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**Mahmood Hamdoon Younus**

College of Physical Education  
and Sports Sciences, University  
of Mosul, Iraq

**Omar Youssef Khalil**

College of Physical Education  
and Sports Sciences, University  
of Mosul, Iraq

**Ammar Mohamed Khalil**

College of Physical Education  
and Sports Sciences, University  
of Mosul, Iraq

## The impact of the two interval training styles (Ascending and Descending) on a number of physical variables of football players

**Mahmood Hamdoon Younus, Omar Youssef Khalil and Ammar  
Mohamed Khalil**

### Abstract

The research aims to reveal the effect of the Two Interval Training Style (ascending and descending) on a number of physical variables for football players. The researchers used the experimental method for its relevance and nature of the research. The experiment was carried out on a sample of Al-Fatwa sports club football players who applied for the football season (2021-2022), which numbered (24) players, and they were randomly divided into two (experimental) groups with (12) players for each group. Homogeneity was achieved in the variables (age, height, mass) as well as making parity between the two research groups in physical variables. The researchers conclude that the ascending Interval method achieved an improvement in all physical variables. By comparing the results of all the pre and post-variables for the players of the first experimental group. The Interval of training descending method also achieved an improvement in the variables of prolongation speed and general prolongation. That is by comparing the results of all the pre and post-variables for the players of the second experimental group. Where the second experimental group that implemented the Interval of training descending achieved a better improvement than the first group in the variable speed prolongation. This is done by comparing the results of the post-test for the two groups.

**Keywords:** Intervals of training, ascending, descending, physical variables

### Introduction

The development taking place in all fields, especially in the field of sports, has led to an interest in employing all capabilities, experiences, and theoretical sciences in order to reach high levels in different sports. In addition, the science of sports training is one of these sciences that is concerned with the process of preparing players. Where the continuous development of team sports depends on the way and how to prepare and prepare the players in all respects in order to succeed and reach the achievement of tournaments. Football is one of the team games that always needs continuous enrichment with scientific foundations to reach everything new in this game. As researchers in its field are trying to find the best ways and methods through which to raise the level of physical performance, skill, and planning, as well as raising the level of career. The method of Intervals of training is one of the main and important methods that aim to raise the level of physical fitness components. It has been known for a long time that the load of football players changes during play, and thus the stages of pregnancy and rest are irregular. Therefore for the purpose of good preparation, coaches pay attention to this aspect when developing special exercises (physical aspect, tactics, and technique) and special exercises similar to matches. But what is important here is that the trainers know the amounts of the load and the amounts of rest Intervals between exercises.

The Interval training is also used in most sports activities in general, as it affects anaerobic and aerobic capacity. Therefore, this type of training depends on the phosphagen system to produce energy, as well as the lactic acid and oxygen systems. Thus, it contributes to creating adaptation with its effective effect by controlling its variables in all sports activities. The reason for calling it "Intervalic training" is due to the presence of rest Intervals between each exercise and another, as well as between one group and another. This training depends on the process of mutual planning between the Interval of work and rest<sup>[1]</sup>.

