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The effect of aerobic exercises on the development of speed endurance according to the measurement of (VO_2 MAX), hemoglobin in the blood, and the digital achievement of 5000 m runners for young men

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Abstract
The study aimed to investigate the effects of training on the development of speed endurance, VO_2 MAX, blood hemoglobin, and achievement in young 5000 m runners. The researchers utilized an experimental approach, which was deemed suitable for the nature of the research. The research community consisted of long-distance runners participating in 5000 m races in clubs located in Wasit Governorate, including Kut, Al-Moufaqia, Wasit, Al-Azza, and Al-Azizia, with a total of five runners representing 100% of the community. The deliberate sample selection was chosen for the study.
The researchers obtained significant results, indicating a clear improvement in endurance speed and achievement among the sample members. The training program had a positive impact on the physiological measurements of the research sample, indicating the success of the training method in enhancing physical capabilities. Based on the findings and conclusions, the researchers recommended the adoption of the training program developed by the researcher for training youth groups, as it demonstrated positive effects on physical development. They also suggested further research and studies to be conducted in similar events to expand the understanding of the topic.

Keywords: Aerobic exercises, speed endurance, blood hemoglobin, 5000 m

Introduction
The world of sports, both globally and in the Arab world, has seen significant advancements and continuous development in both scientific and practical aspects. This is evident in the increasing numbers of achievements and performances in athletic events, particularly in long-distance events such as the 5000-meter run, which has witnessed remarkable progress. This progress can be attributed to the concerted efforts between coaches and runners to overcome challenges, improve performance, and endure the rigorous training loads associated with long-distance running. Maintaining high levels of performance in the 5000-meter run requires special physical capabilities, as runners must sustain their pace until the final meters in order to achieve top rankings and surpass their previous achievements. However, there are challenges that arise during races, such as the increasing steps and racing conditions, which can affect the coordination between maintaining performance levels and pacing strategies, especially in the last rounds or the last thousand meters of the race. This indicates that there may be weaknesses in the speed endurance of runners, particularly observed in youth club races where a decline in running levels has been noticed.
In light of these observations, this study aims to investigate the challenges faced by runners in maintaining speed endurance during the 5000-meter run and the potential weaknesses in their performance. By examining the physical adaptations required for this level of endurance and considering the coordination between maintaining performance levels and pacing strategies, this study seeks to provide insights into improving speed endurance in the 5000-meter run.

Study Objectives
1. To design and implement a specialized speed endurance training program for young 5000 m runners.

2. To investigate the impact of the training program on the development of speed endurance, VO_2 MAX, blood hemoglobin levels, and athletic achievement in young 5000 m runners.

Study Hypotheses

1. There will be significant differences observed in speed endurance and athletic achievement scores between the pre-test and post-test assessments after the implementation of the training program.
2. There will be significant differences observed in VO_2 MAX and blood hemoglobin levels between the pre-test and post-test assessments after the implementation of the training program.

Methodology of the Study

The researcher employed an experimental approach as it was deemed suitable for the nature of the research. The design consisted of one group with both pretest and posttest measures.

Study Population and Sample

The research was conducted among long-distance runners specializing in 5000 m races, who were affiliated with clubs located in Wasit Governorate, including Kut, Al-Moufaqia, Wasit, Al-Azza, and Al-Azizia. The sample consisted of five runners, as shown in Table (1).

Table 1: Statistical parameters to find the homogeneity of the research sample

Significance	Skewness	Median	Standard deviation	Arithmetic mean	unit of measure	Statistical parameters Variables
Homogeneous	0.405	167.50	5.054	167.58	cim	Height
Homogeneous	-0.048	63.50	3.298	63.17	kg	Mass
Homogeneous	0.719	3.5000	0.7785	3.66	year	Training age

Methods, Devices, and Tools Used in the Research

1. weight and height measuring device (Japanese-made)
2. six electronic stopwatches
3. Electronic calculator
4. Whistle
5. Medical materials
6. Cotton
7. alcohol
8. Test tubes with anticoagulant plastic tubes

Tests Used

1. Speed Endurance Test - 1000 Meters Run

Test Name: Speed Endurance Test - 1000 Meters Run

Aim of the test: To assess the speed endurance of the participants.

