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Effect of Different Intensity Step Exercises on some Physical Abilities and Functional Responses and Performance Level for Divers.

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Abstract

The research aims to design training program using varying intensity step exercises accompanied with music and its impact on certain physical abilities, some functional responses, and improving performance level .
Study was conducted on intentionally selected sample consisted of (25) students from third-grade students at Faculty of Physical Education for Men, who practice amateur diving as juniors, that is because diving is one of academic syllabuses for this grade divided to an experimental group of (10) students who undergone the proposed different intensity step secrecies program accompanied with music (60-75% of pulse reserves time) and a control group of (10) students who undergone followed diving teaching program for third students and did not participate in proposed training program. Researcher taught Scuba unit put on/off skill underwater for both groups (control-experimental) – also taught different intensity step exercises accompanied with music to experimental group only through an educational program for a period of two weeks conducted (4 sessions/week), after this main study, later main study conducted for period of (10 weeks) by (3 sessions/week) and session time (60 minutes) at swimming pool of faculty of physical education for men, Alexandria university, results reveal superiority of experimental group over control group in certain physical abilities, some functional responses, and performance level, so the researcher recommends using different intensity step exercises due to its positive effect on developing some physical abilities , functional responses, and improving performance level for various physical activities.

Introduction:

Diving sport encourage studies for best training ways and methods, which can be used to improve some physical and physiological abilities necessary for practicing this type of activity. Diving is classified within physical activities which affected by several variables at same time. It depends on multiple factors for selecting most appropriate structured training methods, which is one of the most important ingredient that cause improvement in some physical abilities and functional efficiency of main body organs such as the circular and respiratory systems and working muscles in the body, Diver proficiency is determined his physical physiological abilities

As physical and physiological facts is the basis for directing training process with what commensurate with each sporting activity to access a level of achievement. Diving have got sophisticated and significant interest in many institutions and organizations due to its important economic aspect, as it is an important element of national income, in the same time recent years, scientific have had remarkable progress in training field generally and in diving particularly.

MagdiyAbu Zaid (2007, p186-187) argues that diving is a special nature sport, as it requires certain characteristics to get diver do his work safely under water. Diver should be characterized with high and physical of physiological abilities to enable him to perform his tasks skillfully and mastery.

Recently, diving training methods to improve some physical abilities and functional responses as a basis to raise performance level, Levy, Furest (2002, p137) mentioned that there are many research confirm the positive impact of step exercises on improving and fitness of cardio respiratory system, and increase cardiac output and blood circulation with effort saving.

Brick (2001, p2) argues that step exercises have effective effect on improving fitness level, as well as helping body's systems to work more efficiently, especially the lower limb muscles. (9: 2)

Afaf Darwish and Nourhanne Hassan (1997, p13) adds that step exercises using step box are considered latest types of aerobic exercise which depends going ups and downs from the box, so it increase player's enthusiasm and acquire him performance challenge through his moves on the box with different changes in his body parts t. (5: 13)

Corbin and Lindsey (2000, p73) and Champion, Hurst (2000, p96) agreed that carefully planned step exercises would be influential in development and construction of cardio respiratory fitness, and hence possibility of continuing performance for long periods before reaching fatigue stage.

Mahmoud Marei (2001, p120), Iman Abdullah (2000, p84) Abeer Ramadan (2000, p82) and Azmi Faisal (2002, p163) studies confirmed the positive effects of step exercise on physical aspects like neuromuscular endurance, agility, motor physical in addition the muscular endurance of legs,

abdomen, and arms muscles . (7: 120), (1: 84), (3: 82), (4: 163)

Scientific researches vision for the positive effect of step exercises on improving some physical abilities and functional responses called the researcher to conduct this study to identify the impact of different intensity step exercises accompanied with music on some physical abilities, functional responses and skills performance level, and then directing training program to achieve better level for diving juniors.

Research objectives:

The research aims to design training program using varying intensity step exercises accompanied with music and its impact on:

A- Certain physical abilities.

B- Some functional responses.

C- Improving performance level.

Research hypotheses:

1- There are statistically significant differences between pre and post measurements in some physical abilities level for experimental and control group in favor of experimental group.

2- There are statistically significant differences between pre and post measurements in some functional responses level for experimental and control group in favor of experimental group.

3- There are statistically significant differences between pre and post measurements in improving performance time for experimental and control group in favor of experimental group.

