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The Effectiveness of Special Exercises in Improving The Optimal Speed of The Approach Phase and Their Effect on The Distance of The Long Jump

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Abstract: The research aims to identify the effectiveness of special exercises in improving the optimal speed of the approach phase and their effect on the distance of the long jump among long jump athletes. The researcher used the experimental method with a pre-test and post-test design for one experimental group, due to its suitability for the nature of the research. The research sample was intentionally selected from long jump athletes, and their number reached (8) athletes, The researcher used a set of tests to measure the optimal speed of the approach phase, represented in the full approach run test (30 m), the 20 m flying speed test, step frequency in the last 10 m, the length of the last three steps, and the accuracy of rhythmic adjustment of the approach mark, in addition to measuring the digital level of the long jump ,The researcher applied a proposed training program using special exercises that lasted for 8 weeks at a rate of 3 training units per week. The results of the research showed the presence of statistically significant differences between the pre-test and post-test measurements of the experimental group in the tests of optimal speed of the approach phase and the digital level of the long jump in favor of the post-test measurement, The results also showed the presence of a positive statistically significant correlation between the improvement of the optimal speed of the approach phase and the improvement of the long jump distance. In light of these results, the researcher recommends the necessity of paying attention to the use of special exercises in training long jump athletes due to their positive effect in improving approach speed, developing technical performance, and increasing the digital level in the long jump.

Keywords: Optimal Speed, Approach Phase, Long Jump

Introduction

Track and field events are among the most important sports activities that contribute to the development of athletes' physical and motor abilities, as these events depend on the integrated interaction of several physical abilities such as speed, strength, and motor coordination. The long jump is considered one of the events that combine elements of speed, power, and technical precision, as it requires complex motor performance that begins with the approach phase, followed by take-off, flight, and landing. The integration between these phases influences the achievement of the best possible jumping distance.

Islam Mohamed Naji (2020) stated that the approach phase in the long jump represents the foundation upon which the remaining phases of technical performance are built. During this phase, the athlete seeks to gain the greatest possible horizontal speed while maintaining balance and motor control before reaching the take-off board. The more the athlete can reach an appropriate and controlled speed at the end of the approach, the more positively it is reflected in the take-off power and consequently the jump distance.(Naji, 2020: 63)

Saad Fathallah Al-Alam (2018) explained that optimal speed in the approach phase does not only mean reaching the maximum possible speed, but rather reaching a speed that can be technically controlled so that the athlete can perform the take-off step accurately and efficiently without losing balance. Therefore, developing optimal speed requires specialized training that takes into account the biomechanical characteristics of performance in the long jump. (Al-Alam, 2018: 28)

The concept of optimal velocity refers to the movement speed at which the highest muscular power is produced as a result of the optimal balance between force and speed according to the force–velocity relationship. Muscular power is the product of force and speed; therefore, maximum power is not achieved at maximum force or maximum speed, but at an intermediate value known as optimal velocity. This concept is widely used in explosive strength training, weightlifting, and athletics, especially within the methodology of velocity-based training.

Optimal speed in the approach phase is one of the fundamental factors affecting performance level in the long jump event, as this phase contributes to providing the athlete with the necessary horizontal velocity to achieve the best possible jump distance. Optimal speed does not simply mean reaching the maximum speed, but rather reaching an appropriate speed that can be technically controlled before the take-off board. This speed helps the athlete maintain balance and regulate the movement rhythm of the final steps, and also contributes to an effective transition from the approach phase to the take-off phase while minimizing the loss of horizontal velocity. Achieving optimal speed improves performance mechanics and increases the efficiency of force utilization during take-off. Therefore, coaches focus on developing it through specialized exercises that simulate the nature of long jump performance, due to their important role in improving athletes' performance achievements. (Linthorne, 2008: 96)

Lees (1993) indicated that approach speed contributes greatly to determining the distance achieved in the long jump, as the horizontal velocity generated during the approach forms the basis for converting part of it into vertical velocity during take-off. Therefore, coaches seek to develop approach speed while maintaining the accuracy of the approach steps before the take-off board.

