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THE EFFECT OF HIIT TRAINING ON SOME FUNCTIONAL INDICATORS AND STRAIGHT PUNCH SPEED ENDURANCE FOR YOUNG BOXERS WEIGHING 57-63 KG

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ABSTRACT

Boxing training is characterized by strength and speed, meaning a high ability to perform offensive and defensive movements. Boxing requires high physical preparation and scientifically codified training for the purpose of raising the physical capabilities of the boxers to complete the fight, more so towards the conclusion of the second and third rounds.This requires the efficiency of the circulatory and respiratory systems, and it also requires the safety and efficiency of the nervous system for what it needs. Boxing with high concentration while maintaining high energy levels throughout the fight.

Therefore, the research study aimed to use high-intensity training for the purpose of developing the physical efficiency that a boxer needs, especially the maximum anaerobic capacity, because the dominant system is the anoxic system (lactic), as well as the enzymes that directly affect this system (LDH.CAT) and carry the speed of the straight punch of young boxers. The researcher used the experimental approach with two equal groups. The research sample was represented by young boxing players in the Iraq Club in Karbala Governorate, who numbered 10 boxers weighing 57-63 kg. High-intensity training (HIIT) was applied to the research sample at a rate of three number of sessions per week, 30 training sessions total. Through it, the training intensity was regulated to suit the nature of the method followed and the intensity of the fight. After that, post-tests were conducted for the research variables. The researcher used the statistical program SPSS to extract the research results, from which the researcher concluded that HIIT training had a significant impact on the variables investigated (maximum anoxic capacity, speed endurance). The straight punch and the LDH.CAT enzyme. In light of this, the researcher recommends the necessity of following training with intensity similar to the fight environment in order to adapt the boxers' functional systems and to avoid a rapid decline in the boxers' level during the fight.

Keywords: *HIIT Workouts , Functional Indicators , Speed and Endurance.*

INTRODUCTION

Training science is considered one of the sciences that is largely based on other sciences and is complementary to the modern training process through conducting laboratory and field experiments. Physiology is one of the important and basic sciences for advancing the reality of training by revealing the effects of training and the level of development of the body's functional systems, as well as the work of glands and enzymes and the effect of each of them. In physical effort and energy expenditure, as well as the major role in regulating stress, the safety of players, and achieving great training results, especially in games with high intensity, and whose exercises are characterized by relatively high intensity, it is accompanied by large accumulations of lactic acid and energy waste such as lactate salts and free radicals,[1] so it requires that the exercises be Constructed and codified in a sound and scientific manner, it effectively contributes to the occurrence of real adaptations and planned time periods, in addition to proper nutrition. The game of boxing, which is one of the games that requires a very great effort, and this prompts those in charge of this sport to choose exercises that suit the type of intensity, because the body's responses to high stress give the boxer Adapting to the nature of performance in terms of increasing energy stores.[2]

Therefore, exploring the application of high-intensity training (HIIT) in a competition environment similar to fighting is of great significance for young boxers.

RESEARCH PROBLEM

The ability of the athlete to continue performing skills and to withstand fatigue during physical effort requires correct training that is appropriate to the intensity to which the athlete is exposed in tournaments. One of these games is the game of boxing and the high physical abilities it requires. Through the researcher's follow-up of most of the boxers in the tournaments held by the Central Federation, he noticed that there is a weakness. In the physical fitness of many boxers, this is what prompted the researcher to use high-intensity training (HIIT) for the purpose of building functional adaptations that suit the intensity to which the boxer is exposed during the fight and to increase the boxers' tolerance for accumulations of fatigue resulting from the elevated lactic acid content in the blood.

RESEARCH OBJECTIVES

1. Preparing high-intensity training (HIIT) for young boxers weighing 57-63 kg.
2. Determine how HIIT training affects a few functional markers and young boxers' stamina for straight punch speed..

RESEARCH HYPOTHESIS

- Young boxers weighing between 57 and 63 kg benefit from HIIT training in terms of developing some functional indicators and straight punch speed endurance.

FIELD OF RESEARCH

- Human field: In 2023 AD, young boxers in the Karbala Governorate at the Iraq Club.
- Time frame: for the period from 7/1/2023 until 10/15/2023.
- Spatial field: The Iraq Boxing and Kickbox Club hall and ring. And Elite Laboratories for Medical Analysis in Karbala Governorate.

RESEARCH METHODOLOGY

To suit the nature of the research project, the researcher adopted an experimental method of pre-test and post-test with two equal experimental groups and control group.

