A COMPARATIVE STUDY OF SOME PHYSIOLOGICAL ABILITIES ACCORDING TO THESE LINES OF PLAY (DEFENSE, MIDFIELD, ATTACK) DURING THE FOOTBALL COMPETITION PHASE[i]

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Abstract:

In this research, under the title of "*Comparative study of some physiological abilities according to these lines of play (defense - center and attack) for football players under the age of 17*", we tried hard to detect the differences of some physiological capacities. Consequently, we suggested two hypotheses which are: 1) there are many differences in some physiological capacities according to the lines of playing, and 2) the competition has effects on some physiological capacities of football players according to the lines of playing. Therefore, to confirm the validity of the hypothesis or deny it, we as researchers, conducted a descriptive method on a sample consisted of 15 players from the youth team of Tiaret where the sample was chosen intentionally and in the light of the theoretical and the field study, in which we identified the research tools, which were the functional tests, and also through the scientific foundations (validity, constancy, and objectivity). The results of the study revealed many differences in some physiological abilities by playing lines (defense - center - attack) and resulted in that competition affects positively on some physical capacities according to these lines (defense, center and attack). The most important recommendations were to generalize the results of this study to the rest of the other states. This is in order to increase the

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confirmation and validity of the results obtained. Also, in view of the objectives of the study and its results, appears a need for further studies that deal with physical capacities that reflect an important factor in the planning of sound training programs and implemented during a competitive phase.

Keywords: physiological capacities, lines of play, competition phase

1. Introduction

Football is the world's most popular sport, both in terms of practice and watching. It is no wonder that football has for decades attracted the interest of sport scientists and doctors who have studied various aspects of sport, (physiological, natural, nutritional, Mechanical or psychological), which has led to the present time to the availability of numerous scientific researches and scientific information of scientists on the scientific aspects about football where the studies confirmed: Regular physical training leads to the physiological conditioning of many functions of different body systems and shows the impact of Aerobic exercises particularly in the development of maximum oxygen consumption through improving the heart's production and increase the activity of enzymes and the number and size of mitochondria in the working muscles (Schiffand 1999 / Relley1990 / ASTRAND 1970).

Ideal physical training does not miss the development of anaerobic abilities, endurance, muscular strength, flexibility and agility (Schifand 1999, Relly 1990). The fundamental aerobic energy production system that supports the anaerobic energy system for footballers is that the game varies in frequency between high altitudes the rapid pace and sometimes slows down. Vo2max is considered as an accurate indication of the body's ability to consume oxygen. This results from a great cooperation between the lungs, heart and general muscles. The results show heart rate measurements in football players. And the players of the attack 172 per minute and the midfielders 176 strokes per minute and known that running the ball leads to the consumption of oxygen for what is in the case of running without a ball by up to 10% according to some research results, thence, physiological abilities differs according to the individual and age training for football players (Bangsbo 1994, Relly 1997).

Indicates that excellence in the performance of the centers and lines of play in football is largely related to the extent of each player's physical characteristics, kinetic skill and the ability to perform the tactical, offensive and defensive duties, despite the rapid pace of technology and rapid shift from defense to attack and vice versa during the game it is necessary to find players who are in a center of play centers or a line of

playing lines to master the requirements of this center, but this does not necessarily provide special specifications of the physical characteristics that must be enjoyed by the player in this center through different playing lines, which helps to identify the weaknesses of the players and work to overcome them through the objective evaluation of the training curriculum.

