



ISSN Print: 2664-7559  
ISSN Online: 2664-7567  
IJSHPE 2023; 5(2): 09-11  
[www.physicaleducationjournal.in](http://www.physicaleducationjournal.in)  
Received: 05-05-2023  
Accepted: 13-06-2023

**Dr. Amer Mohamed Nasser**  
Assistant Professor, College of  
Physical Education and Sport  
Sciences, Wasit University,  
Iraq

**Dr. Karrar Abdul Karim  
Khudair**  
Lecturer, College of Physical  
Education and Sport Sciences,  
Wasit University, Iraq

**MA Ammar Samir**  
College of Physical Education  
and Sport Sciences, Wasit  
University, Iraq

**Corresponding Author:**  
**Dr. Amer Mohamed Nasser**  
Assistant Professor, College of  
Physical Education and Sport  
Sciences, Wasit University,  
Iraq

# International Journal of Sports, Health and Physical Education

## The effect of frequent high-intensity training in terms of the concentration of lactic acid in the blood and the development of endurance speed and achievement of 400 m runners for young men

**Dr. Amer Mohamed Nasser, Dr. Karrar Abdul Karim Khudair and MA Ammar Samir**

DOI: <https://doi.org/10.33545/26647559.2023.v5.i2a.71>

### Abstract

The incredible advancements in the fields of training and physiology, along with the resulting functional responses and adaptations, aim to enhance the performance of players and help them reach their highest potential without any negative effects on their functionality or physical well-being. To minimize time wastage, the researcher employed an experimental approach, utilizing a single group with both pretest and posttest assessments.

The study focused on a community of young runners participating in 400-meter races in clubs within Wasit Governorate. The community consisted of five runners. The findings indicated that frequent training has a positive impact on improving lactic acid levels, speed endurance, and overall digital achievement.

**Keywords:** Frequent training, lactic, speed endurance, 400 m

### Introduction

The development of physical performance requires multifaceted factors and goals that enable the player to reach the desired goal, including proper planning of training loads by increasing them, aiming to bring about a number of physiological and biological changes in order to develop the physical and functional side and its skill returns. Often resorting to training loads of different intensity and size during training units or Mini and medium training circuits, the aim of which is to stimulate the vital and functional organs of the body and raise the high level to create positive adaptations without harming them. And the remarkable progress in the science of training and physiology and what it provides of functional responses and adaptations, the purpose of which is to develop the player's performance and reach it to the highest possible level without the occurrence of effects in the functional or physical aspect for the purpose of saving time for training and training units, as studies confirm (Amer Fakher Shaghatai, 2011) <sup>[5]</sup> that the effectiveness The 400-m run is one of the activities that is characterized by the ability to carry the speed in particular, because it combines speed and the endurance capacity, which is characterized by the balance of steps at the same level during the distance with a speed less than the maximum, i. whose time falls between (30-60) seconds, it falls within the anaerobic lactic system associated with the accumulation of lactic acid in muscle fibers and blood, which creates special resistances through the enemy with the occurrence of metabolic processes in the body and cells through the foregoing. The importance of research lies in the development of high frequency exercises the intensity or intensity through which the runner adapts to the 400 m event.

The effectiveness of the 400-meter run has become one of the fast runs that require the runner to have high physical capabilities for the purpose of maintaining the level of performance for the distance traveled, as well as carrying the pain of the energy waste produced during the distance. The appearance of lactic acid pain in the muscle fibers and the lack of resistance to fatigue in maintaining the same level of steps at the beginning of the race, which leads to excessive time taken. Waste of time spent on this distance.

**Research objectives**

1. Preparing frequent intensity exercises and their impact on the development of lactic acid, speed endurance and digital achievement for young 400 m runners.
2. Identifying the effect of training on the development of lactic acid, speed endurance and digital achievement of young 400 m runners.

**Research hypotheses**

1. There are significant differences between the pre and posttest in the variable of lactic acid in favor of the post test.
2. There are significant differences between the significance between the pre and posttest in the speed endurance variable in favor of the posttest.

