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Effect of short interval training by Barlov style and hill repetitions to developing strength endurance, speed endurance and endurance of the 800 m youth runners

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Abstract

Introduction The process of preparing and developing players and improving their achievements is subject to a variety of different methods and methods in a single training unit, provided that they are consistent with the biomotor abilities of the age group and training level. The 800 m competition is one of the competitions that has distinctive training characteristics that require high training and one of its most important requirements is the possibility of continuing the performance in the shortest time despite the long distance, including the ability (endurance of force, endurance of speed and endurance of ability). The training modernity witnessed by the world and evident through the records achieved in all competitions came to work with a diversity of training methods, so this study was based on the adoption of two different methods in an attempt to develop these capabilities, namely the Barlov method and the method of hill repetitions by adopting short distances with high intensity and the regulated rest period to reach the achievement Muscular adaptations resulting from the development of energy production by the lactic system, which enhances the economic runners with effort and control of their steps according to the division of the distance along the length and duration of the competition. After reviewing some training curricula and watching and analyzing local tournaments, the researcher found that these exercises still lack the adoption of modern training methods that have led to a steady improvement in the capabilities studied in the research, especially that the researcher is a trainer and academic for these competitions. There is no solution to this problem except by achieving the following goals: preparing exercises with short intervals in the style of Barlov and hill repetitions to develop some biomotor abilities (strength endurance and speed endurance) as well as endurance of ability) to identify the statistical differences of exercises with short intervals in the style of Barlov and hill repetitions in the development of some biomotor abilities (strength endurance) and endurance of speed) as well as endurance of the ability of the 800 m youth runners, as for the research hypotheses for these exercises with short intervals and the two methods Barlov and hill repetitions a positive effect in improving some of the biomotor abilities (endurance of strength, endurance of speed and endurance of ability) for the 800 m youth runners, and with regard to the conclusions, the contribution of the exercises of hills repetitions in bringing about improvement was the achievement of (800 m) youth, the contribution of trainings The method of repetition of the hills in improving the variables investigated (endurance of force, endurance of speed and endurance of ability).

Keywords: Short interval training, Barlov style

1. Introduction

The process of preparing and developing players and improving their achievements is subject to a variety of different methods and methods in a single training unit, provided that they are consistent with the biomotor abilities of the age group and training level. Performing in the shortest time despite the long distance, including the ability (endurance of force, endurance of speed and endurance of ability) and these capabilities have a significant impact on the development of the world record for the running competition (800 m). It represents the most important aspect of the physical aspects of middle-distance runners, that the training modernity witnessed by the world, which is evident through the records achieved in all competitions, came to work with a diversity of training methods, so this study was based on the adoption of two different methods in an attempt to develop these capabilities, namely the Barlov method and the method of repetitions of the hills by adopting Short distances with high intensity and a regulated rest period to reach the achievement of muscular adaptations resulting from the development of energy production through the lactic system, which enhances the economic runners with effort and control of their steps according to the division

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of the distance along the length and duration of the competition, After following up on the achievements at the regional, Asian and global levels, we find that there are great differences between them and the local achievements, which requires us to search for the causes and causes of these differences. To the stability of improvement in the abilities studied in the research, especially that the researcher is a trainer and an academic for these competitions, and there is no solution to this problem except by achieving the following goals:

- Preparing exercises with short intervals in the style of Barlov and repetitions of hills to develop some biomotor abilities (endurance of strength and endurance of speed) as well as endurance of ability).
- Identifying the statistical differences of exercises with short intervals in the Barlov style and the repetitions of the hills in the development of some biomotor abilities (endurance of strength and endurance of speed) as well as endurance of the ability of the 800 m youth runners.

As for the research hypotheses

These exercises, with short intervals, the two Barlov methods, and hill repetitions, have a positive effect in improving some of the biomotor abilities (strength endurance, speed endurance and endurance of ability) for young 800 m runners.

2. The purpose of the study

The second purpose of this is to know the extent of responses of young runners in the 800 m competition to these exercises in improving the studied variables.