Bompa (2009) stated that specialized exercises represent one of the most important training methods used to develop skill performance in various sports activities. These exercises aim to simulate the movement path of the actual performance, focusing on the working muscles and the motor characteristics associated with the sports skill. In light of scientific developments in sports training, it has become necessary to design training programs based on specific exercises that correspond to the requirements of skill performance in each sport, especially in track and field events that largely depend on coordination between physical and skill abilities. (Bompa, 2009: 46)

Intisar Mazhar Saddam and Haider Nawar Hussein (2025) indicated that the final steps in the approach phase are among the most sensitive stages in the technical performance of the long jump. During this stage, the athlete must maintain running speed while controlling the length and frequency of the steps to ensure accurate placement of the take-off foot on the board. Motor coordination between approach speed and the rhythm of the final steps contributes to achieving an effective transition from the approach phase to the take-off phase, which leads to better utilization of the acquired speed during the jump. The use of modern training methods also contributes to improving performance levels in jumping events by focusing on developing mechanical factors affecting performance such as approach speed, take-off angle, and explosive leg power. (Saddam & Hussein, 2025: 63)

Linthorne (2008) explained that the long jump is an event that requires integration between physical and skill abilities. Achieving performance results depends on the athlete's ability to combine speed, strength, and motor coordination during the different phases of performance. The development of sports training methods has increased interest in using specialized exercises that simulate the actual skill performance, due to their effective role in improving neuromuscular coordination and enhancing movement control during performance. (Linthorne, 2008: 32)

Thus, the importance of focusing on the approach phase in the long jump becomes clear, as it is the stage in which the horizontal velocity necessary for performance is generated. Any defect in this phase may lead to reduced take-off efficiency and consequently a decrease in jump distance.

In light of the above, designing training programs based on specialized exercises aimed at improving the optimal speed of the approach phase may contribute to improving the technical performance efficiency of long jump athletes, which will positively reflect on achieving better jumping distances.

Research Problem

The long jump is one of the events that largely depends on the horizontal speed gained during the approach phase, as this phase represents the foundation on which the technical performance of the remaining phases of the jump is built. In many cases, some athletes are unable to reach the appropriate speed before the take-off board, which leads to a decrease in take-off efficiency and consequently a reduction in jump distance.

Reaching maximum speed during the approach does not necessarily mean achieving the best performance, as excessive speed may lead to loss of balance or inaccurate placement of the foot on the take-off board, which is related to the concept of optimal speed, representing the balance between speed and technical control of performance.

Through the researcher's observation of the performance level of some long jump athletes, it was found that there is a deficiency in the approach phase, represented by the inability to maintain appropriate speed while controlling the motor rhythm of the final steps before take-off, which negatively affects the jump distance.

This may be due to insufficient attention to the use of specialized exercises aimed at developing approach speed while maintaining motor coordination between the final steps and take-off, as some training programs focus on developing general physical abilities without paying sufficient attention to the specific performance requirements of the long jump.

Therefore, the need emerged to conduct this study to identify the effectiveness of specialized exercises in improving the optimal speed of the approach phase and their effect on the long jump distance, with the aim of presenting a training program that contributes to improving technical performance and performance achievements among long jump athletes.

Research Objectives

This research aims to identify:

- The effect of using specialized exercises on improving the optimal speed of the approach phase among long jump athletes.
- The extent to which specialized exercises affect some variables related to the approach phase such as approach time and the speed of the final steps before the take-off board.
- The effect of specialized exercises on the long jump distance of the research sample.
- The relationship between improving the optimal speed of the approach phase and improving the performance level in the long jump.

Research Hypotheses

- There are statistically significant differences between the pre- and post-measurements of the experimental group in the tests of optimal approach speed in favor of the post-measurement.
- There are statistically significant differences between the pre- and post-measurements of the experimental group in the long jump distance in favor of the post-measurement.
- There is a statistically significant correlation between the improvement in optimal approach speed and the improvement in long jump distance among the research sample.

Methodology

The researcher used the experimental method due to its suitability to the nature of the research. The researcher adopted an experimental design with pre- and post-measurements for one experimental group.

Research Population

The research population consisted of long jump athletes from sports clubs in Diyala Governorate.

Research Sample

The researcher selected a purposive sample of (20) long jump athletes from sports clubs in Diyala Governorate. The sample was divided as follows:

- **Pilot study sample:** (12) athletes used to calculate the scientific coefficients of the research variables.

