

The outputs of the angles of power output according to the method of (gaint set) and its effect on some biomechanical and physical indicators of the fifth barrier in the running of 110 m / hurdles of a category less than 20

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Abstract

The 110-meter hurdles race is one of the races that have achieved scientific progress at the level of training as well as at the level of selection, and this is what we noticed in the last Olympic Games as well as the World Championship, as there was a great competition for the first places, and this indicates the overlapping of various sciences in the training process aimed at refining mechanical performance to sync with physical abilities and these sciences, which have an advantage in this event. Biomechanics with two parts of kinematics and kinematics, for the relatively short race distance compared to the fast and accurate physical performance of the race stages, and this made the research important to study the minutes and details of performance. The research problem was identified and built through continuous observation of the prior performance of the daily search sample exercises through the observed slow speed of crossing the barrier and the consequent movement performance over the barrier and the distance of the barrier and this slowness led to the emergence of some errors in the sense of the distance between the barriers in terms of the length and frequency of the step. As the entirety of this case will inevitably lead to the renewal of these technical errors and their multiplication in the subsequent stages of the race as a result of a state of physical fatigue and this field problem prompted the researchers to study it and work on developing suggested and accurate training solutions to overcome it, and the researchers also used the experimental method to design the one group with the test. Tribal and postal, the research community consisted of 110 m runners hurdles from the Sports Giftedness Center in Baghdad under 20 years old and their number is 4 runners if the research sample represented the community by 100%, and the researchers used training according to the method gaint set. The purpose of the research sample is to shed power outputs on muscle groups operating at several angles, resulting in an improvement in the mechanical performance of runners.

Keywords: angles of power output, gaint set, biomechanical, physical, indicators, running of 110 m

Introduction

The training process has recently gained great attention that differs from what was in previous years, as the training process was mainly focused on the physical aspect in order to reach the athlete to the best physical abilities and thus to the best advanced levels of achievement at the level of specialized activity. Now, modern devices and tools have played an effective role in Refining the athlete's training process and targeting the performance minutes because these devices show the athlete what he is internally and not on what is known about the apparent motor performance. Athletics activities are the first in monitoring such matters targeting the athlete's kinetic performance (Muhammad, 2008). Man has created modern technologies that enable him to reach to the smallest details and their description to achieve success in all areas of life to overcome mechanical obstacles to harness energy and the appropriate effort to perform the work that falls on the shoulders of organic devices and through these technologies access to achievement has become easy and one of these sciences is biomechanics that works To explain movement to a person by linking it physiologically through one or several joints in addition to his mass, Biomechanics was concerned with the movements of athletes at all levels in order to improve and develop the movement performance in various activities to reach accurate solutions to the movements that the athlete makes that cannot be observed with the naked eye that appears in the form of movement. Achievement in the 110m

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/ hurdles relates primarily to maximum speed and rapid ability to maintain (Kamal, 2009). The 110-meter hurdle race is one of the excitement races as the player faces the ten hurdles that impede his start at maximum speed, as well as maintaining technical performance under the conditions of good biomechanical performance as well as knowing the physical measurements of the hurdle runner will provide great help to coaches, especially in the maximum speed stage in choosing the important elements which can be fruitful in their efforts and thus achieve the economy in time and effort, hence the importance of research appears.

Research problem

Identified the research problem through constant observation on the prior performance of the exercises sample daily through slow the remarkable speed of passing through the checkpoint and the consequent performance of the motor above the barrier and dimension barrier and this slow led to the emergence of some mistakes in the sense of distance between the barriers of the length and frequency step. As the entirety of this case will inevitably lead to the renewal of these technical errors and their proliferation in the subsequent stages of the race as a result of a state of physical fatigue, and this field problem prompted the researchers to study it and work on developing proposed training solutions to overcome it.