THE RESEARCH COMMUNITY AND ITS SAMPLE

The research community was determined by the young boxers in the Iraq Club for the 2023 season, which numbered 10 boxers. Two groups (experimental and control) of five boxers each were created from the sample.

- Equality and homogeneity between the two study groups

Table 1. Displays the study variables' mean, standard deviation and t values

Variables	Experimental group		Control group		F value	Calculated (t) value *	Sig	Indication
	mean	Sd	Mean	Sd				
Anoxic capacity	34.78	1.91	35.46	1.33	1.03	0.65	0.53	Insignificant
Endurance the speed of a straight punch	128.80	4.14	126.60	3.91	0.038	0.863	0.41	Insignificant
LDH enzyme	259.08	7.20	256.40	8.94	0.567	0.522	0.61	Insignificant
CAT enzyme	447.52	16.16	452.28	9.73	0.379	0.564	0.59	Insignificant

*Degrees of freedom are 8 and significance threshold is 0.05.

It is clear from the table above that the research variables are random between the experimental and control groups.

FIELD RESEARCH PROCEDURES

DETERMINE SEARCH TESTS

First : Maximum anaerobic capacity

- Wingate .[3]
- Assessing the maximal anaerobic capacity is the test's goal.
- How to put the test into practice:

1. Mass of body.
2. Warm up on a bicycle for three to four minutes, depending on the subject's weight. The resistance was one to two kilograms. Towards the end of the warm-up, the participants spun the bicycle wheel at top speed for three to five seconds, then repeated two to three times in a row.
3. After entering the subject's data into the computer, the resistance is adjusted to be 7.5% of the subject's body weight, based on his weight.
4. The participant starts to spin the bicycle wheel as fast as possible - at least 80 revolutions per minute - for a maximum of three seconds. The patient then continues to spin the wheel for a while while the weight is gradually reduced, pressing the start program button to start the measurement process. For 30 seconds, he is instructed and encouraged to keep the rotation speed as high as possible.
5. Register: An electronic calculator application that is installed for the purpose of calculating variables immediately records the results.

Second: Biochemical tests

1. LDH-CAT enzymatic measurement .[4]
2. The research sample is warmed up on the treadmill for five minutes. Next, the device is physically stressed by increasing its speed to 15 km/h for two minutes. After a five-minute break, Measuring enzyme effectiveness using a German-made device in accordance with each kit's instructions. An examination to provide the necessary data, understanding that its typical proportion is (226-351 U/L).

Third: Straight punch speed endurance test

- Purpose of the test: Measuring the speed endurance of a direct hit.
- Performance method: The boxer stands in front of a wall cushion, and at the start signal, the boxer directs straight punches towards the cushion for 40 seconds.
- Recording: The number of correct punches is counted only during the 40 seconds.

PRETESTS

The pre-tests were conducted on Thursday, 3/7/2023, and at five o'clock in the afternoon, starting with speed endurance tests, after which functional tests were conducted (maximum anaerobic capacity and the enzymes LDH and CAT. Blood samples were drawn from the boxers to measure the levels of enzymes after the effort, that is, after conducting a test. It was carried out at the speed of a straight punch and was carried out by a specialist in medical laboratory analysis, then it was transferred to elite laboratories to be processed and to extract the variables required to study it, according to what is explained in the details of the test for each of the variables investigated.

MAIN EXPERIENCE

High-intensity training was prepared in the HIIT style through exercises similar to the fighting environment in terms of the intensity used and the exercise periods, that is, the training volumes, while manipulating relatively small rest periods between repetitions for the purpose of accustoming the boxer to withstanding the accumulation of lactic in the blood and withstanding the speed of throwing punches, as the exercises continued for ten weeks and in reality Three training units per week, meaning thirty training units, which included high-intensity training, ranging between 80-95% of the maximum intensity for each boxer, taking into account the individuality of training for young boxers.

POSTTESTS

On Tuesday, September 19, 2023, the researcher administered the post-tests to the study sample members while keeping in mind the same guidelines that applied to the pre-tests.

RESULTS AND DISCUSSION

Table 2. Shows the values of the pre- and post-tests for the experimental group on the investigated variables

Variables	Pretest		Posttest		Calculated (t) value	Sig*	Indication
	Mean	Sd	Mean	Sd			
Anoxic capacity	34.78	1.91	40.88	1.99	5.44	0.006	Sig.
Endurance the speed of a straight punch	128.80	4.14	152.60	3.50	10.02	0.001	Sig.
LDH enzyme	259.08	7.20	279.41	9.06	2.88	0.4	Sig.
CAT enzyme	447.52	16.16	565.50	28.57	10.2	0.001	Sig.