**Corresponding Author:**

**Mahmood Hamdoon Younus**

College of Physical Education  
and Sports Sciences, University  
of Mosul, Iraq

There are many methods used in the Interval of training, which are important in raising the level of physical fitness for many events and sports, including ascending and descending Interval training. Which works oppositely by prolonging the exercise distance in each repetition and shortening the distance of the same exercise in each repetition, which may have an effect on the physical variables of football players. Several studies of Intervals of training in football have emerged, such as the study by Howard and Stavrianeas, which dealt with a high-intensity Interval of training for the season to improve the compatibility of high school players [2]. Sperlich, *et al.* also discussed the effects of high-intensity Intervals of training for an Interval of (5) weeks versus training on size for football players aged (14) years [3]. Whereas, the only study that used ascending and descending Interval training was the study by [4] in athletics, which dealt with the effect of the ascending and descending Interval training methods on the prolonging of speed, and a number of functional variables and achievement in the 800-meter enemy. Through the foregoing, highlights the importance of this research is studying ascending and descending the Interval training methods and knowing their effect on the physical aspects of football players. Perhaps reaching results that reveal to coaches and workers in this field the importance of this type of training, which is a research attempt through which we hope to reach results that serve the sport of football. Through the interest of researchers in the game of football and from those working in the academic field, they noticed that the nature of performance in the game of football is variable and not fixed. As the players cut travel various short, medium, and long distances or vice versa and in different directions according to the situations that the players are exposed to. That is, the player may go a short distance, especially when the organization of play is in his own half of the pitch. But when play moves in the opponent's court, the player cuts the medium distance. Furthermore, there are many situations such as rapid rebound attacks using long passes, the player cuts a long distance and often the rest Intervals are between these situations too short as a result of quick play. For the purpose of training according to these different situations that occur during the match, the thinking of the researchers turned to the Intervalic training in the ascending and descending style, because the method of implementing these two-Interval training methods is consistent with the nature of the mentioned performance. Moreover, these two methods should be used in the training process in which they prefer to use exercises similar to the situations and movements of the game. On the other hand, to the knowledge of the researcher, there is no study in the field of football that used these two methods of training to develop the physical qualities in football. Therefore through these two methods, the researchers try to solve the research problem, which is determined in the following question: Is there an effect of the ascending and descending Interval of training methods on the number of physical variables for football players, and which is better?.

The research aims to reveal the effect of the Interval of training ascending method on a number of physical variables for football players. The effect of the Interval of training

descending method on a number of physical variables for football players. The differences in a number of physical variables between the two experimental groups in the post-test.

The study hypothesize there are statistically significant differences in a number of physical variables for the first experimental group of players between the pre and post-tests, in favor of the post-test. There are statistically significant differences in a number of physical variables for the second experimental group of players between the pre and post-tests in favor of the post-test. There are statistically significant differences in a number of physical variables in the post-tests between the two experimental groups.

### Materials and Methods

The experimental method was used for its suitability to the nature of the research.

The main research sample was determined from the youth players of the Al-Mustaqbal Al-Mashriq Sports Club for football for the sports season (2021-2022), and it consisted of (27) players. The (24) players were selected from among them representing the experimental research sample. The sample was divided into two experimental groups by following the method of random selection using a lottery with (12) players for each group. The number of goalkeepers (3) has been excluded, and Table (1) shows this.

**Table 1:** Shows the research sample, the excluded players and their percentages

Variables	Number	Percentage
Main Research Sample	27	100%
Experimental Research Sample	24	88.88%
Excluded Players	3	11.11%

The researcher used the following research tools (content analysis, personal interviews, tests, and measurements). The content of scientific sources and studies in football was analyzed in order to determine the most important physical variables and their tests that serve the research objectives. As well as conducting personal interviews with experienced and specialized gentlemen.

### Measurement of the body height

A graduated wall was used to measure the height of the body, and when measuring the player stands barefoot with his back adjacent to the wall, with the wall touching the backs of the feet, hips, and shoulder blades, and looking forward. The height of the body is measured from the ground to the highest point of the skull.

### Measurement of the body mass

To measure the mass, the player stands on the scale while he is wearing only shorts, and his body weight is measured to the nearest hundred grams.

Homogenization was performed in the variables (age, height, mass) and Table (2) shows the arithmetic means, standard deviations, and the value of the coefficient of variation and skewness of the dependent variables in homogenization.

**Table 2:** Shows the arithmetic means, standard deviations, coefficient of variation, and skewness values of homogeneity.

