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A COMPARATIVE STUDY OF REDUCED GAMES AND HIGH-INTENSITY INTERMITTENT EXERCISE IN THE DEVELOPMENT OF VO2 MAX AND THE VMA[i]

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Abstract:

The study aims at comparing each of the mini-games and high-intensity intermittent exercise in order to figure out which of the two methods that most developing the aerobic capabilities (VO2max-VMA), using the experimental approach through proposing two training programs, each program consists of 8 weeks, by two training sessions each week. The size of each share ranged from 90 to 120 minutes, the programs conducted on a sample consisted of 36 players, divided into 18 players from the WABT team and 18 players from the USBT team. It has also been relying on research tools that are in line with the nature and objectives of the study. Physical tests that have been tested validity of the scoping study. They involved 10 players (5 from WABT team, and 5 from the USBT team), without involving the members of the scoping study in the basic study.

All of these steps have led to discharging a set of results that have been analyzed and processed statistically to reach at the latter to the following results:

- No statistical significance between the two groups in pre- tests.
- There are similarities between the two methods in the development of an aerobic capacity (VMA et VO2max).
- There is no statistical significance in the post tests between the two groups.

After comparing the results of pre and post tests within each group, we concluded the extent of the contribution of each of the two programs in the

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development of aerobic capacities. All these results prompted us to develop a set of suggestions:

- The organization of forums and special days of formation of modern requirements in football means and methods especially from the physical trainers.
- Proposing the use of both the high-intensity intermittent exercise way and mini-games during the various stages of the annual planning, especially in the preparation stage and competition stage.

Keywords: mini-games, intermittent exercises, VO2 Max, VMA

1. Introduction

Football is the most popular sport in the world, it is closest to the heart of millions of children and young people of the world who actually practice, and also to the tens of millions who watch in stadiums across different media or by following this information and events through newspapers and magazines not to mention the many books that invade the market and discussing this fun sports.

The world football is not reached this high level by chance but thanks to the involvement of science and the efforts of researchers to develop the level of performance and improving the physical condition of the players.

So the fundamental goal for a coach is to optimize performance. The biggest performance gains are achieved through optimal amount of physical training with adequate recovery periods for optimal adjustments before the competition. Athletic performance depends on the interaction between the technical, tactical, psychological, physical, and numerous parameters such as weather, altitude, time of day, the ground conditions, and equipment used, dietetics (Bangsbo, 1994).

Improving the athletic performance is a complex process that requires the optimization of different qualities. Although the development of physical qualities only fit one aspect of training, our work will focus on this axis. Some types of exercise, such as intermittent exercises, can improve both anaerobic and aerobic performance (Tabata, 1996).

Bangsbo (1994b) described football as an "intermittent sport", which can be defined as a continuous succession and random periods of effort and periods of active or passive recovery. Intermittent exercises are characterized by the combination of several variables: the period of exercise and its intensity, the type (active or passive recovery) and the recovery period.

Intermittent exercises are an example of the orientation of the training according to analyzes of various performance factors. However, many authors (Hoff 2002) have tried to link these physical data with technical-tactical data. They questioned the physiological stress and physical exercises with ball such as mini-games, technical circuits, compared to some specific physical exercises.

Modern training was oriented more toward integrated collective practices, with a mixed work integrating the technical and tactical aspects, but also physical and psychological.

So many coaches use the mini -games as essential stimuli of training with some results. These ball exercises have the advantage of being "miniatures" of football; approaching similar levels to those of the intermittent efforts of type "short-short" according Dellal, (2008).

Also, these modern techniques of training and physical preparation promote aspects that will make them more effective players in their football skills match, and in the financial return of their best training activities.

1.1 Problematic

The endurance qualities seem so essential in football, and will promote the series of sessions according to the intrinsic skills of each player. The football training must be more comprehensive, with a more complex dimension, closer to the reality of the game and competition conditions. Currently, the training content is based more on the demands of the game and the level of players' abilities.

The modern game requires the development of almost all conditional capacities (motor) based on the exigencies of the occupied job in the team; Starting from the fundamental action of the game. Also, the radical change in the characteristics of efforts solicited in football in the various major championships has proportionately led to profound revisions on the means and methods, the quality of physical training and even the way considering it. (Dellal, 2008)

Indeed, during a game, sequences and intensity of efforts vary continuously, meaning that the physical training as realistic as possible. To be specific, the preparation should include the regular use of the ball as this will help develop specific muscles involved in the game, but also improve the technical and tactical skills while maintaining player interest.