- **Main study sample:** (8) athletes on whom the proposed training program was applied, as shown in **Table (1)**.

Table 1. Numerical Distribution of the Research Sample

Percentage	Number	Classification
%60	**12**	**Pilot Study Sample**
%40	**8**	**(Main Study Sample (Experimental Group**
%100	**20**	**Total Sample**

Result and Discussion

Statistical Description of the Research Sample

The basic variables of the research sample (under study) were measured in terms of age, weight, and height in order to control variables that may affect the research procedures. Table (2) below illustrates these measurements.

Table 2. Statistical Indicators of the Research Sample in the Basic Variables Before the Experiment

N = 20

Kurtosis Coefficient	Skewness Coefficient	Standard Deviation	Mean	Unit of Measurement	Variables
-0.89	1.02	2.36	22.63	**Year**	**Age**
-0.52	-0.63	1.02	76.91	**kg**	**Weight**
0.84	-0.85	0.99	179.47	**cm**	**Height**

It is clear from Table (2), which presents the homogeneity of the research sample data in the basic preliminary measurements, that the data related to the total research sample are moderate and not dispersed, and they follow a normal distribution. The values of the skewness coefficient range between (-0.85 to 1.02), which are values close to zero. The kurtosis coefficient ranges between (-0.89 to 0.84), indicating that the fluctuation of the normal distribution curve is acceptable and average, neither excessively peaked nor excessively flat. This confirms the similarity of the research group members in the basic variables before the experiment.

Tools and Means of Data Collection

Devices and Tools Used in the Research

After reviewing many references, scientific studies, and similar research, the researcher identified the following devices and tools that contributed to completing the research procedures and achieving its objectives:

- **Height measuring device (Rest meter)** to measure total body height to the nearest centimeter.
- **Calibrated medical scale** to measure body weight to the nearest kilogram.
- **Athletics track** equipped to conduct sprinting and long jump tests.

- **Long jump pit** equipped with a legal take-off board.
- **Metal measuring tape** to measure distances used in the different tests.
- **Digital stopwatch** to measure time in speed and running tests.
- **Training cones** to determine test distances and the approach path.
- **Adhesive tape or ground markers** to determine measurement zones and approach distances.
- **Video camera or mobile phone** to record performance and analyze the final steps when needed.
- **Medical scale** to measure the weight of the research sample members.
- **Stadiometer** to measure the players' height.
- **Chalk or marking substance** to determine the foot mark on the take-off board for approach accuracy.
- **Data recording forms** for documenting test results.

Tests Used in the Research

Measuring the Optimal Speed of the Approach Phase in the Long Jump Skill

The researcher conducted a literature review of references, scientific research, and previous studies related to physical abilities associated with measuring the optimal speed of the approach phase. Accordingly, a set of physical tests related to measuring speed during the approach phase in the long jump was identified as follows:
- 30 m sprint test (full approach distance)
- Flying 20 m sprint test
- 30 m sprint from a flying start
- Step frequency in the last 10 m
- Length of the last three steps
- Rhythmic accuracy of the approach mark
- Triple hop on the take-off leg

The researcher presented these tests to a group of experts (Appendix 1) consisting of (9) specialists in sports training to obtain their opinions regarding the suitability of these tests for the research. The following table shows the percentage of agreement among the experts regarding the physical tests.

Table 3. Experts' Opinions on the Tests of Optimal Speed of the Approach Phase

N = 9 Experts

Disagree		Agree		Unit of Measurement	Physical Tests	No.
%	Frequency	%	Frequency			
%00	00	%100	9	Second	30m sprint test (full approach distance)	1
%00	00	%100	9	Second	Flying 20m sprint test	2
%55.56	5	%44.44	4	Second	30m sprint from flying start	3
%00	00	%100	9	Step/second	Step frequency in the last 10m	4
%11.11	1	%88.89	8	Meter	Length of the last three steps	5
%00	00	%100	9	cm	Rhythmic accuracy of the approach mark	6
%66.67	6	%33.33	3	Meter	Triple hop on the take-off leg	7

It is clear from Table (3) that the experts agreed on the tests proposed by the researcher with approval percentages ranging between (33.33% – 100%). The experts suggested excluding the two tests (30 m sprint from a flying start, triple hop on the take-off leg) as they received approval rates of (33.33% – 44.44%). Accordingly, the tests that the researcher will rely on are as follows:

- 30 m sprint test (full approach distance)
- Flying 20 m sprint test
- Step frequency in the last 10 m
- Length of the last three steps
- Rhythmic accuracy of the approach mark

Measurement of the Performance Level of the Long Jump Skill

The performance level of the long jump skill is measured from the end of the take-off board to the nearest point of contact of the body in the sand pit.