Research aim

- 1- Identify the values of some biomechanical indicators in the fifth curve of the research sample.
- 2- Preparing exercises according to gent set for some biomechanical and physical indicators for 110m runners and hurdles under 20 years old.
- 3- Identify the effect of gentle set-based training for some biomechanical and physical indicators of 110-meter hurdles runners under 20 years old.

Research postulation

-There are statistically significant differences between the pre and post measurement in some of the physical biomechanical indicators of the research sample.

Research Methodology

The researcher adopted that in his study of the experimental curriculum design with pre and post tests per experimental group with the nature of the suitability of the problem.

Research community and sample

The researcher has identified the research community, which represents a hostile activity of 110 m / checkpoint in the National Center for Sports Giftedness / Baghdad Governorate, which numbered (4) runners from a category of under 20 years, as the sample represented (100)% of the research community.

Methods of data collection

The researcher used technical scientific observation, testing, measurement, analysis and methods of data collection to obtain a number of kinematic variables.

Means, tools and devices used in the research

The methods used in the research : Personal interviews. / Arab and foreign sources and references. / Scientific and technical observation. / International information network.

Devices and tools used in the research : Legal barriers, count (10 / .(Two (2) stopwatch hours / .Video cameras number (1) type CASIO) (At a speed of (240) images per second / .Camera supports ,count (1). / An electronic stopwatch that measures to the nearest (0.01) seconds, count (2). / A metric tape measure 50 meters long / .Data dump form

Determine the physical and biomechanical search tests:

Two tests were used in the research to extract private data, namely, the 30m top speed test and the achievement test for 110m hurdles.

A test run of 30m from high start (flying) (Nahah, 1971):

- *The purpose of the test:* to measure the maximum speed.
- *Necessary tools :* stopwatch, whistle.
- *Performance description:* The laboratory stands behind the starting line at a distance of 10 m, and when the start signal is heard, the laboratory runs until it reaches the starting line, then the arbitrator gives the signal to the timer at the beginning of the timing, then the laboratory cuts the distance between the starting and ending line (30 m) as quickly as possible and upon crossing a line End The timer stops timing, as in the figure below.

Scoring method: The tester shall record the time taken from the starting line to the finish line, to the nearest fraction of a second. The achievement test of running 110m hurdles (Al Ittihad, 2009): A running test was used (110m) hurdles and according to the international law for athletics, and the height of the barrier was (91 / cm) because the research sample was from the junior category, and each runner was given two resting attempts between them (45) One minute and the best attempt was calculated (the shortest time).

Determine the physical variable and the biomechanical indicators of the research:

The two researchers relied on personal experience and what previous research had concluded to choose the variables for the research and arrived at the following variables:

- 1- Top speed: here it was measured as a physical variable via timing to the nearest fraction of a second.
- 2- The distance between the imaginary vertical line of the point of contact and the center of gravity of the body on the front support: (It is the distance between the center of gravity of the body before getting up and the imaginary line, and it is measured in centimeters).
- 3- The time from contact to vertical support (braking): (often this period is a delay and hindrance period for the player due to the great friction of the ground and absorption of the horizontal velocity at the expense of the vertical velocity, i.e. the time taken from contact to the vertical support and is measured in seconds).
- 4- The time from vertical support to rise: (It is the time in which the position of the body changes from a vertical support to a semi-horizontal position, and in this case the absorption is for the velocity)
- 5- The total time for crossing the barrier: (It is the time period calculated from the first touch of the ascending man before the checkpoint to the first touch of the leading man after the checkpoint, and it is measured in the second)
- 6- The length of the step of the barrier: (It is the horizontal distance between the position of the foot of the rising man before the barrier and the position of the landing foot of the leading man after the barrier, and this distance is measured in centimeters).

Exploratory experience:

Was conducted reconnaissance experience in the field of the National Center for Athletics on Saturday, pain approved (09/06/2018) The aim of the experiment is: filming one sample of individuals research to determine the maximum speed stage and identify the nearest barriers at that point where he was identified barrier (5) As a maximum speed, as well as determining the location of the camera, its resolution and the preferred time for shooting.

