

The Effect of Training Using the Innovative Starting Device to Develop Some Physical Abilities of the 100-Meter Runners Under 20 Years Old

Hassanein Hussein Abd Ali ⁽¹⁾, Prof. Dr. Zaidoun Jawad Muhammad⁽²⁾

⁽¹⁾ Master. Student. College of Physical Education and Sports Sciences / University of Baghdad, Iraq.

⁽²⁾ College of Physical Education and Sports Sciences/ University of Baghdad, Iraq.

hassneen.hassnean@gmail.com , dr.zaydoon@yahoo.com

Received: 2022 March 15; **Revised:** 2022 April 20; **Accepted:** 2022 May 1

Abstract

The purpose of this paper is to design an innovative device to develop the achievement for the 100-meter runners under 20 years old and to identify the effect of the exercises using the innovative device between the pre and post-tests of the control and experimental group to develop the achievement. The research was done by the intentional method, as the research community included the top eight players in the Iraq Championship for Athletics, the third round of the season (2021), and their number (16) players, (4) players were selected for the exploratory sample and (8) players who managed to reach the finals of the 100 meters race in the Iraq Championship for the 2021 season, and they represent the research sample with a percentage of (50%) of the original community. As for the most important conclusion, training using the innovative starting device had a positive effect on the achievement of 100-meter runners under 20 years old for the experimental group.

Introduction:

Despite the development in the sports field that came as a result of modern scientific research that helped to develop the level of all sports and games, scientific research and specialists in the field of sports are still working without fatigue or fatigue in finding the best ways and the

best way to develop athletes and reach the world and that is through the interdependence and overlapping of a large number of theoretical and applied sciences that would supplement the sports side and increase the possibility of achieving the best level in it, as well as the development of devices, tools, aids, sports equipment

and many other factors that led to the development of the performance of players and runners in particular in international forums. And the emergence of high levels of record numbers and high achievements, especially the introduction of new training methods for runners, increases their desire and excitement towards training in the best ways and methods to develop each sporting event in an optimal manner in an attempt to invest the existing youth energies to the maximum extent possible. Where the researcher noticed that there is a clear weakness in one of the stages of the 100-meter race, which lies in the stage of starting and accelerating up to almost the maximum speed, which is one of the reasons that lead to the loss of a lot of time and consequently the loss of the race and achievement. One side of the body during kinetic performance, but strength training was for the muscles of the body in general.

Several studies have dealt with the subject of the research, including the study (Al-Karaawi. 2014), which aims to identify the level of strength ratio of the runners' limbs (right and left) and the working and opposite muscles of one side, and the preparation of special strength exercises at speed for a 100-meter runner and identifying special strength exercises

By speed in improving the balance of power for the right and left limbs of the body. The research community, such as the Al-Diwaniyah Governorate team in athletics, included the youth category for speed activities, which numbered (8) runners. As for a study.

As for the study (Abdullah. 2012), the study aimed to prepare special exercises using a device for the stage of increasing speed and to identify the effect of special exercises on some biomechanical physical variables and the achievement of the 100-meter sprint. 6) Players who represent the community (100%).

As for the study (Kazem. 2021) aims to prepare special exercises according to a proposed device to develop the length and frequency of the step for stages and the digital level runner 100 m for people with disabilities category (36 T - T38) for Paralympics in Muthanna and designing a proposed device to develop the length and frequency of the step for stages and the digital level runner 100 m for people with disabilities Disability class (36 T - T38) for Paralympics in Muthanna, as well as identifying the effect of special exercises according to a proposed device to develop the length and frequency of the step for stages and the digital level 100 m sprint

for people with a disability category (36 T - T38) for Paralympics in Muthanna.

The research community included the (100-meter) runners for people with disabilities, category (T38-T36) for the Paralympic Committee in Muthanna Governorate, which numbered (3) players, who represent the original community by (100%). As for the study (Al-Janabi. 2011) aimed To prepare a training curriculum by means of weighting on different parts of the body to develop response time, acceleration and transitional speed for the 100m runners, the advanced category, and to identify the changes that occur in some of the kinematic variables for the effectiveness of the 100m runner for applicants according to the weighting on different parts, as well as identifying the biomechanical variables affected by the weighting programs and when Any of the separating distances for the completion stages of the 100m event for the applicants. The research sample included the 100m event runners, a category for applicants in Iraq for the 2010/2011 sports season, which numbered (48) runners representing (24) clubs.

As for the study (Khalaf. 2010), the study aimed to design two training approaches with different distances in developing the maximum speed and its

length, and the achievement of running (100) meters, as well as knowing the effect of the two training approaches for different distances in developing the maximum speed and its length, and the completion of running (100) meters for the two experimental groups for the pre and post tests In addition to knowing the differences between the post-tests of the two training approaches with variables, the research sample included (10) runners, who constituted 77% of the total community of Anbar Governorate, which amounted to (13).