Performance and recording method: The research sample stands on the starting line, which is 200 meters away from the high starting position. When one of the assistant team members blows the whistle, the participants start running, and the timer starts the stopwatch. The participants run the first 200 meters and then complete the remaining 800 meters, totaling 1000 meters. When a participant completes the 1000 meters, the timer stops the stopwatch and records the time taken for each runner. (Shaghati, 2011) [2].

2. Achievement of Running - 5000 Meters

Test Name: Achievement of Running - 5000 Meters

Aim of the test: To assess the achievement of running 5000 meters for the participants.

Performance and recording method: The participants start from the starting line, which is 200 meters away from the high starting position. When the whistle is blown by one of the assistant team members, the participants start running, and the timekeeper starts the stopwatch. The participants complete 12 and a half laps around the track, totaling 5000 meters. When a participant reaches the finish line, the research team stops the stopwatch and records the time taken for each participant to complete the distance. Note: All necessary precautions were taken to ensure the accuracy and safety of the measurements and tests during the research Physiological measurements

Physiological measurements

1. Hemoglobin Analysis

The method of analyzing hemoglobin involved withdrawing a blood sample of 25 cm^3 from the runner's arm, specifically venous blood. The blood sample was preserved by placing it in anticoagulant preservative tubes containing EDTA for transfer to the laboratory for hemoglobin examination. Only a sufficient amount of blood was considered for this purpose and was then placed in a prepared tube containing 5 milliliters of diluted Draskin solution. The mixture was thoroughly mixed in a device, and the results were obtained at a wavelength of 540 nm. (Salama, 1990) [4].

2. Maximum Oxygen Consumption (VO_2 MAX)

VO_2 MAX was determined through a pre- and post-performance test. The distance traveled was multiplied by 5000 meters and then divided by the time taken by each runner. The result was then multiplied by 3.5 milliliters/kg/min to obtain the maximum oxygen consumption value for each runner. (Abu El-Ola, 1999) [1].

Study Procedures

Pre-tests were conducted by the researcher and the assistant work team. The tests included a speed endurance test of 1000 meters and physiological variable measurements. The pre-tests were conducted at exactly five o'clock in the afternoon on 10-12/2/2023 at the athletics track in the Al-Kout Olympic Stadium.

Training Curriculum

After the completion of the pre-tests, the training curriculum was implemented for a period of 8 weeks, with three training units per week. The researcher started implementing the training curriculum on 2/15/2023, based on distances chosen by experts following the principles of sports training and considering the fluctuation and gradient in the training load.

Design and Implementation of Training Curriculum

The training curriculum was designed and developed by the researcher, and its validity was determined by a group of trainers who provided feedback and suggestions. After completing all the pre-tests, the training curriculum was implemented on the sample from 15/2/2023 until 15/4/2023.

Post-tests

Post-tests were conducted for the sample with the assistance of the work team on 17-18/4/2023, following the same steps

as the pre-tests. The tests were conducted after the prescribed 8-week period of the experiment, with careful consideration of the place, time, and means of testing.

Statistical Analysis
Data processing was performed using the statistical software SPSS.

Presentation and Discussion of Results
The results of the pre- and post-tests for physical tests and physiological measurements will be presented and discussed.

