

## The Effect of Using Fast And Direct Cooling after Physical Effort on Some Physiological Variables of Advanced Football Players

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### Abstract

The research objectives to identify the effect of using rapid and direct cooling after physical exertion on some physiological variables among football players, the researchers assumed that there are statistically significant differences between the pre and post-tests of the two research groups (experimental and control) in some physiological variables among football players and that there are statistically significant differences between the two research groups (experimental and control) in the post-test, the experimental approach was used to design the two equal experimental and control groups. The research sample was the (20) advanced football players, as rapid cooling was used with the experimental group. As for the control group, it was trained using the method used by the coach, and the physiological variables were measured by the pre and post-test included ( Temperature, pressure, and lactic acid concentration), after collecting and processing the data, the researchers reached the superiority of the experimental group over the control group in all research variables, and that the cooling method using cold sprinklers was effective and gave positive results in the physiological variables under investigation.

**Key words:** Fast and direct cooling, physical effort, physiological variables.

### Introduction:

The emergence of modern sciences in the mathematical field, including tests and other sciences, had a great impact on advancing progress and development in this field, prompting many scientists, specialists and researchers to pay wide attention to studying important and different topics in the field of tests.

The interest of specialists in sports in general and football in particular has increased, as it is an important component of the game of soccer, by developing the skills of players, raising their levels, and finding solutions that help speed up their recovery from sports injuries.

The game of football is one of the sports that is characterized by physical effort and a relatively long period, and it has taken a great deal in the field of scientific research by paying attention to the physical, functional and other aspects in order for the planning to be based on scientific foundations to reach high levels and as a result of this scientific development in various sports has become It is necessary to raise and develop the physical levels of the players in order to pass the tests and all the requirements with minimal effort.

Through the foregoing, the importance of research lies in the use of auxiliary means aimed at reducing the rate of injury to the players, including rapid cooling directly after physical effort and its effect on some physiological variables among football players.

**Research problem :**

The different sports injuries that occur in sports in general, and for players and athletes in particular, all need treatment and development to pass these tests, and the fact that physical therapy is one of the sciences specialized in this field, as well as the direct rapid cooling, which is one of the departments of physical therapy, is considered effective and positive in athletes for some sports, therefore, the researchers decided to conduct a special study in this regard by using rapid cooling after rapid physical effort on some physiological variables in soccer players.

**Research objective:**

- Identify to the effect of using rapid and direct cooling after physical effort on some physiological variables in football players.

**Research hypothes :**

- There are statistically significant differences between the pre and post-tests of the two research groups (experimental and control) in some physiological variables of soccer players.
- There are statistically significant differences between the two research groups (experimental and control) in the post test

**Research fields:**

**The human field:**First-class players for Iraqi football clubs.

**Time field:**14/10/2018 to 25/12/2018.

**Spatial field:** The stadium of the College of Physical Education and Sports Sciences / University of Baghdad.

**The concept of cooling:**

It is called (freezing anesthesia) and cooling reduces swelling, bleeding, pain and inflammation, and ice is used during a period of (5-10) minutes from the occurrence of the injury, the most common method of freezing the injury is to cover the affected area with a plastic bag filled with snow and attached to the bandage, where it is fixed on the site of the injury and thus can put pressure on the affected area, as well as cooling it, taking into account that the bag is moist in order to achieve contact with the tissue and not isolate the skin from the cooling effect. It is recommended to cool down for the first (24-48) hours of the injury.

**Physiological effect of cryotherapy:**

- 1- Cryotherapy works to stop bleeding and swelling (because cooling is due to constriction of blood vessels at the site of the injury and limits their expansion and slow local ascites, and reduces blood infiltration at the site of the injury) as the cooling occurs narrowing or shrinking blood vessels immediately after contact with the cold, which leads to a lack of bleeding, it is followed by a marked expansion of the same blood vessels as a neurophysiological reflex effect and accompanied by an increase in blood in the affected area.
- 2- Because of the cold, a significant decrease in the feeling of pain, which appears in acute injuries, because it leads to a reduction in the transmission of nerve signals that carry pain to the brain, and thus the sensitivity of the affected part of the pain to the injury decreases.
- 3- Cooling reduces the muscle contraction associated with the injury immediately after it occurs, and when it reaches 12-13 degrees celsius or less, it is accompanied by an anesthetic effect on the injured part, and voluntary muscle relaxation occurs as a result of the lack of basic metabolism as a result of cooling and the neurophysiological effect of treating the injured muscle and tendons varies according to For the long and short period of time for cooling.

- 4- Cooling relieves muscle tension and helps to relax as cryotherapy reduces muscle tension by affecting the sympathetic and parasympathetic nervous system, when cooling is used on the affected tissues, it works to change the temperature of the skin and internal tissues by absorbing heat from them and thus lowering the body temperature in general.

### **How to use cryotherapy:**

One of the common methods in the cooling process is the use of the following methods (cold packs - ice water - ice blocks - ice bags - ice massages - ice baths - cooled gases and cold sprays).

