

THE EFFECT OF SPECIAL EXERCISES AND BETA-CAROTENE INTAKE ON SOME PHYSICAL VARIABLES AND RECOVERY SPEED FOR 400-METER HURDLES ATHLETES

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ABSTRACT

Nutrition plays a major role in the recovery process and replenishes energy sources for players. It also works as antioxidants and improves the level of players. Therefore, the research study aimed to prepare exercises accompanying beta-carotene intake to improve the recovery process and some physical variables for 400-meter hurdles players. The research community included 400-meter players at Ain Al-Tamr Club. The athlete - Iraq - Al-Ghadhariya, which numbered 10 players. The research sample was divided into two experimental groups (control) and experimental, equally. The researcher used special exercises (recovery) at the end of the main part of the training unit for the coach, with a time of approximately (15) minutes. The recuperative exercises were used, including the Massage using (roller, cold compresses, ice bags) and aerobic exercises (stretching the muscles) for the purpose of accelerating the recovery process after the great effort of the training units, while taking beta-carotene in one dose daily. The first experimental group (control) used recovery exercises only, relying on the instructions of the trainer from The nutritional program also used the same exercises for the second experimental group, along with taking a dose of beta-carotene after lunch every day for one month and under the supervision of a specialist doctor. The researcher concluded. The recovery exercises prepared by the researcher, accompanied by beta-carotene as an antioxidant, have a clear positive impact on the recovery process and the improvement of variables through the development that occurs in the level of strength endurance and speed endurance of the players. Eating carotene contributed to improving the maximum level of oxygen consumption, so the researcher recommends that players take nutritional supplements and antioxidants to compensate for the deficiency in meals, especially beta-carotene as an antioxidant because of its major role in the player's recovery processes.

Keywords: *Special exercises ,beta-carotene and recovery.*

INTRODUCTION

Athletics is one of the individual games that have special features and whose style and mastery depend on following plans, the sound scientific method, and the use of modern methods in sports training and recovery for all its competitions, which cause adaptation in the internal functional systems of the player's body as a result of the training loads to which the player is exposed, including the nervous system. - Muscular, and the total exercises and exercises that the player performs lead to a state of catabolism and exhaustion of energy sources, which requires restoring recovery and rebuilding energy sources through correct nutrition based on scientific foundations and according to the calories expended, that is, according to the player's body's need for them. Given the role that nutritional supplements play for the player, since the exercises that the player performs at a high intensity require good nutrition, natural nutrition may not be at a sufficient level for the player, and in order for nutrition to be compensated, one must resort to important nutritional supplements that help him in the recovery process, including beta-carotene, which It is considered an important antioxidant and reduces muscle inflammation that results from high-intensity training and gets rid of free radicals left behind by the body.¹ It also gives us more accurate and objective pictures of the course of the training, physiological and chemical processes taking place in the player's body systems, thus increasing the clarity of the vision of the functional systems that work as an integrated system to complete work requirements. Functional and release the energy necessary for neuromuscular work. Hence the importance of the research lies in studying the effect of special exercises with beta-carotene intake and their role in improving the recovery process for youth 400 meter hurdles athletes.

Research problem

The important and correct nutrition for the player is one of the things that the player must be aware of in order to aspire to reach an advanced level in competitions, as it is one of the priorities that must be taken into account in the training process in a way that is consistent with the nature of the intensity of training and competition, and that any deficiency in the player's nutrition directly affects it. It is significant in the level of recovery, and therefore there is no development in the player's physical and skill level, and beta-carotene is an antioxidant necessary to increase the body's immunity, reduce inflammation, and get rid of free radicals resulting from intense training, and this greatly affects the player's recovery processes, and thus this deficiency affects the level of muscle strength. Physical attributes and other physical abilities, and what we observe in the 400-meter hurdles competition for young people in terms of high-intensity exercises and training, the athlete's body may not be able to compensate for the expended energy, get rid of free radicals, and reach excess compensation, and this affects the level of the athlete's physical and functional development.

Research objectives

1. Identifying the effect of special exercises in improving recovery, some physical variables, and VO2 max for young 400-meter hurdlers.
2. Identify the effect of special exercises associated with taking beta-carotene in improving recovery, some physical variables, and VO2 max for young 400-meter hurdles.

Research hypothesis

- There is a positive effect of special exercises and beta-carotene on some physical abilities and VO2 max for young 400-meter hurdles athletes.

Research field

- Human field: 400 meter hurdles players for youth clubs (Ain al-Tamer - Iraq - Al-Ghadriyah) for the 2023-2024 season.
- Spatial field: Olympic Stadium in Holy Karbala
- Time period: The period from 1/15/2024 to 3/25/2024.

RESEARCH METHODOLOGY AND FIELD PROCEDURES

Research Methodology

The researcher used the experimental method to suit the nature of the research problem he posed

Research population and sample

The research community included young 400-meter hurdles players in (Ain Al-Tamar Club, Iraq, and Al-Ghadhariya), who numbered 10 players, and they represented the research community, that is, 100%. The research sample was divided into two experimental groups, control and experimental.

