the arms swinging forward.
- Recording: The distance to the furthest point recorded by the laboratory is calculated.

Second: Running test (30 m) from the flying position (319:7)

Purpose of the test: measurement of maximum transition speed

Test instruments: stopwatch - whistle, identification of (3) parallel lines The distance between the first and second (310) and the third (30 m), where the first line represents the starting place of standing, the second line represents the place of operation of the stopwatch and the third line is the finish line.

Performance Description: The tester stands behind the starting line of standing and when the whistle is heard the shooter begins to accelerate continuously in an attempt to reach the highest possible speed directly above the second line and continues to maintain this speed until passing the third line.

Registration: The laboratory is given only one attempt and the time taken by the laboratory is calculated from the moment of passage over the second line to the moment of chest entry to the laboratory above the finish line (third line).

Third: Running test (100 m) from sitting (32:1)

Purpose of the test: Measurement of achievement.

Test instruments: legal running field, whistle, stopwatch.

Performance Description: Each two testers stand on the starting line with the starting position seated. When the whistle is heard, you run at full speed to the end of the distance.

Recording: Time is recorded closer than 1/100th of a second.

Pre-tests:

Pre-tests were conducted for the research sample, which included a test (long jump from stability, running test (30 m) from the flying position, running achievement test) (100 m) from sitting), and during the morning period, and with the help of the work team (Appendix No. (2)).

Main experience:

The main experiment layer on the research sample in the morning period of the lecture, the arena and the field, where the harmonic exercises were applied Appendix (3) in the main section of the lecture for a period of (25-30 minutes) by two training units per week and for a period of four weeks and in a repetitive manner because the sample is a beginner The training unit included Appendix (4) (basic skills for the effectiveness of running 100 m, harmonic exercises, various beginnings, running and jumping) and in line with the capabilities of the physical sample, where the gradation was from easy to difficult by giving repetition of exercises And its diversity and performance and mentions the stamp that modern training is a stressful process for athletes and requires the performance of the skill or some exercises multiple times can lead to boredom so emphasizes the principle of diversification of exercises by referring to the type of skill any reliance on movements and exercises similar to performance and in a diverse way that allows the student to perform and repeat and successively in order to maintain the student's desire for training (546:6) ≫≪

Post-tests:

The researcher conducted the post-tests of the research sample in the field of the College of Physical Education and Sports Sciences / University of Baghdad / the arena and field track. In the morning and after the completion of the last training unit, the researcher was keen that all the conditions of the post-tests are similar to the conditions of the pre-tests to ensure the accuracy of the results.

Statistical methods:

The statistical bag (SPSS) was used to extract and process the results.

Presentation and discussion of results:

Table (1)

It shows the percentages of the experts' agreement, the value of the coefficient (Ka2), the percentage of the percentage, and the tests used in the research (the number of experts (15)).

Moral	Ka2	Percentage	Approving Experts	Percentage	Experts disagree	Variables / auditions	t
Moral	15	zero	zero	100%	15	Choosing a long jump from stability	1
Moral	11.26	6.66%	1	93.32%	14	Ran (30m) from flying position	2
Moral	15	zero	zero	100%	15	Running (100m) Achievement from sitting	3

Table (2)

Between the arithmetic means, standard deviations, the calculated value of (t) for the experimental and moral group, and the level of significance in the pre- and post-tests.

Moral	Sig	Calculated (t) value	Post-Test		Pre-Test		auditions	t
			Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean		
Moral	0.00	4.13	0.98	2.99	0.91	1.88	Long jump of stability	1
Moral	0.00	6.17	1.53	7.41	1.34	5.96	He ran 30m from flying mode	2
Moral	0.00	5.67	1.97	18.42	2.31	22.13	Running 100m Achievement from Sitting	3

Table (3)

Shows the difference in arithmetic means in the evolution rates of the experimental group used in the research.

