

## THE EFFECT OF COMPETITIVE FITNESS (CROSS FIT) EXERCISES ON THE LACTIC ABILITY AND SOME BIOCHEMICAL VARIABLES FOR WEIGHT TRAINEES

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### Abstract

The purpose of this paper is to identify the effect of cross fit exercises on the lactic ability of weight trainees, as well as identify the effect of cross fit exercises on some biochemical variables for weight trainees. The researchers used the experimental method with a one-group design with the pre and post-tests. The researchers also used a random sample consisting of (12) weight trainees (20-25) years old, weighing (70-85 kg), as they represent 70% of the research community in the wolf gym. The homogeneity of the research sample was calculated on the scale of chronological age, weight, height and training age, and the value of the torsion coefficient was ( $\pm 1$ ), which indicates the homogeneity of the research sample. One of the most important conclusions reached by the researchers is that interactive fitness exercises significantly affect the lactic capacity and some biochemical variables.

### Introduction

The state of progress in the level remains the goal that man seeks in various fields of science and knowledge, including the mathematical aspect, which began to take a scientific curve with the passage of days. In return, new types of methods, methods and exercises began to appear in training programs in the form of a new formation to achieve specific training goals and from the beginning. From the idea of the training goal, it was necessary to find modern exercises that are compatible with the goals set, and since the main training goal in our research is the general health of the individual through reducing the weight of the players as well as the effect on some fatty components stored in the human body, which cause great harm to his health, and these exercises Modern use in our societies and for all activities as a result of its very precise specificity and despite its great importance in creating effects on the human body and clearly, but scientific research has not yet addressed such exercises except that it is competitive fitness exercises and was named so in relation to its regularity between the main groups of each exercise specifically to the periods of rest from. The main groups are therefore two fitness exercises to a large extent due to the different adaptations they provide, according to each. Therefore, fitness exercises gain their importance because they are used by ordinary individuals to reduce weight and strengthen the muscular system. Thus, it is not limited to the athlete's segment. In addition, it is important to provide such formations of exercises to enrich the sports community with such modern ideas in our society.

### Research problem

Through vigorous field and research follow-up of the training methods, methods and organizations in our Iraqi society, we were not able to find a change in the training formations within the training units to ensure keeping pace with the development-taking place in the advanced societies. New exercises within the training unit in which

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the orientation towards the type and from the initial stages of preparation in various games as well as weight reduction exercises, and there is no better way to do this than using competitive fitness exercises that perform with almost extreme intensity, which gives an advantage in focusing on the parts of the body that need to reduce weight as well as. What you achieve from a shortcut in the training unit by transferring exercises that target some parts of the body from the end of the training unit to rest periods between the main exercises.

### Research objective

- To identify the effect of cross fit exercises on the lactic ability of weight trainees
- To identify the effect of cross fit exercises on some biochemical variables for weight trainees.

### Research hypotheses

- Competitive fitness exercises affect the lactic ability of weight trainees.
- Competitive fitness exercises affect some biochemical variables for weight trainees.

### Research fields

- Human field: Weight trainers in the wolf gym, aged (20-25) years.
- Time field: (27/1/2021) to (3/4/2021)
- Spatial field: wolf Gym.

### The concept of competitive fitness training (Cross Fit) <sup>(1)</sup>

It is one of the modern methods of fitness training developed by the founder and CEO (Greg Glassman) in 2002 in order to develop a program to prepare the trainees with the best preparation so that they can face any physical condition and in order to increase the health and fitness of the athletes, the (Cross Fit) exercises are not like any other exercises, they are intense and high repetitions that you do on a daily basis, such as jogging, rowing, carrying weights and others, and that the way to perform these exercises is different from others, as the trainee chooses a set of exercises between three to five exercises such

as jumping rope, jogging, carrying weights or rowing. Or pull-up exercises (any set of exercises is determined), and the number of repetitions of each exercise, and the number of rounds for the set of exercises, is determined. The Cross Fit exercises are designed to give the trainee the widest adaptive responses such as the maximum oxygen capacity (VO<sub>2</sub>) and the lactate threshold, these modern exercises have gained widespread popularity in the world recently, due to the nature of exercises that depend on competition between two or more people. And some gymnastic movements, as (Cross fit) exercises, are a set of exercises in the form of stations, as it consists of two stations for beginners, and when their physical fitness develops, the number of stations is gradually increased and in line with their level of physical fitness, and the (Cross fit) training is in the form of groups consisting of two or more people who perform the training stations competitively and as quickly as possible and focus these exercises on one part of the body or the body as a whole and maybe a combination of both types, and the (Cross fit) are deliberate attempts to develop physical competence in all areas of fitness. The ten physical ones are (endurance for the respiratory and circulatory system, muscle endurance, strength and flexibility, ability, speed, coordination, dexterity in changing direction, balance and accuracy).