2. Problematic

The modern football player is characterized by different physiological abilities and characteristics depending on the positions of play .The researchers believe that each line of play have characteristics and features that must have a set of physical qualities that indicate the level of respiratory and physical efficiency of the player and qualify them to play the role entrusted to him within the training plan Therefore, researchers are trying to identify the physiological responses of the body organs in the face of different physical loads intensity of the defense, center and attack players during the competition as well as to identify the level of respiratory and physiological efficiency of the different lines of play and its use in preparing the players in proportion to the requirements of the training plan ,the capabilities and potential of each player. After reviewing the scientific sources, we find that most trainers focus on giving the loads in the training module to the players in one team in a comprehensive manner and not taking into account the differences in the centers of play and its implications on physiological adaptations. For example, there is a tight correlation between the maximum amounts of oxygen consumption of football players have a cut-off distance during play (Bangbo1993-Relly1990). Football is at the top of the sport in which the largest distances are scored during the game, ranging from 7m to 12km. This distance differs from player to player according to a set of criteria. The player's system, the game's system, the place of the match, the physical and healthy case of the player. According to the report of Universal Sport based on 3 matches in the French league, the average distance of the players is:

- Mid-field defender: 10.67 km;
- Midfield defensive: 11.57 km;
- Midfield offensive: 12.30 km;
- Central attacker 11.10 km;
- Wing attacker 11.70 km.

Therefore, the physiological requirements vary according to their level and nature and according to the system, centers and the plans of play applied during the matches in addition to the different levels and the format of the games. Hence the problem of

research that we can ask the questions as follows: Lines of play (defense- Midfield - attack) on some of the physiological capacities of football players under 17 years old: *"Are there statistically significant differences between the lines of play (defense-center and attack) in some physiological abilities of footballers under the age of 17?"*

3. Hypotheses

- These play lines (defense, Midfield and attack) have an influence on some of the player's physiological capacities.
- There are statistically significant differences between play lines (defense- Midfield -attack) in some physiological abilities of football players under 17 years.

4. The importance of research

This research is important in several aspects, foremost of which are the following:

A. The theoretical importance

To highlight the importance of the corporal physiological aspect of football players and to highlight the requirements of the lines of play through the studied physiological indicators as well as to try the studied scientific work to avoid the random ways and means of determining Some of the basic qualities that must be provided in the modern football player, as well as to highlight the scientific value of field tests and the extent of their contribution in the detection of the level of players of different qualities ,positions and individual differences between players.

B. Practical importance

The information derived from this research will help coaches and football teams to pay attention to the physical preparation by play centers and try to plan properly taking into account the differences in physiological abilities of football players (defense - Midfield - attack), as The results of this research will highlight the importance of taking advantage of the physical preparation program in football.

5. Definition of concepts and terminology

Aerobic capacity: Air capacity means the ability of the body to produce energy during oxygen consumption and the permanence to perform the work of muscle at high levels of maximum oxygen consumption, whenever the ability of the player or athlete to consume oxygen O_2 the more capacity to produce energy At higher levels, and thus means the amount of oxygen used by muscles and tissues. O_2 oxygen consumption can

reach more than 80% of the maximum athlete. The higher the sports fitness, the better is the oxygen consumption in the training. The muscles cannot continue in effort for long periods without oxygen whenever the load is high, the oxygen consumption is fast.

The anaerobic capacity: The muscle efficiency to produce the anaerobic energy that the player uses to perform the movements that require the conditions of play that perform with maximum force and speed as possible About 30 seconds. The anaerobic energy production system is the basic system for football, especially the lactic acid system. Although the time of the game classifies the game of football in aerobic activities, the anaerobic fitness of a football player means the development of maximum aerobic capacity and is the ability to produce the maximum possible power in the anaerobic system Phosphates that perform with maximum strength and speed in the shortest time of 5-10 seconds (Muwafiq Majd Al Mawla 2000 / p. 367).

Competition: The word "competition" is used in general in the field of sport. It is used by trainers, administrators and fans as well as athletes. Definition of competition According to Wenberg Gould (1997), sports competition is a situation in which two or more people compete to win the prize or the largest share and achieve their elitist level (weineck.1997.p125) and then achieve competition when two or more are struggling for something or to achieve a goal.

