



Effects of
a Sports March Using Bench
Step and Free Exercises

on Blood Fats and Body
Composition Components
of Student
of Faculty of Physical Education

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Abstract

The current research aims at identifying the effects of a sports march using the stepping box and free exercises on some blood fats and physical structure components for students of the faculty of physical education. The researchers used the quasi-experimental approach on a randomly chosen sample (n=48) from the third year students of the faculty of physical education – Tanta University. The researcher used a centrifuge (3000 hertz/min) for separating blood serum, an electronic suction tube and (Tanita Body Composition Analyzer Sc-350st) to analyze body composition. Results indicated that:

1. *The sports march with stepping box and free exercises, calibrated according to physical load variables, had positive effects on total cholesterol level (CHOL), high density fatty proteins (HDL), low density fatty proteins (LDL) and tri-glyceried (TG) for the research sample.*
2. *The sports march with stepping box and free exercises, calibrated according to physical load variables, had positive effects on body composition components (weight – Fat percentage – fat mass – total body weight [TBW] – water ratio – Body Mass Index [BMI] – muscle mass – Metabolic Rate [BMR]) while bone mass did not show any statistically significant differences.*

Background

Countries all over the world, including Egypt, concentrate on sports marches as it relates to festivals, events and national sports championships. These marches are considered very important to show the advance of nations in an effective way and the extent to which these nations care for youth.

Atiat Khattab (1997) and Laila Zahran (1997) identify sports marches as a set of physical movements prepared and formed according to educational, physiological, motor and aesthetic principles, and are performed by a large group of individuals simultaneously accompanied by expressive music or songs. It is performed in front of audience or spectators to express the real level of performers and their sports development (23,9).

Fathy Ebraheem (2008), Atiat Khat-tab et al (2006), Enaiat Farag & Faten Al-Batal (2004) and Salah El-Din Soliman (2001) agreed that the exercises used in

sports marches depend on the type and nature of movements used. It is formed with positions and movements of physical exercises, either basic or purposive, or artistic exercises with elite level of motor performance. It can be performed with or without tools or on various stable or mobile equipments through using modern innovative tools (1, 15, 11, 5).

Afaf Shehata and Norhan Soliman (1997) indicated that the Bench Step is one of the tool used in exercises and has various effects on the physical, physiological and biochemical aspects of the body as these exercises are performed while sufficient amount of oxygen is available to perform metabolism to produce the energy necessary for continuous muscular work. Bench Step exercises depend on the movements of stepping up and down the box with effective control of performance with and against gravity according to scientific bases and in accompaniment with music (14).

Biological and biochemical rules indicate that human body systems and its functions are clearly affected by physical loads used in exercises as these exercises lead to biochemical and physiological changes according to the indications of affecting the vital organs of the body and to the direction of the load used (12).

Blood fats increase is one of the risk factors of heart disease. Most body cells, especially the liver, produce cholesterol internally. Exterior resources of cholesterol are various foods and the variance in human individuals' abilities to metabolize and transfer cholesterol. This leads to increasing cholesterol levels in plasma, which in turn leads to fat disposition on arterial membranes (4).

Ayman Al-Hosainy (1997) indicates that refraining from sports activities, including marches exercises, leads to the increase of total cholesterol in blood. This lead to imbalance between LDL (proteins that tend to cling to arterial membranes) and HDL (proteins that resist clinging to arterial membranes and decrease cholesterol levels) (7)

Bahaa El-Din Salama (1999) and Rowell (1996) indicated a positive correlation between cholesterol and regular physical exercises as the later works on improving HDL/LDL ratio and is considered an agent for decreasing heart diseases risk factors (20, 26).

Body formation is divided into three main categories: body size – body structure – body composition. Body size includes measurements of weight, height, size and surface area. Body structure includes measurements of parts of the

skeleton. Body composition includes measurements of body components like fats, muscles, bones, fluids ... etc. each of these measurements is very important for general health and sickness. It gains maximum importance for athletes as it affects their sports performance greatly (17,2).

