

THE EFFECT OF HARMONIC EXERCISES ON ENHANCING SPEED STRENGTH, MAXIMUM RELATIVE OXYGEN CONSUMPTION AND SCORING IN FOOTBALL

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Abstract

Programs of sport training in the past were based on improvising, but now it became an educational process subject to principles that aim to prepare players completely to achieve the highest possible level in any type of sport activities. Harmonic exercises are used by trainers and athletes regularly due to its effect on performance efficiency. Harmonic exercises process is considered one of the important elements of preparing players even inside the training unit. The problem of the study lies in trainers' non-interest of preparing training units and using improper exercises with the development of football which is became characterized by high fitness, functional and skilled abilities of players. The goal of the study is to determine the effect of harmonic exercises on enhancing strength speed, maximum limit of relative oxygen consumption and scoring in football. Hypothesis of the study: there are statistically significant differences at level ($0.05\alpha \geq$) between pre and post tests for the empirical and control group in the effect of harmonic exercises on enhancing strength speed, maximum limit of relative oxygen consumption and scoring in football. Methodology: the researcher adopted the empirical method as it is proper for the nature, problem and goals of the study. Population and sample of the study: the population of the study consisted of the 1st year students in the Physical Education Department, Faculty of Basic Education, Al Mostansereya University / 2015 (56 students). As for the sample of the study, it was chosen purposively of males only (36 males) after eliminating 20 female students (64% of total population). The sample is homogeneous as individuals were subjected to a testing battery for selection to be accepted in the department. The researcher divided the sample into two equal groups (18 students each) randomly. Harmonic exercises were applied in the first group (empirical group) for 25 minutes before starting the training unit, while the traditional method was used with the second group (control group). The researcher used parity and using legalized tests on the variables of the study. He made pre and post test and used multiple statistical methods such as arithmetic means, percentages, standard deviation, skewness coefficient, Pearson correlation coefficient and median for independent and equal samples. Conclusion and recommendations: efficiency of harmonic exercises prepared by the researcher and their properness to the nature of the study. The researcher found a clear development in enhancing strength speed, maximum limit of relative oxygen consumption and scoring as a result of using harmonic exercises. The researcher recommends the increase of time period of using training programs accompanying harmonic exercises.

Keywords: harmonic exercises, speed strength, maximum oxygen consumption, scoring in football.

1. INTRODUCTION & PROBLEM OF THE STUDY:

Programs of sport training in the past were based on improvising, but now it became an educational process subject to principles that aim to prepare players completely to achieve the highest possible level in any type of sport activities. Harmonic exercises are used by trainers and athletes regularly due to its effect on performance efficiency. Harmonic exercises process is considered one of the important elements of preparing players even inside the training unit. The problem of the study lies in trainers' non-interest of preparing training units and using improper exercises with the development of football which is became characterized by high fitness, functional and skilled abilities of players.

Goal & Hypothesis of the study:

The goal of the study is to determine the effect of harmonic exercises on enhancing strength speed, maximum limit of relative oxygen consumption and scoring in football. Hypothesis of the study: there are statistically significant differences at level ($0.05\alpha \geq$) between pre and post tests for the empirical and control group in the effect of harmonic exercises on enhancing strength speed, maximum limit of relative oxygen consumption and scoring in football.

2. METHODOLOGY:

the population of the study consisted of the 1st year students in the Physical Education Department, Faculty of Basic Education, Al Mostansereya University / 2015 (56 students). As for the sample of the study, it was chosen purposively of males only (36 males) after eliminating 20 female students (64% of total population). The sample is homogeneous as individuals were subjected to a testing battery for selection to be accepted in the department. The researcher divided the sample into two equal groups (18 students each) randomly. Harmonic exercises were applied in the first group (empirical group) for 25 minutes before starting the training unit, while the traditional method was used with the second group (control group).

Sample Parity:

In order to achieve parity between empirical and control groups, the researcher shows in the following tables about parity of physical, functional and skilled variables of the study that show arithmetic means, standard deviations and the (T) counted and scheduled values.

Table (1): Values of means, standard deviations of the study variables, the T counted and scheduled values for empirical and control groups

Physical variables	Empirical group		Control group		T counted value	T scheduled value	result
	Mean	S.D	Mean	S.D			
Speed strength	8.357	0.202	8.267	0.146	1.525	2.24	Insignificant
Maximum relative oxygen consumption R-vo2 max	41.76 ml/kg/m	2.364	4.236 ml/kg/m	1.388	0.789	2.24	Insignificant
Scoring	0.944	0.725	0.888	0.676	0.233	2.24	Insignificant

Freedom degree (34) and significance level (0.05).

Procedures of the Study:

- a- Determining physical abilities: the researcher used speed strength, jumping on one leg for 30 meters (right leg).
- b- Determining functional abilities: the researcher chose maximum oxygen consumption via maximum relative oxygen consumption.
- c- Determining basic skills: the researcher chose scoring, test of scoring during movement.