In this context, one can ask the question: *"Is there a significant difference in the development of VO2max and VMA between high-intensity intermittent exercises and reduced in football games?"*

Hence, it arise other questions:

- Is the training program based on high-intensity intermittent exercise an influence on the development of the VMA and VO2max?
- Is that the training program based on mini games to influence the development of the VMA and VO2max?
- What is the most effective program in the development of the VMA and VO2max?

2. Hypotheses

In this problematic, we can assume:

A. General Hypothesis

- There is no significant difference in the development of VO2max and VMA between high-intensity intermittent exercise and mini games among footballers.

B. Partial Hypothesis

- The training program based on high-intensity intermittent exercise has an influence on the development of the VMA and VO2max.
- The training program based on clearances to influence the development of the VMA and VO2max.
- There is no significant difference between the two programs.

3. Objectives

- Comparison of high-intensity intermittent exercise and mini games in the development of the VMA and VO2max.
- Have a better idea of the level of aerobic fitness in football (Category U17).
- Define an experimental way the means and methods for raising the level of VMA and VO2max and performance.
- Development of training programs based on high-intensity intermittent exercise and games to reduced aerobic qualities improvements.

4. Research Methodology

4.1 Sample

This study involved a sample of 36 soccer players (18 players from WABT of Tissemsilt and 18 player from USBT of Tissemsilt) belongs to the Category U17, these players play in the league "a division" west region.

Table 1: Introducing the sample characteristics

	Seize (cm)	The weight (kg)	IMC
Average	**171**	**63 ,21**	**20.03**
Standard deviation	**6,35**	**0,04**	**1.12**

4.2 Organization and method of research

Our choice focused on field tests for the VMA, VO2max and performance (Novmijanov). The subjects performed:

- VMA Test (VAMEVAL) Cazorla and Légera.
- Performance Test (Novmijanov).
- Cooper test 12 minutes.

4.3 The training program

A) The training of program steps

After determining the compared tests, our research objective and in the age category of our population we tried:

- The confirmation of the validity of actual devices and their relevance to the search service.
- The control of other random variables that can affect the accuracy of the results of the baseline study.
- Physical tests are characterized by objectivity, variability and honesty.

B) The application of the program

After selecting the two groups, we built two different programs, each program has the duration of 8 weeks, each week contains two training sessions, here are the features of the program:

- **The 1st program based on reduced games (WABT Tissemsilt**)

A meso development cycle, consisting of 8 micro cycles have reduced the use method of play. Each microcycle included two training sessions, the duration in each session ranges from 90 to 120 minutes.

- **The 2nd program based on high-intensity intermittent exercise (USBT Tissemsilt)**

A meso development cycle, consisting of 8 microcycle contains intermittent exercise; each microcycle included two training sessions, the duration in each session varies from 90 to 120 minutes.

4.4 Method of statistical calculation

The comparison between the two programs and the effectiveness of each program has been appreciated by applying the following calculated statistics:

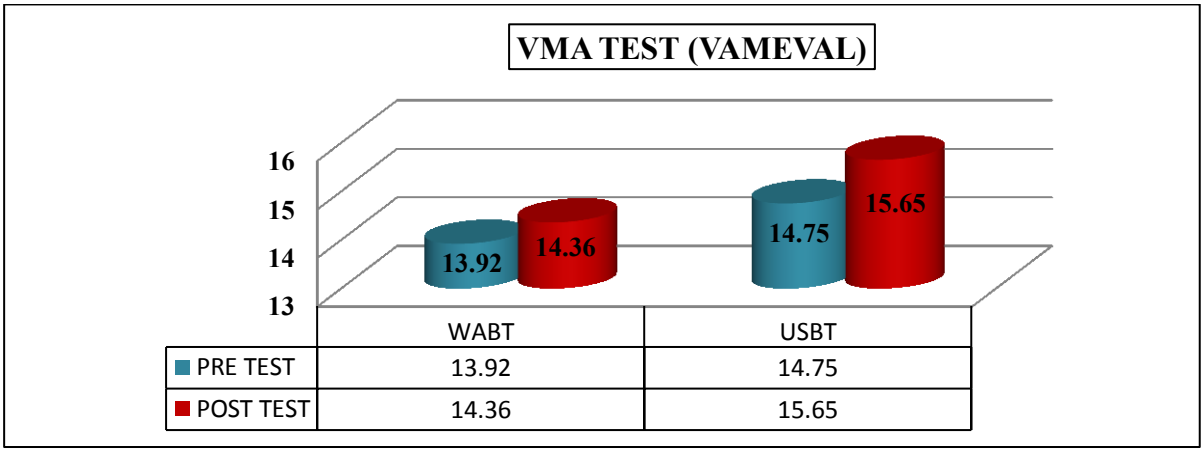
- Arithmetic average.
- Standard deviation.
- Coefficient of correlation.
- Calculation of the ratio (f) Fischer-Snedecor.
- Student test (T).