Blood fats represent boredom on all functional systems and body components. This decreases the individual's effort and affects his/her motor activity. Sports marches have a direct effect on improving the ratios of LDL and HDL and thus help maintaining the student's health (19). Although there are major developments in the field of exercises and sports marches, there are still several aspects that need more research to be explored and clarified. These are related to body systems' reaction and timing in the face of tolerating sports marches' exercises.

Through review of literature, Fatema Saad (2003) indicated that the recommended program of exercises has positive effects on blood fats and body formation in addition to other physiological variables of female students in faculty of physical education (10). Al-Saeed Al-Adl (2005) indicated that teaching the physical preparation part of PE lesson using sports marches has a positive effect on improving some physiological elements (flexibility – muscular strength – endurance – VO₂max – vital capacity of lungs – body fat – fat weight – body weight) for high school students (3). Mohamed Lasheen (2010) indicated that practicing sports activities improves blood fats and body formation (24)

Through review of literature, the researchers found a need to perform this research as the related literature is not sufficient.

Aim:

The current research aims at identifying the effects of a sports march using the stepping box and free exercises on some blood fats and physical structure components for students of the faculty of physical education.

Hypotheses:

1. There are statistically significant differences between the pre- and post- measurements of the experimental group on some blood fats variable in favor of the post measurement.

2. There are statistically significant differences between the pre- and post- measurements of the experimental group on body formation variable in favor of the post measurement.

Methods:

Approach:

The researchers used the quasi-experimental approach (one-group design) with pre- and post- measurements.

Study limitations:

This research is limited to:

- ✓ Students of the 3rd year – faculty of physical education – Tanta University.
- ✓ Measurements were taken in the Physiology Lab - faculty of physical education – Mansoura University.
- ✓ The researcher was performed in 2011 – 2012

Subjects:

Subjects were randomly chosen (n=48) from the third year students of the faculty of physical education – Tanta University. The following table shows sample homogeneity:

Table (1):

Mean, SD, median and Sqewness of the sample on all research variables (n=48)

Variable	Measurement	Mean	SD±	Median	Sqewness
Height	Cm	175.95	5.85	176	0.11-
Age	Year	20.66	1.85	20.20	1.03
Systolic BP	Mm/m	117.06	1.29	117	1.99
Diastolic BP	Mm/m	76.93	0.88	77	0.89
CHOL	ml.g	193.751	3.925	194.560	-.18
HDL	ml.g	44.920	1.444	45.000	.19
LDL	Kg	103.10	1.20	103.00	0.23
TG	ml.g	3.50	1.85	93.50	0.00
Weight	Kg	75.18	1.94	75.10	0.59
Fat percentage	%	11.24	0.60	11.45	-.77
Fat Mass	Kg	9.14	1.03	9.15	0.60
Muscle Mass	Kg	73.33	1.48	73.20	-.21
TBW	Kg	46.55	1.44	46.50	-0.23
TBW	%	61.93	2.30	62.30	-.14
Bone Mass	Kg	3.11	0.23	3.20	-0.92
BMR	Kg	8224.80	42.77	8359	-2.64
BMI	Kg	26.87	1.56	26.93	-.00

Table (1) indicates that all sqewness values are between (3±) and this indicates sample homogeneity.

Tools and Equipments:

- ✓ A medical balance for measuring weights
- ✓ A restameter for measuring heights
- ✓ Bench step
- ✓ Blood pressure electronic device
- ✓ Centrifuge (3000 hertz/min) for separating blood serum
- ✓ An electronic suction tube
- ✓ Tanita Body Composition Analyzer Sc-330st to analyze body composition.

