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| The impact of a proposed training program for the development of special endurance depending on the fatigue index of defense and attack players - Field study of the Sports Academy of football in Djelfa (15-16 years) | |
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Introduction:

Sports is a major social system, a reality in our lives, in which all types of behavior occur in the normal life. The sport passed through different stages from discovery to creativity, education, development, and the desire of the theorists to exploit the physical and spiritual abilities of the human being and took forms, It has become a means to raise money, gain wealth and acquire stardom, and has become a pillar of economy, culture and politics, and its importance has emerged in all other fields, Sports Training is a science that draws a large part of its theories, principles and principles in the implementation of its operations from other sciences such as physiology, life chemistry and nutrition, which are combined with each other to raise the training status of the athlete, through which the levels of players are affected towards the positive and achieve advanced results and distinct.

Modern sports training depends on the concentration of its objectives for the development of energy production systems and the associated functional changes. The more anaerobic or aerobic fitness is possible, the more direct it will be on the level of physical and skill performance.(Mohamed Mari,2004,p10).

Football is a collective sport that has become popular in the world in general and in Algeria in particular. And gained popularity and a large audience compared to other sports , And to ensure the continuation of the status of this sport to its fans and hope to develop for the better , The authors of the research and planning through the development and development of skills and development as well as the development of aspects of the schematic and methods and methods of play, whether offensive or defensive , As well as work to maintain physical capacity and development through the development of various physical qualities.

1-the problem:

The great development witnessed by the science of sports training through its association with most of the natural and human sciences and the use of the results of studies and research in them to establish the rules and laws of sports training. The most important of these sciences is physiology and physiology. Therefore, the scientific input in the formation of training loads and directing them towards the objectives of the desired training is to identify and determine the systems of energy production prevailing in the performance of the game or sports effectiveness or elements of physical preparation. (Shamkhy, 2008, p16).

Al-Sharnoubi and Abdel-Moneim (2006) note that the most important physical qualities that have a high impact on the level of achievement of football players are the attributes of endurance, speed and strength which are in their composite form (strength endurance and speed endurance), which can be placed under the category of "special endurance" Is the basis for achieving achievement if used properly.

The effectiveness of football falls within the mixed system with the anaerobic system beating more than the air system, so it requires the development of energy systems commensurate with their distances, high performance and ability to withstand high level of lactic acid in the muscles and blood and increase the pain associated with fatigue, Is one of the most important obstacles that lead to the player to stop performance is one of the problems that have received a lot of research and study.

The fatigue state during the anaerobic effort may result mainly from a significant increase in the concentration of hydrogen ions (H^+) as a result of the high acidity of the blood, which led us in this study to identify the impact of training programs to develop the classes of speed and tolerance of power and compare the players of different lines of football in the index Fatigue to detect strengths and weaknesses in order to develop appropriate training solutions in the development of training curricula, which will work to develop the ability of anaerobic and non-tactical and delay the emergence of fatigue as long as possible, Based on what was discussed, the following questions can be asked:

- Does the proposed training program affect the development of special endurance depending on the fatigue index of defense and attack players

There are several sub-questions that the present study seeks to answer. The study questions are:

- Are there significant differences in the fatigue index between the tribal and subsequent measurement of the experimental group and in favor of subsequent measurement?.

- Are there any statistically significant differences in the fatigue index between the experimental group and the control group in the subsequent measurement and for the benefit of the experimental group?.

- Are there significant differences in the fatigue index between the defensive and offensive players of the experimental group in the subsequent measurement and for benefit of the defense players ?.

2-Objectives:

- Studying the differences between the tribal and subsequent tests in the fatigue index of defense players and attacking football.

- Build a training program for the development of special endurance (strength endurance and speed endurance) and to know its effectiveness in delaying the emergence of fatigue or disposal of the effects of football players.

- Try to show differences in fatigue index between football players (defense and attack players).

