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The effect of special exercises on some physical and kinematic variables and the achievement of the effectiveness of the 400-meter dash

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Abstract
The research aims to prepare special exercises and to identify the impact of the proposed training curriculum on some variables Kinematics and achievement of effective running 400 metres to single out the research sample.

Research areas formed the human field Players of the Specialized School for Nurturing Sports Talent for Arena and Field Games in Maysan Governorate for ages (14-16 years) for a 400-meter run event for the 2022 sports year And the temporal domain for the period of 4/16/2022 to 7/5/2022 and the spatial field Maysan Olympic Stadium and Scout camp stadium for athletics in Maysan Governorate The scientific method The researcher used the experimental method in one group style to solve the research problem Research community and sample to choose The research community in the intentional way, which was represented by the players of the Specialized School for Nurturing Sports Talent for Arena and Field Games in Maysan Governorate for ages (14-16 years) for the 400-meter running event for the sports year 2022 AD. Their number is (8) players, and the number of the research sample was (6) players. Two players were excluded due to conducting the reconnaissance experiment on them, and they constituted (75%) of the original community. Either the most important conclusions are that the proposed exercises have contributed clearly and effectively to the development of step time. The proposed exercises had a clear impact in developing the rate of speed as well as the length of the step. The most important recommendations were the researcher recommends the Iraqi trainers to rely on effective modern training methods and include them in the training programs and the need to emphasize the development of kinematic variables during the training of the effectiveness of the 400 m run.

Keywords: Physical, kinematic variables, achievement, dash

Introduction

The sports field is one of the important areas in the lives of peoples, so the continuous interest in the sports movement was to achieve the highest levels of mathematical achievement, whether by using theoretical and applied mathematical sciences or scientific means and modern technologies, and the competition began to intensify between these countries to innovate modern scientific means and conduct studies and research and interest The main factors involved in the implementation of modern training methods and attention to the physical aspects of the game as well as the mechanical factors. And that knowledge Biomechanics is one of the modern sciences that has influenced the scientific progress of human motor performance. The motor analysis also contributes to revealing the most important Influential technical errors associated with the technical performance that the coach is unable to accurately identify As well as finding new methods of sports technique, and it is also used to solve technical problems related to learning and training, as it diagnoses movements and compares them because it adopts accurate measurement to show the technical details of performance in their true form. The activities of arena and field games are among the activities that are characterized by physical, psychological and physiological activity, as these events witnessed great interest in the field of research and studies, as they are distinguished from other games. The other is that it is a competition between individuals to show their competence and physical ability to achieve new achievements Find modern means and training methods to reach The highest levels by preparing the player physically, psychologically,

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technically and educationally. and effective enemy 400 It is one of the activities of the arena and field games that depend on the efficiency of physical and kinematic variables The runner, which requires the trainers to choose the best training methods, has an impact on the development of these variables to keep pace with the development in the level of achievement for this event. Thus, the importance of the research shows the impact of the proposed exercises on some kinematic variables and the achievement of the effectiveness of the sprint, 400 metres.

Research problem

Due to the modest experience of the researcher in the field of arena and field games, being a former national team player and a teacher at the University of Maysan for the arena and field course, and his knowledge of the numbers achieved in the event of the 400-meter run, he noticed that there is a weakness and a low level of achievement of this event when compared to the Arab, Asian and international levels, which prompted the researcher To prepare suggested exercises. The aim of these exercises was to develop some kinematics and achievement variables for the purpose of overcoming the problem of low achievement in this activity, in an attempt to reach the Arab and Asian levels with this activity.

Research aims
- Preparing a proposed training curriculum.
- Identify the impact of the proposed training curriculum on some variables Kinematics and achievement of the effectiveness of the 400 - meter sprint for the research sample.

Research hypotheses
- There are statistically significant differences between the results of the pre and post tests for some kinematic variables and the achievement of the research sample individuals and in favor of the post tests.

Research areas
- **The human field:** Players of the Specialized School for Nurturing Sports Talent for arena and field games in Maysan Governorate for ages (14-16 years) for a 400-meter run event for the 2022 sports year
- **Time range:** For the period from 4/21/2022 to 7/5/2022.
- **Spatial field:** Maysan Olympic Stadium in Maysan Governorate.

Methodology _ Research and field procedures
Research Methodology
The researcher used the experimental approach in one group style to solve the research problem.

Community and sample
The process of selecting the sample is closely related to the nature of the community from which the sample was taken "The part that represents the original community or the model on which the researcher conducts all his work" (Wajih, 2001) [7]. Therefore, the research community was chosen by the intentional method, which was represented by the runners of the specialized school to nurture the athletic talent for the arena and field games in Maysan Governorate, for ages (14-16 years) for the 400-meter running event for the 2022 sports year. Their number is (8) players, and the number of the research sample was (6) players, and two players were excluded because of conducting the reconnaissance experiment on them (75%) of the original community.