Lines of play: Which is the possibility of determining the location occupied by the player in an integrated building through which to carry out his offensive and defensive duties within the framework of the objective plans (Ibrahim, 1994)?

Football: It is a collective sport practiced by all people as indicated by Rumi Jamil "*Football is above all a collective sport adapted to all classes of society*" (Jamil 1986 p. 51).

5.1 Previous and similar studies

The study of Nawar Abdullah Hussein al-Lami (2007); entitled "*Determination of standard levels of certain physical characteristics and basic skills and physical measurements of the different playing lines of the middle youth of the Euphrates*". The study aimed to highlight the importance of special physical attributes and their relationship to some basic skills of football and specifications Which requires the player to play within the three lines and determine the standard levels of some basic variables, physical, skill, physical styles of different lines of the player and to highlight the differences between the centers and the requirements of each position player. The results of the research were in the 88 players of the central Euphrates governorates after excluding the goalkeepers. One of the most important results of the research was the necessity of relying on the standard criteria in selecting the players of the lines and adopting the standard standards for evaluating the performance of the team.

The study of Naser Abdelkader (2006); entitled "*The influence of the duties of the play centers and its defensive and midfield defense lines in the variation of the physical and skill requirements of the football players*". The study aimed to identify the areas of interdependence and differences in physical and skill requirements between centers and lines of play. Teams from the Western Regional Division of the First Class for the first class. They were subjected to tests and measurements of the fitness of running 30 meters, flexibility and agility, high jump of stability and running test 12D and some basic skills of pitching and strike corner and The researcher used the survey method to prove or deny the existence of differences between the centers of the player in the physical and skill requirements of football players. In the light of the results and statistical analysis, the researcher found significant differences between the centers of the players of some elements of fitness and some basic skills, Where the attacking positions achieved the best result in both speed, strength and agility, and in both the skills of running the ball between the characters and the correction in the goal.

6. Research Methodology

The nature of our research problem is that we are forced to follow the approach, not by accident. Through our research, we dealt with a field problem aimed at comparing these lines (defense-center-attack) from the physiological point of view. Comparative survey, which is among the most accurate and the best in terms of achieving healthy results and through it appears the features of the scientific way of thinking and identifying the research problem, analyizing and discussing the hypothesis.

6.1 The research community
The research community consists of teams under 17 years active in the championship between the west Algerian associations.

6.2 The search sample
The research sample consisted of football players of Tiaret Youth team under the age of 17, which is active in the championship among the associations where the sample of the research reached 15 players who were chosen in a deliberate way and then dividing the players into three groups, ie, five players in each line of the game where 5 in the defensive line, 5 in the midfield and 5 in the front line as players and participants in the majority of matches can be adjusted a range of variables, including the impact of the play centers on some physiological capabilities during the competition, forcing the exclusion of players who do not participate regularly in their team games.

6.3 Research variables

- Independent variable: play lines (defense- Midfield -attack) during the competition stage.
- The dependent variable: Some physiological abilities (functional).

6.4 Domains of the research

1. The human domain: consists of 15 football player under the age of 17 years of the Tiaret youth registered in the season 2016/2017.
2. Spatial domain: the functional Field tests (pre-post) done in Ait Abdul Rahim playground in Tiaret.
3. Chronological domain: The experiment was conducted on 29/10/2016 and re-tests on 05/11/2016.
   - Pre-tests: were conducted 15/11/2016 after the team conducted two interviews in the tournament.
   - The post-tests: were conducted on 21/03/2017 after the team conducted twenty interviews in the tournament.