Define terms

- **Short periods:** they are running short distances of high intensity, interspersed with rest periods that are commensurate with the intensity exerted when performing them.
- **Barlov's method:** It is continuous relay running. It is an old but not common training method that requires fun and excitement when working with it so that it allows everyone to practice running, which is a good way to cut record distances where the athlete can run as fast as possible within what allows him its ability.

- **Endurance capacity:** It is the possibility of reducing the amount of time spent in which the force is applied.

3. Method and procedures

The researchers used the experimental method for the two equal experimental groups to suit the nature of the research problem in order to find appropriate solutions to it (Mohammed Abdel Fattah Al-Serafy 2002 AD, p. 185). The research community was determined by the 800 m runners of the youth category from the holy Karbala governorate clubs and the participants in the Iraq Clubs Championship for the Sports Marking 2022 AD, their number is (16 runners). The research sample was chosen by the researcher in a simple random way, which consisted of (12 runners), the first experimental group was (6 runners) and the second experimental group was (6 runners), as for the research tools used, they were (testing, measurement, observation, Arab and foreign sources and references, a manual stopwatch, 3 handheld electronic calculators, SHARP type, a weight measuring device, a cotton tape measure 50 m long, a HP computer, a whistle, and a legal track for athletics in the Olympic Stadium). For youth in Karbala governorate, as for the field procedures, it was first the exploratory experiment: The exploratory experiment was conducted on (5/2/2022 until 9/2/2022). The aim of it was to know the times that the tests take as well as the total time of the tests, taking the achievement figures for all the exercises that will be included in the training doses, the researcher has determined the tests concerned with the variables investigated in the study, depending on the sources, theses and the scientific thesis. The researcher performed the process of homogeneity on the members of the research sample for the extraneous factors in (height, mass, training age) because of their effects on the research variables using the Levin coefficient and the value of the coefficient for all variables was (0.318, 0.620, 0.119) and the sample level was greater than the level of Significance (0.05), which indicates the homogeneity of the individuals of the research sample, the research sample, in a random way, into two experimental groups (the first uses exercises in the Barlov style) and (the second uses the method of repetitions of the hills).

Second - the pre-test (equivalence of the sample)

Table 1: It shows the equivalence of the two experimental groups with the measurements studied in the research.

Variables	Measurement units	First experimental group		Second experimental group		T value	Sig level	Sig type
		Mean	Std. deviation	Mean	Std. deviation			
Endurance Run Speed (500 m)		1,16,30	0,025	1,15,50	0,053	1,262	0,964	
Endurance Strength (Build me jump for 60 seconds)		25	1,972	26	1,349	0,604-	0,847	
Endurance performance ran (700 m)		1,45,60	0,210	1,46,80	0,512	1,240-	0,568	
Achievement		2,0342	0,065	2,02,96	0,217	0,822-	0,393	

Third - the main experience:

The researchers worked on preparing exercises to be included in the training program to improve the studied research variables for both experimental groups, relying on the analysis and review of a large number of specialized scientific sources and references, as well as the modest experience of the researcher who gained through his practice of athletics as well as from his studies, and the exercises were distinguished.

- The exercises were carried out in the special

preparation stage.

- The exercises included in the training program were started on Saturday (12/2/ 2022).
- The exercises included in the training program continued for a period of (12 weeks).
- Number of training units (three training units) per week.
- The total number of training units (36 training units).
- Days of training units: Saturday, Monday, Wednesday.
- The intensity used in the implementation of the

exercises ranged between (65% - 90%) of the maximum ability of the athlete in the light of the tribal tests that were applied to the research sample.

- As for the training methods, the researcher used the two methods of intermittent training of medium intensity (65% - 80%) and intermittent training of high intensity (80% - 90%),
- The training volume was equal for both experimental groups, but it was distributed in two different ways, the first (Barlov) and the second (hill repetitions).
- The researcher took into account the training for the rest of the days of the week to be as equal as possible for all members of the research sample in terms of the components of the training load and the studied

biomotor abilities.