Means of collecting information
- Tests and measurements.
- foreign scientific references and the Internet
- Equipment and tools used in the research:
- A legal athletics stadium
- Stopwatches (6)
- measuring tape (30) m
- kickstand (6)
- Whistle and arbitration flags (2)
- A drawing scale with a length of (1) m, number (2).
- Konica cameras, with a frequency of (300) images per second, with a tripod
- Barriers (10) of various heights
- bungee cords
- Multi-weight medicine balls

The training method used
The researcher prepared the proposed training curriculum to develop some kinematic variables, and the period of the proposed training curriculum used was (8) weeks, with (3) units (Saturday, Tuesday, and Thursday) of each week. The time of the main section in one training unit is from (60-65) minutes, and the training curriculum was applied during the special preparation period in a high-intensity interval style.

Kinematic variables
Step time for a distance (100 m, 200 m, 300 m, 400 m)
Average speed for a distance (100 m, 200 m, 300 m, 400 m)
Step length (100 m, 200 m, 300 m, 400 m)

Exploratory experience
The researcher conducted the exploratory experiment on Saturday 16/4/2022 In order to identify the most important difficulties that accompany field research procedures, the aim was to do so recognize the time in performing the experiment. Knowledge of the work of the assistant staff.
The number of cameras that will be used In order to achieve the best shooting distance tests: -
- tests were conducted on Thursday 4/21/2022 on all members of the research sample and at the Maysan Olympic Stadium at four o'clock in the afternoon and in the presence of all members of the research sample, and through that all the research variables under study were obtained.

Dimensional tests
She conducted the main experiment on Saturday 26/6/20 22 at the Maysan Olympic Stadium, and the researcher confirmed the reason that the conditions were the same in which he conducted the pre -test and at the same time, where the 400-meter sprint effectiveness test was conducted for the research sample members, and the law of the International Federation was applied in all aspects of the test, and the individuals were photographed The research sample, through which the research variables were obtained.

Videography
The researcher photographed the research sample using two (4) Kohica cameras with a frequency of (300) images per second with a tripod, and the height of the camera lens center from the ground was (1.34). mtr) _ And at an angle perpendicular to the running field, the camera was placed at a distance of (4.15) meters from the running field, and the researcher used a scale drawing with a length of (1) m.

Statistical means
The researcher used the statistical bag (SPSS) to extract the following values:

- Arithmetic mean.
- Standard deviation.

- The value of (T) calculated for the corresponding samples.
- Presentation, analysis and discussion of the results:
- Analyzing and discussing the results of the research sample tests for the step time variable

Table 1: It shows the arithmetic means, standard deviations, and the computed and tabulated (T) value for the pre and posttest of the step time variable

Variable	Measuring unit	Tribal		After me		Calculated T value	Tabular T- value	Indication
		s-	p	s-	p			
Distance of 1 00 m	The second	0,243	0.03	0,237	0.09 _	3. 41	2.57	Moral
200 m distance		0,241	0.02 _	0,234	0.01 _	3. 56		Moral
300 m distance		0,244	0.05	0,236	0.07	2. 88		Moral
400 m distance		0,242	0.06	0,235	0.0 4	2. 79		Moral

Table (1) for the step time variable for a distance (1 0 0 m) shows that the arithmetic mean of the pre-test is (0.243) with a standard deviation of (0.03), while the arithmetic mean of the distance test was (0.237) with a standard deviation of (0.0 9), and the value of (T) calculated to find out the differences between the pre and posttests amounted to (3.41), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and posttest and in favor of the post test.

Either distance (200 m) that the arithmetic mean of the pre-test is (0.241) with a standard deviation of (0.02), while the arithmetic mean of the distance test was (0.234) with a standard deviation of (0.01), and the value of (T) calculated to find out the differences between the two tests The pre and posttest amounted to (3.56), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and posttest and in favor of the post test.

Distance (300 m), the arithmetic mean of the pre-test was (0.244) with a standard deviation of (0.05), while the arithmetic mean of the post-test was (0.236) with a standard deviation of (0.07), and the value of (T) calculated to find out the differences between the pre and posttests was (2). 88) It is a value greater than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05), and this indicates that there are significant differences between the pre -test and the post-test and in favor of the post- test.

The distance of (400 m) was that the arithmetic mean of the pre-test was (0.242) with a standard deviation of (0.06), while the arithmetic mean of the post-test was (0.235) with a standard deviation of (0.04), and the value of (T) calculated to find out the differences between the pre and posttests was (2.79), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre -test and the post-test and in favor of the post- test.