6.5 Research tools

6.5.1 Arab and foreign sources and references

In order to comprehensively understand and understand the theoretical subject of the research, the students relied on all available sources and references in both Arabic and foreign languages in addition to the scientific concourses, journals, as well as the Internet; also depending on the previous studies which is related to Sport training field

- Physical tests: The researchers adopted a battery of standardized tests that measure. The physical and technical aspects of the under-17 mediums. These tests were also presented to the experts for nomination.
- Exploratory experiment: In order to avoid mistakes, and uncover the aspects and difficulties of research.
- Field tests:
  - Brixy test running (05 minutes), Objective of the test: maximum oxygen consumption plus maximum air speed.
  - Sergeant test (the vertical jump), the aim of the test: short anaerobic capacity test (explosive force of the lower limbs).
  - Retrieval test (Rofie).
  - Speed test30 meters, the objective of the test: Evaluating the anaerobic average speed.

6.6 The scientific basis of the tests

A) The constancy of the test

Moquadim Abdelhafidh says: "*The constancy of the test is the accuracy or consistency and constancy of its results if applied to a sample of individuals on two different occasions" which means that if the same test is repeated on the same individuals and in the same circumstances it gives the same findings."* (Bengoua, 57, 1997).

B) The Validity of the test

In order to verify the validity of the test, the researchers used the self-validity coefficient as the validity of the standard scores for the real degrees from which the measurement errors were obtained, which is measured by calculating the square root of the test stability coefficient. (Bengoua, 57, 1997).

C) The objectivity of the test used in this research is easy, clear, non-existent, interpretable and far from self-coronation.

Table 1: Shows the constancy and validity coefficient of the functional test battery

Functional tests	Sample size	Degree of freedom	Level of significance	Correlation coefficient	Stability coefficient	Honesty coefficient
Rofi test					0,89	0,94
Speed test 30mtr	6	5	0,05	0,75	0,91	0,95
Brixy test					0,88	0,93
Sergeant test					0,81	0,90

The results of the Pearson correlation coefficient show that the physical and skill tests are characterized by a high degree of self-validity .The calculated amounts of the self-validity coefficient are greater than the amount of the Pearson correlation coefficient where all constancy indicators fluctuated between (0,81-0,91) in all tests which reached 0,75 and this is at the level of statistical significance 0,05 and the degree of freedom 05.

6.7 Statistical means

The aim of using these means is to reach quantitative indicators which help in analyzing, explaining and judging. And the most important statistical means used in this research are:

- Arithmetic average: (Saad Allah.1991.184).
- Normative deviation: (Naji -Overall 92).
- Simple correlation coefficient (Pearson): (submitted 1993.110).
- Disparity test analysis: (Fisher).

7. Results analyses

Table 2: The results show the pre functional tests of
different positions of play (defense, midfield, attack)

Statistical study / Tests	Freedom's degree	Level of statistical significance	tabular value "F"	Calculated value "F"	Statistical significance
Short anaerobic capacity				3‹27	Statistically not significant
Average anaerobic capacity				3‹37	Statistically not significant
Maximum oxygen consumption				0‹45	Statistically not significant
Maximum aerobic speed	(2/12)	0,05	3,88	0‹85	Statistically not significant
Return to normal ratio				0‹59	Statistically not significant
Pulse rate in a normal state				0‹74	Statistically not significant
Pulse rate after exertion				0‹52	Statistically not significant