3- Hypotheses of the study:

3.1 General Hypothesis:

-The proposed training program affects the development of endurance depending on the fatigue index of defense and attack players.

3.1 - Partial Hypotheses:

- There are significant differences in the fatigue index between the tribal and subsequent measurement of the experimental group and in favor of subsequent measurement.

- There are any statistically significant differences in the fatigue index between the experimental group and the control group in the subsequent measurement and for the benefit of the experimental group.

- There are significant differences in the fatigue index between the defensive and offensive players of the experimental group in the subsequent measurement and for benefit of the defense players .

4 - Identification of concepts and terminology:

4.1 Training Program:

4.1.1 - Training Program Language:

A set of topics or instructions that are closely related to a field and arranged and organized in advance according to a particular structure in which the educational rules are followed

4.1.2- Training program terminology:

Is the operational steps for the process of planning a plan designed in advance indicating the start date and the completion date of each process to be implemented, and requires the implementation of the time distribution and methods of implementation and possibilities to achieve the goals of the plan. (Idris, 2012, p. 5)

4.1.3- The procedural definition of the training program:

The training program in our research means the set of exercises planned according to the objectives set and linked to a specific time period, and this program consists of units and courses small and medium.

4.2 Special endurance:

4.2.1 Special endurance Terminology:

It is the ability of the player to cope with fatigue at the highest functional level of the aerobic metabolism that can be achieved by the player in his sports sports specialist. (Alaa Abdul Wahab, Ali Ghanem, 2014, p. 244).

4.2.2-The procedural definition of the Special endurance:

special endurance purpose here is to the strength endurance and speed endurance of the long distance sprinters. The first is the relation between strength and endurance and the second is to combine the two classes of endurance and speed.

4.3-muscle fatigue :

4.3.1-muscle fatigue terminology:

Risan Khreibat defines fatigue as the condition in which the ability to respond effectively to stimuli is variable, but its effect on the muscular system is not the ability to retain or replicate the muscular

contractions with the same strength as usual. (Tarek Hassan Al-Nami, Muna Abd Al-Sattar Hashim, 2004, p. 92)

4.3.1-The procedural definition of the fatigue:

It is the inhibitor that causes the player to stop performing the exercise

4-4 - Players of defense and attack:

The defense player in our search means the player who plays behind the midfield and his task is to support the goalkeeper and prevent the opponent from scoring, the player is responsible for the goal.

5-Previous Studied And similar:

5-1 Study of Ahmed and Samer Yousef Meteb Al-Shamki (2008): The impact of anaerobic exercises on the development of the strength and speed of young players in handball.

The study aimed at understanding the effect of anaerobic exercises in the development of the tolerance of the strength and speed of young players in handball. The researchers followed the experimental method to suit the nature of the problem through the use of experimental design (tribal and remote testing of one group) For the season of 2005 and the number of (12) players ages (18-19) years.

The results were concluded to:

- Anaerobic exercises have a positive effect on the development of the traction of young players in handball.
- Anaerobic exercises have a positive effect on the development of speed bearing ability of young players in handball.

2-2- Study (Chalencon, Sébastien, et al., 2012): A model of training effects in swimming and the relationship between the symbiotic machine, performance and index of fatigue.

The study aimed to study the precise relationship between autonomic nervous system activity (ANS), fatigue and athletic performance.

The study sample consisted of 10 swimmers (06 males and 40 females). The age ranged from 15-17 years. Data were collected from national and regional swimmers during two consecutive 30-week training periods. ANS) Was measured by analyzing the wave conversion of the recorded heart rate and performance was measured by a 400 m freestyle. A model was proposed where the fatigue indicators were calculated using the Banister's two antagonistic model of fatigue and adaptation applied to each activity ANS) performance,

the results concluded to have a strong relationship between performance and the spectral component (HF), and the variation of information about the effect Training in the case of fatigue and adaptation of the athlete.