Rate of development	Difference of arithmetic means	Tests	t
37.12%	**1.11**	Long jump of stability	**1**
19.56%	**1.45**	He ran 30m from flying mode	**2**
16.76%	**3.71**	Completion of running 100m	**3**

In Table (2) shows the results of the pre- and post-tests of the research sample in the long jump test of stability for the arithmetic mean, which amounted to (1.88) and a standard deviation of (0.91) in the pre-test and the arithmetic mean was (2.99) and a standard deviation (0.98) in the post-test.

The above table No. (1) indicates that the arithmetic means of the tests subject to the dimensional research have significant differences, which indicates the positive impact of harmonic exercises on performance. As the harmonic work between the

two legs and arms through harmonic exercises is the product of neuromuscular compatibility and Diab indicates that harmonic exercises in effective movements that depend on organized and coordinated work between the neuromuscular system, if it is good between the work of the two organs become harmonious movement and this is expressed in (neuromuscular compatibility). The individual feels empowered and able to perform well (4:40).≫≪

In Table (3), it was found that the difference between the pre- and post-tests in the long jump test of stability was (1.11), where the calculated value of (t) was (4.13). The difference is significant, which indicates the validity of the compatibility exercises applied by the students, which acquired the characteristic of motor speed and acceleration during the use of these exercises.

As for the running test (30 m), the results showed the significant differences, meaning that the harmonic exercises that were applied have contributed slightly to the development of some students in the speed formula, as well as that this trait needs a longer time to develop because there are individual differences between students. The researcher attributes this to the fact that the students are beginners, so the development fell on some of them.

As the development of speed, especially for a distance of (30 meters), needs more time and the legalization of training work. It also depends on other factors in the development of most of the general and special physical qualities throughout the curriculum period in line with the technical performance, as the increase in speed depends on several factors, including: the type of muscle fibers, neuromuscular compatibility, intrometric scales, reaction speed and the ability to work in the absence of oxygen, in addition to external factors that serve the athlete in this event and achieve his development (205:8)

As for the achievement test ran (100 m), the moral difference in the pre- and post-tests reached (0.178) and the value of (t) calculated (0.329), which indicates the significance of the differences ((The researcher attributes that the curriculum contains the harmonization of the arms and legs had a great impact on the exercises in increasing the development of this test for the research sample, especially being a beginner to its application)) as these exercises took an active role in improving the speed characteristic of students, which aimed to increase the efficiency of muscle work, giving the highest ability Its mechanism appeared by covering the distance in the post-test in a shorter time, and this is due to the researcher's opinion to the positive effect of harmonic exercises on the occurrence of adaptation in these muscles (43:1)

This development in the result of the test (100 m) as a result of harmonic exercises and their application by the sample in the best and best case as it contains a variety

of exercises, i.e. applied with the principle of diversity in motor implementation, as well as containing easy and difficult exercises in the training unit interspersed with complete rest and according to the physical ability of the sample, which facilitated the application process and optimal performance, and Al-Bahadli mentions ((One of the advantages of harmonic exercises is to train them within a short period (45 d) to avoid fatigue that should not occur when performing exercises. Compatibility as well as Diversity in its forms and giving well-known exercises for coordination in the movement, which helps in the development of the level (23:9)

Conclusions and recommendations

The researcher concluded through the results.

_ The significance of the differences between the pre- and post-tests showed the test (long jump) from the fixed position as well as the test (running the achievement of 100 m) from sitting

_ The appearance of significance in the results of the pre- and post-tests in the selection of (30 m run) from the flying position

_ The curriculum vocabulary of harmonic exercises has effectively contributed to the development of the movement of the arms and legs at the moment of departure, which contributed to the improvement and development of the achievement of (running 100 m).

The researcher recommends:

The researcher recommends the introduction of harmonic exercises in the curricula and study programs of university students in general, especially the faculties of physical education and sports sciences because of their great importance in improving the level of neuromuscular compatibility, which contributes to the performance of most sports events.