Pilot Study

The pilot study was conducted during the period from 7/11/2025 to 16/11/2025 on a sample of (12) long jump athletes from sports clubs in Diyala Governorate, who were selected from outside the main research sample.

The purpose of this study was to calculate the scientific coefficients of the research tests (validity and reliability).

Scientific Coefficients of the Tests of Optimal Approach Speed and Long Jump Performance Level

Validity

To determine the validity coefficient for the tests of optimal approach speed and the performance level of the long jump, the researcher used discriminant validity by applying the extreme group comparison method. This was done by calculating the differences between the upper quartile and lower quartile of the results obtained from the pilot sample of (12) athletes selected from the research population but outside the main sample.Table **(4)** illustrates this.

Table 4. Significance of Differences Between the Upper and Lower Quartiles to Determine Discriminant Validity in the Tests of Optimal Approach Speed and Long Jump Performance Level

N = 12

t-value	Lower Quartile		Upper Quartile		Unit of Measurement	Variables
	SD	Mean	SD	Mean		
4.87	0.15	5.21	0.14	5.71	Second	30m sprint test (full approach distance)
3.69	0.63	3.10	0.19	3.73	Second	Flying 20m sprint test
4.02	0.45	4.08	0.32	4.77	Step/second	Step frequency in the last 10 m
3.42	0.41	1.93	0.47	2.42	Meter	Length of the last three steps

6.95	0.87	17.63	0.96	20.57	cm	Rhythmic accuracy of the approach mark
4.56	0.55	4.05	0.58	4.62	Meter	Long jump performance level

Tabulated t-value at significance level (0.05) = 3.182

It is evident from Table (4) that there are statistically significant differences between the upper quartiles and the lower quartiles in the optimal speed tests for the approach phase and the numerical level of the long jump, where the calculated (t) value ranged between (3.42 : 6.95), which is greater than the tabulated (t) value at the significance level of 0.05, indicating the validity of the variables under study Ahmed (2020).

Reliability:

To determine the reliability coefficient for the optimal speed tests of the approach phase and the numerical level of the long jump under study, the researcher used the test–retest method on the same exploratory study sample of (12) players. The variables were re-applied once again one week after the first application in order to find the correlation coefficient between the first and second applications for the exploratory sample under study, as shown in Table (5).

Table 5. The reliability coefficient by finding the correlation between the first application and the re-application in the optimal speed tests for the approach phase and the numerical level of the long jump under study

(N = 12)

Value of ""r	Re-application		First Application		Unit of Measurement	Variables
	SD	Mean	SD	Mean		
*0.953	0.59	5.30	0.63	5.33	Second	30m sprint test (full approach distance)
*0.989	0.14	3.19	0.18	3.18	Second	Flying 20m sprint test
*0.944	0.39	4.15	0.41	4.19	Step/second	Step frequency in the last 10m
*1.00	0.55	2.02	0.52	2.02	Meter	Length of the last three steps
*0.941	0.92	18.75	0.89	18.70	cm	Rhythmic accuracy of the approach mark
*0.952	0.35	4.50	0.33	4.53	Meter	Long jump performance level

The tabulated value of (r) at the significance level (0.05) = 0.553

It is evident from Table (5) that there is a statistically significant correlation between the first application and the re-application in the optimal speed tests for the approach phase and the numerical level of the long jump, where the calculated (r) value ranged between (0.941 : 1.00), which is greater than the tabulated (r) value at the significance level of 0.05, indicating the reliability of the variables under study Malik (2024).

The proposed program using special exercises to improve optimal speed:

The proposed training program aims to improve the optimal speed of the approach phase for long jump athletes through the use of a set of special exercises that simulate the motor performance of the skill, which contributes to improving approach speed and the motor coordination of the final steps before the take-off board. This is positively reflected in the numerical level of the long jump.