Upon observing Table (1), we find that all the values of the distances of the tests were significant and in favor of the post-tests of the step time variable, which means that there is a development indicating that the proposed exercises have contributed mainly to improving the proportions of this variable better. Accordingly, the amount of force impulse or the change in the amount of movement has a positive effect on the exploitation of the instantaneous impulse force, which helps in reducing the fulcrum time, in addition to that the greater the extension of the joints of the body, especially the joints of the leg based on the ground, so that the line passing through the center of gravity of the body mass to the ground is close From the vertical line of Earth's gravity at the moment of fulcrum, we can get a better fulcrum time and a high flow of the running movement, and exploit the runner's ability to overcome inertia and different resistances. (Sawsan, 1977)

Analyzing and discussing the results of the research sample tests for the variable rate of speed

Table 2: It shows the arithmetic mean, standard deviations, and the calculated and tabulated (T) value for the pre and post- test of the speed rate variable.

Variable	Measuring unit	Tribal		After me		Calculated T value	Tabular T- value	Indication
		s-	p	s-	p			
100 m distance	Meters/sec	4, 31	0.0 2	4,7 7	0.0 1	2. 68	2.57	Moral
200 m distance		4,4 4	0.0 4	4,91	0.09 _	2. 7 1		Moral
300 m distance		4,3 9	0.0 4	4, 89	0.06 _	2. 9 3		Moral
400 m distance		4, 17	0.06 _	4, 68	0.0 5	2. 74		Moral

Table (2) for the average speed variable for a distance (1 0 0 m) shows that the arithmetic mean of the pre-test is (4.31) with a standard deviation of (0.0 2), while the arithmetic mean of the distance test was (4.7 7) with a standard deviation of (0.0. 1) The value of (T) calculated to find out the differences between the pre and posttests amounted to (2.68), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05), and this indicates that there are significant differences between the pre-test And the post- test and in favor of the post- test.

Either distance (200 m) that the arithmetic mean of the pre-test is (4.4 4) with a standard deviation of (0.0 4), while the arithmetic mean of the distance test was (4.91) with a standard deviation of (0.0 9), and the value of (T) calculated to find out The differences between the pre and post tests amounted to (2.7 1), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and posttest and in favor of the post test.

distance (30 0 m), the arithmetic mean of the pre -test was (4.3 9) with a standard deviation of (0.0 4), while the arithmetic mean of the post-test was (4.89) with a standard deviation of (0.0 6), and the value of (T) calculated to find out The differences between the pre and posttests amounted to (2.9 3), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and post-test and in favor of the post test.

The distance of (400 m) was that the arithmetic mean of the pre-test was (4.17) with a standard deviation of (0.06), while the arithmetic mean of the post-test was (4.68) with a standard deviation of (0.05), and the value of (T) calculated to find out the differences Between the pre and posttests, it amounted to (2.7 4), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and post-test and in favor of the post test, the researcher finds that there is a significant difference in favor of the post-test, which indicates an increase in the player's rate of speed during the 400 sprint event. The researcher attributes the reason for this development to the exercises contained in the proposed training curriculum that emphasizes the development of maximum speed, speed endurance, and the rest of the other

characteristics related to the level of performance, in addition to the correct motor construction of the jogging step movement, which contributes to reducing the effort and directing the force in the right direction for the goal of the practiced sports activity. All of these factors resulted To raise the average speed of the runner during the test, which reflected positively on the level of achievement, and the researcher agrees with Qasim Hassan Hussein, " The good qualities of the runner are that he has the ability to expand the length of steps and repeat them at one time" (Qassem, 1976) [6]. Therefore, the middle-distance runner must be characterized by regular speed and the economy of the energy expended, because the change in speed depends on changing the dominance of force values based on Newton 's first law, which confirms the body's need for additional energy in the event of a change in speed. Mobility, oxygen and anoxic tolerance (Qassem, 2000) [2]

Kinetic efficiency includes the interrelationship between stride length and stride frequency Increasing one or both of them increases the rate of speed. (Vittori), 1995 [6] indicates that (the ideal balance between stride length and frequency contributes effectively to improving the rate of speed) (vittori c., 1995) [6].