Pilot Study:

The researchers performed a pilot study on a pilot sample (n=25) from the same research community and outside the main sample from 22-9-2011 to 30-9-2012 to verify the following:

- ✓ Calibrating the research equipments
- ✓ Identifying total duration of the sports march
- ✓ Identifying the total number of students in each formation
- ✓ Identifying the total number of exercises in each formation
- ✓ Identifying the best formations and arranging these formations according to its importance
- ✓ Identifying the suitable music for each formation
- ✓ Calibrating the exercises loads

The pilot study revealed that:

1. All research equipments are valid
2. Total duration of the march is (20) minutes
3. Identifying the total number of students in each formation
4. Number of exercises for each for-

formation are: first formation (4) – second formation (11) – third formation (14) – fourth formation (10) – fifth formation (5) – sixth formation (19) – seventh formation (8) – eighth formation (7).

5. Best formations are arranged according to its importance as follows: trains – two attached triangles – rows – four circles – diagonal trains (X) – progressive circles with rays and rows from corners – (W) shape trains – three overlapping circles.

Exercises design:

In designing the sports march, the researchers reviewed related literature (9, 23, 14, 22, 5, 11, 1, 3). The researchers considered the progression principles and included exercises from the exercises curriculum of the 3rd year. The researchers used the bench step, pyramid formations and free exercises.

Research Experiment:

Pre-measurements:

The researchers measured all research variables from 1-10-2011 to 2-10-2011 as pre-measurements.

The sports march:

The sports march was divided into (24) units from 3-10-2011 to 28-12-2011 for 3 months (12 weeks – 2 units per week). The researchers considered the following:

- ✓ Each unit begins with warm-up
- ✓ Unit content is introduced twice a week through exercises lesson
- ✓ Most exercises were repeated for several times
- ✓ During the third month, the researchers introduced music
- ✓ March loads are progressive
- ✓ Basic principles of loads (intensity

- volume - rest) are considered
- ✓ Load intensity was (60% - 90%) of the individual level
- ✓ The march included three main parts: a) entrance : forward run in trains and moving into two attached triangles, b) main part (content of exercises), c) exit: from both sides of the field.

Post-measurements:

The researchers took the post-measurements on all research variables from 29-12-2011 to 30-12-2011.

Statistical Treatments:

The researchers used SPSS software to calculate the following: mean – median – skewness – (t) value – variance rate (%) – torsion.

Table (2)

difference significance between the pre- and post- measurements of the experimental group on blood fats variables

(n=48)

Variables	Measur- ement	Pre-		Post-		Means d _{ij} ference	D _{ij} ference SD	(t)	Variance rate (%)
		Mean	SD±	Mean	SD±				
CHOL	ml.g	193.75	3.93	189.19	4.13	4.56	0.68	21.34*	2.35
HDL	ml.g	44.92	1.44	46.80	1.55	1.88	0.34	17.57*	4.19
LDL	ml.g	103.10	1.20	94.64	1.51	84.6	1.56	17.44*	8.20
TG	ml.g	93.50	1.58	87.60	1.51	5.90	1.29	14.50*	6.31

Significance on 0.05 = 2.04.

Table (2) indicates statistically significant differences between the pre- and post- measurements for the sample on all blood fats variables. (t) Values ranged between 14.5 and 21.34 in favor of the post-measurements as variance rates ranged between 2.35 and 8.2. the researchers think that these differences are due to the positive effects of the recommended sports march that included various free exercises with all its different formations and positions, in addition to pyramid formations and bench step exercises for all body parts. These exercises are done in presence of sufficient amount of oxygen to metabolism through moving up and down the bench step with total control over performance with and against gravity. This has positive effects

on biochemical changes for the research sample over all blood fats. The researchers think that the decrease of CHOL, LDL and TG and the increase of HDL have positive effects on the physical load variables for the sports march as changes were not limited to consumed calories and improving fats mobility and metabolism. Instead, it includes changes in blood proteins. This indicates the importance of physical activity as Terry Herbert (1994) and Donald (1993) indicated that the increase of HDL prevents risk factors of heart diseases and arteriosclerosis of coronary arteries through fighting LDL sticking to the artery membranes and improving cholesterol transfer to liver where its is metabolized and secreted (25, 8).

