

## The Effect of Cross-Training on Some Physical and Physiological Variables and Improve The Level Of Performance In Modern Dance

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**Abstract:** The aim of this study was to design a cross-training program and see its impact on some physical and physiological variables (muscular strength - flexibility - muscular endurance - aerobic capacity – anaerobic capacity) and improve the level of performance in modern dance. The researcher used the experimental method using pre and post measurement. Population of the study consisted of the fourth year students specialty motor expression aged (20-22 years old) for the academic year 2011/2012 at the faculty of physical education at the Zagazig University, sample of this study consisted of (20) student distributed on two equal groups one is experimental group which trained by using the cross training and the other is control which trained through the ordinary method. Data of the study was complied by using a physiological measurement (aerobic capacity - the ability anaerobic), physical measurements (muscle strength - flexibility - muscular endurance), Form for measure the level of performance in modern dance by jury. The results indicated that cross-training has a positive effect on some physical and physiological variables this was reflected at the level of performance in the modern dance. There are statistically significant in all the research variables. In favor of the post measurement of the experimental group compared to the control group post test which uses the traditional training method.

[Doaa Kamal Mohamed Tawfik. **The Effect of Cross-Training on Some Physical and Physiological Variables and Improve The Level Of Performance In Modern Dance.** *J Am Sci* 2013;9(6):128-132]. (ISSN: 1545-1003). <http://www.jofamericanscience.org>. 14

**Key words:** Cross - training, aerobic capacity – anaerobic capacity, modern dance

### 1.Introduction

The athletic training is a meaningful educational process depends primarily on several scientific foundations that serve the various aspects of the preparation to reach the individual sports to the highest levels in the sports activity sports and developed using the best party for the accomplishment of which is the focus of the training process. Which requires innovation and the development of various training methods and be directed towards increasing the efficiency and ability of athletes to achieve the best results

The cross-training is one of a modern methods in the field of training, which can be used to keep the adaptation of the athletes during training periods and also to restore the healing of a training course. It reduces problems overload and fatigue muscle through different use a variety of activities to achieve fitness in a secure manner and develop athletic performance as well as some benefits physiological derived from this type of training, such as adaptable systems breathing and blood vessels and cardiac muscle and skeletal. [Zaki, 2004].

That cross-training means the use of a sport or activity or a different method of training from basic sport activity to help improve performance in core sports. It is a useful way of training to maintain a high level of fitness in general and improve aerobic capacity and building muscle strength and reduce the

chances of injury and improve performance skills and so it improves both physical and physiological qualities and skills that one [Moran & Meglynn, 1997].

The cross-training has a tremendous positive effect on aerobic and anaerobic endurance athletes and adds improvements in muscle strength and flexibility for player activity also works to increase the capacity of the respiratory and circulatory system to supply oxygen to the muscles necessary during operation [Zaki, 2004].

As a result of physiological adaptation of continuous training the enjoyment of fitness improves the efficiency of performance and various other technical aspects associated with specialized activity.

Dance has a significant impact on physiologically and physical the body it increases the efficiency of the body and its ability to perform effort as possible to continue practice of modern dance and help to access to high level of motor performance within the limits of his physiological and physical modern dance movements Featuring diversity there are simple movements but require consensus when their performance and require power. There is also a mixture of sudden movements and smooth And also violent movements all that needs to elastosis effort and continuous training so that all organs of the body to produce cooperation [Eglal & Nadia, 1994].

The researcher observed through taught modern dance difficult for the students to continue in the performance of free modern dance to end efficiently and well. Beside the rapid onset of signs of fatigue on them during motor performance, which is reflected on the performance level of the students in the kinetic performance a whole and lose the beauty of kinetic performance. The researcher attributed to the lack of students to have some of the physical and physiological capabilities, where is the first pillar upon which to build the possibility of continuing to exert effort and develop the level of performance and what was modern dance is one of the arts that require physical and physiological capabilities. This is what encouraged the researcher to address this by following the modern style in the field of training, a cross training represents a strategy used by trainers rely on diversity and using different activities which related with Specialist activity practice in order to maintain the physical demands and physiological and psychological players.

Cross - training activities are developing training for athletes if carefully placed in training system where you must use the activities in the form and proper technique so as to get the most benefit and reduce the incidence of injuries. These activities include swimming - cycling - karate - the enemy in the water and kayaking (Stephen Black).

The Cross training is the way to use a lot of different exercises jogging and swimming and rowing and cycling and the various games that greatly affect the basic physical activity to make the sport more powerful and afford flexibility and agility. Swimming is a sport that require practitioners elements physical private access to performance skills optimal. cross training is the way to get to the development of these physical abilities.

[Moran & Meglynn, 1997].

The researcher used forms of a cross-training performance is in a variety of exercises in aqueous media working to improve the components of fitness. The in-water training is useful in increasing muscle strength and muscular endurance [Binkley, 1996]

The in water training is important in raising the fitness and reduce the proportion of fat and gain body flexibility to re-hospitalization and prevention of injuries and tear and tensile stress muscle output at high excess pregnancy.[Martha & OTR,1995]

As the researcher used cycling to have a clear impact on fitness and help improve heart function and weight loss as well as it related with Specialist activity of modern dance Where noted Institute of Physical Education German in Cologne that bike ride is a way idealism which an individual can improve all the functions of the body and maintaining his health if keen on the sport for ten minutes only a day helps to

strengthen muscles and blood circulation and body joints and improves heart and burning body fat as well as strengthen the muscles of the back and spine.