### Research methodology and field procedures

#### Research Methodology

The researchers used the experimental method with a one-group design, with pre and post-tests, as shown in Table (1).

#### Community and sample research

Choosing a research sample is one of the most important things in scientific research, as the original community must be faithfully represented in order to give accurate and real results about that community and enrich the research with honest scientific information. Therefore, the researchers chose a random sample consisting of (12) weight trainees aged (20-25) years weighing (70-85 kg), they represent 70% of the research community in the wolf gym hall. Homogeneity was calculated for the research sample on the scale of chronological age, weight, height and training age as shown in Table (2) and the value of the torsion coefficient was ( $\pm 1$ ), which indicates homogeneity of the research sample.

**Table 1:** The experimental design of the research group.

Group	Pre-test and measurement	Training program	Post-test and measurement
Experimental group	physical test Functional measurements	Competitive Fitness Workout	physical test Functional measurements

**Table 2:** The homogeneity of the research sample.

Variables	Measuring unit	Arithmetic mean	Mediator	Standard deviation	Skewness
Chronological age	Year	22,916	23,500	3,941	0,273
weight	Kg	77,916	77,000	3,776	0,727
height	Cm	167,916	169,500	3,964	0,441
training age	months	24,583	24,500	1,083	0,229

### The means, devices and tools used in the research

#### Means of collecting information

- Note
- Experimentation
- Measurement and testing

#### Devices and tools used in the research

- Lactic acid meter (Lactatepro)
- STOP Watch
- Electronic measuring watch (test intensity)
- Abdominal device (Ab Claeder)
- Iron shaft length (75 cm)
- Dumbbells of different weights
- Circumference tape measure
- Skin fold thickness gauge
- Weight and height scale (electronic)
- 40 cm high platform

#### Field research procedures

##### Identify of measurements and tests

After identifying the main research variables by analyzing the content of some previous studies that were agreed upon between the researchers, some measurements and tests were identified that fit the research variables in line with the basics of training formation according to the interlaced exercises and their results, knowing that all measurements and tests bear the scientific conditions (honesty, Stability, and objectivity), most of which were measured directly through tools and devices.

##### Description of the measurements and tests used

In order to be acquainted with how to perform and how to register and the steps for carrying out measurements and tests, it was necessary to present them as follows:

##### First: the physical test

- Test name: Anaerobic Step Test (2)
- Purpose of the test: To measure the lactic ability.
- Measurement unit: watt
- Tools used: 40cm high table, stopwatch.
- Method of performance: The player stands in front of the bench and puts one foot on the bench and the other is fixed on the ground. When giving the start signal, he extends the entire knee joint to the leg on the bench, is fixed for a split second in a perpendicular position of the body above the bench, and then returns with the same leg that left the ground to fix it on the ground again and without repetition.
- Recording method: The largest number of repetitions per minute (60 seconds) is calculated, and the lactic capacity is calculated through the anaerobic step test in a unit of measurement (watts) from the following equation<sup>(3)</sup>

Lactic ability = Distance x number of repetitions x body weight/ time

### Second: biochemical measurements

#### 1- Lactic acid measurement

- Measurement name: Lactic acid measurement.
- The purpose of the measurement: to identify the level of lactic acid concentration after exertion.
- Unit of measurement: mmol/L
- Equipment and tools used.

A - Sterile material

B - cotton.

C - Special lancets.

d- Lactic acid measuring device, type (Lactate Pro).

C - a special book (tapes specific to the type of device)

- Method of performance: The laboratory performs the anaerobic step test for a period of (1 minute) without stopping, then the laboratory sits for (5 minutes) in complete comfort, after which the test person cleans the index finger well with a sterile material, then pricks the finger from the outer edge, then cleans the outside blood and re-presses The finger is again placed on the edge of the measuring tape of the device. After placing it in the device without touching it, blood drops are placed without interruption until the device is commended for reading.