The importance of the research lies in inventing and designing a device that helps develop the special strength of the working muscles at the moment of starting and the first steps after the start as a modest contribution from the researcher to solve this problem that the researcher first and most of the Iraqi runners suffer from in the 100-meter effectiveness.

Research problem:

As for the research problem, there is a clear weakness in the completion of the 100-meter race among the Iraqi athletes in the early stages of the race, which is the starting and starting stages until reaching the maximum speed, which is one of the reasons that lead to the loss of time and

consequently the loss of the race and achievement.

Research objective:

- Design an innovative device to develop the achievement for the 100-meter runners under 20 years old an.
- Identify the effect of the exercises using the innovative device between the pre and post-tests of the control and experimental group to develop the achievement.

Research methodology and field procedures:

Research Methodology:

The researcher adopted the experimental approach by designing two equal groups (experimental and control). In this method, two groups are used, if they are equal in all the variables that can affect the dependent variables in the experiment, through which it is possible to

study the relationships of the changes to reach the desired results from the research.

Community and sample research:

The researcher chose his sample in an intentional way from the elite athletes with the effectiveness of 100 meters under the age of 20 years. The elite represented the best 8 runners who qualified for the final race in the 100 meters within the Iraq Championship for Athletics, the third round, which was on (10/28/2021). After that, the researcher divided the sample into two equal groups, each group containing 4 athletes, for the purpose of starting in one initiation line and verifying the results, they are moderately distributed among the members of the research sample. The training curriculum using the innovative training device (start device) has a clear effect, as the researcher will distribute the players as shows in the table.

Table (1) shows the distribute the players

Experimental	1	3	5	7
Control	2	4	6	8

In order to determine the variables of the study, a group of specialized professors and athletics trainers were consulted. The

most important physical abilities for the 100-meter effectiveness were identified as follows:

Explosive ability

Strength characteristic speed

Maximum speed

Speedlengthening

After that, it was agreed on a set of field tests according to the specific physical abilities that were identified, in addition to the 100-meter achievement test based on the international law of the game and the tests were as follows

Long jump stability test

30-meter jump run test

Test running 30 meters from a sitting position

After reviewing many scientific sources, training curricula, and specialists, the researcher codified the training loads according to the sources and references for the science of sports training, and the special mathematical equations to determine these stresses according to extracting the maximum force in a maximum test for the runners of the experimental group. High in the trainer's curriculum, the load for exercises using the innovative starting device was high, and this was taken into account in the ripple line of stress, but when carrying out a low load in the trainers' curriculum, then the load for exercises using the innovative starting device was high in proportion to the logical foundations in sports training to

gradually in The following are some explanations for the different resistance exercises that have been applied:

1- The exercise began on Sunday, on November 14, 2021, until Sunday, on January 9, 2022

2- The period of application of the exercises is two months by (8) weeks.

3- The number of exercises used in the main experiment (3).

4- Total number of training units (16) training units.

5- The days of applying the training units are Sunday-Wednesday of each week.

6- The application of the exercises shall be within the training units assigned to the sample in their training curriculum prepared by their trainers

7- The training volumes were determined according to the physical capabilities and capabilities of the players through the second reconnaissance experiment on the experimental group and in the presence of the coach, as well as the rests in which the runner reaches a pulse rate of 130 z / d. vice versa)

8- Adopting the principle of gradual pregnancy on a regular basis so as not to lead to the phenomenon of overload that negatively affects the runners, as they are

young players, taking into account the principle of gradual training in line with their physical capabilities.

9- Adopting the method of high-intensity interval training with low volume and the method of repetitive training.

10- Use the maximum and below the maximum intensity.

11- The researcher used the intensity ripple (between the first exercises high and then low)

After implementing the training curriculum with the innovative start device, the researcher implemented the

post-tests on the experimental and control groups in the same style, sequence and conditions of the post-tests atmosphere.

The ready-made statistical package (SPSS) version (24) was used to extract results for the study variables by using the laws of arithmetic mean, standard deviation and (t) test for independent and non-independent samples.

Results and discussion:

Presentation and analysis of the results of the maximum transition speed test for the pre and post-test of the control group:

Table (2) shows the values of the arithmetic means, standard deviations, t-test and the level of the computed significance value for the values of the maximum transitional velocity test for the pre and post-tests of the control group.