Research domains:

Spatial domain:

Swimming pool, exercises lounge and gymnastics of Faculty of Physical Education for Men, and Chest Department (respiratory functions), Faculty of Medicine, Alexandria University.

Time domain:

The period from Three months,

Research sample:

Study was conducted on intentionally selected sample consisted of (25) students from third-grade students at Faculty of Physical Education for Men, who practice amateur diving as juniors, that is because diving is one of academic syllabuses for this grade distributed as follows:

- An experimental group of (10) students who undergone the proposed different intensity step secrecies program accompanied with music (60-75% of pulse reserves time).
- A control group of (10) students who undergone followed diving teaching program for third students and did not participate in proposed training program Both groups undergone pre- and post-measurements.
- Pilot study group of (5) students.

Table (1)
Statistical description of experimental and control groups and total research sample in basic measurements prior experiment.

Statistics / measurements	Groups	N	Statistical description significance			
			Mean	Median	SD	Skweness coefficient
Age to nearest month	Experimental	10	19.65	20	1.34	-0.62
	Control	10	19.93	20	0.24	-0.16
	Total research sample	20	19.79	20	0.95	-0.59
Height cm	Experimental	10	174.2	175	3.49	-1.39
	Control	10	175.1	173	5.22	0.56
	Total research sample	20	174.65	175	4.34	0.24
Weight kg	Experimental	10	77.5	78	4.22	-1.19
	Control	10	78.9	77	7.95	0.3
	Total research sample	20	78.2	78	6.24	0.32

Table (1) results reveal that skewness factor for all variables ranged between (-1.39 to 0.56) i.e. between ± 3 and near to zero, indicating that all obtained measurements are close to normal distribution. which confirms homogeneity of experimental and control groups, and total research sample in basic variables prior to the experiment.

Table (2)
Differences between experimental and control groups in basic measurements prior experiment (homogeneity)

Statistics / measurements	Experimental group (n=10)		Control group (n=10)		Differences between averages	T value
	Mean	SD	Mean	SD		
Age to nearest month	19.65	1.34	19.93	0.24	0.28	0.64
Height cm	174.2	3.49	175.1	5.22	0.9	0.45
Weight kg	77.5	4.22	78.9	7.95	1.4	0.49

*** T Significant at the 0.05 level = 2.10**

Table (2) results reveal that T value for differences between experimental and control groups in the basic measurements ranged from (0.45 to 0.64) and these values were not significant at the 0.05 level, which indicates that the two research groups are homogeneous in basic measurements.

Research Tools:

I – Tools and equipments:

Restameter for measuring height (cm), medical calibrated scale for measuring weight (kg,) Polar watch to measure the pulse during physical exertion in training sessions, simple reaction device, Chest Graph HI-701 device for measuring pulse at rest (electronic), Geneometer device (for measuring motionrange) Mternom (to adjust the rhythm), HP laptop equipped with recorded musical rhythms begin from 60 beat/minute to 110 beat/minute Sony speakers with high frequency (1000 RMS), diving goggles (Mask), diving fins, diving suits (dry), air cylinders (oxygen), air regulator, lead belts, tape measure (cm) buoy (phosphoric), lead weight, 20cm hieight step box .

II- **Physical, functional and performance time tests and measurements**:

Physical, functional and performance time tests and measurements carried out for both groups (experimental – control) prior to experiment, and post the experiment ,

1- Physical measurements and tests:

A- special endurance test:

- 400 m fins swimming as it contribute to energy production systems (min).

B- Muscle strength endurance:

- Knee bent from stand test (40 sec) to measure legs' muscular endurance
- Setting from squatting lying test (40 sec) to measure abdominal and thigh flexor muscles muscular endurance.
- Trunk lifting from prostration (40 sec to measure muscular endurance.
- Arms bend from slanted prostration amended test (40 sec) to measure arms and shoulders muscular endurance.

C- Motion Range measurements:

- Measuring hip motion range in extending and adduction (Geneometer).
- Measuring foot motion range in extending and adduction (Geneometer).

D- Motor speed tests:

- Pendulum running test 4 × 9m (sec) to measure legs motor speed.
- Measuring simple reaction speed (reaction device).

E- Power

- Vertical jump test to measure legs muscle ability.

F- **Spatial direction ability** test (agility under water) (sec).