Table 2: Shows the results of pre and post measurements of physical tests and physiological measurements

Sig or not	The level of confidence	T-test	Post-tests		Pre-tests		Variants
			Standard deviation	Median	Standard deviation	Median	
sig	0,019	3,796	0,034	2,534	0,061	3,084	Endurance speed
sig	0,005	18,50	0,249	16,180	0,129	17,01	Achievement 5000
sig	0,002	7,203	0,083	13,920	0,421	12,660	hemoglobin
sig	0,000	16,48	0,983	64,906	0,702	62,062	VO_2 MAX

Discussion of Results
The results obtained from the pre- and post-tests revealed significant differences in the post-test outcomes for the research variables and achievement. The physical effort test or competition, which focused on developing endurance speed and rhythm, led to enhanced cardiovascular function, including improved heart performance and cardiac impulse alternation with the respiratory system. This resulted in increased oxygen delivery to the body through hemoglobin in the blood (Kharibet, Abu Ela, 2016) [7], which facilitated the supply of oxygen and nutrients from food to the working muscles during physical exertion. As a result, the research sample was able to cover greater distances while consuming the maximum amount of oxygen and efficiently alternating between outside air and pulmonary alveoli to supply the muscles (Hasan. B.B, 2021) [5]. The activation of hemoglobin in the blood further facilitated maximum oxygen consumption and raised the overall aerobic capacity of the muscles through adaptations that occur with regular exercise. Consequently, the digital achievements of the research sample reached their highest level. (Nasser, 2022) (Hasan. B.B, 2022) [6].

Conclusions
1. The research sample demonstrated significant development in endurance speed and achievement.
2. The training program had a positive and effective impact on the physiological measurements of the research sample, as evident from the comparison of pre- and post-test results.
3. The training method employed in the study was successful in developing the physical capabilities of the research sample.

Recommendations
1. Adoption of the training program developed by the researcher for training youth, given its positive impact on physical abilities.
2. Availability of appropriate and modern training methods to enhance the physical capabilities of both research groups.
3. Conducting similar research and studies in other activities to further investigate the effectiveness of the training program.

References

1. Abu El-Ola, Ahmed Abdel-Fattah: Development and Measuring the Maximum Oxygen Consumption for Middle and Long Distance Runners, Cairo, Regional Development Center; c1999.
2. Amer Fakher Shaghati. The Science of Sports Training, Training Systems for Juniors for Higher Levels, Baghdad, Bab Al-Moazem, Al-Nour Office; c2011.
3. Amer Muhammad Nasser. The Science of Sports Training, Foundations and Rules of the Coach, Iraq, Dar Al-Diyaa for Printing, Najaf; c2022.
4. Bahaa El-Din, Ibrahim Salama. Biochemistry in the Mathematical Field, Cairo, Minia University; c1990.
5. Hasan BB. he 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, *1*(الثالث); c2021.
6. Hasan BB. The Effect of Special Exercises on the Acute Rehabilitation of the Reconstructed Anterior Cruciate Ligament for Football Players. Wasit Journal of Sports Sciences. 12(الرابع); c2022
7. Raysan Khreibet, Abu El-Ela Ahmed Abdel-Fattah: Sports Training, Cairo, Al-Kitab Center for Publishing; c2016.

Training Curriculum Supplement

Intensity	Rest	Exercises	Days	Weeks
75 %	1 M	15 × م400	Mandy	First
75 %	3 M	6 × 1000	Thursday	
80 %	5-10 M	2 × م1000 + م800 + م600	Mandy	Second
80 %	5 M	3× م1200	Thursday	
85 %	2 M	20 × م 200	Mandy	Third
85 %	5 M	5 × م 1000	Thursday	
80 %	5 M	3 × م 2000	Mandy	Forth
80 %	5 M	5 × 800	Thursday	
85 %	5 M	م 1000 + م 800 + م600 + م400	Mandy	Fifth
85 %	7 M	3 × م 2000	Thursday	
90 %	5 M	10 × م 200	Mandy	Sixth
90 %	5 M	3 × م 1200	Thursday	
95 %	10 M	2 × م 3000	Mandy	Seventh
95 %	10 M	م 1000 + م 800 + م 600	Thursday	
90 %	7 M	3 × م 1200	Mandy	Eighth
90 %	5 M	م 1200 + م 1000 + م 800	Thursday	