Research Methodology and Field Action:

1- Research Methodology:

Approach: The experimental approach was used

2. Community and sample research:

The research community consists of a group of middle class players active in the sports academy of the state of Djelfa, and they were (30) players, while the sample of the research was chosen by a deliberate way of the players of the sports academy number of (20) players, divided into two groups.

-Experimental Group 10: Players (5 + 5 Defensive)

-Control Group 10: Players (5 + 5 Defenders)

And after parity between the two sets of research to adjust the variables (length, weight, age, training age) and physical tests.

3-Research areas:

-Human field: players active in the sports academy of the state of Djelfa

- Spatial field: Hassi Bahbah Stadium in the state of Djelfa

- Time domain: The time required to complete this research:

14/09/2015 to 13/1/2015.

4. Data collection tools:

Are the means used by the researcher, whether in the process of description or analysis or prospecting to reach its goals. (Ankibi, & Alakabi, 2015, p. 37)

And we used our research

4.1 Body measurements:

The following measurements were taken: Body length / cm. Body weight / kg.

4.2 Tests:

- Test the anaerobic voltage of (Rast):

This test is a measure of the anaerobic capacity of the laboratory as well as the possibility of recognizing the fatigue index. The test was conducted at **Wolverhampton University** in the United Kingdom.

-Performance Specifications:

Preparations for the test begin by measuring the weight of the laboratory and then give it a period of (10) minutes for the purpose of warming followed by recovery of healing for 5 minutes. The test is six quick jumps of 35 meters, completed by the laboratory and given 10 seconds between start and finish. The time of each start is recorded for the nearest part of one hundredth of a second to calculate the anaerobic capacity for each frequency. According to the anaerobic power calculation of the six frequencies, the following is determined:

- Highest capacity (Watt) which is the highest recorded value
- Minimum capacity (watts) is the lowest recorded value.

- Anaerobic capacity (W) = Weight × Distance² / Time³

The fatigue index is produced by (W / s), the highest anaerobic power output from the lowest anaerobic capacity, divided by the total time of the six repetitions

Fatigue index (W / s) = (highest capacity - lowest capacity) / total time of the six launches.

The fatigue index refers to the rate at which the anaerobic capacity of the laboratory decreases. The lower the value of this indicator, the greater the laboratory's ability to maintain anaerobic performance. The higher values of this indicator (more than 10 W / s) indicate the need for the laboratory to develop its anaerobic tolerance. (Dabbagh Ahmed Taha, 2006, pp. 299-298).

5. Applicable training program:

We have developed a training program and have used the opinions of experts and specialists in the field of training science as well as scientific sources.

The program included a variety of general endurance and special endurance (strength endurance and speed endurance). The program included 24 training modules for 20 (2) weeks, ie (03) weekly classes

5.1 -Program Objective:

- Development and development of general endurance
 - Development and development of speed endurance
- Development and development of strength endurance.

5.2 Program Time Division:

- Age of players: 16-15 years
- Program Duration: 14/09/2015 - 13/11/2015

- Number of weeks: 08 weeks
- Number of training units: 24 units
- Number of training units per week: 03)
- Module time: '90-120 '

5.3 Scientific foundations for program development:

We have taken into consideration some important scientific foundations in the development of the program:

- Taking into account the gradual increase in training loads.
- Taking into account the proper composition of the components of the training load used (intensity - size - comfort) and commensurate with this age group.
- Taking into consideration individual differences in the level of performance of hostilities.
- Taking into account gradation in pregnancy is easy to hard.