Foundations for designing the program

The training program was designed in light of a set of scientific principles related to sports training, the most important of which are:

- The suitability of the special exercises to the nature of performance in the long jump.
- Gradual progression of the training load from easy to difficult.
- Taking into account individual differences among the players.
- Variety in the exercises used within the training unit.
- Taking into account appropriate rest periods between exercises.
- Focusing on exercises that develop approach speed and step frequency.
- Using exercises that simulate the final steps before take-off.

Duration of the training program

- Program duration: 8 weeks
- Number of training units per week: 3 training units
- Total training units: 24 training units

Duration of the training unit

The duration of the training unit ranges between 60–90 minutes, and the training unit consists of the following parts:

- Warm-up (15–20 minutes)
- Main part (35–50 minutes)
- Cool-down (10–15 minutes)

Content of the training unit

Warm-up

It aims to prepare the players physically and functionally before performing the main exercises.

Examples of warm-up exercises

- Light running around the field
- Muscle stretching exercises
- Joint flexibility exercises
- Motor coordination exercises

Main part (special exercises)

It includes a group of special exercises aimed at developing approach speed, step frequency, and motor coordination.

Examples of special exercises

Exercise (1) Gradual speed sprint

- Sprint for a distance of 30 meters with a gradual increase in speed until reaching maximum speed.

- Number of repetitions: 4–6 times
- Rest: 2 minutes

Exercise (2) Flying sprint
- Sprint for a distance of 20 meters after a preparatory distance of 20 meters.
- Number of repetitions: 4–5 times
- Rest: 2–3 minutes

Exercise (3) Sprint with adjustment of the final steps
- Running the approach distance with a focus on the last three steps before the take-off board.
- Number of repetitions: 5 times

Exercise (4) Low hurdle exercises
- Sprinting over 5–6 low hurdles to improve step frequency.
- Number of repetitions: 4 sets

Exercise (5) Consecutive jumps
- Performing consecutive jumps for a distance of 20 meters to develop speed–strength.
- Number of repetitions: 3–4 times

Exercise (6) Full approach with jump
- Performing the full approach followed by performing the long jump.
- Number of repetitions: 4 attempts

Cool-down

It aims to return the body to its normal state after training.

Examples of cool-down exercises
- Light running
- Stretching exercises
- Breathing exercises

Numerical level of the long jump:

The numerical level was measured by giving the athlete three attempts and taking the best attempt, both before the application of the program and after the completion of the total period of the program.

The main study:

The main study was conducted during the period from 18/11/2025 to 22/1/2026. The researcher will explain this as follows:

Pre-test:

The pre-measurements were conducted on 18/11/2025 for the variables under study on the research sample consisting of (8) athletes, and the measurements were carried out at the clubs of Diyala Governorate.

Application of the program:

The proposed program was applied to the experimental group consisting of (8) athletes. The proposed program was implemented over a period of 8 weeks from 20/11/2025 to 20/1/2026, at a rate of (3) training units per week on the main sample (the experimental group).

Post-test:

The post-measurements of the variables under study were conducted on the members of the research sample on 22/1/2026, and the measurements were carried out at the clubs of Diyala Governorate.

Statistical treatments used in the research:

- Arithmetic mean
- Standard deviation
- Median
- Skewness coefficient
- Kurtosis coefficient
- T-test
- Pearson correlation coefficient
- Frequency and percentage.

Presentation and Discussion of the Results

Presentation and discussion of the results of the second hypothesis: There are statistically significant differences between the pre- and post-measurements of the experimental group in the optimal speed tests for the approach phase in favor of the post-measurement.

