PalArch's Journal of Archaeology of Egypt / Egyptology

The effect of intensive tempo training in development of speed endurance, some physiological indicators, and 800-meter performance in 20 years runners

[1]Maytham Fakhri Al-Hammadi, [2]Abbas Khaleel Mohammed, [3]Ali Abdulameer Hussein*

[1] University of AL Safwa College, Karbala, 56001, Iraq

[1] maytham_3100@yahoo.com

Maytham Fakhri Al-Hammadi, Abbas Khaleel Mohammed, Ali Abdulameer Hussein: The effect of intensive tempo training in development of speed endurance, some physiological indicators, and 800-meter performance in 20 years runners -- Palarch's Journal Of Archaeology Of Egypt/Egyptology 18(4). ISSN 1567-214x

Keywords: intensive tempo training, speed endurance, physiological indicators, and 800-meter performance.

ABSTRACT

It is clear in sports training what the training process has had on the physical and physiological condition of the whole body parts and the effectiveness of this training in the occurrence of physical and physiological changes that give a positive result in the performance of the 800-meter competition. The researchers noticed that there is a decrease in speed endurance and a small percentage of the occurrence of insufficient physiological adaptations that occur inside the body, so they decided to set up of intensive tempo exercises in terms of accelerating recovery during the level of physical achievement in the sessions, where the positive effect in achievement in appropriate training requirements for this kind of competition to build their physical potential and prepare the body to adaptation. The research aims to set up intensive tempo exercises and to identify it's effect in development of speed endurance and some physiological indicators and 800-meter performance runners under 20 years. The researchers used the experimental method by pre and post tests for the experimental and control groups, and the research community was the players of the 800-meter in Babel Governorate's clubs for the sport season 2020, (N=16) players chosen as research sample, by a comprehensive inventory method, and the sample was divided into two groups (8) Players for each group. Intensive tempo training applied to the experimental group for eight weeks, with three sessions per a week, and they used the SPSS to process data and obtain results. Physiological indicators and 800 meters performance.

Introduction

Athletics competitions have become one of the most diverse sports, and each of its competitions forms had a different appearance according to the different characteristics and manner of performance of each competition, and the 800-meter event is one of the athletics competitions in order to keep up with the tremendous progress in this competition..

Concentration of exercise physiology on the necessary sciences, workers in the field of sports training is , because of its effect in the evolution the level of physical performance as a result of the effects of physiological training that it be adapted vital organs of the body process, and that the study of chemical reactions that occur within cells of different organs of the most important foundations. Illustrative to know the way these vital organs work during sports activity and the extent of the individual's ability to continue performing physical exertion **[**1**].**

Focus on Tempo training that has an effective role for physical and physiological adaptations to overcome or resist or reduce the appearance of fatigue during and after training, as well as obtaining information on the description and interpretation of the physiological changes resulting from achieve these exercises on which these changes are based, and then they can be controlled and increased their effectiveness during training in order to achieve the best performance that is distinguished with this competition, and in particular, the performance through the PB achieved in this competition.

There is a close link of the intensity of the training load and the physiological load, as the result of any physical loads to physiological changes , in the body called physiological loads and therefore the physiological load naturally reflection of physical load [2].

The research importance lies to used intensive tempo exercises to build training capacity and quality to run at higher speeds and with relatively recovery periods in developing speed endurance and physiological indicators and 800-meter performance in runners under 20 years for upgrading the athletic level and reaching the higher levels.

(Bastawisi) quoting from (Matveev) realizes carrying speed as the possibility of fatigue resistance when achieved muscular work, which requires a high speed [3**].**

In addition, that it is a specific velocity or relative velocity connecting relative to the maximum speed, as determined by its ratio for running, so in running 400 meters is from 80-86% , running 800 meters is 71-77% and running 1500 meters it is 70-73**[** 4].

Research problem:

It is clear for those who concerned in sports training what the training process has had on the physical and physiological condition of whole parts of the body and the effectiveness of this training in physical and physiological changes which give a positive result in achieving the performance of 800-meter race. The researchers noticed that there is a decrease in the speed endurance and a small percentage of the occurrence of insufficient physiological adaptation., So

they decided to set up intensive tempo exercises of accelerating recovery during the level of physical performance in sessions, where the positive effect in achieve in terms of appropriate training requirements for this the kind of race to build their physical potential and prepare the body to adapt.