Analyzing and discussing the results of the research sample tests for the step length variable

Table 3: It shows the arithmetic means, standard deviations, and the calculated and tabulated (T) value for the pre and post-test of the step length variable

Variable	Measuring unit	Tribal		After me		Calculated T value	Tabular T- value	Indication
		s-	p	s-	p			
100 m distance	Meter	1,3 6	0.0 4	1,6 3	0.03	2. 69	2.57	Moral
200 m distance		1,3 8	0.0 1	1,6 5	0.0 2	2. 74		Moral
300 m distance		1,3 5	0.03	1,6 2	0.04	2. 71		Moral
400 m distance		1,3 7	0.0 7	1, 69	0.0 1	3. 1 2		Moral

Table (3) for the step length variable for a distance (1 0 0 m) shows that the arithmetic mean for the pre-test is (1.3 6) with a standard deviation of (0.0 4), while the arithmetic mean for the distance test was (1.6 3) with a standard deviation (0.03) and the value of (T) calculated to find out the differences between the pre and post-tests amounted to (2.6 9), which is a value greater than the tabular value of (2.57) at a degree of freedom (5) and below a significance level (0.05), and this indicates that there are significant differences between the pre and post-test dimensional and in favor of the dimensional test. Either distance (200 m) that the arithmetic mean of the pre-test is (1.3 8) with a standard deviation of (0.0 1), while the arithmetic mean of the distance test was (1.6 5) with a standard deviation of (0.0 2), and the value of (T) calculated To find out the differences between the pre and posttests, it amounted to (2.7 4), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and post-test and in favor of the post test.

distance of (0 30 m), the arithmetic mean of the pre-test was (1.3 5) with a standard deviation of (0.03), while the arithmetic mean of the post-test was (1.6 2) with a standard deviation of (0.04), and the value of (T) calculated to find out the differences Between the pre and posttests, it amounted to (2.71), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and posttest and in favor of the

posttest.

The distance of (0 40 m) was that the arithmetic mean of the pre-test was (1.3 7) with a standard deviation of (0.0 7), while the arithmetic mean of the post-test was (1.69) with a standard deviation of (0.0 1), and the calculated (T) value To find out the differences between the pre and posttests, it amounted to (3.12), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and post-test and in favor of the posttest.

Through the researcher's review of the results shown in tables (3), he noticed that there is a significant difference in favor of the distance test. As the researcher sees, this development is significant in the length of the step during the race distance, and that the reason for the development is due to the proposed training curriculum and the exercises they contained that emphasize the development of the characteristics of strength and speed. And its compounds, which worked to increase the amounts of positive thrust at the end of the rear fulcrum by fully extending the joints of the driving leg and compatible with weighted movements of the free leg and arms, which in turn led to an increase in flight time. The step or its repetition" (Qassem, 1976) [6] and Diaa al-Talib also mentions, " The length of the step continues to increase to the athlete reaches his maximum speed (Diaa, 1988) [1].

Analyzing and discussing the results of the research sample tests for achievement.

Table 4: It shows the arithmetic means, standard deviations, and the calculated and tabulated (T) value for the pre- and post-test of achievement.

Variable	Measuring unit	Tribal		After me		Calculated T value	Tabular T- value	Indication
		s-	p	s-	p			
Achievement (4 00 pm)	The second	58,13	1, 27	54,92	1,0 9	3. 54	2.57	Moral

Table (4) shows the achievement that the arithmetic mean of the pre-test was (58.13) with a standard deviation of (1.27), while the arithmetic mean of the post-test was (54.92) with a standard deviation of (1.09), and the value of (T) The calculated differences between the pre and posttests amounted to (3.54), which is a greater value than the tabular value of (2.57) at a degree of freedom (5) and below the level of significance (0.05). This indicates that there are significant differences between the pre and posttest and in favor of the posttest.

been presented through table (4), the researcher believes that there is a significant difference in favor of the post-test, and this development came to the improvement in the level of physical fitness (general endurance - speed endurance - strength endurance - and maximum speed) among the research sample individuals as a result of the proposed training curriculum The training curriculum has been prepared in a way that helps to develop the achievement of the effectiveness of the 400 -meter sprint and what it requires of speed and endurance, and this is what (Raisan Khraibet) mentioned: " Regular and programmed training and the use of rationed types of intensity in training using the optimal types of rest between repetitions lead to the development of achievement." (Risan, 1995) [4], so we see that the distribution of effort was according to the indicator of the rate of speed required for each athlete, so that the focus when training this activity is on exercises of less than maximum intensity that are close to the type of competition so that there is an adaptation of the functional body systems of the athlete and their ability to perform Efficacy is strongly distanced, and the distribution of repetitions and rest periods between repetitions, according to the return of the pulse to its normal state.

Conclusions
1. We notice when using the suggested exercises it had a prominent role in developing step time
2. The proposed exercises have clearly and effectively contributed to the development of the rate of speed
3. Proposed exercises had a clear impact on the development of stride length

Recommendations
1. The researcher recommends Iraqi trainers rely on effective modern training methods and include them in the training programmes
2. The need to emphasize the development of kinematic variables during the training of an enemy 4 00 mtr.
3. He conducted studies similar to this one

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