Equivalence and homogeneity of the research sample

Table 1. Shows the Levene value, the calculated T value, and the significance level of the research variables

Variables	Control group		Experimental group		T value*	Sig.	Levene value	Sig.	Indication
	Mean	STD	Mean	STD					
Endurance speed	30.2	1.30	29.4	1.14	1.03	0.3	1.88	0.43	Non sig.
Bearing strength for the legs	15.2	0.83	16	1.58	1	0.3	1.76	0.2	Non sig.
Vo2max	36.2	2.28	36.8	1.30	0.51	0.6	2.43	0.15	Non sig.

* Below a significance level of (0.05) and a degree of freedom of 8.

Devices and tools used

- Centrifuge (centrifuge).
- Beurer heart rate monitor to measure vo2max.
- Glass platform.
- Plastic tubes that contain the anticoagulant (EDTA).
- Electronic scale.
- I saw a barbell and different weights.
- Massage roll.
- Plastic bags.
- Electronic stop watch.
- Chest belt.
- Measuring tape.
- Whistle number (1).
- Rubber joint.

Tests and measurements used in the research

1. Name of the test: Shuttle running test (25×8) from a high start (standing)²

- The aim of the test: to measure the speed endurance of the tested player
- Tools required for the test: measuring tape, adhesive tape, electronic stopwatch, playground, and whistle.
- Description of the test: Two parallel lines are drawn with a distance of (25) meters between them. The tested athlete stands at the starting line, and upon the signal from the researcher, the athlete runs as quickly as possible towards the second line, touching it with one of his feet, then turns around to return to the starting line from which he started, and the tested athlete repeats this performance (8).) times to become 8 x 25 metres, and the total distance of the laboratory is (200) metres
- Recording: The tested player records the time he took to cover the distance in seconds and its fractions only once

2. Squat deep test for the legs³

- Purpose of the test: to measure the force endurance of the legs.
- Devices and tools used in the test: Smith device - iron discs weighing 25 kg.
- Description of the test: The tested athlete carries weight on the back area of the shoulders behind the neck. The tested athlete bends and extends the legs to the point of fatigue while lifting a weight that does not exceed 25-30% of the athlete’s maximum weight.
- Recording: The recording is for the number of correct times of descending and ascending for the tested player.

3. VO2MAX estimation test³

- Objective of the test: The maximum oxygen consumption is measured with a device called a heart rate monitor, which consists of three parts:
 - The heart rate monitor, which resembles a manual watch, contains a number of keys, namely (Stop/Start, change test functions, Option set, change test menus)
 - Chest strap
 - Elastic tension
 - Test measurement method:

- The laboratory wears the device on the wrist so that it is not more than 70 cm away from the chest belt to receive the signals emitted from the sensors in the chest belt. The chest belt is fixed under the chest muscle using a rubber connector, and a medical liquid is placed on the sensors touching the skin of the laboratory to increase communication and send signals to the heart rate monitor, with the “beurer” sign directed forward.
- Enter the tester’s personal information (age, weight, height, maximum pulse) into the test device.
- Press the (start) button to start the test, as a period of 5 minutes is given for preparation, after which audio signals are given by the device 10 seconds before, and the last second is a long whistle to start the running process by the selected player.
- Continuous running by the player for a distance of (1600 metres), equivalent to four laps on the field of the arena and field.
- After completing the distance and reaching the finish line, press the (stop) button to stop the testing process. We notice a number showing the VO2MAX that is saved in the device’s memory.

Pre-test

The researcher conducted pre-tests for the research sample on Saturday, 3/27/2024, as the tests were conducted at the Olympic Stadium in Karbala Governorate at three o’clock in the evening.

The main research experience

The researcher used special (recovery) exercises at the end of the main part of the training unit for the trainer and in a time not exceeding approximately (20-25) minutes. The recuperative exercises were used, including massage using rollers and cold compresses (ice bags) and relaxation aerobic exercises (stretching the muscles) for the purpose of accelerating the process of Recovery after great physical exertion for both groups, where the (control) group used recovery exercises only, relying on the coach’s directions in terms of the players’ nutritional program. The experimental group also used the same recovery exercises, but with taking a single dose of beta-carotene, 450 international units, made in the United States, daily for a period of time. Two months and under the supervision and follow-up of the researcher and a specialist doctor.

Posttest

The researcher conducted the post-tests on Monday, 3/25/2024, under the same conditions as were in the pre-tests, as much as possible.

RESULTS AND DISCUSSIONS

- **Presenting the differences between pre- and post-discrimination and their effect**

Table 2. Shows the differences between the pre- and post-tests in the variables investigated for the control group

Variables	Pretest		Posttest		T value*	Sig.	Indication
	Mean	STD	Mean	STD			
Endurance speed	29.4	1.14	28	0.7	2.06	0.18	Sig.
Bearing strength for the legs	16	1.58	18.2	0.83	2.99	0.04	Sig.
Vo2max	36.8	1.30	40.4	1.34	5.30	0.02	Sig.