2- Functional responses are as follows:

A - Lung Function Tests include:

- Vital capacity (VC).
- Forced vital capacity (FVC).
- Forced expiratory volume in first second (FEV1).
- Forced expiratory volume in the first second% FEV1%).
- Peak Expiratory Flow Rate (PEFR).
- Forced aspiratory vital capacity (FIVC).
- Maximum voluntary ventilation (MVV).

B - **Respiratory fitness tests include:**

- Resting pulse (pulse/sec).
- Physical work efficiency at pulse of 170 PWC 170 (W) (Kariman test).
- Relative Physical work efficiency at pulse of 170 PWC 170 (Watt/Kg)).
- Maximum oxygen consumption (VO2 MAX) (Quinn test).

3- Scuba unit put on/off skill underwater time measurement

Pilot study:

The researcher conducted a pilot study on sample of (5) students in order to determine the appropriate step box height and step exercises various intensities accompanying music, which can be formed from training loads for the proposed program, Faisal. A, et al (2009, p143) indicated that pulse rates are stabled after 2- 3 minutes from the beginning of medium intensity physical effort , so time of pulse measurements for arms and legs movements using step box has been determined as (3 minutes) after starting, height (20 cm), where the researcher used the Polar watch to measure and record pulse during performance.

Main study:

The researcher taught Scuba unit put on/off skill underwater for both groups (control-experimental) – also taught different intensity step exercises accompanied with music to experimental group only through an educational program for a period of two weeks , with (4 sessions/week) each session time is 45minutes , later the main study conducted . for (10 weeks) by (3 sessions/week) and session time (60 minutes), where experimental group perform various intensity (50-70%) step exercise, and control group perform regular diving syllabus for 3rd grade all done inside swimming pool lounge at Faculty of Physical Education for Men, Alexandria University , where each group (experimental - control) performed its training dose as per training foundations and training physiological laws..

Proposed training program general principles:

Based on the scientific consensus [Sharkey (2001, p89), Foss & Keteyian (2002, 176) and Bastawissi Ahmad Bastawissi (1999, p99)] researcher has identified proposed training program general principles for going up/down the step box accompanied with music to develop :physical and physiological abilities level, and Scuba unit put on/off skill time measurement for experimental group as follows:

- Principle of load and in-between rest as training basis.
- Wave principle in training load dynamic in terms of increase and decrease load intensity for both training session-level, and training program as a whole.
- Individual training principle so training load intensity is determined by player's pulse reserve according to training's functional direction, based on Carfoden formula for aimed training pulse calculating.

Proposed training program variables:

- Load volume: determined by various intensity step exercises proposed program's duration, weekly training session, and training session time, step exercises time in session and in all sessions.
- Load intensity: determined pulse reserve depending on training functional direction for experimental group, where its rate ranged between 50-70% of pulse reserves.
  - Where reserves pulse = maximum pulse – rest pulse
  - Maximum pulse = 220-age
  - Using Carfoden formula aimed training pulse could be calculated as follow:

$$\textbf{Aimed training pulse} = \frac{\textbf{required intensity x pulse reserve}}{\textbf{100}} + \textbf{Rest pulse}$$

- In-between-rest: determined as 1:3 of training duration so student do going up/down the step box for (3 minutes) to reach required pulse rates , followed by lower intensity for (1 minute), where pulse rate is reduced to 115-110 beats (positive rest principle with partial rest times) to achieve:
  - Partial positive rest from previous intensity.
  - Maintain intensity continuation and use various intensity wave load principle.

Training session content:

Training session of (60) minutes included the following:

Warm-up (10 minutes):

This part included various running exercise so pulse rate reach 110-115 beats/minute and stretching exercises of various muscle groups.

Physical preparation (31 minutes):

This party included various intensity step exercises accompanied with music, where intensity rate through the program ranged between 50-70% of pulse reserves, and training load formed using various intensity waves through training session ((variable load).