Figure (01) The functional pre tests of different of play (Defense, Midfield, Attack).
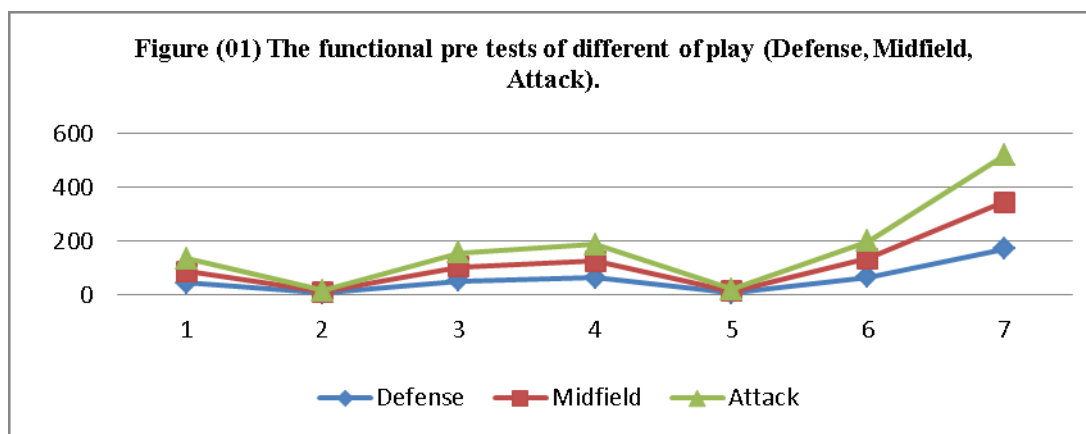
The above table shows the calculated value of" F" for the functional tests of pre measurement and that after passing 2 championship tours, in order to know the homogeneity in the research sample and through the results we found that the calculated "F" in pretests respectively rated :
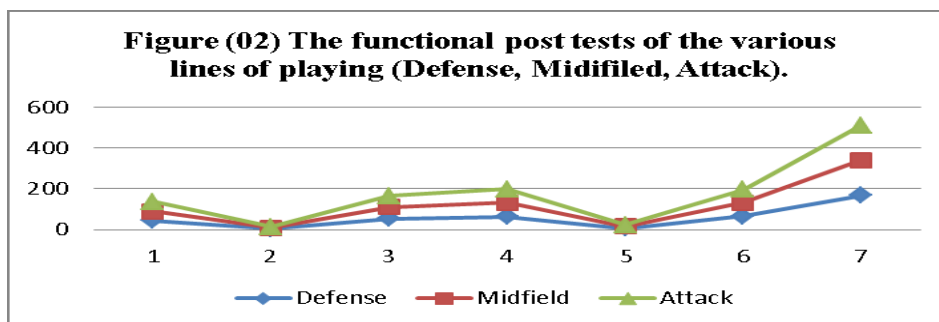
1) Short anaerobic capacity: 3.27.
2) The average anaerobic capacity: 3.37.
3) The maximum oxygen consumption: 0.45.
4) Maximum aerobic speed: 0.85.

5) Normal returning rate: 0.59.

6) Pulse rate in a normal state: 0.74.

7) Pulse rate after utmost exertion: 0.52.

So, the calculated value of "F" is smaller than the value of tabular "F" which is rated with 3.88 and 0.05 at the level of statistical significance, and (2/12) at freedom's degree. Therefore, these rates do not have intangible significance between the lines of play (defense, midfield, attack).

Table 3: Results of the functional posttests of
the various lines of playing (defense, midfield, attack)

Statistical study / Tests	Freedom's degree	Level of statistical significance	tabular value "F"	Calculated value "F"	Statistical significance
Short anaerobic capacity				4٬34	Statistically significant
Average anaerobic capacity				4٬49	Statistically significant
Maximum oxygen consumption				6٬16	Statistically significant
Maximum aerobic speed	(2/12)	0,05	3,88	14٬72	Statistically significant
Return to normal ratio				1٬56	Statistically not significant
Pulse rate in a normal state				0٬06	Statistically not significant
Pulse rate after exertion				5٬10	Statistically significant

Figure (02) The functional post tests of the various lines of playing (Defense, Midifiled, Attack).

The above chart shows the calculated amount of "F" of the functional tests of post measurement and that after passing 16 rounds of the tournament on a sample, and the results were treated statistically and through these results we observe that the calculated "F" in the post test, successively:

1. The short anaerobic capacity: 34.4.
2. The average anaerobic capacity: 4.49.
3. The maximum oxygen consumption: 6.16.
4. Maximum aerobic speed: 14.72.
5. Pulse rate after utmost exertion: 5.10, is smaller than tabular "F" estimated with 3.88,and 0.05 at the level of statistical significance, and(2/12) at freedom's degree.