The research aims to know the effect of using Cross- training on some physical and physiological variables and improve the level of performance in modern dance.

## 2. Material and Methods

The researcher used the experimental method of measuring pre and post for two groups. 20 students from the fourth year at the faculty of physical education at the Zagazig University participated in the study were divided in two groups. one is the experimental group used cross-training, which includes exercises in aqueous media is in walking and running into the water, as well as floating on the water and strikes against water resistance It also includes a cycling. And the other is control group, the number of each of them 10 students. The measuring was conducted twice, before and after the period of training program. The variety of measurements to gather data such as Physiological measurements include measuring VO<sub>2</sub>max using Quenes College Step test for measure aerobic ability and anaerobic and Physical measurements include measuring muscle strength, flexibility and muscular endurance and measure of the level of modern dance performance.

The proposed program has been implemented using the cross-training for 8 weeks by 4 training units per week, and ranged daily training time of 40 min at the beginning of the program to 70 min at the end of the program, Took time to warm up 5 min at the beginning of each module throughout the period of implementation of the proposed program to create muscle groups to work and heating joints, researcher graduated the time of main part of the 30 min at the beginning of the program to 60 min at the end of the program by increasing the time 10 min every two weeks provided that the main part begins exercises for flexibility (yoga and stretch) a time of 10 min constant throughout the period of implementation of the program, and then exchange and rotation between the shapes used in cross-training (exercises aqueous medium - cycling) throughout the week.

The researcher identified intensity for the program 60% to 69% of the maximum rate of student pulse which known as Target Heart Rate. It was calculated by compensation in equation Carfinun Karvonen on the basis of 60% of the maximum rate of the pulse and then 69% of the maximum pulse rate and the output of equations expressing target heart rate THR who must work through students whereas the average pulse is 70 impulse / minute at rest. The researcher calculates heart rate target during training where ranged of 147 impulse / minute to 159 impulses

/ minute and so by famous equation formulated by Carfinun Karvonen.

### Testing procedures

The study data were collected using a Physiological measurements include measuring VO<sub>2</sub>max using Quenes College Step test for measure aerobic ability, sergent test for measuring anaerobic ability, Dynamometer for measuring strength muscles and a form for measuring the level of performance in modern dance by jury of three from faculty member in modern dance.

### Statistical methods

All calculations were performed with the use of STATISTICS SPSS (v. 7.0, Stat Soft Inc., USA). Mean- deviation – t. test

### 3. Results

Table 1 shows the values of selected indices of the Physical and physiological variables and level of performance in modern dance achieved by students of experimental group. There are statistically difference at level 0, 05 between pre and post measuring for the experimental group that used Cross – Training in the variables for the post measuring.

**Table 1:** Differences between the two measures pre and post for the experimental group in Physical and physiological variables and level of performance in modern dance (N= 30)

| Variables                    | Measuring unit | Pre-measurement |        | Post-measurement |        | value (T) |
|------------------------------|----------------|-----------------|--------|------------------|--------|-----------|
|                              |                | Mean            | Sd±    | mean             | Sd±    |           |
| Flexibility                  | cm             | 12.200          | ±0.854 | 15.510           | ±0.532 | 9.869*    |
| Muscle strength (legs)       | Kg             | 52.710          | ±1.130 | 61.040           | ±2.048 | 10.648*   |
| Muscle strength (back)       | kg             | 55.720          | ±1.083 | 62.550           | ±0.834 | 14.990*   |
| Muscular endurance           | Number         | 10.60           | ±1.174 | 15.50            | ±1.080 | 9.467*    |
| Aerobic ability              | M/kg/min       | 30.90           | ±2.378 | 38.60            | ±1.506 | 8.207*    |
| Anaerobic ability            | cm             | 23.85           | ±.944  | 31.00            | ±1.491 | 12.155*   |
| The performance total degree | degree         | 7.10            | ±0.738 | 14.60            | ±1.174 | 16.226*   |

\* Significant level 0.05= 2.048

Table 2 shows the values of selected indices of the Physical and physiological variables and level of modern dance performance

Achieved by students of the control group. There are statistically difference at level 0, 05 between pre

and post measuring for the control group that used traditional training method in the variables for the post measuring.