Skill preparation (15 mminuts):

Student performs Scuba unit put on/off skill underwater as follow:

A- Scuba unit put off skill underwater

B- Scuba unit put on skill underwater

Calling Down: (4 minutes):

This part included swinging and stretching exercises

Educational program for Scuba unit put on/off skill underwater and different intensity step exercises accompanied with music:

Both research groups (experimental control) taught Scuba unit put on/off skill underwater, while different intensity step exercises accompanied with music taught to experimental group only, through an educational program for (2 weeks) with 4 sessions/week, session time is of 45 minutes as shown in tale (3):

Table (3)
Time schedule for Scuba unit put on/off skill and different intensity step exercises accompanied with music

Week	Session aim	Research groups	Session time
1st	Scuba unit put on skill (out of water)	Experimental-control	45 minutes
	Teaching some different intensity step exercises	Experimental	45 minutes
	Scuba unit put off skill (out of water)	Experimental-control	45 minutes
	Teaching some different intensity step exercises	Experimental	45 minutes
2nd	Scuba unit put on skill (out of water)	Experimental-control	45 minutes
	Associating different intensity step exercises with accompanied music	Experimental	45 minutes
	Scuba unit put on/off skill underwater	Experimental-control	45 minutes
	performing different intensity step exercises with accompanied music	Experimental	45 minutes

Post-measurements:

Post-measurements was performed for both research groups (experimental - control) , after completion of proposed program application with same conditions of pr-measurements.

Statistical work:

In light of research variables, the researcher used the following statistical factors/tests:

- Mean.
- Standard deviation .
- Skewness coefficient
- Independent T test for identifying difference significance between two homogeneous groups
- Paired T test for identifying difference significance between pre and post-measurements for same group

All statistical work done using Statistical Package for Social Sciences (SPSS)

Results

Table (4)
statistical characterization for experimental, control and overall research sample in physical tests before the experiment

Statistics / Tests		Groups	N	Statistics significance			
				Mean	Median	Slandered Deviation	Skweness coefficient
Muscle strength endurance	400 m swimming time	Experimental	10	8.21	8.32	0.56	-0.84
		Control	10	8.34	8.4	0.56	0
		Overall	20	8.27	8.32	0.55	-0.37
	Knee bent	Experimental	10	48	50	7.26	-1.14
		Control	10	49.9	51	7.02	0.2
		Overall	20	48.95	51	7.01	-0.47
	Setting from lying	Experimental	10	36.8	37.5	5.53	-0.1
		Control	10	35.4	34.5	4.74	-0.06
		Overall	20	36.1	36	5.07	-0.01
	Trunk lifting	Experimental	10	33.6	34.5	7.18	0.03
		Control	10	33.9	33	7.99	-0.19
		Overall	20	33.75	34	7.4	-0.08
Motion Range	Arms bend	Experimental	10	21.9	21.5	3.11	0.5
		Control	10	20.4	20	3.34	0.06
		Overall	20	21.15	21	3.23	0.16
	Foot	Experimental	10	29.6	29	6.75	-0.01

Statistics / Tests		Groups	N	Statistics significance			
				Mean	Median	Slandered Deviation	Skweness coefficient
	Adduction	Control	10	27.2	25	5.81	0.39
		Overall	20	28.4	27.5	6.25	0.22
	Foot extending	Experimental	10	26.6	25	7.6	0.61
		Control	10	25.5	27.5	4.97	-0.24
		Overall	20	26.05	27.5	6.28	0.52
	Hip adduction	Experimental	10	42.7	40.5	6.7	2.2
		Control	10	40	41.5	8.55	-0.47
		Overall	20	41.35	40.5	7.6	0.21
	Hip Extending	Experimental	10	86.2	83.5	8.39	0.36
		Control	10	82.8	78.5	8.05	0.78
		Overall	20	84.5	83	8.19	0.5
Speed	Pendulum Running	Experimental	10	10.75	10.65	0.53	0.1
		Control	10	10.53	10.57	0.47	-0.42
		Overall	20	10.64	10.58	0.5	-0.02
	reaction speed	Experimental	10	0.23	0.2355	0.02	0.02
		Control	10	0.23	0.233	0.01	0.03
		Overall	20	0.23	0.2335	0.02	0.14
Power	Vertical jump	Experimental	10	32.9	33.5	3.38	-0.28
		Control	10	33.2	33.5	3.39	-0.26
		Overall	20	33.05	33.5	3.3	-0.24
Ability	Agility under water	Experimental	10	11.8	11.645	1.29	0.03
		Control	10	12.14	12.485	1.63	-0.24
		Overall	20	11.97	11.955	1.44	-0.05

Table (4) results show that skewness coefficient range from (-1.14 to 2.20) , indicating that measurements obtained are close to normal distribution where skewness coefficient values should be between ± 3 and very close to zero This confirms homogeneity of experimental, control, and overall research sample in physical tests before the experiment .