Variables	Measurement Unit	Sample		Variation coefficient values	Skewness values
		Arithmetic mean	Standard deviation		
Height	cm	170.210	5.761	3.384%	- 0.921
Age	Year	17.728	1.410	7.953%	- 0.825
Mass	Kg	63.265	7.395	11.688%	0.911

Table (2) shows that the coefficient of variation values for the variables (age, height, mass) was less than (30%). This indicates that the sample is homogeneous in these variables, and the skewness coefficient values were confined between ( $\pm 1$ ) and this indicates that the sample is homogeneous in these variables. The skewness coefficient, whenever it is

between ( $\pm 1$ ), indicates the moderate distribution of the sample naturally.

### Equivalence of the two research groups

Equivalence between the two research groups was performed in physical variables as shown in Table (3).

**Table 3:** Shows the arithmetic means, standard deviations, calculated (t) values, and the probability level of equivalence in the physical variables between the two research groups.

Statistical Features and Physical variables	Measurement Unit	Ascending method group		Descending method group		Calculated (t)	Probability Level <sup>1</sup>
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
Maximum transition speed	Second	3.966	0.082	3.914	0.088	1.504	0.147
Agility	Second	10.958	0.096	10.899	0.069	1.725	0.099
Speed endurance	Second	31.059	0.697	30.961	0.617	0.363	0.720
General endurance	Minute	7.890	0.161	7.970	0.146	1.283	0.213

Through table (3), it was found that the calculated (t) values were between (0.363, 1.725) and we noticed that the values of the probability level were between (0.099, 0.720), and all of them are greater than the level of the approved significance (0.05). That is, there are no significant differences between the two research groups, and this indicates the equivalence of the two research groups in the physical variables.

### Techniques and tools used in research

Electronic balance, timing clock number (4) German-made digital clocks for measuring the pulse indicator, signs number (25) different heights, and tape number (1) measurement.

### The exploratory experiments

- The first exploratory experiment was on (1/12/2021) in which the exercises were approved after learning how to implement the exercises and detecting errors that may occur, as well as determining the maximum values for each distance in each exercise.
- The second exploratory experiment was on (5/12/2021) which showed the possibility of adopting the selected tests. As well as the knowledge of the assistant work team and their understanding of how to work and the method of registration. In light of this, the tests were distributed over two days.
- The third exploratory experiment on 12/12/2021, the aim of which was to identify the time of rest Intervals between repetitions and exercises by measuring the pulse index.

### Designing two-Interval training methods (ascending and descending) used in the research

After analyzing the content of the sources and scientific studies, the two methods of research were designed (Appendix 1), and the first week was mentioned only because of the change in the intensity for the length of the implementation of the two methods. As well as conducting interviews with gentlemen specializing in sports training and football science to determine the validity of the two methods used in the research.

### Pre physical tests

The pre-tests were conducted for the Interval from (29/12/2021) to (30/12/2021) on Wednesdays and Thursdays at 3 p.m. as follows.

**The first day:** On (29/12/2021): (maximum transitional speed test, speed prolongation test).

**The second day:** On (12/30/2021): (Agility test, general prolongation test).

### Implementation of the two interval training methods (ascending and descending) used in the research

After completing the application of all pre-tests, the two training methods prepared by the researchers were implemented where the upward method was implemented in the first experimental group, while the downward method was implemented in the second experimental group on 1/1/2022 and until 2/3/2022.

### The following points were taken into account when implementing the two training methods

- The two Intervalic training methods have been applied for scientific research purposes.
- Start all training units with the general warm-up to prepare all body muscles, followed by a special warm-up.
- The two methods were implemented in the main part of the training units and determined the skill side aspect and physical qualities that depend on the phosphagenic system.
- The method of high-intensity interval training with upward and downward methods was used in the execution of the exercises used. The upward training group carried out each exercise according to distances (30, 60, 90, 120) meters and the downward training group carried out each exercise according to distances (120, 90, 60, 30) meters.
- Three exercises were performed in each training unit. The two groups carried out the same exercises but in a different manner, one group started at the longest

<sup>1</sup> The researchers adopted a probability level  $\leq (0.05)$ .

distance and finished at the shortest distance and the other group started at the shortest distance and finished at the longest distance. Interstitial rest was given after each distance in each exercise. And an intermittent rest was given after each distance in each exercise, and after each exercise, a rest was given to move to the next exercise.