The main experiment:

The following steps were followed in the main experiment, as follows:

The pre-tests were conducted from the main experiment on Tuesday (6/12/2018) at 3:30 pm in the track of the National Center for Sports Talent, affiliated to the Ministry of Youth and Sports, and the camera was installed in the location specified for it. 10) a meter so that we can see the distance (4) meters before the barrier and after the barrier, and the runner begins to run (110) meters hurdles after a directive from the absolute, so that the values of the variables are obtained accurately during the checkpoint step and for all four members of the sample, and two attempts are given to each runner (rest period Between attempt and another it was for 45 minutes.) It was then given a period of rest two days "to start training the stomach of researchers" where the implementation of the exercises to discuss with your trainer sample by moving away from similar exercises for the training of researchers during the days of the Ataatdrb sample with researchers chose researchers three days of the week to carry out three training modules in The week is 8 weeks, which is equivalent to a two-month period of training that has been undergone within the special preparation period for the sample and by using high-effort exercises through the use of exercises according to the Giant Set method using rubber ropes. This method aims to target all the corners of the muscle in one repetition, meaning the runner works four performances behind Some, with a frequency of 3 to 4 times, and this is what works to pump the largest amount of blood into the muscles. After completing the prepared exercises, the post-test was conducted with the same pre-test mechanism, in order to take the data and deal with it according to the biomechanical programs and then the statistical program to arrive at values indicative of what was produced during the training period.

The statistical methods used in the research:

After collecting the information and data, the researcher analyzed them statistically, as he used statistical treatments through the statistical bag program (spss).

Discussion of the results of the values of the biomechanical indicators of the fifth barrier step:

measuring unit		The pretest		Post test	
		s	±P	s	±P
maximum speed	M / s / s	3.658	0.226	3.353	0.045
The distance between the imaginary vertical line	cm	0.492	0.019	0.401	0.022
Time from contact to vertical support (braking)	Sec.	0.043	0.021	0.039	0.018
Time from vertical support to rise	Sec	0.068	0.023	0.060	0.021
Total time to pass the barrier	Sec	0.528	0.026	0.426	0.024
Fender step length	M	2.423	0.043	2.712	0.046

Variables	P	P p	Values T Calculated	SIG	indication
maximum speed	0.305	0.239	3.124	0.026	moral
The distance between the imaginary vertical line	0.091	0.007	2.058	0.002	moral
Time from contact to vertical support (braking)	0.004	0.003	1.671	0.005	moral
Time from vertical support to rise	0.008	0.006	1.424	0.014	moral
Total time to pass the barrier	0.102	0.901	1.813	0.030	moral
Fender step length	0.289	0.199	2.456	0.018	moral
Significant at a degree of freedom 5 if it is a level SIG ≤ (0.05)					