- The exercises prepared in the training program were implemented on the two experimental groups at the same time.
- The implementation of the exercises prepared in the training program ended on Wednesday (10/4/2022 AD).

As for the statistical means: the researchers chose the relevant statistical means to compare the pre and post-tests, using the SPSS statistical packages (arithmetic mean, standard deviation, Levin, T for symmetric and independent samples).

4. Results, presentation, analysis and discussion

Table 2: It shows the values of the arithmetic mean, standard deviation, mean of differences, standard deviation of differences, (T) calculated, the level of significance, and statistical significance of the pre and post tests of the research variables for the first experimental group.

Variables	Pre-test		Post-test		Means Difference	Std. deviation Difference	T value	Sig level	Sig type
	Mean	Std. deviation	Mean	Std. deviation					
Endurance Run Speed (500 m)	1,16,30	0,025	1,14,70	0,024	1,6	0,215	7,442	0,001	Sig
Endurance Strength (Build me jump for 60 seconds)	25	1,972	29	1,369	4	0,926	4,320	0,006	Sig
Endurance performance ran (700 m)	1,45,60	0,210	1,44,20	0,005	1,40	0,365	3,836	0,015	Sig
Achievement	2,03,50	0,098	2,02,40	0,125	1,10	0,256	4,297	0,008	Sig

Table No. (2) shows that all levels of significance for the T-test and for all the variables investigated for the first experimental group (Barlov method) were less than the significance level (0.05), which indicates the existence of significant differences between the pre and post tests in favor of the post test.

4/2 shows the values of the arithmetic mean, standard deviation, mean of differences, standard deviation of differences, (T) calculated, the level of significance, and statistical significance of the pre and post tests of the research variables for the second experimental group (by hills frequency method).

Table 3: It shows the values of the arithmetic mean, standard deviation, mean of differences, standard deviation of differences, (T) calculated, the level of significance and statistical significance of the pre and post tests of the research variables for the second experimental group in a manner (Repetitions of the hills).

Variables	Pre-test		Post-test		Means Difference	Std. deviation Difference	T Value	Sig Level	Sig Type
	Mean	Std. Deviation	Mean	Std. Deviation					
Endurance Run Speed (500 m)	1,16,30	0,025	1,14,70	0,024	1,6	0,215	7,442	0,001	Sig
Endurance Strength (Build me jump for 60 seconds)	25	1,972	29	1,369	4	0,926	4,320	0,006	Sig
Endurance performance ran (700 m)	1,45,60	0,210	1,44,20	0,005	1,40	0,365	3,836	0,015	Sig
Achievement	2,03,50	0,098	2,02,40	0,125	1,10	0,256	4,297	0,008	Sig

Table No. (3) shows that all levels of significance for the (T) test and for all the variables investigated for the second experimental group (frequencies of the hills) were less than the significance level (0.05), which indicates the existence of significant differences between the pre and post tests in favor of the post test.

Discussion

Through the presentation and analysis of the results that came in Tables (2) and (3) that the researcher obtained for the tests examined in the study and for the two experimental research groups, it was found that there are significant differences between the pre and post tests for the two experimental groups, which came after their implementation of the exercises prepared in the training program. The researchers attribute this improvement in the physical variables to the exercises (barlov and hill repetitions) used in the training program and throughout the duration of the study and for both experimental groups, which took into account the scientific foundations of training in terms of gradual training from the easiest to the most difficult, as well as the distances that he worked in the exercises, taking into account the training intensity In the two training

methods in terms of intensity, volume and comfort, in the sense that the researcher was present in the training load also emphasizing the rest periods (between repetitions and between groups) in order to achieve recovery and restore energy from its sources. From the shortest to the longest, variable intensity, which ranged (65% - 90%) of the athletes' maximum susceptibility, which helped these exercises to improve the level of physical variables investigated in this study among the runners of the two experimental groups, and confirms (Mohammed Al-Madamgha, 2008, pg. 593, quoted from Bomba) "The central nervous system adapts during endurance training to the specificity of the requirements of the executed training. As a result of this training, the ability of the central nervous system to work increases, which in turn leads to the improvement of the nerve connections required for the good harmonic work of the functional organs and systems of the body. In order to reach the state of working muscular adaptations, it is necessary to diversify the nervous excitations of the runners (the nervous-muscular system), and this diversity can only be obtained through diversity in the exercises in terms of methods or methods. It was adopted by the runners of the two experimental groups, affecting the improvement of