Table (5)
statistical characterization for experimental, control and overall research sample in physiological measurements before the experiment

Statistics / Tests		Groups	N	Statistics significance			
				Mean	Median	Slandered Deviation	Skweness coefficient
Lung Function Tests	V C	Experimental	10	7.09	7.04	0.65	0.65
		Control	10	6.97	6.66	1.2	1.28
		Overall	20	7.03	6.94	0.94	1.08
	F V C	Experimental	10	7.03	7.04	0.61	0.98
		Control	10	6.75	6.57	1.12	2.02
		Overall	20	6.89	6.94	0.89	1.55
	F E V 1	Experimental	10	5.93	5.87	0.52	1.51
		Control	10	5.75	5.775	1	0.21
		Overall	20	5.84	5.87	0.78	0.17
	F E V 1 %	Experimental	10	84.48	84.705	5.94	0.63
		Control	10	85.51	90.67	9.64	-0.55
		Overall	20	84.99	85.555	7.81	-0.22
	P E F	Experimental	10	12.11	11.77	1.27	-0.07
		Control	10	12.27	12.25	1.17	-0.25
		Overall	20	12.19	12.11	1.19	-0.15
	F I V C	Experimental	10	6.83	7.01	0.71	-0.94
		Control	10	6.5	6.55	0.61	0.18
		Overall	20	6.67	6.755	0.67	-0.3
	M V V	Experimental	10	182	178.4	32.91	0.08
		Control	10	169.53	173.2	32.46	0.74
		Overall	20	175.77	175.5	32.45	0.35

Statistics / Tests		Groups	N	Statistics significance			
				Mean	Median	Slandered Deviation	Skweness coefficient
Heart and blood circle functions	Rest pulse	Experimental	10	70.3	70	1.16	1.41
		Control	10	70	70	0.94	0
		Overall	20	70.15	70	1.04	0.92
	Pulse reserve	Experimental	10	129.6	130	1.71	-1.53
		Control	10	130.1	130	0.74	1.91
		Overall	20	129.85	130	1.31	-1.67
PWC 170	Absolute	Experimental	10	50.1	49.5	3.51	0.26
		Control	10	49.8	49.5	1.93	0.24
		Overall	20	49.95	49.5	2.76	0.36
	Relative	Experimental	10	0.65	0.65	0.04	0.09
		Control	10	0.64	0.64	0.06	-0.34
		Overall	20	0.64	0.65	0.05	-0.37
VO_2max (Queen test)		Experimental	10	158.7	156.5	22.41	0.21
		Control	10	150.6	154	15.58	-0.17
		Overall	20	154.65	155.5	19.24	0.33

Table (5) results show that skewness coefficient range from (-1.67 to 2.02) , indicating that measurements obtained are close to normal distribution where skewness coefficient values should be between ± 3 and very close to zero This confirms homogeneity of experimental, control, and overall research sample in physiological measurements before the experiment .

Table (6)
statistical characterization for experimental, control and overall research sample in Scuba unit put on/off time (sec) before the experiment

Statistics / Tests	Groups	N	Statistics significance			
			Mean	Median	Slandered Deviation	Skweness coefficient
Scuba unit put on/off time (sec)	Experimental	10	56.56	57.72	3.56	-0.46
	Control	10	55.27	54.29	3.59	0.37
	Overall	20	55.91	55.75	3.54	-0.04

Table (6) results show that skewness coefficient range from (-0.46 to 0.37) , indicating that measurements obtained are close to normal distribution where skewness coefficient values should be between ± 3 and very close to zero This confirms homogeneity of experimental, control, and overall research sample in Scuba unit put on/off time (sec) before the experiment.

Table (7)
Differences between experimental and control groups in physical tests before experiment (homogeneity)