#### 2- Cholesterol measurement.

- Measurement name: blood cholesterol measurement.
- The purpose of the measurement: to identify the level of cholesterol concentration in the blood.
- Measurement unit: milligrams/dl.
- Equipment and tools used:

A - Sterile material (diluted Spirito).

B - Syringes.

T- Cotton.

C- Centrifuge

C - Photo analysis device (Skin Photometer)

H- Glass tubes

G- Analytical palm (\*).

D- Corsets (rubber bands).

- Method of performance: Before performing any movement performance from complete rest, the competent person withdraws a sample of blood (0.3 moles) from the laboratory. The sample of blood is saved in special glass tubes on which the name and number of the laboratory is recorded for transfer to the laboratory, noting that the process of drawing blood It is done with the availability of safety and health conditions with sterile tools and materials.

- The method of laboratory work: After transferring the blood sample to the laboratory, the laboratory person separates the blood from the serum by placing it in a centrifuge with a capacity of (3000 cycles/min), so the color of the serum is yellow, which is a liquid in which it moves. All components of the blood, including through the red blood, this process is done to strip the blood of the dye, platelets, leukocytes, etc., after

which it is kept at the point of freezing.

- The formula for the mixture called the "Reagent Working" mixture is made by taking from the color solution an amount of (0.03) mmol, and from the standard solution (0.03) mmol, mixed in an ampoule, left for three minutes at room temperature, then taken from a mixture Work (0.01) mmol and taken from the serum (0.05) mmol, mixed and left for less than a minute at room temperature, placed in a water basin at a temperature of (37) for 2 minutes.
- Before placing the working mixture in the photoanalyzer, the reading of the device must be accurately determined by zeroing the wavelength in the device, which is measured in units (Nm) of nanometers. The word (nano) means the zeroing part in Greek. According to the attached book, the measurement of the mixture is done at the wavelength (500NM) and the process of minimizing the device is carried out by placing a tube containing distilled water because it is a pure substance free of salts, minerals and other substances, so it is read as zero on the device.
- After placing the working mixture in the photoanalyzer, we start recording the readings that appear on the screen of the device, and the number is fixed at the top of the equation (Asawple).

#### COLSTRATION STANDARD (200 MWOL) MG/DL $\times \frac{Asample}{Astandard}$

It can be converted into larger units of measurement (MOL) through

$$MMOL/L = 0.0259 \text{ Constant number} \times \text{Mg/d output}$$

#### 3- Triglycerides Measuring

The same steps as the cholesterol method and can be converted to larger units of measure (MOL) through

$$MMOL/L = 0.0113 \times (\text{Mg/DI}) \text{ Final Product}$$

#### 4- High-density lipoprotein (HDL) measurement

The same steps as the cholesterol and triglyceride methods, except before starting to put the mixture in the photo analyzer (Skinphotomten), we do the following: according to the instructions of the book

- We take (400, um) of the working mixture (Reagent Work), mix it with (200, um) (serum) and put it for (10 minutes) at room temperature, then put it in the device.

#### 5- Very low-density lipoprotein (VLDL) measurement.

It is extracted according to the following equation after knowing the value of triglyceride.

$$VLDL = \text{TricycERIDES} / (\text{constant number}) 5 = \text{output} + \text{mg/dl}$$

It can be converted into larger units of measure (mol) by.

$$\text{Mmol/L} = 0.0259 \times \text{Mg/dl output.}$$

#### 6- Low-density lipoprotein (LDL) measurement.

It is extracted according to the following equation after knowing the value of cholesterol, high-density lipoprotein, and very-low-density lipoprotein:

$$\text{Output Mg/dl} = \text{VLDL} - \text{HDL} - \text{CHOLesterol} = \text{LDL}$$

It can be converted into larger units of measure (mol) by

$$\text{Mmol/L} = 0.0259 \times \text{mg/dl output.}$$

#### Exploratory experience

It is a preliminary experimental study in which the researcher works on a small sample before carrying out the research in order to choose the methods, means and tools of the research <sup>(4)</sup>. In addition to that, it is practical training for the researcher to find out the pros and cons that occur during the measurements and tests. The exploratory experiment was conducted on 27/1/2021 on five trainees with a weight of (70-85) as the exploratory experiment targeted the physical test and measurement of lactic acid to identify:

- The initial idea of the validity of the tests for the sample.
- The possibility of working on the devices and tools used in the measurements and tests.
- Conduction of the best methods when carrying out measurement and testing.
- Identify the obstacles facing the work.
- Understand the research sample of the measurements and tests used.