Table 6. Statistical significance of the differences using the (t) test between the pre- and post-measurements in the optimal speed tests for the approach phase for the experimental group

(N = 8)

t-value	Experimental Group				Unit of Measurement	Variables
	Post-test		Pre-test			
	SD±	Mean	SD±	Mean		
*4.87	0.19	4.98	0.24	5.31	Second	30m sprint test (full approach distance)
*4.94	0.11	2.74	0.13	3.16	Second	Flying 20m sprint test
*5.14	0.15	4.48	0.18	4.21	Step/second	Step frequency in the last 10m
*3.97	0.09	2.19	0.11	2.04	Meter	Length of the last three steps
*7.03	1.88	9.37	2.74	18.62	cm	Rhythmic accuracy of the approach mark

The value of (t) at the significance level (0.05) = .2.365

It is evident from the results of Table (6) as follows:

- There are statistically significant differences at the level (0.05) between the mean scores of the pre-measurement and the post-measurement for the experimental group in favor of the mean of the post-test in the optimal speed tests for the approach phase (sprint test for the full approach distance (30 m), flying speed test 20 m, step frequency in the last 10 m, length of the last three steps, accuracy of rhythmic adjustment for the approach mark), where the calculated "t" value ranged between (3.97 : 7.03).

These results are consistent with what Linthorne (2008) indicated, that the approach phase in the long jump is one of the most important phases affecting technical performance, as the horizontal speed gained during this phase represents the basis upon which the efficiency of take-off and achieving a better jumping distance depend. Developing approach speed also contributes to improving motor coordination and the movement rhythm of the final steps before the take-off board, which leads to improving the skill performance of athletes Hashim (2025).

The results of this study also agree with what Abdelkader El-Sayed Mostafa (2009) concluded, that improving approach speed through specialized training programs leads to improving the mechanical characteristics of performance in the long jump. Organized training helps develop transition speed, step frequency, and step length, which are among the basic factors affecting reaching optimal speed before the take-off phase.

The results of the research are also consistent with what Bompa (2015) stated, that the use of special exercises in training programs contributes significantly to the development of physical abilities related to skill performance. These exercises improve neuromuscular coordination and develop movement speed, which is positively reflected in the development of technical performance in sports activities that depend on speed and power such as jumping events Hamid (2025).

The researcher believes that the improvement that appeared in the results of the post-measurement in the optimal speed tests for the approach phase is due to the effectiveness of the proposed training program, which relied on the use of special exercises that simulate the real performance of the long jump. These exercises helped develop approach speed and motor coordination of the final steps before the take-off board, in addition to improving the players' ability to control running speed while maintaining the accuracy of the movement rhythm of the final steps. This led to reaching the optimal speed for the approach phase and improving the performance level of the members of the research sample.

Presentation and discussion of the results of the second hypothesis: There are statistically significant differences between the pre- and post-measurements for the experimental group in the long jump distance in favor of the post-measurement.

Table 7. Statistical significance of the differences using the (t) test between the pre- and post-measurements in the numerical level of the long jump for the experimental group

(N = 8)

t-value	Experimental Group				Unit of Measurement	Variables
	Post-test		Pre-test			
	SD±	Mean	SD±	Mean		
5.41	0.26	5.07	0.29	4.48	Meter	Numerical level of the long jump

The value of (t) at the significance level (0.05) = .2.365

It is evident from the results of Table (7) as follows:

- There are statistically significant differences at the level (0.05) between the mean scores of the pre-measurement and the post-measurement for the experimental group in favor of the mean of the post-measurement in the numerical level of the long jump, where the calculated "t" value reached (5.41).

This result agrees with what Islam Mohamed Nagi (2020) indicated, that improving the performance elements in the approach and take-off phases leads to increasing horizontal speed and improving the efficiency of converting it into propulsive force during take-off, which is directly reflected in increasing the jump distance. He also explained that training programs that focus on developing speed and speed–strength contribute to improving the numerical achievement in jumping events Ghanem (2025).

These results are also consistent with what Ali Abdel-Latif Abdel-Moaty (2025) concluded, that developing the biomechanical variables associated with the approach phase, such as running speed, step frequency, and organizing the final steps before the take-off board, contributes to improving the efficiency of technical performance in the long jump, and thus leads to achieving better jumping distances.

The results of the study also agree with what Bompa (2015) mentioned, that the use of special exercises within training programs contributes to improving the physical and skill abilities associated with sports performance. These exercises develop speed–strength and neuromuscular coordination, which leads to improving the level of technical performance and numerical achievement in various sports activities.

The researcher believes that the improvement that appeared in the numerical level of the long jump among the members of the research sample is due to the effectiveness of the proposed training program, which relied on the use of special exercises that simulate the nature of performance in the long jump. These exercises helped improve approach speed and regulate the movement rhythm of the final steps before the take-off board, in addition to developing the speed–strength of the legs, which led to improving the efficiency of take-off and increasing the jump distance among the athletes.