* With four degrees of freedom, significance threshold is 0.05.

Following the presentation of the experimental group's pre- and post-test findings, it was discovered that there had been substantial variations in every research variable. This indicates how HIIT training has significantly affected the anoxic capacity and straight punch speed endurance, as well as the enzymes for the lactic anaerobic energy system, as the high-intensity exercises that are similar to the nature of skill performance create Real adaptations for boxers. Adaptation is the reactions of the body's internal systems to meet physical requirements, and these responses are directly proportional to the intensity of the stimulus.[5]

Table 3. Demonstrates the variations between the variables under investigation's pre- and post-tests

Variables	Pretest		Posttest		Calculated (t) value	Sig*	Indication
	Mean	Sd	Mean	Sd			
Anoxic capacity	35.46	1.33	37.60	2.42	3.05	0.03	Sig.
Endurance the speed of a straight punch	126.60	3.91	136.20	3.70	6.68	0.01	Sig.
LDH enzyme	256.40	8.94	265.65	7.75	2.04	0.1	Sig.
CAT enzyme	452.28	9.73	476.26	18.50	3.10	0.03	Sig.

* With four degrees of freedom, significance threshold is 0.05.

The results of the tests conducted on the control group showed that there was a difference between the pre- and post-tests regarding the research variables, and this shows that the trainer's training during the experimental period had a good effect on the variables of vital capacity and straight punch speed endurance, as well as the LDH-CAT enzyme.

Table 4. Shows the difference between the post-tests of the variables examined by the two study groups

Variables	Pretest		Posttest		Calculated (t) value	Sig*	Indication
	Mean	Sd	Mean	Sd			
Anoxic capacity	40.88	0.99	37.6	2.42	2.79	0.02	Sig.
Endurance the speed of a straight punch	152.60	3.50	136.20	3.70	7.19	0.00	Sig.
LDH enzyme	279.41	9.67	265.65	7.75	2.48	0.03	Sig.
CAT enzyme	565.50	28.57	476.26	18.50	5.86	0.01	Sig.

* With eight degrees of freedom and a significance threshold of 0.05.

Table (4) shows that the value of the significance level (sig) for the investigated variables is less than (0.05). This means that high-intensity training (HIIT) has significantly affected anoxic capacity, as studies indicate that high-intensity training, which is similar to the nature of performance, creates adaptations. Functional for developing performance and special energy systems, such as anaerobic capacity, which increases the speed endurance of the boxer, as well as punch endurance. This is the result of the development in the respiratory circulatory system, which was reflected positively in the development of anoxic capacity.[6] The anaerobic endurance of muscle fibers depends on their ability to consume Oxygen, and this depends on increasing the muscle fiber content of myoglobin, anaerobic energy enzymes, and increasing blood capillaries.[7] These functional changes are responsible for increasing the efficiency of the muscle in consuming and producing energy, and this helps the muscle withstand fatigue, especially withstanding the speed of punches. The nature of performing exercises regularly and at maximum speed through performing A combination of successive punches at high speed and within the lactic energy system leads to an increase in the development of muscle endurance, as speed of punches is required in fights by delivering quick punches to every part of the body.[8] In endurance tests, lactate dehydrogenase (LDH) levels are higher after exercise because it plays a vital role in the biochemical reactions of the anaerobic zinc system that athletes rely on during physical exertion. related to special endurance... as well as the GOT enzyme, as studies have proven. Increased activity of this enzyme in response to the stress of anaerobic training.[9]

The increase in lactate dehydrogenase (LDH) levels after exercise during specific endurance tests is due to the fundamental and important role this enzyme plays in the biochemical reactions of the anaerobic digestive system, which athletes rely on when performing physical training related to specific endurance,[10] Sustained high-intensity quantitative exercise for a period of time (60 seconds) results in a significant increase in LDH levels in the blood after exercise. Among other things, LDH stimulates reactions associated with the conversion of propionate to lactate,[11] This is consistent with the finding that LDH catalyzes the reactions involved in the conversion of propionate to lactate.[12]

CONCLUSIONS

1. HIIT training has clearly affected the variables of anoxic capacity as well as the speed endurance of the straight punch of young boxers.

2. High-intensity training (HIIT) contributed to raising the level of the LDH-CAT enzyme for members of the experimental research sample.

RECOMMENDATIONS

- The necessity of using high-intensity exercises in boxing training for all age groups, taking into account the training conditions, because of their great importance in creating great adaptations for boxers.

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