#### Pre-tests

It aims to identify the levels of the research sample individuals before conducting the main experiment on them. The researchers conducted the tribal tests on Wednesday and Thursday, 29-30/1/2021, respectively.

The first day: the physical test and the measurement of lactic acid, as the anaerobic step test, was conducted for one minute, and then the lactic acid was measured five minutes later.

The second day: measuring biochemical variables, as blood was drawn from the research sample in the hall, and blood samples were transferred in COLBOX to the laboratory for chemical analysis.

#### Main experience

It was agreed between the researchers to introduce competitive fitness exercises as a vocabulary within three training units per week (Saturday - Monday - Wednesday). The organizational forms of these exercises were among the main exercises specified in the training program.

The following steps show the formation of the work in the main experiment of the experimental group, as follows:

- Three main training units per week in which competitive fitness exercises are used.
- The training unit begins with the main exercise followed by an overlapping exercise during the rest period at a lower level of intensity.
- Use (4-5) competitive fitness exercises in one training unit that target different muscle groups in turns.
- It was emphasized to strictly adhere to the timing of the exercise performance when performing the main exercises, the amount of intensity used and the end of the group performed.
- The number of repetitions of the exercises in one group ranged between (12-20) repetitions of (3-4 sets) using bodyweight or different resistances.
- The number of training units was (26) units that extended from 1/2/2021 to 31/3/2021.

#### Post-tests

On 2-3/4/2021, the measurements and post-tests were started. The researchers took into account that the procedures are similar to the measurements and pre-test conditions as much as possible in terms of timing, place, tools and devices used, and following the same sequence in conducting the measurement and testing over two days as follows:

Day 1: Physical exam and lactic acid.

On the second day, blood was drawn from the research sample in the sports hall - the University of Baghdad, and then COLBOX blood samples were transferred to the health center - the presidency of the University of Baghdad, which is adjacent to the sports hall.

**Statistical methods:** The search data was processed through the Statistical Package for the Social Sciences (SPSS).

#### Results presented and discussed

##### Presentation and discussion of the results of the variables of lactic and biochemical ability

Presentation and discussion of the results of the pre and post-tests of the experimental group in the variables of lactic and biochemical ability (Table 3).

Table (3) shows the arithmetic mean, standard deviation, the calculated (t) value, the level of error and significance, the differences of the arithmetic means, and the deviation of differences in the pre and post-tests of the experimental group.

##### Discuss the results of the lactic ability test and measure the level of lactic acid concentration

We note in Table (3) the superiority of the results of the post-tests of the anaerobic step and the concentration of lactic acid on the tribal tests of the experimental group. These exercises represent a state of high intensity for the player that comes after each group or repetition characterized by high or semi-high intensity and this is represented by competitive exercises that created a state of functional adaptation of muscle fibers in the speed of disposal of lactic acid by transferring it through the blood to the rest of the muscles and this fully applies to what Some sources indicate that the oxidation of lactic acid occurs through the use of (8%) of it in the production of (ATP), while (72%) is used as fuel for non-working muscles, (8%) is converted into glycogen in the

Table 3:

No.	Physical biochemical variables	Unit	pre-test		post-test		Means of differences	deviation of differences	T value	Level sig	Type sig
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation					
1	Anaerobic Step Test (Lactic ability)	Repetition	232,220	36,314	267,496	13,318	45,876	15,534	3,798	0,013	Sig
2	lactic acid	Mmol/l	8,533	2,452	3,833	1,579	4,700	1,277	3,680	0,014	Sig
3	cholesterol	Mgdl	172,666	28,563	104,333	1,751	68,333	11,071	6,172	0,002	Sig
4	triglyceride	Mgdl	90,666	24,921	66,666	15,002	24,000	6,255	3,837	0,012	Sig
5	HDL High-Density Lipoprotein	Mgdl	34,183	4,608	34,000	4,673	0,150	0,145	1,031	0,350	Non sig
6	very low-density lipoprotein ULDL	Mgdl	16,466	5,000	10,983	2,597	5,483	2,059	2,668	0,04	Sig
7	Low-density lipoprotein	Mgdl	124,266	19,254	87,733	11,412	36,483	5,939	6,142	0,002	Sig