**Table 2:** Differences between the two measures pre and post for the control group in Physical and physiological variables and level of performance in modern dance (N= 30)

| Variables                    | Measuring unit | Pre-measurement |        | Post-measurement |        | Value (T) |
|------------------------------|----------------|-----------------|--------|------------------|--------|-----------|
|                              |                | Mean            | Sd±    | Mean             | Sd±    |           |
| Flexibility                  | cm             | 12.170          | ±0.712 | 13.260           | ±0.718 | 3.233*    |
| Muscle strength (legs)       | Kg             | 52.530          | ±1.319 | 54.490           | ±1.223 | 3.269*    |
| Muscle strength (back)       | kg             | 55.900          | ±1.049 | 57.910           | ±0.955 | 4.251*    |
| Muscular endurance           | Number         | 10.40           | ±1.075 | 12.20            | ±1.135 | 3.454*    |
| Aerobic ability              | M/kg/min       | 31.00           | ±1.563 | 33.00            | ±1.563 | 2.714*    |
| Anaerobic ability            | cm             | 23.80           | ±0.689 | 25.30            | ±0.949 | 3.837*    |
| The performance total degree | degree         | 7.00            | ±0.667 | 10.11            | ±0.738 | 9.379*    |

\* Significant level 0.05= 2.048

Table 3 shows the differences between the averages for the research groups in the post measurement for the selected Physical and physiological variables and level of modern dance performance there are statistically difference at level 0.05 between both of post measuring for the research

group which indicate progress of the experimental group that used Cross - Training so the researcher sees that these results come from using Cross - Training.

**Table 3:** Differences between the two measures of post measure for research groups in the Physical and physiological variables and level of performance in modern dance (N 1 = N2 = 30)

| Variables                    | Measuring unit | Experimental group |        | Control group |        | value (T) |
|------------------------------|----------------|--------------------|--------|---------------|--------|-----------|
|                              |                | Mean               | Sd±    | mean          | Sd±    |           |
| Flexibility                  | cm             | 15.510             | ±0.532 | 13.260        | ±0.718 | 10.682*   |
| Muscle strength (legs)       | Kg             | 61.040             | ±2.048 | 54.490        | ±1.223 | 11.650*   |
| Muscle strength (back)       | kg             | 62.550             | ±0.834 | 57.910        | ±0.955 | 15.526*   |
| Muscular endurance           | Number         | 15.50              | ±1.080 | 12.20         | ±1.135 | 8.936*    |
| Aerobic ability              | M/kg/min       | 38.600             | ±1.506 | 33.00         | ±1.563 | 10.946*   |
| Anaerobic ability            | cm             | 31.00              | ±1.491 | 25.300        | ±0.949 | 13.683*   |
| The performance total degree | degree         | 14.60              | ±1.174 | 10.11         | ±0.738 | 13.737*   |

\* Significant level 0.05= 2.048

#### 4. Discussion

The statistically significant increase in Physical and physiological variables and level of performance in modern dance was most likely caused by Cross - Training which caused a significant improvement in variables of research. The researcher attributes this result to the use of training cross which contained forms of diverse and different in terms of the nature of the movement and the way the performance and speed of different performance is in training in water and cycling and those sports activities are placed in regulatory and planning within the program to complement each other to improve the physical and physiological variables and the skill level of performance in modern dance. Cross-training includes different sports activities which are codified and planned, it works to improve the physical and physiological variables and improve the level of performance [Moran & Meglynn].

Cross training works on the development of the whole of the body as well as to strengthen the heart and bones, muscles and joints and can also improve the efficiency of the blood vessels and build muscle and reduce fat and help to achieve flexible joints in the body [ Stephen Black].

Cross - training is using different motor activities such as swimming, running and cycling works to improve the physiological and physical capacities and improve athletic performance [Moran & Ginny, 1997]. That the acquisition of individual psychomotor skills and improve athletic performance is based directly on the level of functional efficiency and physical player [Juliuus, 2005].

And returns the researcher to the impact of training cross which include a variety of activities such as in swimming and cycling which differ from activity Specialized but they related with it. it increases ability of player in fitness actress in muscle strength, flexibility, endurance, aerobic and anaerobic capacity as well as the level of performance in modern dance it increases the effectiveness of

training and the removal of feeling bored and getting rid of red tape when training on a single activity cross-training characterized by a spirit of fun and helps to get rid of stress also reduces the stress on the bones as well as its important role in raising the level of fitness and physiological improve athletic performance ( Dave, 2006) Training cross contribute to the revitalization and renewal of the mental capacity of enhance the flow of blood and oxygen to the brain contributes to the revitalization and renewal and receiver units stroke, improves heart health and increase the strength of the heart muscle and blood vessel flexibility and strengthen the nervous system and reduces tension and stress better (Arthur Kramer) ( Marc Harmer)

Study of [ Sanders,1993, Kushner,1995 and Evans & Cureton 1998] which Results indicated that the positive impact of cross-training to improve physical and physiological capabilities and the level of performance in the various activities

#### Conclusions

- 1- The suggested Cross – Training program has a positive effect on acquire the Physical and physiological variables and increase level of performance in modern dance
- 2- The results of measurement proved excellence the experimental group which used Cross – Training program in all variables.
- 3- A significant increase in the level of performance of modern dance and the Physical and physiological variables were most likely caused by the Cross – Training

#### Recommend

- The need to use cross-training in various training programs for all purposes
- Diversity in the use of a variety of sports activities within the cross-training programs
- The need to use exercises to stretch before the main part of the cross-training programs

- The need to use cross-training in the transitional periods for training to keep boiling player's fitness and away from boredom

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3/2/2013