Statistics / Tests		Experimental group (N=10)		Control group (N=10)		Differences Between averages	T Value
		Mean	Standard Deviation	Mean	Standard Deviation		
Muscle Strength endurance	400 m swimming time	8.21	0.56	8.34	0.56	0.13	0.51
	Knee bent	48	7.26	49.9	7.02	1.9	0.6
	Setting from lying	36.8	5.53	35.4	4.74	1.4	0.61
	Trunk lifting	33.6	7.18	33.9	7.99	0.3	0.09
	Arms bend	21.9	3.11	20.4	3.34	1.5	1.04
Motion Range	Foot adduction	29.6	6.75	27.2	5.81	2.4	0.85
	Foot Extending	26.6	7.6	25.5	4.97	1.1	0.38
	Hip adduction	42.7	6.7	40	8.55	2.7	0.79
	Hip extending	86.2	8.39	82.8	8.05	3.4	0.92
Speed	Pendulum Running	10.75	0.53	10.53	0.47	0.22	0.97
	Reaction speed	0.23	0.02	0.23	0.01	0	0.22
Power	Vertical Jump	32.9	3.38	33.2	3.39	0.3	0.2
Ability	Agility under water	11.8	1.29	12.14	1.63	0.35	0.52

*** T significant at 0.05 level = 2.10**

Table (7) results reveal that T value for differences between experimental and control groups ranged from (0.09 to 1.04) and these values are not significant at 0.05 level , which indicates homogeneity between the two groups in physical tests before experiment.

Table (8)
Differences between experimental and control groups in physiological measurements before experiment (homogeneity)

Statistics / Tests		Experimental group (N=10)		Control group (N=10)		Differences Between averages	T Value
		Mean	Standard Deviation	Mean	Standard Deviation		
Lung Function Tests	V C	7.09	0.65	6.97	1.2	0.13	0.29
	F V C	7.03	0.61	6.75	1.12	0.28	0.71
	F E V 1	5.93	0.52	5.75	1	0.18	0.49
	F E V 1 %	84.48	5.94	85.51	9.64	1.03	0.29
	P E F	12.11	1.27	12.27	1.17	0.16	0.29
	F I V C	6.83	0.71	6.5	0.61	0.33	1.12
	M V V	182	32.91	169.53	32.46	12.47	0.85
Heart and Blood circle functions	Rest pulse	70.3	1.16	70	0.94	0.3	0.63
	Pulse reserve	129.6	1.71	130.1	0.74	0.5	0.85
PWC	Absolute	50.1	3.51	49.8	1.93	0.3	0.24
	Relative	0.65	0.04	0.64	0.06	0.01	0.45
VO_2max (Queen test)		158.7	22.41	150.6	15.58	8.1	0.94

*** T significant at 0.05 level = 2.10**

Table (8) results reveal that T value for differences between experimental and control groups ranged from (024 to 1.12) and these values are not significant at 0.05 level, which indicates homogeneity between the two groups in physiological measurements before experiment.

Table (9)
Differences between experimental and control groups in Scuba unit put on/off time (sec) before experiment (homogeneity)

Statistics / Tests	Experimental group (N=10)		Control group (N=10)		Differences Between averages	T Value
	Mean	Standard Deviation	Mean	Standard Deviation		
Performance time	56.56	3.56	55.27	3.59	1.29	0.81

Table (9) results reveal that T value for differences between experimental and control groups was 0.81 and this values is not significant at 0.05 level , which indicates homogeneity between the two groups in physiological measurements before experiment.

Table (10)
Differences between pre and post measurements for experimental group in physical tests (n=10)

Statistics / Tests		Pre measurement		Post measurement		Differences Between averages		T Value	Improvement Percentage %
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		
Muscle Strength endurance	400 m swimming time	8.21	0.56	7.15	0.5	1.06	0.4	8.36*	12.86
	Knee bent	48	7.26	63.1	4.41	15.1	8.41	5.68*	31.46
	Setting from lying	36.8	5.53	45.5	3.06	8.7	5.72	4.81*	23.64
	Trunk lifting	33.6	7.18	43.4	4.35	9.8	7.41	4.18*	29.17
	Arms bend	21.9	3.11	31.9	2.47	10	4.29	7.36*	45.66
Motion	Foot adduction	29.6	6.75	48	7.89	18.4	5.44	10.69*	62.16

Statistics / Tests		Pre measurement		Post measurement		Differences Between averages		T Value	Improvement Percentage %
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		
Range	Foot Extending	26.6	7.6	44.4	10.45	17.8	10.66	5.28*	66.92
	Hip adduction	42.7	6.7	52	4.62	9.3	4.55	6.47*	21.78
	Hip extending	86.2	8.39	95.6	12.93	9.4	6.4	4.65*	10.9
Speed	Pendulum Running	10.75	0.53	9.73	0.43	1.02	0.63	5.16*	9.51
	Reaction speed	0.23	0.02	0.21	0.01	0.03	0.03	3.16*	10.98
Power	Vertical Jump	32.9	3.38	51	9.25	18.1	10.05	5.70*	55.02
Ability	Agility under water	11.8	1.29	9.4	0.88	2.4	0.79	9.63*	20.37