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Appendix (1)

The names of the experts from the competence of training, measurement, testing and athletics

Workplace	Jurisdiction	Name	t
College of Education and Sports Sciences / University of Baghdad	Count	Prof. Thaer Dawood	**1**
College of Education and Sports Sciences / University of Baghdad	Athletics Training	Prof. Haider Faeq	**2**
College of Education and Sports Sciences / University of Baghdad	Athletics Training	Prof. Dr. Ahmed Mohamed Ismail	**3**
College of Education and Sports Sciences / University of Baghdad	Athletics Training	Prof. Hamid Abdel Nabi	**4**
College of Education and Sports Sciences / University of Thi-Qar	Testing & Measurement	Assoc. Prof. Saif Ali	**5**
Iraqi Athletics Federation	Athletics Coach	Yousef Abd El , Rahman	**6**
Eagles University	Bayou Athletics	Prof. Sareeh Abdel Karim	**7**
Isra University	Athletics Training	Prof. Ahmed Naji Mahmoud	**8**
Ashur University	Athletics Training	Prof. Mahdi Kazem	**9**

University of Baghdad	Bayou Athletics	Prof. Ehab Dakhil	**10**
University of Baghdad	Duel Training	Prof. Abdul Karim Fadel	**11**
Maysan University	Testing & Measurement	Prof. Mustafa Abdel Zahra	**12**
University of Basrah	Testing & Measurement	Mustafa Abdulrahman Mohammed	**13**
Maysan Education	Testing & Measurement	Wissam Hamid Abdulredha	**14**
Baghdad / Rusafa Education	training	Assoc. Prof. Zainab Jouni	**15**

Appendix (2)

Names of the assistant team

Workplace	Jurisdiction	Name	t
College of Education and Sports Sciences / University of Baghdad	Athletics Coach	Eng. Mazen Hussein	**1**
College of Education and Sports Sciences / University of Baghdad	Training for athletics	Dr. Fatima Rahim	**2**
College of Education and Sports Sciences / University of Baghdad	Training for athletics	Eng. Ahmed Haitham	**3**
College of Education and Sports Sciences / University of Baghdad	Training for athletics	Eng. Raghad Ahmed	**4**

Appendix (3)

Harmonic exercises model for the research sample

1) Basic skills for 100m running

_ Starting from high start.
_ Starting from the semi-higher.
_ Various beginnings (from sitting, lying on the back, lying on the stomach).
_ Beginnings from different directions (right - left - front - back).
_ Starting from low start for a distance of (20 m-30 m).
_ Beginnings from the bird's position for a distance of (30 m-40 m-50 m-60 m).
_ Starts from the bird's position for a distance of (30m-50m) with a competition.
_ Running for a distance of (80 m-90 m) from the flying position.
_ Run at medium speed in a straight line from a high starting position.

_ Starting from a low starting position and grading at speed for a distance of (50 m).

_ Running with speed change (10 m), speed (10 m) semi-maximum, (10 m) maximum.

2) Strength exercises

_ Running in place by raising the knee high with the arms swinged (running movement).

_ Leaning against the wall and running in place with the torso tilted forward and the head raised.

_ Running over low boxes height (30 cm) for a distance of (10 meters).

_ Running over low barriers for a distance of (10 meters).

_ Regular running over straight lines after (10) lines and walking back.

_ Jumpers on the spot high.

Appendix (4)

Sample training unit with harmonic exercises

First Training Module

Half of the first training module (25-30 min)

Sample number: (20) students

Observations	Comfort	Totals	Exercise	Unit Sections
Emphasis on arm and leg movement	30 seconds	2	General warm-up -Raise a knee in place with the movement of the arms.	section Main – Explains the exercise – Students are divided into two groups of (10) students
Emphasis on the symmetry of arms and legs	30 seconds	2	-Raise a knee for a distance of 10 m with the movement of the arms.	
	1 min	2	-Running over low boxes for a distance of 10 m.	
Maintain the rhythm of movement	1 min	2	- Regular running over straight lines (10) lines and walking back.	
	1.5 min	2	- Normal running from high start to 30m	