Therefore, these rates have an intangible significance between the play positions (defense, center and attack), except the normal returning rate and the pulse measurement test in case of rest in which the calculated amount of "F" is 1.56, 0.06 which is smaller than the "F" tabular value estimated with 3.88 at the level of significance, (2/12) at freedom's degree. So, these rates don't have intangible significance between play positions.

8. Interviewing the results with hypotheses

8.1 The first hypothesis: The play lines (defense- midfield -attack) affect on some physiological abilities of football players under the age of 17.

The obtained results, confirmed the validity of the hypothesis, where we found significant differences between the pre and post- tests due to the evolution of all the physiological variables referred to. The researchers point out that the development is due to the effect of competition according to the different positions of each player which differs in each player's output according to his special position, the high frequency of competition and the importance of matches, in addition to the philosophy of the coach in selecting the special game way of the team according to the players possibilities. Moreover, another study conducted on the players of the English League indicated that the center may significantly affect the value of Vo2max if it was found that the teams used 4-4-2 or 4-3-3 formation, in both cases the midfielders were higher in the value of Vo2max. This was due to the fact that this line of the team was responsible for linking the attack and defense lines and also showed that there was a significant relationship between the maximum of oxygen consumption and the distance of the tournament, while the defenders have the lowest value in the level of Vo2max and Holman refers to that, where the arithmetic average of the four defenders of the German national team reached 56,2 ml / kg / d ,while the arithmetic average of the rest of the team members reached 67 ml / kg.

8.2 The second hypothesis: There are statistically significant differences between the play lines (defense, midfield, attack) in some physiological abilities of -17 footballers. The results showed the validity of the hypothesis, where we found significant

differences between the lines of play (defense, midfield and attack) in the functional tests due to the rate of development and output which varies according to the player's positions. Defense and attack players are characterized by the high, short and medium anaerobic capacity compared to midfielders who have high aerobic capabilities and this depends on the played role by each player alike ,and this is what we observe in modern football as it suggests training programs for players according to their positions, their developmental characteristics and features, and trying to raise the pattern of performance during the competitions as well as elevating the achievement levels.

Some results show that there is a significant correlation between the level of Vo2max and the status achieved in some advanced European leagues. The study also noted that most of football players in advanced leagues have exceeded the threshold of 60 ml / kg / d.

9. Conclusions

In light of the results of the researchers and the statistical treatments of tests used in the research and then reach the following results:

- There were significant differences in functional tests between the pre-test and post-test sample.
- There are significant differences in anaerobic capacity in the post-test between playing lines (defense, midfield, attack).
- There are significant differences in aerobic capabilities in the post-test between player lines (defense, midfield, attack).
- There are no significant differences in player retrieval depending on player lines (defense, midfield, attack).
- There are significant differences in the pulse after the maximum effort between players according to the lines of playing (defense, midfield, attack).
- The physiological abilities of the players differ according to the lines of play (defense, midfield, attack) during the competition stage.
- Competition affects some of the physiological abilities of football players according to these positions (defense, midfield, attack).

6. Recommendations

In the light of the obtained results through the study, the researchers recommend the following:

1. Generalization the results of the study on the rest of the other tournaments in order to confirm the gained results.

2. In the light of the objective of the study and its results, there is a need for further studies of physiological abilities according to these lines (defense, midfield, and attack) in football, which is an important factor in the physical preparation process according to the game positions.

3. Training the players according to the lines of play and this is based on each line's duties, specificities and requirements.

4. Programming adequate and special training according to the positions of the game taking into account the individual differences in the physiological abilities between the players as well as classifying them into levels during the exercises to achieve homogeneity in the team.

5. Intensifying the efforts by the specialists and the formers of the scientific field work and depending on test batteries to determine the level and research in the ways and methods of development and improvement to raise the sport achievement level.

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