Significant at an error level  $\leq (0.05)$  with a degree of freedom (11)

liver and (2%) is eliminated by the body. Through urine and sweat <sup>(5,6)</sup>. From this, we note that the transfer of (72%) of lactic acid to non-working muscles can accelerate the elimination of accumulations, and this is the main goal of exercises for fitness. Thus, working in this system greatly helped in improving the results of the post-test, as increasing the activity of enzymes and achieving the principle of economy in effort and time by working within the idea of the permanence of the lactic acid system, with no more than two minutes, as giving semi-maximum exercises within (1-2) Minute helped in improving the economy and the absence of the products of this anaerobic decomposition significantly. (Philip 1986) confirms that the muscular ability to get rid of the high concentration of lactic level through the development of anaerobic work for the player and that the process of accelerating the removal of lactic acid from the blood through exercise is likely to They are caused by blood flow into the muscles <sup>(7)</sup>.

#### Discuss the results of measuring the concentration of cholesterol, triglycerides and lipoproteins

We note in Table (3) the decrease in the results of the dimensional measurements on the pre-test for the experimental group in measuring cholesterol, triglycerides, and low- and very-low-density lipoprotein, while there were no significant differences in measuring the concentration of high-density lipoprotein, which is the most important among the types of fats and lipoproteins in the body. This type of lipoprotein constitutes the main source in the process of consuming fats in the blood, as high-density lipoprotein plays a major role in human metabolism, as it works to transport harmful light cholesterol from the blood vessels to the liver for analysis and disposal by converting it to bile acid, which helps in the digestion of food <sup>(8)</sup> As for low-density lipoproteins, they transfer cholesterol and triglycerides to the surrounding tissues, so they are considered harmful lipoproteins on the body, as they accumulate fats in the form of subcutaneous fats in the surrounding tissues resulting from their accumulation and lack of independence in the correct manner. From the foregoing, the researchers believe that the main reason for the decrease in the superiority of the results of dimensional measurements is due to high fitness exercises on the other hand, which greatly affected as a result of focusing the exercises on parts of the body in which fat accumulates and at high repetitions, especially since targeting the parts came after the effort performed by the trainee, which adds Kind of extra effort on the player.

Hence, high-density lipoprotein works more effectively in the process of transporting low-density lipoprotein under the influence of training, so we find that the concentration level remained conservative and was not affected by training, despite the low concentration levels of the rest of the lipoprotein. He is the main responsible for the process of transporting it, consuming it and using it as an energy fuel.

#### Conclusions and recommendations

##### Conclusions

Under the findings of the research, the following conclusions were drawn:

- Competitive fitness exercises had a positive effect on lowering cholesterol and triglyceride concentrations.
- Competitive fitness exercises positively affected the decrease in the

concentration levels of harmful lipoproteins (VLDL and LDL).

- Competitive fitness exercises had a positive effect on increasing the speed of lactic acid disposal.
- Competitive fitness exercises positively affected the economy with effort, work and lactic acid accumulation.
- Competitive fitness exercises affected the consumption of fat from the areas where it accumulates in some parts of the body.

#### Recommendations

According to the conclusions reached, the researchers recommend the following:

- The necessity of using competitive fitness exercises to reduce weight and general health.
- The necessity of using competitive fitness exercises in the process of consuming fats from areas that collect them in some parts of the body as isolation exercises.
- The necessity of using competitive fitness exercises with samples, training methods and various activities and in different preparation periods.
- Using competitive fitness exercises with other training methods to see their suitability and impact together, as well as using them as part of a nutritional program to note their effect on weight reduction and low harmful lipoprotein.
- Accurate and complete adherence to the requirements of competitive fitness exercises in terms of intensity and size, and their organization within the training units.

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**Appendix (1)**

Shows the sample-training unit

Training Unit No. (1)	(Wolf Gym)	Training Unit Time - (warm up) (38)			6-7 O'clock
(warm up)					
(warm up)				warm up time (12)	
(Exercise)					
1- Handstand push-ups	The preparatory section is used in each training unit using the same exercises as the main section, but these exercises are with body weight and the other using the iron bar 20 kg, and the performance speed of the athlete is normal with the intention of preparing the same working muscles in the main section				
2- Single leg squats					
3- pull-ups					
(The main part)					
(The main part)				main part time (16)	
(Exercise)	(intensity) 70%	(Reps)	(Sets)	(Rest)	
1- Handstand push-ups	50 kg	5	3	3 Minutes between each round	
2- Single leg squats	50 kg	10			
3- pull-ups	60kg	15			
(The closing part)					
(The closing part )				Closing part-time (10)	