**Research Methodology**

The researcher used the experimental approach due to its suitability to the nature of the research by designing one group with one pretest and one posttest.

**Research community and sample**

The research community was represented by 400-meter runners for young people in the clubs of Wasit Governorate (Kut, Al-Moufaqia, Wasit, Al-Azza, Al-Azizia) and they numbered five runners. The research sample was deliberately chosen and they represent 100% of the research community.

**Methods, devices and tools used in the research**

- Japanese-made weight and height measuring device
- 6 electronic stopwatches
- Electronic calculator
- Whistle
- Medical tools and alcohol
- Cotton
- Lactic acid device
- Kit

**Tests Used**

**400 m sprint achievement test**

Description of the test: The runner sits on the starting line and starts from sitting.

**Measure the concentration of lactic acid in the blood**

The purpose of the measurement: to know the level of lactic acid concentration in the blood after five minutes of physical effort for the 400 m run, and this period is suitable to ensure the transfer of lactic acid from the muscles to the blood. The reading begins in the device within 60 seconds, and the final reading indicates the level of acid concentration (Hazaa, 1995) <sup>[1]</sup>.

**Speed endurance test**

**Test name:** 300-meter run test with endurance.

**The purpose of the test:** to measure speed endurance.

**Description of the test:** The tester stands at the starting line from the standing position and gets ready when he hears the whistle. He starts running so that he runs the test distance at the finish line. He holds the tester and then records the time taken for a distance of 300 meters to the nearest 0.01 part per second (Amer, 2022) <sup>[2]</sup>.

**Pre-tests**

The researcher, accompanied by the assistant work team, conducted the pre-tests on the research sample at exactly five o'clock in the afternoon on 1/3/2023 at the athletics track in the Al-Kout Olympic Stadium. After giving a rest period (40 minutes), a 300m speed endurance test was performed.

**Training curriculum**

After the completion of the pre-test, the implementation of the training curriculum began, which took (8) weeks, at the rate of three training units per week, as the researchers began implementing the training curriculum on 3/3/2023 AD. It includes distances chosen by experts based on the principles of the science of sports training and taking into account the fluctuation and gradient in the training load.

**Design and implementation of the training curriculum**

The training curriculum for the research was designed and developed by the researchers, and this curriculum was presented to a group of trainers, to determine the validity of the training curriculum, and after taking into account the observations and opinions of the specialists, and after the researchers finished applying all the prior physical tests, the training curriculum was implemented on the sample on the date (3/3/2023) to (3/5/2023)

**Posttest**

Post-tests were conducted for the sample with the help of the assistant work team, on 5/5/2023. The researchers followed the same steps that they followed in the pre-test, after completing the prescribed period of the experiment, which lasted (8) weeks. The researchers were keen to find all the conditions in terms of location time and means of testing.

**Statistical means**

The researchers used the statistical bag (spss) to process the data:

**Results**

**Table 1:** View pre and post test results for physical tests and lactic acid concentration

variants	Pre-test		posttest		T-test	Significant
	Arithmetic mean	standard deviation	Arithmetic mean	standard deviation		
lactic acid	14,09	1,65	17,03	1,45	4,25	sig
Speed endurance 300 m	42,01	0,999	39,067	0,844	6,776	sig
Achievement sprint 400 m	56,00	1,011	53,067	1,433	0,012	sig

**Discussion**

Through the results that appeared in the pre and posttests, it was found that there are clear differences in the post tests of the variables of research and achievement through the appearance of high amounts of lactic acid, which indicates that frequent training of high intensity with proportional training distances, as well as the accumulation of lactic acid

in muscle fibers and blood, which It leads to an effect on the physical and physiological state and the lack of oxygen, which causes the adaptations of these functional organs and the cardiac impulse to provide large amounts of oxygen and blood and the expansion of the capillaries to provide the muscles with the largest amount of oxygen during the amounts of paid blood for the purpose of resisting fatigue and

pain, lactic acid and energy waste in muscle fibers for the longest period. It is possible with tolerating the amounts of acid and continuing the physical performance through repetitions and frequent training (Abu El-Ela, 1999) <sup>[3]</sup> (BB Hasan & AA Hasan, 2022) <sup>[4]</sup>.