Presentation and discussion of the results of the third hypothesis: There is a statistically significant correlation between the improvement of optimal speed in the approach phase and the improvement of the long jump distance among the members of the research sample.

Table 8. Correlation coefficient (r) between improvement of optimal speed in the approach phase and improvement of the long jump distance

(N = 8)

Correlation coefficient (r) with improvement in long jump distance	Tests
0.82	30m sprint test (full approach distance)
0.77	Flying 20m sprint test
0.85	Step frequency in the last 10m
0.79	Length of the last three steps
0.89	Rhythmic accuracy of the approach mark

The tabulated value of (r) at the significance level (0.05) = 0.666

It is evident from Table (8) that there is a positive statistically significant correlation between the improvement in the optimal speed tests for the approach phase and the improvement in the long jump distance among the members of the research sample. The correlation coefficients ranged between (0.77 : 0.89), all of which are greater than the tabulated r value of (0.666) at the significance level of 0.05, which indicates that improvement in the optimal speed of the approach phase clearly contributes to improving the long jump distance.

The results of the study by Saad Fathallah Al-Alam (2018) indicated that the horizontal speed gained during the approach phase is one of the most important factors determining the jump distance in the long jump. Reaching an appropriate approach speed contributes to increasing the ability to convert this speed into vertical force during take-off, which leads to improving the jump distance. He also confirmed that any improvement in approach speed is directly reflected in the technical performance and numerical achievement of the athletes Ismaeel (2022).

The results of this study are also consistent with what Linthorne (2008) concluded, that the relationship between approach speed and the distance achieved in the long jump is a close one, as approach speed represents one of the most important biomechanical variables affecting performance. High controlled speed helps improve the movement rhythm of the final steps before the take-off board, which contributes to achieving an effective transition from the approach phase to the take-off phase and thus improving the jump distance Abood (2024).

The researcher believes that the existence of a positive correlation between the improvement of the optimal speed of the approach phase and the improvement of the long jump distance is due to the fact that developing approach speed helps the athlete acquire greater horizontal speed that can be utilized during the take-off phase. Improving the movement rhythm of the final steps before the take-off board also contributes to achieving a more efficient movement transition between the different phases of performance, which ultimately leads to improving the numerical level of the long jump among the members of the research sample Ismaeel (2024).

Conclusion

Drawing on the study objectives and hypotheses, and within the boundaries of the selected sample and methodological approach, the results point to a clear and consistent effect of the proposed training program. The use of special, performance-oriented exercises appears to have enhanced the optimal speed during the approach phase in long jump athletes. This was reflected in the statistically significant differences observed between pre- and post-test measurements, with improvements favoring the post-test outcomes. Beyond speed alone, the program influenced several key variables linked to the approach phase. Noticeable developments were seen in running velocity, step frequency, and the structure of the final strides leading into the take-off. These changes were not isolated; rather, they were accompanied by a tangible improvement in overall long jump performance, as indicated by the numerical results. What stands out in the findings is the positive relationship between approach speed optimization and jump distance. This suggests that improvements in one are closely tied to gains in the other, reinforcing the integrated nature of performance in this event. In addition, refining the rhythm of the last steps before take-off seems to play a meaningful role in stabilizing and enhancing technical execution. The results underline the value of exercises that replicate the actual movement patterns of the long jump. Such specificity in training does not only target physical capacities but also supports the development of skill execution in a more functional and performance-relevant manner.

Recommendations

Based on the results obtained and within the limits of the conclusions reached, the researcher recommends the following:

- Paying attention to the use of special exercises in training long jump athletes due to their effective role in improving the optimal speed of the approach phase.
- Focusing on developing approach speed and the movement rhythm of the final steps before the take-off board due to their direct impact on improving the long jump distance.
- Applying the proposed training program or similar programs in training long jump athletes in different age groups.
- Paying attention to developing neuromuscular coordination and speed–strength due to their important role in improving technical performance in the long jump.
- Using approach phase tests such as the flying speed test, step frequency test, and approach accuracy test to periodically evaluate the level of the athletes.
- Paying attention to movement analysis of the approach and take-off phases because it provides scientific information that helps coaches improve the technical performance of athletes.

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