Tests	Measuring unit	Pre-test		post-test		arithmetic mean of difference	standard deviation of differences	T value	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation					
Maximum transition speed	Sec	4.355	0.005	4.225	0.012	0.130	0.014	18.385	0.000	sig

Significant when the significance value ≤ 0.05 under degree of freedom of 3

Presentation and analysis of the results of the explosive power test of the two men for the pre and post-test of the control group:

Table (3) shows the values of the arithmetic means, standard deviations, t-test and the level of the calculated significance of the values of the two legs explosive ability test values for the pre and post-test of the control group.

Tests	Measuring unit	Pre-test		post-test		arithmetic mean of difference	standard deviation of differences	T value	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation					
Legs explosive ability	Meter	2.750	0.008	2.855	0.012	0.105	0.017	12.124	0.001	sig

Significant when the significance value ≤ 0.05 under degree of freedom of 3

Presentation and analysis of the results of the strength characteristic speedtest for the two legs for the pre- and post-test for the control group:

Table (4) shows the values of the arithmetic means, standard deviations, t-test and the level of the calculated significance of the strength characteristic speed test values for the two legs for the pre- and post-test for the control group.

Tests	Measuring unit	Pre-test		post-test		arithmetic mean of difference	standard deviation of differences	T value	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation					

strength characteri stic speed for two legs	Sec	5.170	0.008	5.150	0.008	0.020	0.014	2.828	0.066	Non sig
---	-----	-------	-------	-------	-------	-------	-------	-------	-------	------------

Significant when the significance value ≤ 0.05 under degree of freedom of 3

Discussion:

The researcher attributes the reason for this development to their regularity in training and the use of exercises prepared by the trainers during the training units, in addition to the fact that the training method used by their trainers was successful and influential in the development of achievement. This is evidence that the correct training and its successful selection of the exercises used in the curriculum, scientific training affects This is what the trainers of runners in the control group generally approached in the approach followed by them and applied by the control group, where the exercises included running at different distances, strength exercises, flexibility exercises, plyometric exercises and others, and maximum transitional speed exercises as well as repetitions, in addition, the researcher believes that one of the reasons for the rise in the process indicators of the development of physical abilities and achievement and the improvement of the

members of the control group is diversity by using exercises and the continuation of the players in the training units and benefiting from their coaches, so that the reality, numbers and data revealed about the development of physical abilities and achievement for the runners of the control group, especially when noticing the difference between the circles, All these factors are evidence of the success of the control group in developing physical abilities better than it was in the past. as well as applying the vocabulary of their exercises and preparing them well so that these exercises serve and are directly in accordance with the applications of the training goals that were set for their development and in terms of the principles of training and the correct codification of the components of the training load and work to be the application in a manner that serves the kinetic paths of the runner.

The researcher believes that muscular training for a certain control group of the body's muscles does not mean that other

muscle groups should not be involved in training. When focusing on a particular group with many repetitions, we find at the same time that other groups participated, but to a limited extent. Thus, the trainers must consider this when training a particular muscle group. to focus on them to reach the desired level, while not neglecting the other muscle groups; Because the body works in the end as one integrated unit for the muscular system of the 100-meter runner. As in the experimental group, the researcher attributes the reason for these differences is due to the fact that the variables used in the research were affected by the application of exercises using the innovative start device that was used in the main section of the training units, which had a positive impact on the development and development of achievement among the runners in the experimental group, in addition to the element of suspense and excitement among the players due to the use of a training method they are not accustomed to, which gave an incentive and motivation for the players to train with enthusiasm. Diversity in the use of training aids and subjecting them to the scientific aspect contributes to the development of the training process and allows the

principle of adaptation to work clearly at the athletes' physical and skill levels.

MunirGerges Ibrahim adds, "The coach's weight is measured by the training he has so that the players do not get bored as a result of the continuous use of traditional exercises known to some, so every coach must arm himself with a variety of ammunition to enrich his players, their enthusiasm and their continuity that benefit them physically and skillfully" (Ibrahim. 2004).

The researcher also sees that the evolution of the variables under study among the runners of the experimental group to the effectiveness of training using the innovative start device, which would break the pace of repetitive training because of its advantages in controlling the degree of difficulty to work on.

Muhammad Othman adds, "Athletic training at one pace does not lead to the required adaptation processes, despite the increase in the degree of load used, which ultimately leads to stability in the level." (Othman. 2000)

This phenomenon is overcome with the help of the change in the forms of pregnancy through modern training means and devices that are used with their

training, as well as the quality of the exercises used.