- The two interval training methods were implemented during (9) small (weekly) cycles in three intermediate courses.
- Each intermediate course consists of three small cycles and each small- cycle consists of (3) training modules (i.e. implementation of "27" training modules). Training modules were conducted on days (Saturday, Monday, and Wednesday).
- The ripple of load movement in each cycle is medium (2:1).
- Load control is only by changing intensity.
- Intervals of rest between repetitions and exercises were determined based on the method of Intervalic training, by conducting reconnaissance experiments by returning the pulse index to (120-130) p/m between repetitions and (90-100) p/m between exercises.
- -pulse oximeter is used to measure the pulse rate during rest and work through which the pulse value rate is directly controlled to confirm the pulse indicator during work and rest between repetitions and exercises.
- The maximum time for the distances used in each exercise was determined based on the exploratory

experiments and the time for each intensity used was determined, depending on the average exercise time and rest in the two training methods

- The intensity of the performance of the three intermediate Intervals was as follows:

**First Intermediate cycle:** First Week (80%), second Week (85%), third Week (80%).

**Second Intermediate cycle:** First Week (85%), second Week (90%), third Week (85%).

**Third Intermediate cycle:** First Week (90%), second Week (90%), third Week (85%).

The training modules were completed with calming and relaxation exercises so that the body can return to a semi-normal condition.

The post-tests were conducted for the Interval from (5/3/2022) to (6/3/2022) in the same sequence as the pre-tests.

The statistical methods were extracted by relying on the statistical package (SPSS), which are: (arithmetic means, standard deviation, coefficient of variation, skew coefficient, t-test for related samples, t-test for independent samples).

**Results and Discussion**  
**Results**

**Table 4:** Arithmetic means, standard deviations, calculated (t) values, and the level of probability of the pre and post physical variables of the first experimental group

Statistical parameters and Physical variables	Measuring unit	Pre-test		Post-test		Calculated (t) values	Sig. Level
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
Maximum transition speed	second	3.966	0.082	3.843	0.067	3.252	0.008*
Agility	second	10.958	0.096	10.810	0.099	3.997	0.002*
Speed endurance	meter	31.059	0.697	30.530	0.486	2.307	0.041*
General endurance	minute	7.890	0.161	7.837	0.132	2.513	0.029*

\* Significant at probability level ≤ (0.05)

**From Table (4) can be found the following**

There are significant differences between the averages of the pre and post-tests in all the physical variables dealt with by the research in the first experimental group, which used the

ascending method, as the calculated (t) values reached (3.252, 3.997, 2.307, 2.513) respectively at probability levels (0.008, 0.002, 0.041, 0.029) and these values are smaller than (0.05).

**Table 5:** Arithmetic means standard deviations, calculated (T) values, and the level of probability for the pre and post-physical variables for the second experimental group.

Statistical parameters and Physical variables	Measuring unit	Pre-test		Post-test		Calculated (t) values	Sig. Level
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
Maximum transition speed	second	3.914	0.088	3.856	0.056	1.826	0.095
Agility	second	10.899	0.069	10.816	0.117	1.882	0.087
Speed endurance	meter	30.961	0.617	29.918	0.510	4.823	0.001*
General endurance	minute	7.970	0.146	7.731	0.142	4.065	0.002*

\* Significant at probability level ≤ (0.05)

**From Table (5) can be found the following**

- There are insignificant differences between the averages of the pre and post-tests in the variables of maximum transitional speed and agility in the second group that used the descending method, as the calculated (T) values reached (1.826, 1.882) at probabilistic levels, respectively (0.095, 0.087) and these values are greater than (0.05).