5. Presentation and analysis of results

5.1 Presentation of results (pre and post test) at a VMA test (VAMEVAL) for both groups (WABT and USBT)

Pre test						Post test					
WABT		USBT		T Calculated	T Tabulated	WABT		USBT		T Calculated	T Tabulated
X	Y	X	Y			X	Y	X	Y		
13,92	1,58	14 ,75	1,46	0, 87	2,03	14,36	1,20	15,65	1,40	1,85	2,03

Table 2: Presentation of results (pre and post test) at a VMA test (VAMEVAL) for both groups (WABT and USBT)



Histogram 1: Presentation of results (pre and post test) at a VMA test (VAMEVAL) for both groups (WABT and USBT)

Through the given the results made in the pre-test of the VMA, we see an average of 13.92 ± 1.58 for the team WABT Tissemsilt and 14.75 ± 1.46 for the team USBT of Tissemsilt.

Reading the data in this table in comparison to the averages of the two groups showed a non-negligible deviation (calculated T = 0.87) the probability level P (0.05) and degree of freedom equal to (34) less than the T tabulated = 2.03. This means that there is no difference between the treatment group and the control group in the pre test VMA.

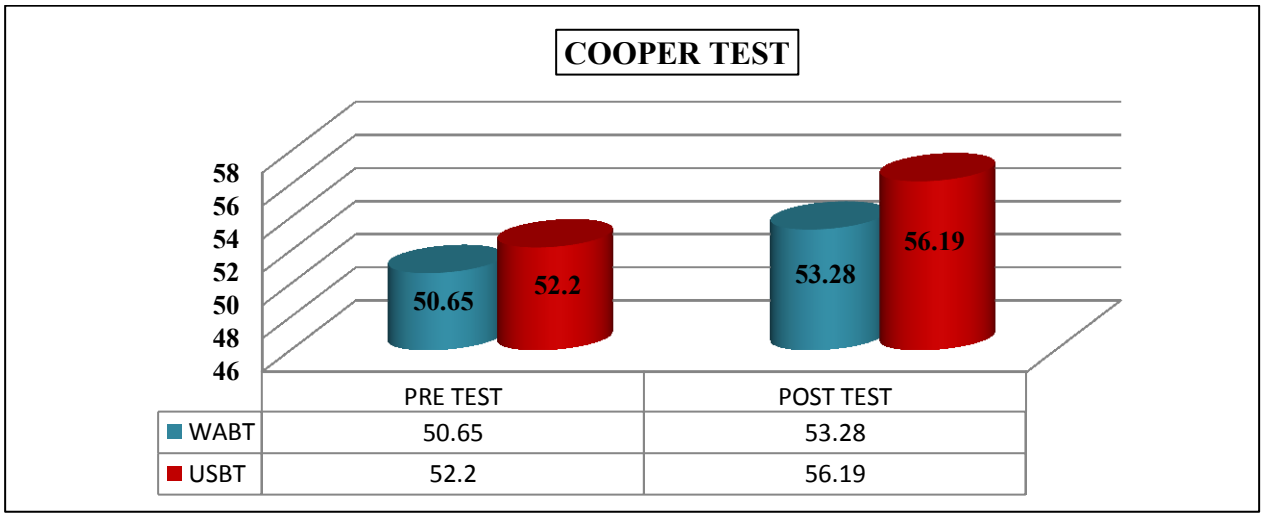
And for the obtained results in the post VMA test, and an average of 14, 36 ± 1, 20 for the team WABT and 15.65 ± 1.40 for USBT team and on this plan , the data in this table compared the means of the two groups showed a non-negligible deviation (calculated T = 1.85) the probability level P (0.05) and degree of freedom equal to (34), which lower the T tabulated = 2.03 This means that there is no difference between the two groups in the VMA test post.