achievement in the (800 m) competition. This was confirmed by (Jamal Sabri 2018 pg. 468) ^[1] “We can stimulate the athlete’s nervous-muscular system by diversifying the excitations in order to improve the required adaptations, and here they must diversify their training.” (Muhammad Hassan Allawi 1975 AD, p ^[5]. speed of muscle contractions, the possibilities that appeared on the members of the two groups in their resistance to fatigue during the performance stages, the effectiveness that requires strength coupled with speed is a result of the improvement in endurance abilities as a result of the exercises that were used by them. Through the stages of performance of a specific sporting event.

As for the exercises used by the researcher, which included exercises to withstand various strengths with body weight or with added weights through various jumps and the size of the weights that were used in the exercises and continuing to extract this strength for the length of time possible, as it is mentioned Mufti Ibrahim 1999 ^[9], p. On the resistors, the better the performance. This was precisely applied by the two experimental research groups, and it was clear through the improvement of this ability that there was no significant drop in speed despite the continuation of muscle work for a relatively long period. The specified distances for these two compound physical attributes, where the researcher started with shorter distances to longer distances, taking into account the diversity of training intensity, which ranged between (80% - 90%) of the runners’ maximum ability, which helped these exercises to improve their speed endurance and endurance ability and for both members of the two experimental groups, he points out (Mohammed Atef and Muhammad Saeed 1984 p. 112) ^[7] “It means the struggle against fatigue in light of the conditions of muscular work that requires showing the increased speed.” He also confirmed that (Jamal Sabry 2018 pg. 300) ^[1] “It is the body’s ability to perform an activity at a very high speed under the requirements and conditions of a high level From anaerobic energy production, the muscle’s acceptance of lactic levels indicates its practical efficiency resulting from the release of oxygen from lactic, which leads to the possibility of reducing fatigue. The exercises used were adopted on this basis, which improved the time of testing these two abilities in the post tests, strength endurance, speed endurance and power endurance exercises have shown their effect in maintaining the highest rate of speed during the last stages of the race, in addition to that, regularity in special endurance training increases the efficiency of the concentration of oxidative enzymes and the size and number of energy houses (mitochondria) that are linked to the energy production system Which in turn helps in maintaining the highest possible level of efficiency to continue performing the physical effort along the race distance. He confirms (Talha Hossam El-Din 1994, p. 41) ^[4] that “muscle fibers begin to adapt to the type of effort

through repetitions at large rates”.

As for the achievement variable through the results that appeared in Tables (2) and (3) for the achievement variable for the two experimental groups, we see that there are significant differences between the two tests, pre and post tests, running time (800), and for both experimental groups and in favor of the post test that used two different methods of training (Barlov and hill repetitions).

The researchers attribute this development to the application of the vocabulary of exercises, which included exercises to improve the studied physical abilities and the completion of a running competition (800), and the use of training loads based on scientific foundations of size, intensity and comfort commensurate with the capabilities of the research sample and the requirements of the physical research variables and achievement, and mentions (Raisan Khribit 1995 Pg. 481) ^[2] indicates that "regular and programmed training, the use of standardized types of intensity in training, and the use of optimal types of rest between repetitions leads to the development of achievement". So, the improvement that occurred in the two experimental groups after their implementation of (Barlov -style exercises and hill repetitions) led to a change in the physical research variables and achievement, and this was confirmed by (Mohammed Othman 1995, p. 23) “that the process of regularity in training leads to changes in tissue cells. The changes that occurred after anaerobic exercises are to improve the ability to work muscles in the event of insufficient oxygen, and this improvement is mainly through an increase in mitochondrial myoglobin (energy houses) in addition to an increase in muscle glycogen stores as well as an increase in the activity of enzymes).