Research aims :

1.Set up intensive tempo training to developing speed endurance and some physiological indicators and 800-meter performance in runners under 20 years old.

2.Identify the effect of intensive tempo training in developing speed endurance and some physiological indicators and 800-meter performance in runners under 20 years.

Research hypotheses:

The researchers hypothesized that intensive tempo training has a positive effect in developing speed endurance and some physiological indicators and 800-meter performance runners under 20 years.

Research scopes:

-The human field: for the athletes who ran 800 meters in the clubs of Babil Governorate for the 2019-2020 sports season. The temporal domain: the period 7/19/2020, the target 9/15/2020-

Spatial Domain: Al Mahawil Club Stadium / Babel Governorate –

The procedures :

The researchers used the experimental style with pre- post tests in the experimental & control groups. The research's community was determined by the players of the 800-meter event in the clubs of Babel Governorate for the 2019-2020 sport's season (N= 16 players) and the sample was divided into two groups, the experimental group and the control group (N=8) players for each group. Measures of homogeneity and equivalence were performed for the sample, and the results were :

Table (1) shows homogeneity of the sample

Variables	Units of measuring	Arithmetic Mean	Mediator	Standard deviation	Coefficient of torsion
Height	Cm	172.13	172	4,123	0.231
Mass	Kg	66,62	62.51	10,584	1.874
Training Age	Year	6,91	7	0,871	0.231

Table (2): shows the significance of the differences between the experimental and control groups in equlivant

Variables and tests	Group	M	SD	CalculatedT	Error Levels	Result
Speed Endurance 600 m running	experimental	90,266	2,17467	1,311	0,226	Random
	Control	91,784	1,40543			

Measurement of pulse difference pre and pos exertion	experimental	100,0	4,879	1,472	0,179	Random
	Control	109,0	5			
Lactic acid measurement	experimental	12,36	0,4099	1,223	0,256	Random
	Control	12,66	0,3647			
(VO2max)	experimental	63,28	2,9132	1,336	0,218	Random
	Control	61,02	2,4108			
800m Performance	experimental	125,032	1,74778	1,279	0,237	Random
	Control	**126,248**	**1,21139**			

Significant at the significance level (0.05) if the error level is less than (0.05)*
The following means and tools which used in the research: Observation. - Tests and measurements - A device for measuring height and weight - Legal athletic track - Cones of different heights (20cm, 30 cm, 40 cm), number 50 - 20 barriers, (5) electronic timing watches.

The tests:

For speed endurance [5].

Pulse difference measurement - measuring the pulse at rest - immediately after exertion.

Measuring the concentration of lactic acid in the blood **[**6**].**

VO2max **[**7**].** Race of running 800 meters)

Ascription of exercises used in the research:

The exercises began on 7/25/2020 until 9/13/2020

The duration of the exercises set in weeks: (8) weeks.

The total number of sessions = (24).

Number of weekly sessions: (3) sessions. -

Weekly training days: (Sunday - Tuesday – Thursday) -

The training method used: intensive tempo training. -

The following exercises were used for the experimental group

Table 3: Exercises used in the research

First month First week	Exercises	Intensity	Rest between		Total volume
			Sets	Rep	
Sunday	150m x 5x+ 200m x5	80%	2 min.	1 min.	1750m
Tuesday	200m x 4 +400m x4	80%	3 min.	90 sec.	2400m
Thursday	500m x 4 + 600m x 2	80%	3 min.	90 sec	320m

The following statistical methods were used in the research: The researchers used the statistical package (SPSS) to find the appropriate statistical treatments.

The results

The results of the experimental and control groups in the studied variables were presented, analyzed and discussed, as well as the differences between pre and post- tests of the experimental group in the variables were presented and analyzed..

Table 4:It shows the significance differences between the pre and post- tests of thetwo groups of research