Pre-Tests:

The researcher made pre-tests for individuals of the study sample (empirical and control groups) as follows:

- 1- Pre-tests for the control groups in three days in the department’s sports hall
- 2- Pre-tests for the empirical groups in three days in the department’s sports hall

Organizing Groups Work:

The sample of the study was divided into two major empirical and control groups (18 players in each group). Steps of the training method adopted by the faculty were followed in terms of number of training units, lessons duration and the used tools (two units a week) noting that the time duration of the single training unit is 90 minutes. According to some references in athletic training physiology, a training unit was divided into three sections (preparation, main and final section). Preparation section includes public and private warming-up, the main section includes (skill indications, training and applied sections), while the final section includes (general calming down, feedbacks and leaving).

Application of Harmonic Exercises:

The proposed harmonic exercises were performed on members of the empirical group. As for the control group, harmonic exercises were not applied on it but only the traditional method was used in the period from 18/10/2014 to 27/01/2015 for twelve weeks in two units per week. Each unit lasted for 90 minutes including harmonic exercises in the beginning of each unit for twenty-five minutes. Harmonic exercises included fifteen various exercises and each one lasted for one minute to follow goals of the study. Scientific aspects were considered while applying harmonic exercises including the plan related to planning training and teaching process which includes:

- Setting the proper harmonic exercises plan with abilities of players.

- Application and direction of harmonic exercises process including educational and psychological principles especially strengthening positive relations with players from the skilled aspect.
- In the beginning of training loads, load size was considered and then its capacity increases at harmonic exercises and relative reduction to ensure achieving better performance level due to technical properties. Annex (2) includes the proposed harmonic exercises.
- Variability of harmonic exercises to cope with requirements of the unit prepared by the researcher.
- Application of individual and double exercises with partners using the ball.
- Multiple forms of harmonic exercises were applied such as:
 1. Balance exercises
 2. Lifting exercises
 3. Agility exercises
 4. Jumping exercises
 5. Walking and trotting exercises

Post-Tests

The researcher made post-tests as follows:

Three days for empirical group tests

Three days for control group tests

The researcher considered the necessary conditions and possibilities to make tests succeed and provide the same conditions in terms of time, place, equipments, tools and application method.

3. RESULTS ANALYSIS:

The following is a discussion of pre and post test results:

Table (2): Means, standard deviations of the study variables, the T counted and scheduled values, significance level and differences significance of physical variables for empirical and control groups

Statistical process	Measuring unit	Empirical group, post-test		Control group, post-test		T counted value	T scheduled value	Freedom degree	Significance level	Differences significance
		M-	S.D+-	M-	S.D+-					
Skill variables										
Speed strength (Right leg)	Second	5.052	0.452	8.265	0.309	24.340	2.042	34	0.05	Significant

Discussing jumping on one leg test for 30 m distance for empirical and control groups:

The above table shows results of jumping on one leg test for 30 meters using speed strength. Results showed that there are statistically significant differences between results of pre and post tests and in post-tests between empirical and control groups as in table (2). The researcher found that the reason for clear development of this physical ability is due to the nature of the applied training program on the empirical group as its components include various harmonic exercises using different tools which help develop muscular strength of the leg with quick muscle contraction for related sets as well as various jumping exercises that helped achieve progress. This is because different jumping exercises, as a training tool, close the gap between maximum strength and speed strength which enhances the explosive movement that is a basic requirement for jump, throwing and running. Harmonic exercises include different jumping exercises to ensure performing maximum effort in order to stimulate muscular nervous system and legs' strength for correct performance and avoiding injuries especially for young athletes (Gambetta, 1981, p. 35). The applied training program using harmonic exercises focuses in its details on giving enough rest opportunity after speed strength in order to provide enough time for recovery.

Discussing results of post-tests for empirical and control groups for functional variables:

Table (3): Means, standard deviations of the study variables, the T counted and scheduled values, significance level and differences significance of functional variables for empirical and control groups

Statistical process	Measuring unit	Empirical group, post-test		Control group, post-test		T counted value	T scheduled value	Freedom degree	Significance level	Differences significance
		M-	S.D+-	M-	S.D+-					
Maximum oxygen consumption	Milliliter/kg/min	54.689	3.970	44.205	1.739	9.975	2.042	34	0.05	Significant

The above table shows test of maximum relative oxygen consumption level for results of empirical and control groups as in pre and post tests. It is noticed that there are statistically significant differences with a clear percentage of development for the study sample and for the sake of the empirical group. The researcher found that the reason for the development is due to type of various aerial and non-aerial harmonic exercises included in the training program as harmonic exercises are useful especially in asserting and improving non-aerial power production processes to respond football requirements. This development is also due to the effect of legalized training applied by members of the empirical group which led to increase the content of muscular fibers (Myofibrils and Mitochondria) (power houses) as well as the increase in blood capillaries which was asserted by Bassett as these physiological changes are nothing but a result of legalized physical effort lasting for (8-10) weeks and they are responsible for increasing muscle efficiency in oxygen consumption and produce aerial power.