5.4. Load dynamics used in the program:

Table (02) Formation of training loads in the training modules during the training program

| | | | | | | | | | | | | |
|-----------------------------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|-----|
| The maximum load is 90-100% | | | | | | | ☉☉ | | | ☉☉ | | |
| 75-90 % | | | | ☉☉ | | | | ☉☉ | | | ☉☉ | |
| 50-70 % | | ☉☉ | ☉☉ | | ☉☉ | ☉☉ | | | ☉☉ | | | ☉☉ |
| 35-50 % | ☉☉ | | | | | | | | | | | |
| unit number | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 |
| the days | Sam | Mar | Ven. | Sam | Mar | Ven. | Sam | Mar | Ven. | Sam | Mar | Ven |

| | | | | | | | | | | | | |
|-----------------------------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|------|
| The maximum load is 90-100% | | | | | | | ☉☉ | | | ☉☉ | | |
| 75-90 % | ☉☉ | | ☉☉ | | ☉☉ | ☉☉ | | | ☉☉ | | ☉☉ | ☉☉ |
| 50-70 % | | ☉☉ | | ☉☉ | | | | ☉☉ | | | | |
| 35-50 % | | | | | | | | | | | | |
| unit number | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| the days | Sam | Mar | Ven. | Sam | Mar | Ven. | Sam | Mar | Ven. | Sam | Mar | Ven. |

5.5 -Tools used in the program:

We have used the following tools:

- Metric bar - chronometer - whistle.

5.6 - Module Contents:

- Warm up.
- Physical preparation.
(100 m, 150 m, 200 m, 300 m, 400 m, 600 m).
- The jump (with the two men, with the right man, with the left man).
- Far talking.

We put the contents of the training modules in line with the objectives of the program.

6. Statistical Methods:

In this study, we rely on a number of statistical methods appropriate to the nature of the study design, as follows:

- descriptive statistics: (arithmetic mean, standard deviation, percentage).
- Induction statistic: T test for two independent samples - T test for two linked samples.

Analysis of results:**1- View and analyze the results of the first hypothesis:**

Table (1) shows the value of the computational and standard deviations of the tribal and subsequent tests of the experimental group in the fatigue index for football players (defense and attack players).

| Statistical Transactions | | Number of Players | X for fatigue index | S | T TEST | | |
|--------------------------|------------------------|-------------------|---------------------|------|----------------|----------------|-------|
| | | | | | T _C | T _t | sig |
| experimental group | Tribal measurement | 10 | 12.87 | 0.93 | 3.6 | 2.26 | 0.002 |
| | Subsequent measurement | | 11.61 | 0.58 | | | |

(Level of significance:0.05,-df=9)

Table (01) shows the calculated T value (3.608), which is greater than the numerical value of (2.26) at the level of significance (0.05). The value of SIG is: 0.002, which is less than the value of alpha (0.05) Statistical significance between the tribal and Subsequent measurements of the experimental group, and the average index of fatigue in The Subsequent measurements (11.6150) Watt / s, which is

less than the average index fatigue index of the experimental group of (12.8790) Watt / s.

2- View and analyze the results of the second hypothesis:

Table (2) shows the computational and standard deviations of the fatigue index for the control and experimental groups in the Subsequent measurements of football players (defense and attack players)

| Statistical Transactions | | Number of Players | X for fatigue index | S | T TEST | | |
|--------------------------|---------------------|-------------------|---------------------|------|----------------|----------------|-------|
| | | | | | T _c | T _t | sig |
| Subsequent measurement | control groups | 10 | 12.62 | 0.25 | 4.95 | 2.1 | 0.000 |
| | experimental groups | 10 | 11.61 | 0.58 | | | |

(Level of significance:0.05,-df=18)

Table (2) shows the calculated T value (4.95), which is greater than the numerical value of (2.10) at the level of significance (0.05). The value of SIG is: (0.000) ,This means that there are statistically significant differences between the control and experimental groups in Subsequent measurement, The average fatigue index of the experimental group (11.61) Watt / s is less than the mean of the control group fatigue index of(12.62) Watt / s.