Through the first and second tables, which show the values of the biomechanical indicators of the fifth barrier, as well as the value of the results of the maximum velocity of the research sample as well as the differences in the arithmetic mean and its standard deviations, where the two tables show the significance that the research sample reached in the values of the indicators and this indicates the commitment of the sample to the implementation of the training units All because they were characterized by a different nature of exercises that targeted the full energy of the target muscle group in the two men and that the nature of change imposed on the sample the application of high-quality exercises to explore the subtleties of the exercises, and this focus that researchers put in place to target strength in the muscles of the legs by pumping blood with the largest amount of muscles as a result of the exercises, which raised The level of strength and thus the effects of rapid power, and its results were reflected in the maximum speed of the research sample, as it is the basis on which the effectiveness is based through building new adaptations, and this is what (Muhammad Reda Ibrahim) indicated, "In order to increase the level of activity completion, coaches must urge athletes to raise the ceiling of adaptations Systematically, so they have to plan the training stimuli of high intensity in a form Succession " (Muhammad, 2008) . As for the distance before the barrier and the distance between the front support and the vertical line before the barrier (al-Kabbah), most scholars and authors have indicated (Qasim, 1999) . Until two-thirds of the distance of the barrier step is located before the barrier, and the remaining third falls after it, and the distance before the barrier is longer due to the short distance in the third step preceding the barrier, and there is no doubt that two-thirds of the distance before the barrier explains the importance of moving from running to jumping on the barrier and this means trying to build momentum Horizontal velocity is transformed into velocity, momentum and vertical capacity according to the law of conservation of momentum. What is lost by a body acquired by another body is lost horizontal for the purpose of verticality, which allows and helps to traverse as quickly as possible. The increase in the distance before crossing explains the increase in vertical vehicles and its negative effect on the resultant speed of the body in The maximum speed stage. And what the researchers found is that the greater the speed in lifting the leading leg, the more the athlete can approach the barrier and cross it, the more quickly and the hostility uses the leading leg in a high and fast manner, that bending in the joints at this stage that is before crossing the barrier reduces the moment of inertia of the body or its parts This allows for high angular velocity and this movement transfers speed to the center of gravity of the runner, and that the accurate and rapid work of the leading leg, the forward tilt of the torso and the strong push of the rising leg are important factors in giving speed to the movement of the body's center of gravity forward, as well as facilitating the rotation of the leg around the axes of the joints of the body and that most Experts believe that the short step before standing, the third step before getting up, allows for forward thrust and tilt of the trunk caused by the desirable front trunk movement before leaving the ground (Risan, 2002) . The two studies attribute this development to the rate of step length to the type of exercises that the researcher was emphasizing on performing in an ideal mechanical form in terms of a balanced rhythm of running as well as repetition with extreme and almost extreme stresses Sama that these exercises are almost complex on runners because these exercises required the sample to focus more. The rhythm of the jogging is due to the difference in the curve on them, and this is what gave the modified curve with speed and strength training a great contribution to developing the ability of the leg muscles to withstand the imprint of speed and strength, and this is what made the sample maintain the average step length in the second curve somewhat as a result of the effective contribution of the instantaneous push exercises resulting from the speed training And strength in focussing and pushing, and this is what was confirmed (Yusra, 2012), "The push and focus exercises have an effective effect in stimulating the central nervous system, which in turn develops the nerve signal in the muscle groups working positively and in turn results in a high stimulation of the muscle fibers working at maximum energy to accomplish the work What is required is the exertion of instantaneous explosive power calculated in a short time" (Yusra, 2012)

Conclusions:

1. The gentle set's specialized exercises using rubber ropes have contributed to improving the level of velocity abilities for effectiveness, as they have an effect on targeting specialized muscle groups for running.
2. Whenever the distance before the barrier is large, the path of the center of gravity of the body is as horizontal as possible and streamlined, and the leading man's descent after the barrier will serve the next run.
3. The improvement of the runner's technical performance within the maximum speed stage contributed to improving all mechanical indicators of the fifth barrier.
4. The training stresses, which legalized the stopping of the gent set by using rubber ropes, contributed to improving mechanical indicators, which in turn contributed to improving achievement.

Recommendations:

1. The necessity for trainers to adopt training stresses according to mechanical indicators and laws of specific effectiveness.
2. The necessity to pay attention to the mechanical aspects that are a factor affecting the success of the activity.
3. The need for runners to pay attention to reducing the center of gravity of the body above the barrier as much as possible, because this method has the effect of reducing the flight time, and this can be done by controlling some variables, the most important of which are the distance before the barrier and the approach speed.
4. Runners should keep as much as possible a slight decrease in their horizontal instantaneous velocity above or beyond the barrier, by reducing the values of the vertical instantaneous velocity.
5. The distance after the barrier should not be too large or too small because it will increase the height of the center of gravity of the body above the barrier, and if it is small, the landing process will be at a right angle or larger and this does not serve to run after the barrier

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