* At a significance level of (0.05) and a degree of freedom of 4.

It was revealed through the results of the pre- and post-tests for the control group that there were significant differences between the pre- and post-tests in the variables studied. This means that the hospitalization exercises followed had an impact on the research variables.

- **Presentation and analysis of the differences between the pre- and post-tests of the experimental group**

Table 3. Shows the differences between the pre- and post-tests of the variables investigated for the experimental group

Variables	Pretest		Posttest		T value*	Sig.	Indication
	Mean	STD	Mean	STD			
Endurance speed	30.2	1.30	23	1.58	8.37	0.01	Sig.

Bearing strength for the legs	15.2	0.83	20.8	0.8	22.86	0.00	Sig.
Vo2max	36.2	2.28	45.8	1.30	7.94	0.00	Sig.

* At a significance level of (0.05) and a degree of freedom of 4.

After presenting the results of the pre- and post-tests to the experimental group, it appeared that there were statistically significant differences between the pre- and post-tests for all the variables investigated, as the value of the significance level (sig) is less than the significance level (0.05), which indicates the presence of a moral difference and in favor of the post-tests, and this This indicates that beta-carotene, along with recovery exercises, has effectively contributed to improving the recovery process and replacing important elements, as well as acting as an effective antioxidant, in addition to its major role in increasing immunity and reducing inflammation in muscle tissue, which was clearly reflected in the research variables.

• **Presentation and analysis of the differences between the post-tests of the control and experimental groups**

Table 4. Shows the differences between the post-tests of the physical characteristics of the control and experimental groups

Variables	Control group		Experimental group		T value*	Sig.	Indication
	Mean	STD	Mean	STD			
Endurance speed	28	0.7	23	1.58	6.45	0.00	Sig.
Bearing strength for the legs	18.2	0.83	20.8	0.8	4.91	0.01	Sig.
Vo2max	40	1.34	46	1	7.48	0.00	Sig.

* At a significance level of (0.05) and a degree of freedom of 8.

Through the data that was presented in the table above, it was shown that the value of the significance level (sig) is less than the significance level (0.05) for all research variables. This indicates that the experimental group has achieved progress in the level of the studied variables. This indicates that taking beta-carotene with exercise Recovery has effectively contributed to improving the recovery processes for players and thus improving the vital functions of the circulatory and respiratory system (VO2max). This has helped speed up the process of transferring oxygen to muscle cells and thus has contributed to accelerating the recovery process and increasing the improvement of physical characteristics and abilities through the correct compensation of energy sources in addition to its role in Getting rid of free radicals of oxygen in the blood, as well as improving the level of muscle activity, as correct nutrition contributes effectively to the process of compensating for the deficiency found in athletes' foods, and thus can compensate for the existing deficiency and achieve overcompensation and development at the physical and functional level, and this is with the supplement. Nutrition contributes effectively to recovery processes also emphasized that beta-carotene has a major role in increasing immunity and reducing inflammation by increasing the body's immunity and healthy physical growth.⁴ Studies also indicate that it contributes to improving the functioning of the circulatory and respiratory system, and this was observed through the results of the vo2max test. Correct nutrition of beta-carotene has effectively contributed to reducing inflammation in the muscles as a result of microscopic cracks in the walls of muscle cells and thus has helped speed up recovery processes and accelerate development in the level of muscular strength and endurance.⁵

Planning in sports and athletic training is considered one of the most predictive methods that rely on numerous studies of the player's reality, taking into consideration the experiences, available places, material and moral capabilities, and what can be achieved for a specific goal, which is preparing athletes for recovery after the efforts made to reach the highest levels. Achievement”⁶ “The training planning is correct for many years for an athlete to reach the highest level of need, motor, psychological and emotional needs to be used during training and competition and to maintain this level for the longest period of time through the training organizer”⁷ “Developing well-rounded and organized programs based on scientific foundations works to develop the diverse, skillful, and intermediate level”⁸.

The researcher believes that the reason for saying, through the above, is that the difference in concentration, then the experimental is the regulated use and beta-carotene with the practice of recovery games in the application of training to sports training is an organized and continuous task to advance the athletes to reach the highest levels, that the organized and leads to an increase in The performance of individual ability is the result of performing exercises for days, weeks, or months, by imprinting the body's systems to perform and gaining strength”⁹.

CONCLUSIONS

1. The recuperative exercises prepared by the researcher, accompanied by beta-carotene, have a clear positive effect in improving the research variables.
2. Taking the beta-carotene nutritional supplement clearly contributed to the recovery process through the development in the level of strength endurance and speed endurance.
3. Eating carotene contributed to improving vo2max.

RECOMMENDATIONS

1. It is necessary for players to take nutritional supplements to compensate for the deficiency in the meals that the player eats.
2. Taking care of a comprehensive diet and conducting periodic checks to avoid cases of nutritional deficiency in the player.
3. It is necessary for players to take beta-carotene because of its major role in recovery and immunity processes by acting as an antioxidant and getting rid of free radicals.

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