Tests	Measure Units	group	Pre- test		Post- test		Calculated T	Error level	Significance of Differences
			M	S . D	M	S.D			
Speed Endurance	**sec.**	**Experimental**	**90,266**	**2,174**	**85,632**	**2,200**	**3,500**	**3,500**	**Significant**
		Control	**91,784**	**1,405**	**90,390**	**2,739**	**2,829**	**2,829**	**Significant**
Measurement of pulse difference before and after exertion	**beatl / min**	**Experimental**	**100,00**	**4,879**	**110,04**	**3,209**	**3,942**	**3,942**	**Significant**
		Control	**40,109**	**5,112**	**115**	**0,702**	**2,833**	**2,833**	**Significant**
Lactic acid measurement	**Mml/lit.**	**Experimental**	**12,36**	**0,409**	**14,840**	**00,249**	**6,061**	**6,061**	**Significant**
		Control	**12,66**	**2,913**	**13,420**	**2,132**	**4,209**	**4,209**	**Significant**
VO2max	**Millimeter/kg/min.**	**Experimental**	**63,38**	**2,913**	**68,72**	**2,569**	**7,133**	**7,133**	**Significant**
		Control	**61,02**	**2,410**	**62,18**	**2,689**	**3,833**	**3,833**	**Significant**
800m performance	**sec.**	**Experimental**	**125,032**	**1,748**	**118,150**	**2,358**	**3,921**	**3,921**	**Significant**
		Control	**126,248**	**1,211**	**123,382**		**3,247**	**3,247**	**Significant**

Significant at the significance level (0.05*)

Table 5:It shows significance differences between post-tests of the two groups.

Tests	Measure Units	Experimental group		Control Group		Calculated T	Error Level	Significance of Differences
		M	S . D	M	S.D			
Speed Endurance	**sec.**	85,632	1,530	90,390	2,200	3,970	0,004	Significant
Measurement of pulse difference before and after exertion	**Beats/min**	110,4	2,739	115	3,0209	4,982	0,001	Significant
Lactic acid measurement	**Mml/lit.**	14,840	0,7021	13,420	0,249	4,262	0,003	Significant
VO2max	**Millimeter/ kg/min**	68,72	2,132	62,18	2,569	4,380	0,002	Significant
800m performance	**Sec**	118,150	2,689	123,382	2,357	3,271	0,011	Significant

Significant at the significance level (0.05)*

The discussion:

The results of Table (3 & 4) show that there are significant differences in the variables between the pre and post- tests of the two research groups and in favor of post tests, and the researchers attribute this result to the intensive tempo exercises that applied to the experimental group of 800-meter, which led to the occurrence of physiological and physical had adaptations an effective effect in the program prepared and regulated according to the components of the training load, as the exercises included various distances from the race distance performed according to stresses that change with the change of distance and speed, as the speed gradually increases with the shortness of the distance, as the specificity of training occurs special adaptations that are generated from the special effects of the training process **[8]** as well as "The regularity of the experimental group in the exercises and the commitment to specific rest times without interruption and the seriousness that they enjoyed in

performing the exercises of different distances, intensit and time contributed to raising the efficiency of the functional systems, the practice of regular training in a serious manner leads to a change in the rates of vital functions of the body's systems and this effect appears in their responses to loads of different intensities **[9]**. The exercises that were used to determine their intensities in training, the intensive training developed speed endurance, have caused an adaptation of heart rate during the effort, which indicates the improvement of the efficiency of the circulatory system and this reflected positively on the adequacy of muscle contraction and its continuation of work according to the time of the competition, which indicates the regularity of speed during the competition distance **[10]** as it was found that athletes who practice endurance sports and practice aerobic and anaerobic exercises have large hearts, and this is a result of the type of exercises and their specificity such as those practiced by the experimental group, which worked to make the beats during the effort economically in order to ensure the volume of heart beats larger and increase in the amount of blood necessary for the working muscles, until training has a clear effect on the rate of heart rate at rest, as this rate decreases in the trained individual with the correlation with his training condition **[11],** and there is a strong relationship between each of the size of the heart muscle which is enlarged during training, and between the amount of blood that it pushes, as greater the size of heart as a result of training, the greater the amount of blood pump from the heart and more oxygen that is given through It has muscle nutrition, which means an increased level of speed endurance **[12],** as for the maximum relative oxygen consumption that represents the maximum amount of oxygen that can be transported in the blood and used by working tissues during a certain period, and that the significant increase in the rate of oxygen consumption, except for intense physical effort, indicates exerting the maximum effort possible to cover the distance in the shortest possible time, and this is a result of the effectiveness of the exercises that depended on the intensity of tempo training to implement some parts of the sessions, which reflected positively in increasing rate of oxygen consumption, and that the goal of applying training according to a prior training plan and by adopting a pre-rhythm for the intermediate times of the race and by adopting a scientific training intensities directed according to a target times that should be achieved and by using intensive tempo training by emphasizing in training to achieve acceleration and restore it after a sense of decreasing speed as much as possible it gives the rider's physical abilities to determine the ideal rhythm of the race **[13]** and this is what made the development of performance in this group. The researchers believe that the nature of the implementation of stomach exercises that depended on the division of running distances and commitment to the exercise time, which lasted in (8 weeks) development What happened with high physical ability as required, that training programs ranging from 6 to 8 weeks are carried out at the rate of (3) weekly sessions that are sufficient to have a tangible training effect on different physical abilities **[14].** He also stressed the importance of this characteristic (Peter) who mentioned that

bearing speed or anaerobic endurance helps the player to run quickly despite the formation of lactic acid [15].