From these data, we find that there is no difference between the discounted games and high-intensity intermittent exercise in the test VMA.

5.2 Presentation of the results (pre and post test) of Copper test (VO2 max) for both groups (WABT et USBT)

Pre test						**Post test**					
WABT		**USBT**		**T Calculated**	**T Tabulated**	**WABT**		**USBT**		**T Calculated**	**T Tabulated**
X	Y	X	Y			X	Y	X	Y		
50,65	3,91	52,20	4,77	1,06	2,03	53,28	4,12	56,19	4,90	1,92	2,03

Table 3: Présentation of the results (pre and post test) of Copper test (VO2 max) for both groups (WABT et USBT)



Histogram N2: Présentation of the results (pre and post test) of Copper test (VO2 max) for both groups (WABT et USBT)

Through the given results achieved in the pre test VO2max, we see an average of 52.20 ± 4.77 for the team USBT and 50.65 ± 3, 91 for the WABT team. Reading the data in this

table in comparison to the averages of the two groups showed a non-negligible deviation (calculated T = 1.06) the probability level P (0.05) and degree of freedom equal to (34). T tabulated = 2.03. This means that there is no difference between the two groups in the pre test VO2max.

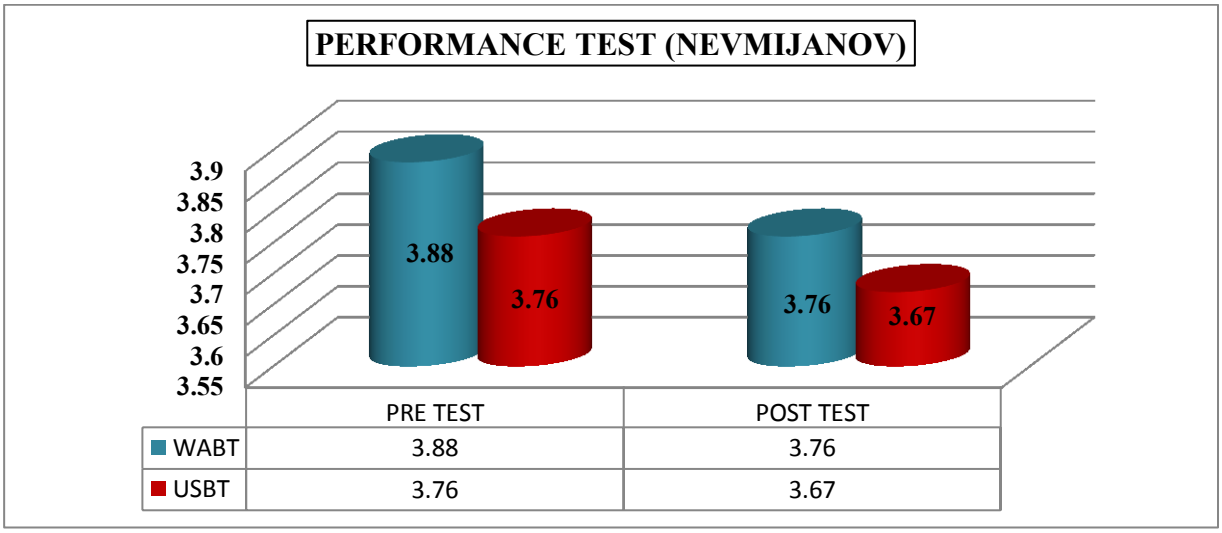
Regarding the results obtained in the post test VO2max, there was an average of 56.19 ± 4.90 for the team USBT and 53.28 ± 4.12 for the team WABT. In this regard, the data in this table compared the means of the two groups showed a non-negligible deviation (calculated T = 1.92) the probability level P (0.05) and degree of freedom equal to (34), T tabulated = 2.03; this means that there is no difference between the two groups in the VO2max test post.

From these data, we find that there is no difference between the discounted games and high-intensity intermittent exercise in the test VO2max.