3-View and analyze the results of the third hypothesis:

Table (03) shows the mathematical and standard deviations of the fatigue index of the experimental group in the Subsequent measurement of football players according to defense and attack lines.

| Statistical Transactions | | Number of Players | X for fatigue index | S | T TEST | | |
|--------------------------|---------------------|-------------------|---------------------|------|----------------|----------------|-------|
| | | | | | T _c | T _t | sig |
| Subsequent measurement | control groups | 5 | 11.37 | 0.73 | 1.35 | 2.3 | 0.214 |
| | experimental groups | 5 | 11.85 | 0.31 | | | |

(Level of significance:0.05,-df=8)

Table (3) shows the calculated value of T (1.350), which is less than the value of (2.3) at the level of significance (0.05) , and the value of (SIG): (0.214) which is greater than the value of alpha (0.05) There were statistically significant differences between the defense players and the attackers of the experimental group in the Subsequent measurement, The average fatigue index for the defense players was(11.37) W / s, which is less than the average of the fatigue index of the attackers (11.85) W / s .

Discussions and conclusion:

- It is clear to us through the results of Table (1) that there are statistically significant differences between the tribal and Subsequent measurements of the experimental group, which is trained according to a proposed program which led to a marked improvement in results in the development of strength endurance and speed endurance.
- When reviewing the results of Table (2), it was found that there are significant differences in the Subsequent measurements between the control group and the experimental and for the latter, and these differences that the training program used by the researcher led to the development of the special endurance (strength endurance and speed endurance), (**MEKKELSON**) that the exercise (special endurance) is high, as it should be up to (85 - 90%) of the maximum rate of heart beat (**MEKKELSON,1996,2**), and stressed the **Issam Abdul Khaleq said**, "The training loads of high intensity, ranging from the intensity of the minimum to the maximum (75-90%) and (90- 100%) of the player's maximum ability are considered suitable for the development of special endurance (**Essam Abdel Khaleq, 1987,183**).

This is what **Talha Hossam Eldin** pointed out that training near the maximum limit can reduce the depletion of glycogen As well as increase the number and size of mitochondria within the muscle cell, and these two factors are considered the main factors of back muscle fatigue, so trying to maintain this stock Acidification and rationing in addition to reducing the accumulation of lactic acid is one of the most important factors that the training aims to develop for long periods of work.

- In view of the results of Table (3), there is no statistically significant difference between the defense players and the attackers of the experimental group in the Subsequent measurements and in accordance with the instructions of the anaerobic voltage tests (**RAST**) which indicate the fatigue index to the rate at which the anaerobic capacity of the laboratory decreases. Indicator Low The laboratory's ability to maintain anaerobic performance has increased. The higher values of this indicator (more than 10 Watt / s) indicate the need for the laboratory to develop its anaerobic resistance.

With defense players, the fatigue index (11.3740) watt /s that has, and attackers (11.8560) watt / s. They are almost values This is because defense and attack players need to develop their anaerobic resistance. They rely on quick start-ups, And the maximum finishes to fill the balls or registration, noting by the results improve the special endurance of defense players better than attackers.

As a summary of the results of the research and statistical analysis of the data, we reached the following conclusions:

- There are statistically significant differences in the fatigue index between the tribal Subsequent measurements of the experimental group and for the sake of Subsequent measurements.
- There are statistically significant differences in the fatigue index between the experimental group and the control and for the benefit of the experimental group.
- There were no statistically significant differences in the fatigue index between the defense and attack players of the experimental group in the Subsequent measurements.

Finally, we will make some scientific and practical suggestions that we believe are very important for trainers or officials alike:

- The necessity and necessity of using technological techniques in modern sports training, which facilitates the work of trainers on the one hand and the encouragement of practitioners.

For sport in its performance and regular practice, as well as to familiarize yourself with recent developments and changes in sport.

- The necessity of training trainers in accordance with modern curricula for physical, psychological and social preparation and to inform them of the various sciences related to sport (anatomy, biomechanics, psychology, physiology ...).

- Selection of trainers with certificates, experience, experience and competence.

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