*** T significant at 0.05 level = 2.26**

Table (10) results reveal that T test value for differences between pre and post measurements ranged between (3.16 to 10.69), and these values are greater than the T significant value at 0.05 level, and improvement percentage ranged between (9.51% - 66.92%)

Table (11)
Differences between pre and post measurements for experimental group in physiological measurements (n=10)

Statistics / Tests		Pre measurement		Post measurement		Differences Between averages		T Value	Improvement Percentage %
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		
Lung Function Tests	V C	7.09	0.65	7.73	0.79	0.63	0.46	4.41*	8.94
	F V C	7.03	0.61	8.91	0.76	1.88	1.12	5.31*	26.67
	F E V 1	5.93	0.52	7.19	0.54	1.26	0.72	5.53*	21.33
	F E V 1 %	84.48	5.94	87.84	5.5	3.36	6.45	1.65	3.98
	P E F	12.11	1.27	13.34	0.64	1.23	1.63	2.40*	10.16
	F I V C	6.83	0.71	7.98	0.52	1.15	0.98	3.70*	16.8
	M V V	182	32.91	231.95	32.3	49.95	23.45	6.73*	27.45
Heart and Blood circle Functions	Rest pulse	70.3	1.16	66.8	0.42	3.5	1.18	9.39*	4.98
	Pulse reserve	129.6	1.71	137.93	5.62	8.33	6.3	4.18*	6.43
PWC	Absolute	50.1	3.51	61.72	4.42	11.62	3.87	9.49*	23.19
	Relative	0.65	0.04	0.8	0.07	0.15	0.05	8.83*	23.35
VO_2max (Queen test)		158.7	22.41	241.6	38.53	82.9	41.64	6.30*	52.24

*** T significant at 0.05 level = 2.26**

Table (11) results reveal that T test value for differences between pre and post measurements ranged between (2.40 to 9.49), and these values are greater than the T significant value at 0.05 level, and improvement percentage ranged between (3.98% - 52.24%)

Table (12)
Differences between pre and post measurements for experimental group in Scuba unit put on/off time (n=10)

Statistics / Tests	Pre measurement		Post measurement		Differences Between averages		T Value	Improvement Percentage %
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		
Performance time	56.56	3.56	40.63	5.78	15.93	5.2	9.69	28.17

Table (12) results reveal that T test value for differences between pre and post measurements was (9.69), and this value are greater than the T significant value at 0.05 level, and improvement percentage was (28.17%)

Table (13)
Differences between pre and post measurements for control group in physical tests (n=10)

Statistics / Tests		Pre measurement		Post measurement		Differences Between averages		T Value	Improvement Percentage %
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		
Muscle Strength endurance	400 m swimming time	8.34	0.56	8.28	0.54	0.06	0.17	1.04	0.66
	Knee bent	49.9	7.02	54.5	7.63	4.6	3.24	4.49*	9.22
	Setting from lying	35.4	4.74	38.7	5.44	3.3	1.83	5.71*	9.32
	Trunk lifting	33.9	7.99	36.5	8.32	2.6	2.67	3.07*	7.67
	Arms bend	20.4	3.34	22	2.67	1.6	1.78	2.85*	7.84
Motion Range	Foot adduction	27.2	5.81	31.3	4.19	4.1	3.84	3.37*	15.07
	Foot Extending	25.5	4.97	30	5.77	4.5	4.38	3.25*	17.65
	Hip adduction	40	8.55	41.4	7.78	1.4	4.74	0.93	3.5
	Hip extending	82.8	8.05	85.4	8.45	2.6	1.65	4.99*	3.14
Speed	Pendulum Running	10.53	0.47	10.44	0.42	0.09	0.38	0.72	0.82
	Reaction speed	0.23	0.01	0.23	0.01	0	0	0	0
Power	Vertical Jump	33.2	3.39	34.4	3.63	1.2	3.97	0.96	3.61
Ability	Agility under water	12.14	1.63	11.54	1.24	0.6	0.68	2.80*	4.93