That the speed of high intensity with the length of the performance leads to the concentration of lactic acid in the muscles, which in turn affects the ability of the athlete’s performance, so we see that the distribution of effort is not at a single pace, but rather uneven in performance, because a running competition (800 m) requires speed High at the beginning of the race and to bear the speed in the middle and very important at the end of the race, and it was pointed out by (Shaker Al-Sheikhly 2001, p. 115) ^[3] “So the focus when training this activity is on exercises of high intensity, so that there is an adaptation for the functional organs of the athlete’s body, and their ability to perform the effectiveness with high intensity despite the accumulation of lactic acid and its resistance to fatigue.” This is what it included the exercises prepared in the training program that the members of the two experimental groups underwent.

4/3 Presentation, analysis and discussion of the arithmetic mean, standard deviation, (T) calculated values, the level of significance and the statistical significance of the dimensional tests of the research variables for the two experimental groups.

Table 4: It shows the values of the arithmetic mean, standard deviation, (T), the level of significance, and the statistical significance of the post-tests of the research variables for the two experimental groups.

Variables	Experimental (1)		Experimental (2)		T value	Sig level	Sig type
	Mean	Std. deviation	Mean	Std. deviation			
Endurance Run Speed (500m)	1,14,70	0,024	1,12,50	0,038	3,085	0.015	Sig
Endurance Strength (Build me jump for 60 seconds)	29	1,369	34	1,523	3,574	0.011	Sig
Endurance performance ran (700m)	1,44,20	0,005	1,43,30	0,142	3,063	0.016	Sig
Achievement	2,02,40	0,125	1,59,95	0,437	3,838	0.005	Sig

Through the presentation and analysis of the results obtained by the researcher in Table (4), it is clear that there are insignificant differences for the studied physical variables between the two research groups in the results of the post-tests and in favor of the second experimental group (the method of repetitions of the hills). The researcher attributes the reason for this preference to the fact that the exercises used by the researcher were More effective than exercises (Barlov style), Because it works directly on diversifying the neuromuscular excitations, which caused an improvement in the muscular ability of the runners, especially the muscles of the legs, for their ability to mobilize the largest number of muscle fibers that were working stronger. Good knee lift and maximum leg movement, starting at the ankle, this is what was indicated by (Jamal Sabri 2018 p.793) ^[1] “The athlete should aim to drive and push up through the toes, bend the ankle as much as possible and land on the front part of the foot and then let the heel come down below the level of the thumb where the weight is based.” The exercises were Running on hills varied in terms of speed, medium speed and slow running, which led to the ability of working muscles to tolerate lactate due to its undulating movement between the ups and downs of one set. This training provided ideal endurance conditions, and this also helped to improve the lactic energy system, which is the main system for the 800 m competition. In this way, the muscle cells adapted to the accumulation of lactic and also adapted to how to get rid of it by using the produced lactate as a source of energy during recovery periods of less intensity and this This means that lactate rates were variable throughout the training period between rise and fall, and this type of training gave the ability of the runners of the second experimental sample to the ability to withstand continuous changes in the tactics of players and competitors in the competition, and thus it gives the same possibility to other runners in running middle and long distances, Also, this training method enables the runners to run with a step close to the race step, and this is what gave preference to the members of the second experimental group in the studied research variables (strength endurance, speed endurance and endurance of ability) over the members of the second experimental group. As for the achievement variable, the results showed that there are significant differences between the two research groups in the results of the post-tests in favor of the second experimental group (the method of repetitions of the hills). This is indicated by the results of the physical tests between the two groups, with the preference of the members of the second group over the first.

5. Conclusions and Recommendations

Conclusions

1. The contribution of the hills repetition exercises to the improvement of the achievement of (800 m) youth.
2. Contribution of hills repetitions exercises in improving the studied variables (endurance of strength, endurance of speed and endurance of ability)

Recommendations

1. Giving high importance to the hills repetition style exercises by the trainers
2. Giving high importance to the performance technique in hills repetition style exercises by the trainees.

3. Conducting hill repetitions exercises for different age groups.

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