Discussion of Post-tests for the empirical and control groups for skilled variables of football:

Table (4): Means, standard deviations of the study variables, the T counted and scheduled values, significance level and differences significance of skilled variables for empirical and control groups

Statistical process	Measuring unit	Empirical group, post-test		Control group, post-test		T counted value	T scheduled value	Freedom degree	Significance level	Differences significance
		M-	S.D+-	M-	S.D+-					
Scoring from movement	Degree	3.388	0.607	1.333	0.485	10.930	2.042	34	0.05	Significant

The above table shows test of scoring from movement from results of the empirical and control groups in pre and post tests. It is noticed that there are statistically significant differences with a clear percentage of development for the study sample and for the sake of the empirical group in post-test. The researcher found that the reason for the development is due to effective exercises included in the training program applied by members of the study sample which developed this skill. In his preparation of program and to develop scoring from movement skill, the researcher depended on variability of exercises and using helping means and equipments in applying harmonic exercises that led to increase effectiveness of accompanying exercises to training units such as poles, flags and walls as well as the use of partners through exchanging dual exercises to increase difficulty degree of exercises to make them more factual. Cases of scoring from movement were applied with different postures and on specific areas as this increases players' realization of

distances, and then enhancing this skill as well as applying scoring process after quick dribbling among poles and flags and turning direction or maneuvering opponents and direct scoring in addition to passing exercises, quick movements toward goals and focusing on repeating these exercises for the purpose of increasing kinetic features and raise muscular and nervous enhancement. All of the previous factors contributed to achieve the needed development.

4. CONCLUSIONS:

- 1- Efficiency of harmonic exercises prepared by the researcher and their properness with the nature of the study sample.
- 2- There is a clear development in speed strength, maximum oxygen consumption and scoring as a result of using harmonic exercises in the training program.
- 3- Individuals in the empirical group achieved good development percentage in functional abilities included in the study. They were characterized, after their application of the training program by the increase of oxygen consumption ability.
- 4- Through pre-tests of basic skills, there was found a weakness in ball control ability for the players during scoring which requires focus on speed strength exercises.

5. RECOMMENDATIONS:

- 1- Increasing time period of using training programs accompanying harmonic exercises.
- 2- The interest in general preparation periods and raising awareness of the used exercises in preparing players in football subject and the rest of team sports.
- 3- Application of harmonic exercises with the participation of partners in some general and private preparation periods.
- 4- Performing similar researches on harmonic exercises in physical, kinetic, skilled and functional abilities in other sport games.

6. REFERENCES:

- 1- Abdelfattah, A. & Hassanien, M. S. (1997): "Sport Aniology and Morphology and Methods of measurement and Assessment", 1st Ed, Dar Al Fikr Al Araby, Cairo, A.R.E.
- 2- Rateb, O. & Zaki, A. (1985): "Scientific Principles of Swimming Training", Dar Al Fikr Al Araby, Cairo, A.R.E.
- 3- Mahrous, A. F. (1996): "Effectiveness of Aerial and Non-Aerial Physical Work on Functional Adaptation and Fitness in Handball", Master's Thesis, Unpublished, Faculty of Physical Education for Girls, Helwan University, Cairo, A.R.E.
- 4- El Barody, A. M. (1999): "The Effect of a Proposed Program on this Aerial and Non-aerial Features and Performance Level of some Volleyball Skills", PhD, Unpublished, Faculty of Physical Education for Girls, Helwan University, Cairo, A.R.E.
- 5- Elsayed, L. S. (1991): "The Effect of a Training Program Based on Developing some Non-Oxygenic Variables, special physical characteristics and Skills of Volleyball Female Players, PhD Thesis, Unpublished, Faculty of Physical Education for Girls, Helwan University, Cairo, A.R.E.
- 6- Moustafa, A. M. (1990): "The Contribution of Physical Non-Oxygenic Properties in Skilled Performance Level for Specialties of Volleyball players" PhD Thesis, Unpublished, Faculty of Physical Education for Girls, Helwan University, Cairo, A.R.E.
- 7- Bedir, A. A. (1995): "Developing Physical Abilities Directed only due to the Biological Rhythm Pattern on the Effectiveness of Shooting by Jumping from the Three-Point Area in Football", Master's Thesis, Unpublished, Faculty of Physical Education for Girls, Helwan University, Cairo, A.R.E.
- 8- Allawy, M. H. & Nasreldin, M. (1996): "Kinetic Intelligence Tests", 3rd Ed. Dar Al Fikr Al Araby, Cairo, A.R.E.
- 9- Ahmed, M. A. (1995): "Studying Effectiveness of using Aerial and Non-aerial Work in the Beginning of Studying Units on Numeral Achievement and some Oxygenic Variables for Short Distance Swimmers", Research Summaries of the International Conference "Human Development & Sport Economies: Embodiments & Ambitions", Helwan University, Cairo, A.R.E.
- 10- Hamad, I. M. (2011): "Modern Sport Training, Planning, Application and Leadership", Dar Al Fikr Al Araby, Cairo, A.R.E.
- 11- Namir, M. Al Dailamy (2010): "The Effect of Scheduling Exercises of Developing Aerial Work on Performance Level and some variables of Functional Efficiency for Indoors Football Players", Master Thesis, Unpublished, Faculty of Physical Education, Babylon University.