This is also in agreement with Mohamed Abdo (2000) in that aerobic training programs help balancing body fats through muscular cells instead of being disposition in fatty cells or exertion through the liver. The program, calibrated according to physical levels and loads of students increases the activity of LPL enzyme, responsible for TG and plasma fats. This leads to decreasing TG

and total fats to a fixed threshold that can be maintained through diet and exercises (16).

This is also in agreement with Mostafa Atwa (2012), Mohamed Lasheen (2003) Fatema Saad (2003), Soha Abdullah (2007) and Wallace et al (2000) in that blood fats levels can be improved through aerobic exercises (18, 24, 10, 13, 27).

Table (3)

difference significance between the pre- and post- measurements of the experimental group on body formation variables

(n=48)

Variables	Measur- ement	Pre-		Post-		Means dif- ference	Difference SD	(t)	Variance rate (%)
		Mean	SD±	Mean	SD±				
Weight	Kg	75.18	1.94	72.33	2.19	2.85	0.56	13.82*	3.79
Fat percentage	%	11.24	0.60	4.22	41	7.02	0.23	96.52*	62.46
LDL	Kg	9.14	1.03	4.91	1.18	4.23	0.35	38.66*	46.29
Fat Mass	Kg	73.33	1.48	74.20	1.49	0.87	0.04	56.95*	1.19
Muscle Mass	Kg	46.55	1.45	45.88	1.47	0.67	11	20*	1.44
TBW	%	61.93	2.30	61.59	2.38	0.34	0.17	6.27*	55
TBW	Kg	3.11	23	3.11	0.23	0.00	0.08	0.00	0.00
BMR	Kg	8224.8	42.78	8345.8	42.78	121	14.87	6.02*	1.45
BMI	Kg	26.87	1.56	24.91	1.69	1.96	18	35.07*	7.31

Significance on 0.05 = 2.04.

Table (3) indicates statistically significant differences between the pre- and post- measurements for the sample on all body formation variables except for bone mass. (t) Values ranged between 6.02 and 96.52 in favor of the post-measurements as variance rates ranged between 0.55 and 62.46. The researchers think that these differences are due to the regular training on the sports march exercises and formations according to physical loads of each exercise.

This is in agreement with Ali Gala El-Din (2004) who indicated that human body formation and body systems do not perform separate functions. Instead, there are close relations and mutual reactions among various body parts, organs and systems (21). This is also in agreement with Al-Saeed Al-Adl (2005) teaching the physical preparation part of PE lesson using sports marches has a positive effect on improving some physiological elements for high school students (3).

Al-Desouqy Ammar (2004) indicated that aerobic / anaerobic exercises can be used for building and strengthening body muscles as they increase general metabolism and consume more calories, compared to sedentary state as decreasing body weight through decreasing food intake may only lead to consume muscle fats. Aerobic

exercises maintain muscles and increase its mass and this leads to maintain good shape and decreases obesity (6).

This is also in agreement with Fatema Saad (2003) and Mohamed Lasheen (2012) who indicated that sports activities have positive effects on body formation components (10, 24).

Conclusions

The researchers concluded that:

1. *The sports march with stepping box and free exercises, calibrated according to physical load variables, had positive effects on total cholesterol level (CHOL), high density fatty proteins (HDL), low density fatty proteins (LDL) and tri-glyceried (TG) for the research sample.*

2. *The sports march with stepping box and free exercises, calibrated according to physical load variables, had positive effects on body composition components (weight – Fat percentage – fat mass – total body weight [TBW] – water ratio – Body Mass Index [BMI] – muscle mass – Metabolic Rate [BMR]) while bone mass did not show any statistically significant differences.*

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The researchers recommend that:

1. *Teaching sports marches for students of faculties of physical education according to physical load variables as it has positive effects on improving blood fats and body composition.*

2. *Doing more similar research efforts on other age groups and variables.*

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