The muscular work does not exceed a minute for most activities such as running (400) meters. The lactic system helps the circulatory system to get rid of lactic acid through the blood as a result of the cardiac impulse, the density of capillaries and the distribution of blood flow, which helps the activity of the enzyme (LDH) in the metabolism of acid. Therefore, any increase in enzyme activity is accompanied by an increase in the elimination of lactic acid. As a result of this diligent work through communication in the training process, adaptation occurs when the hostility and the development of devices as well as systems in the process of the chemical balance of the blood through the acidity resulting from lactic acidity and pain tolerance that leads to Developing the level of endurance and raising the level of runner, which through distances for frequent training creates continuity in the work that is commensurate with the amounts of blood connected to the muscle fibers and oxygen, through which a development occurs in the level of performance as stressed (Amer Fakher Shaghati<sup>2</sup>) (BB Hasan, 021) on muscular work without the use External oxygen and dependence on stored energy, and because carbon dioxide cannot be removed directly through the lungs, lactic acid is formed in the muscle fibers, and through this process, the runner can endure the effort for the longest possible period, and through alternating work in frequent training, which also causes adaptations at the cell level. Possible through raising the level of endurance and digital achievement. Therefore, endurance of speed requires high efficiency of functional devices that work with high intensity in order to achieve the goal of endurance speed with the accompanying largest amount of lactic acid, which is an indicator of development (Salama, 1990) <sup>[7]</sup> (Banwan, B. H. (2018) <sup>[8]</sup>.

### Conclusion

1. There is an effect of frequent exercises in improving the level of lactic acid, speed endurance and digital achievement.
2. Frequent exercises have an effect on improving the performance level of 400 m runners for youth.
3. Significant differences appeared between the pre and posttest in the research variables in favor of the post test.

### Recommendations

1. The need for trainers to pay attention to frequent high-intensity exercises.
2. The need for trainers to take care of tracking physiological measurements.
3. Conducting research and similar studies on other activities with frequent training.

### References

1. Al-Hazzaa H. Maximal oxygen uptake, ventilatory anaerobic threshold, and endurance running performance in elite Saudi distance runners. *Saudi Medical J.* 1995;16:545-551.
2. Amer Muhammad Nasser. *The Science of Sports Training, Foundations and Rules of the Coach*, Iraq, Dar Al-Diyaa for Printing, Najaf; c2022.
3. Abu El-Ela, Ahmed Abdel-Fattah. *Development and Measuring the Maximum Oxygen Consumption for*

4. Middle- and Long-Distance Runners, Cairo, Regional Development Center; c1999.
4. Hasan BB, Hasan AA. Effect of Using Rubber Band and Kinesio Taping as a Rehabilitation Program to Treat Gymnasium Players with Chronic Shoulder Pain: Randomized Trial. *Revista iberoamericana de psicología del ejercicio y el deporte.* 2022;17(3):146-149.
5. Amer Fakher Shaghati. *The Science of Sports Training, Training Systems for juniors for Higher Levels*, Baghdad, Bab Al-Moazem, Al-Nour Office; c2011.
6. Hasan BB. The effectiveness of the (FIFA 2011+) program in preventing injuries to the lower part of the amateur pentathlon players in Wasit Governorate. *Wasit Journal of Sport Sciences*; c2021. p. 1 (الثالث).
7. Bahaa El-Din Ibrahim Salama. *Biochemistry in the Mathematical Field*, Cairo, Minia University; c1990.
8. Banwan BH. *The effect of a rehabilitation approach using Kinesio tapes and therapy in the rehabilitation of athletes with partial rupture of the hamstring muscles* (Doctoral dissertation, Ph.D. thesis, College of Physical Education and Sports Sciences, University of Baghdad); c2018.