- 1- **Cold compresses:** Cold compresses are used to cover the muscles for relatively large areas, and cotton tissues can be placed in ice and salt water, which prevents the tissue from stiffening and wrap it after relatively drying on the affected part, and it is used in the treatment of the joints of the upper and lower extremities and in the treatment of bruises, muscle tension, tearing and injuries close to the soft tissues as the skin surfaces are placed Relatively large, with pressure and without pressure wrapping on the affected part, it takes the shape of the injured part, especially in the case of joint injury.
- 2- **Ice water:** That is, immersing the affected area in cold (ice) water, and using ice water to treat large areas of the affected tissue structures in the body.
- 3- **Snow blocks :** It consists of paper boxes in which water is placed, and in the center of the box is a depressor (wooden tongue) and when turning water into ice after freezing it comes out of the box holding the protruding wooden part (tongue), and it is used in the treatment of large joints such as the shoulder and knee as well as in the treatment of bruises, strains and muscle lacerations adjacent to the tissues the mollusk by making circular movements on the place of injury.
- 4- **Ice massage :** The massage with shredded ice or ice cubes is used in circular motions or in the direct application of ice and is used for small areas in injuries to muscles, tendons and joint ligaments, and ice massage is also used for a preventive purpose as well as in the treatment of injuries of hands, fingers, elbow, feet, small joints and places characterized by a narrow skin surface adjacent to tissues Soft, and in the treatment of bruises.
- 5- **Snow baths :** It is used when an athlete is exposed to training or walking for a long time in high temperatures and when exposed to sunstroke if the match is held in a very high temperature in the atmosphere and is also used for injured parts all over the body and in the case of multiple injuries that include large areas of the body, as it is used in treatment Bruises, muscle strains and injuries close to the tissues that take up a large area of the body, and when submerging the injured part and the body in ice baths, the duration of exposure to cold must be taken into account according to the type of injury and the age of the injured.
- 6- **Cryogenic gases and cold sprayers :** Cryogenic gases and cold sprays are used in all types of sports injuries to remove muscle tension and spasms during sports and to increase the range of motion of the joints, and they are used to spray the skin directly in the area of injury and at a distance of 20 cm from the place of spraying, such as chloroethyl, and this method is used in field treatment for injuries to the feet, hands and shoulders in football, hand, basket, and hockey games to reduce pain resulting from injury, repeated use of ethyl chloride numbs the nerve sensory receptors in the joints, and this method provokes skin sensitivity, but less than regular ice treatment.

### **Research methodology and field procedures:**

#### **Research Methodology:**

The experimental approach was used to suit the research problem by designing the experimental and control groups with pre and post-test..

#### **Research community and sample:**

The research community was determined by the intentional method represented by the advanced football players for the year 2018-2019, and by lottery, (20) players were selected and divided into two groups of equal number, control and experimental. Equality was found between the two groups in the variables of temperature and lactic acid and a running time of 450 meters to start One initiation line and table (1) shows that.

Measures of homogeneity and equivalence were performed for the sample, and the results were:

Table (1) shows the equivalence of the experimental and control groups in the research variables.

Variables	Experimental		Control		(T) Calculated	Sig level	Sig type
	Mean	Std. Deviation	Mean	Std. Deviation			
Temperature	36.79 0	0.228	36.72 0	0.204	0.722	0.479	Non Sig
Lactic acid	1.630	0.1494	1.620	0.131	0.159	0.876	Non Sig
450 metersran	61.80 0	2.149	61.60 0	1.505	0.241	0.812	Non Sig

Significant  $\leq (0.05)$  at a degree of freedom (18) and below a level of significance (0.05).

#### **Methods of data collection, devices and tools used :**

##### **Search devices and tools:**

- Height and weight measuring device (Chinese made)
- DELL Calculator
- Lactic acid meter.
- Blood Pressure Monitor.
- A thermometer to measure the temperature
- Camera
- Electronic stopwatch

##### **Methods of data collection**

- Arab and foreign sources.
- Physiological tests.
- The Internet is network.

##### **Determine the physiological indicators:**

**First:The temperature:** of the body after physical exertion was done by means of a thermometer placed under the tongue to give a reading of the temperature of the body.

**Second: Lactic acid:** by taking a drop of blood on the kit of the device after it has been purified, to give the concentration of lactic acid in less than a minute, and it works with a dry battery.

**Third: Blood pressure:** The blood pressure of the players was measured by a German-made device that was fixed around the wrist of the left hand in a parallel way to the left side of the body, and the shoulder was raised at the level of the heart.

##### **Exploratory experience:**

The exploratory experiment was conducted on a number of players from the same research community and outside the research sample of (3) players on the day of the coincidence (14/10/2018) at 10 in the morning, president, and to ensure the safety of the devices and tools

used and to know the ability of the assisting work team, as well as the distribution of duties to them when conducting the main experiment.

#### **Pre-test:**

The pre-test was performed for the experimental and control research sample, on the date (16/10/2018), the body temperature was measured, on (19/10/2018), the concentration of lactic acid in the blood was measured.

#### **Main experience:**

The main experiment was conducted from (20/10/2018) until (20/12/2018) on the experimental research group for a period of two months, with five training units per week, as the time of the training unit reached an hour and a half, rapid training was used immediately after the end of the effort. Cold sprinklers and cold compresses as a way to reduce the player's fatigue and reduce his temperature resulting from continuous training, as for the control group, they took the same training, but without the use of rapid cooling.