And that the oxygen consumption is an integrated measure of the most important vital organs during performance, which are the respiratory system, the circulatory system, the muscle and the blood, so physiological laboratories depend on it to evaluate the athlete's training and physiological condition**[16].** As the heart rate is a good indicator that reflects the health of the heart and circulatory system in the runners and its habit of exercising muscular work and also leads to an increase in the volume of cardiac output, which leads to an increase in the amount of oxygen paid to the tissues in one stroke, which helps to continue to work in a regular and healthy way For a longer period without feeling tired**[17].** As most of the changes resulting from training usually take place during the first period of the program within 6-8 weeks[**18].**

Conclusions:

1.The results showed the evolution of speed endurance between pre and post measurement through intensive tempo training for the experimental group and in favor of post measurement .

2.The results showed a development between pre and post measurement at the time of completion of 800 meters players of the experimental group and in favor of post measurement.

Recommendations:

The researchers recommend :

1.Attention in developing speed endurance because it has a direct effect in developing performance in middle distance athletics races.

2.Conducting similar studies on other groups and for both genders in athletics competitions.

References

1 -Alam Dar Al :-Learning Kinetic and Sports Training 1- Muhammad Othman , Kuwait, 1994, p. 493.

2 -Abu Al-Ela Ahmed Abdel-Fattah : Carrying Training and the Health of the Athlete, the Pros and the Risks p77. Arab Thought House, Cairo, 1996, :Track and Field Competitions - Learn in - Technique – Training , 3- A .Bastwissi 1st Edition, Cairo p88. , Dar al-fiker al araby ,4- Hussein Ali Hussain and Amer Fakher Shaghati: Strategies, Methods of Sports Training 1st Edition, Baghdad , Al-Nour Office , 2010. pg. 236.

5- Matthew Fraser Moat: Athletics Coach. Scientific journal issued by the British Union for the Athletics ,p23 2010

6- H, M. Hazaa: Laboratory Experiments in Physical Exhaustion Positions, King Saud University, Deanship of Library Affairs, 1992

7- Abu El-Ela Ahmed Abdel-Fattah: Development and Measurement of Maximum Oxygen Consumption for Middle and Long Distance

Runners, Athletics Bulletin, Issue p23 of 1999, Cairo, Regional Development Center.
8- Macardle, W.O. et al: Exercise physiology, Energy, Nutration and ---Human performance Lea and Febiger., 1981.
9- Nemtesv.Oleg; Foot Placement by elite sprinters during bend running. NSA, 2011.
10- Clausen .J.P : Effect of training on Cardio vascular Adjustments to Exercise Physical, U.S.A, 1979, p779.
11- Fox & Mathews (1996) The physiological basis of physical Education and Athletics , 2 ed W.B. Saunders company .
12- Fitzeraled.L: Overtraining Increase the susceptibility of infection. Int, J. of sport med. Stuttgart. pp(98-99)1991.
13- Bahaa El-Din Ibrahim Salama: Why training on flat, high and sloping ground for long distance players, Athletics Bulletin, Issue 25, 1999, International Athletics Federation, Cairo.
14- Lasse Mekkelson: How to train to become a top distance runner. In New studies in athletics. No. 4 . 1996.
15- Peter J.L. Thompson: Introduction to Training Theories (translation), Regional Development Center in Cairo, International Federation Amateur Athletics, Cairo, 1996, p.16.
16- Bahaa El Din Salama: Athletics Bulletin, Cairo, Regional Development Center, 2002,: 67.
17- Ibrahim El Sakar and others: Encyclopedia of Track Competition Physiology, Book Center for Publishing, Cairo, 2006 .: 94.
18- Abu Al-Ela Ahmed: Carrying Training and Athlete's Health, Cairo, Dar Al-Fikr Al-Arabi, 1996, p. 32.