- There are significant differences between pre and post-test averages in the prolonging speed and general prolonging variables of the second group using the descending method, with calculated (T) values (4.823, 4.065) respectively at probability levels (0.001, 0.002) respectively, and these values smaller than (0.05).



**Table 6:** Arithmetic means, standard deviations, calculated (t) values, and the level of probability for the post-physical variables between the two research groups

Statistical parameters and Physical variables	Measuring unit	post-test ascending		post-test descending		Calculated (t) values	Sig. Level
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
Maximum transition speed	second	3.843	0.067	3.856	0.056	0.526	0.604
Agility	second	10.810	0.099	10.816	0.117	0.150	0.882
Speed endurance	meter	30.530	0.486	29.918	0.510	3.010	0.006*
General endurance	minute	7.837	0.132	7.731	0.142	1.888	0.072

\* Significant at probability level  $\leq (0.05)$

#### From table (6) can be found the following

- There are insignificant differences between the averages of the two tests, the pre, and post-tests in the variable of maximum transitional speed, agility, and general prolonging between the two research groups, the calculated (t) value was (0.526, 0.150, 0.1888) respectively, at the probability level (0.604, 0.0882, 0.072) and this value is greater than (0.05).
- There are significant differences between the averages of the pre and post-tests in the variable prolonging speed between the two research groups and in favor of the second experimental group, as the calculated (t) value reached (3.010) at the probability level (0.006), and this value is less than (0.05).

#### Results and Discussion

The researchers attribute the development in the results of both table variables (4) and (5) which indicate the development of the players of the two experimental groups in most physical variables as well as the improvement in the rest of the variables for the players of the two groups but did not rise to the significant level to the effective positive effects of the two training methods (ascending and descending) using the high-intensity Interval training method by relying on the objectives, principles, and conditions of this method in terms of intensity, volume and rest Intervals.

The development in the results of Table (6) indicates the superiority of the players of the second experimental group which used the descending Interval training method over the first experimental group which used the ascending Interval method in the speed prolonging variable. The researchers attribute the superiority obtained to the descending Interval training method in which the pressure on energy production systems, especially lactate, is greater if the pressure is from the first training distance: (120) m and this pressure continues until the completion of distances which ends with a distance of (30) m. In contrast to the ascending Interval method, in which the pressure and the accumulation of lactate are somewhat less, because the first distances (30) meters and the second (60) meters in which the focus is on the phosphagenic system is more, and (Khoshenaw) indicates in this regard that "the descending method works to put pressure on the system." Lactate and its effects after excessive lactate increase since the first repetition. As well as the depletion of phosphagens, there was a gradual increase in the level of lactate accumulation in the muscles and blood as a result of the continuation of running training distances with a lack of rest Intervals despite the decrease in the length of the distances. This means that the level of lactate accumulation was at the first training distance, and this increase was greater than the level of the ascending method<sup>[5]</sup>. Denadai, *et al.* Confirm that under the influence of anaerobic lactate training, the capacity of the maximum anaerobic capacity increases, and the athlete can perform maximum muscular work for longer Intervals of time within the specified times for this system, in addition to

increasing the ability of fast muscle fibers to break down glycogen to produce energy in the absence of oxygen (anaerobic glycolysis). And with continued training for a long time, the capacity of lactate anaerobic work increases.

#### Conclusions

The ascending Interval method which was implemented by the first experimental group achieved an improvement in all physical variables by comparing the results of all pre and post variables of the first test group players. The descending Interval method which was implemented by the second experimental group achieved an improvement in the variables of speed prolonging and general prolonging but did not achieve improvement in the maximum transition speed and agility by comparing the results of all pre and post variables of the second group players. The descending Interval method, which was implemented by the second experimental group, achieved a better improvement than the ascending Interval method implemented by the second experimental group in the variable speed prolongation, by comparing the results of the post-test for the two groups.

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