#### **Post-test:**

Post-tests were conducted for the experimental and control research sample after completing the main experiment. Body temperature was measured on (24/12/2018) and the concentration of lactic acid in the blood was measured on (25/12/2018).

#### **Statistical means:**

The Statistical Package for Social Sciences (SPSS) was used. And with the following laws:

- Mean
- Standard deviation.
- The t-test of correlated samples.
- The t-test for non-correlated samples.

#### **Presentation, analysis and discussion of results:**

#### **Presentation and analysis of the results of the pre and post tests for the experimental and control groups in the skill tests:**

Table (2) shows the arithmetic mean and mean differences for the pre and post-tests, the calculated (T) values, and the significance of the differences for the experimental group in the search variable.

Variables	Pre-test		Post-test		F means	F Std. Deviation	(T) Calculated	Sig level	Sig type
	Mean	Std. Deviation	Mean	Std. Deviation					
Temperature	36.790	0.228	35.300	0.674	1.490	0.213	6.973	0.000	Sig
Lactic acid	1.6300	0.149	8.080	0.396	6.450-	0.136	-47.139-	0.000	Sig
450 metersran	61.800	2.149	58.700	1.159	3.100	0.900	3.444	0.007	Sig

Significant  $\leq (0.05)$  at a degree of freedom (9) and below a level of significance (0.05).

Table (3) shows the arithmetic mean and mean differences for the pre and post- tests, the calculated (T) values, and the significance of the differences for the control group in the search variable.

Variables	Pre-test	Post-test	F	F Std.	(T)	Sig	Sig
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	Mean	Std. Deviation	Mean	Std. Deviation	means	Deviation	Calculated	level	type
Temperature	36.720	0.204	36.460	0.631	0.260	0.191	1.357	0.208	Non sig
Lactic acid	1.620	0.131	8.740	0.490	-7.120	0.135	-52.489	0.000	Sig
450 metersran	61.600	1.505	60.300	1.337	1.300	0.538	2.414	0.039	Sig

Significant  $\leq (0.05)$  at a degree of freedom (9) and below a level of significance (0.05).

### **Presentation and analysis of the results of the post-tests between the experimental and control groups in the variables under investigation:**

Table (4) shows the results of the post- tests between the control and experimental groups for the variables under investigation:

Variables	Experimental		Control		(T) Calculated	Sig level	Sig type
	Mean	Std. Deviation	Mean	Std. Deviation			
Temperature	35.300	0.674	36.460	0.631	-3.970	0.001	Sig
Lactic acid	8.080	0.396	8.740	0.490	-3.309	0.004	Sig
450 metersran	58.700	1.159	60.300	1.337	-2.858	0.010	Sig

Significant  $\leq (0.05)$  at a degree of freedom (18) and below a level of significance (0.05).

### **Discuss results:**

Through the above table, we notice the superiority of the experimental group over the control group in the dimensional tests in the physiological variables under investigation, and the researchers attribute this to the use of a method of cooling with cold sprinklers, which worked to remove muscle tension, spasms and fatigue during the period of play, especially that football is one of the games that depend on a system aerobic energy, and this leads to an increase in the concentration of lactic acid in the blood and also increases in blood pressure and body temperature, as "Treating injuries using low temperature is an effective way to relieve pain, tension or swelling, and it is also used as an aid in rehabilitation therapy training programs. It can be used alone or with other treatments such as movement therapy to relieve pain due to movement and is commonly used in the treatment of sports injuries as well as Other than sports, there are many different cooling agents or means to cool the affected body tissues".<sup>(1)</sup>

The performance of any muscle effort is accompanied by an increase in the speed of the accumulation of lactic acid in the blood, and this increase in turn leads to a lack of acidity or alkalinity in the blood and leads to an imbalance in it, therefore training often leads to the production of lactic acid and also leads to an increase in blood pressure and an increase in the body temperature, since " The increase in lactic acid depends on the type of effort that the athlete performs,when the physical exertion is of moderate intensity and under the use of oxygen, the lactic acid does not accumulate in the muscles and blood except a little,but if the physical

exertion is of high intensity and is done in conditions of lack of oxygen, the lactic acid accumulates in the muscles and blood.<sup>(2)</sup>

The researchers also attribute the reason for the development of the experimental group to the training curriculum according to the method of rapid cooling after physical effort, as "the training units, type and nature of exercises, methods and methods of training constitute an important basis for the success of the training program, regular repetition for long periods leads to a change in the general training status of the player, and the growth of his functional efficiency".<sup>(3)</sup>

### **Conclusions and recommendations:**

#### **Conclusions:**

- The experimental group outperformed the control group in all research variables.
- The method of cooling using cold sprinklers was effective and gave positive results in the variables under investigation.
- The most of the physiological variables that were positively affected by the cooling method are body temperature.

#### **Recommendations:**

- Approval of research results by coaches and clubs.
- Conducting similar studies and on other physiological variables.
- Conducting studies on other sports games.

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