The researcher also believes that the focus should be on exercises using the innovative starting device that are suitable for runners' lengths, physical capabilities and kinetic abilities, in addition to the repetitive moving method of the lower and upper extremities on the device that achieves development in the level of muscular strength of the muscles working in performance and auxiliary muscles, and trainers must pay attention to Correct technical performance during the implementation of exercises using the innovative starting device and the use of appropriate resistances and in appropriate doses can reflect positive effects in the development process. (),

The repetitive mobile muscular training method on the innovative device also showed effectiveness in developing rapid frequency in all stages of running for the experimental group. Commonly used muscle techniques it is sometimes referred to as 'central or dynamic muscular stylization' and the word 'central' simply means that the muscle shortens during stylization. In fact, the term 'dynamic' is more accurate; Because the word (motile muscle) means that the muscular tension is constant, another meaning that the

muscular kinetic method is hypothetically a method that produces the same amount of muscular tension between the muscle, meaning its length while overcoming a fixed resistance.

Conclusions and Recommendations:

Conclusions:

- The results of the tests showed a positive development for the experimental group at the digital level (Performance time) for the control group, because the innovative starting device had a positive effect on the development of the maximum transitional velocity, and this was observed through the post-tests of the two groups.
- The mechanism that works in the splendor of the device and the resistance of the rubber ropes installed in it allowed the runners to gain a distinctive force at the speed of the legs through acceleration in rounding and abduction, and this had a positive effect for the experimental group over the control group in the development of the amount of movement and reducing the time of foot contact with the ground and thus increased the transitional speed for the lower extremities.
- The exercises using the innovative starting device created a state of safety for the sample and helped to implement the

difficult exercises that the runner cannot perform outside the innovative device.

- 4-Exercises on the proposed device stimulated many non-working muscles, such as the muscles of trunk and stomach muscles to participate in the muscular work.

Reference

1. Akram Hussain Jabr Al-Janabi. 2011. The effect of weight training on different parts of the body on some kinematic variables during the interval distances and achievement of 100-meter runners, PhD thesis, Al-Qadisiyah University, College of Physical Education.
2. MubadderMuttalibKhalaf. 2010. The effect of training a training curriculum with different distances in developing the maximum speed and its length and the achievement of running 100m, Master's thesis, University of Anbar, College of Physical Education.
3. Muhammad Othman. 2000 .Training Pregnancy and Adaptation, 1st Edition, Cairo, Dar Al-Arabi.
4. Muhammad Talib Musa Al-Karaawi. 2014. The effect of strength exercises characterized by speed to balance the strength of the two ends of the body for working and opposite muscles on some special physical characteristics and achievement stages of a 100-meter youth sprint, University of Qadisiyah, College of Physical Education and Sports Sciences.
5. MunirGerges Ibrahim. 2004. Comprehensive training and skill excellence, Cairo, Arab Thought House.
6. Mustafa Ali Abdullah. 2012. The effect of special exercises using an innovative device to control the angle of inclination of the body during the stage of increasing speed on some physical and biomechanical variables and the completion of a 100-meter sprint, Master's thesis, Al-Qadisiyah University.
7. Osama JassemKazem. 2021.Special exercises according to a proposed device to develop the length and frequency of the step for the stages and the digital level 100-meter sprint for people with disabilities, category (t36-t38) for Paralympic Games in Muthanna, Master's thesis, University of Muthanna, College of Physical Education and Sports Sciences.

Appendix (1)

Represents the distribution of the daily training unit

Day		Sunday						training unit	first	
Date		-11-14 2021	Time he training unit of the device is 61.25 minutes					week	first	
Exercisecode	Objective	Intensity %	Repetition	Rest between repetitions	Sets	Rest between sets	Total time of Rest	Total time of work	Total time of exercise	Rest between exercise and others
A1	Explosive ability	%100	3	ces10	3	nim1	nim3	ces 17	ces3.17	nim 5
A3	Strength characteristic speed	%80	8	ces 20	5	nim2	nim20.40	1.14 nim	nim21.54	nim5
A4	Strength characteristic speed	%80	8	ces20	5	nim2	nim20.40	nim1.14	nim21.54	nim5

Appendix (2)

Represents the innovative training device



Appendix (3)

Shows the performance of the device



Appendix (4)

Shows the explanation exercises used in the device

No.	exercise name	code	explanation	Objective
1	feet push	A1	The runner grabs the hands of the device from the front part, puts his feet on the starting pads that are located in the back of the device, and is facing the ground and when the exercise begins, the runner pushes as hard as possible back.	Explosive ability
2	pushfrom start mode	A2	The runner grabs the hands of the device from the front part and places his feet on the starting pads that are located at the back of the device in proportion to simulating the real performance, i.e. one foot forward and the second back and facing the ground	Explosive ability of working muscles
3	squat push	A3	The payment with both feet and cubes is equal, provided that the payment is only half and not a full extension	Strength characteristic speed of the lower body