5.3 Presentation of results (pre and post test) during a performance test (Nevmijanov) for the two groups (WABT and USBT)

Pre test						Post test					
WABT		USBT		T Calculated	T Tabulated	WABT		USBT		T Calculated	T Tabulated
X	Y	X	Y			X	Y	X	Y		
3,88	0,36	3,76	0 ,40	0 ,98	2,03	3,76	0,38	3,67	0,40	0,69	2,03

Tableau 4: Presentation of results (pre and post test) during a performance test (Nevmijanov) for the two groups (WABT and USBT)



Histogram 3: Presentation of results (pre and post test) during a performance test (Nevmijanov) for the two groups (WABT and USBT)

From the results in Table 4 at the pre-test of the performance, and an average of 3.76 ± 0.40 for the team USBT and 3.88 ± 0.36 for the team WABT. Reading the data in this table in comparison to the averages of the two groups showed a non-negligible deviation (calculated T = 0.98) the probability level P (0.05) and degree of freedom equal to (34), T = tabulated 2.03. This means that there is no difference between the two groups in the pre-performance test (Nevmijanov).

For the results in the post-performance test and a mean of 3.67 ± 0.40 for USBT team and 3.76 ± 0.38 for the team WABT. In this regard, the data in this table compared the means of the two groups showed a non-negligible deviation (calculated T = 0.69) the probability level P (0.05) and degree of freedom equal to (34). T tabulated = 2.03 This means that there is no difference between the treatment group and the two groups in the performance test post.

From these data, we find that there is no difference between the discounted games and high-intensity intermittent exercise in the performance test.

6. Discussion

From the results of the tests performed, we realize that there is no significant difference between the reduced games and high-intensity intermittent exercise in the development of aerobic capacity (VO2max and VMA) in football. These results confirm the results achieved in the same field. Indeed, some authors Dellal (2008); Mallo and Navarro (2008), Rampinini (2006), Robineau and Lacroix (2009) had noted that the reduced games allowed many developing aerobic capacity of soccer players, as many studies such as those Balsom (1999); Hill-Haas (2007) or Impellizzerri (2006) confirmed our results.

At the end of our modest study and statistical light, we conducted a contribution in the development of indicators to improve the outcomes of footballers Case U20 and effective planning of training loads, to improve performances. Our research is based on two fundamental aspects: Regarding the first to know the comparison between two teams of similar age and the same level of competition to inform improvements in their aerobic capacity, results of comparison between the two groups reveal to us:

- Non-significant differences between the arithmetic means of the players in bluegrass physical tests of the two groups for the Vameval, Novmijanov and Cooper test.
- The similarity of development of aerobic capacity (VO2max and VMA) between high-intensity intermittent exercise and Mini games.

- Non-significant differences between the two groups for Vameval, Novmijanov and Cooper test.
- Improving aerobic capacity for both programs performed.

7. Recommendations

Based on the obtained results, we can recommend the following:

- It is recommended the need to increase the cognitive abilities of coaches in the field of sports training through the organization of training programs under the direction specialized cadres.
- It is recommended the need for knowledge for coaches requirements of modern football and especially regarding the physical requirements and physical preparation methods in this area.
- It is recommended that the required clearances apply in the workouts aimed at developing aerobic qualities.
- The need to coach the perception of various means of development of football in endurance based on various driving styles such as high-intensity intermittent exercise to develop.

8. Conclusion

The modern trend of development in young players is manifested throughout the world by design and do the preparation process of study and scientifically based training, which is closely correlated with the outlook spots top football while fixing main objective the implementation of a quality teaching staff for the benefit of the youth training.

Physical preparation, whatever the sport, the specific approaches; we must adapt the training by working the physical qualities and technical and tactical at the same time to avoid the loss of time. The formation of a sport such as football starts early and depriving a ball player to develop the athletic side becomes increasingly disturbing. Physical preparation must adapt and work with discipline. We knew the methods room with ball machine or without land to develop the VMA, max strength, relaxation... but times change and we must adapt. For this, some authors began to do research on the development of physical qualities of the games from the football and mainly interesting game is football with limited land, in other word “game-reduced”.

In this study, we will try to determine the comparison between modern methods (intermittent - mini games) in the preparation of footballers and particularly in the

development of aerobic capacity (VO2max and VMA) after applying two different programs and specific physical tests. This will lead to similar results between the two methods therefore no significant differences between the two programs built.

Finally, it is imperative to point out that raising the level of preparedness of young footballers is dependent on a coaching job meeting the requirements of specialization, and the basic principles of study and training process. A systemic and rational planning, power of effective methodical approach based on good cyclical alternation of training loads, contributes to raising the level of preparedness of young footballers.

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