*** T significant at 0.05 level = 2.26**

Table (13) results reveal that T test value for differences between pre and post measurements for most measurements ranged between (2.80 - 5.71), and these values are greater than the T significant value at 0.05 level, there was no differences between pre and post measurements in 400 m swimming time , Hip adduction , Pendulum Running , Reaction speed and Vertical Jump, improvement percentage ranged between (0.00% -17.65%)

Table (14)
Differences between pre and post measurements for control group in physiological measurements (n=10)

Statistics / Tests		Pre measurement		Post measurement		Differences Between averages		T Value	Improvement Percentage %
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		
Lung Function Tests	V C	6.97	1.2	7.19	0.76	0.22	1.07	0.65	3.14
	F V C	6.75	1.12	7.21	1.02	0.46	0.61	2.36*	6.79
	F E V 1	5.75	1	5.95	0.59	0.19	0.94	0.65	3.39
	F E V 1 %	85.51	9.64	82.37	6.38	3.14	9.56	1.04	3.67
	P E F	12.27	1.17	10.14	1.81	2.13	1.71	3.93*	17.35
	F I V C	6.5	0.61	7.08	0.64	0.58	0.66	2.78*	8.92
	M V V	169.53	32.46	189.2	33.32	19.67	39.05	1.59	11.6
Heart and Blood circle Functions	Rest pulse	70	0.94	69.4	0.97	0.6	0.7	2.71*	0.86
	Pulse reserve	130.1	0.74	131.33	0.62	1.23	0.88	4.38*	0.94
PWC	Absolute	49.8	1.93	48.84	3.2	0.96	3.39	0.9	1.93
	Relative	0.64	0.06	0.62	0.07	0.01	0.04	0.87	1.94
VO_2max (Queen test)		150.6	15.58	204.9	37.31	54.3	26.64	6.45*	36.06

*** T significant at 0.05 level = 2.26**

Table (15) results reveal that T test value for differences between pre and post measurements were significant in 6 tests only and ranged between (2.36 - 6.45), and these values are greater than the T significant value at 0.05 level, while differences were not significant in 6 other test where T value ranged between (0.065 - 1.59), and these values are lower than the T significant value at 0.05 level and improvement percentage ranged between (0.94% to 36.06%)

Table (15)
Differences between pre and post measurements for control group in Scuba unit put on/off time (n=10)

Statistics / Tests	Pre measurement		Post measurement		Differences Between averages		T Value	Improvement Percentage %
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation		
Performance time	55.27	3.59	50.05	3.73	5.22	1.13	14.57*	9.44

*** T significant at 0.05 level = 2.26**

Table (15) results reveal that T test value for differences between pre and post measurements was (9.44), and this value are greater than the T significant value at 0.05 level, and improvement percentage was (9.44%)

Table (16)
Differences between experimental and control groups in physical tests after experiment

Statistics / Tests		Experimental group (N=10)		Control group (N=10)		Differences Between Averages	T Value	Differences Percentage %
		Mean	Standard Deviation	Mean	Standard Deviation			
Muscle Strength endurance	400 m swimming time	7.15	0.5	8.28	0.54	1.13	4.83*	15.78
	Knee bent	63.1	4.41	54.5	7.63	8.6	3.09*	13.63
	Setting from lying	45.5	3.06	38.7	5.44	6.8	3.45*	14.95
	Trunk lifting	43.4	4.35	36.5	8.32	6.9	2.32*	15.9
	Arms bend	31.9	2.47	22	2.67	9.9	8.61*	31.03
Motion Range	Foot adduction	48	7.89	31.3	4.19	16.7	5.91*	34.79
	Foot Extending	44.4	10.45	30	5.77	14.4	3.81*	32.43
	Hip adduction	52	4.62	41.4	7.78	10.6	3.71*	20.38
	Hip extending	95.6	12.93	85.4	8.45	10.2	2.11*	10.67
Speed	Pendulum Running	9.73	0.43	10.44	0.42	0.72	3.79*	7.39
	Reaction speed	0.21	0.01	0.23	0.01	0.02	5.21*	11.56
Power	Vertical Jump	51	9.25	34.4	3.63	16.6	5.28*	32.55
Ability	Agility under water	9.4	0.88	11.54	1.24	2.15	4.49*	22.88

*** T significant at 0.05 level = 2.10**

Table (16) results reveal existent of significant differences between experimental and control groups after experiments in all tests as that T value ranged between (2.11 - 8.61) and these values were significant at 0.05 level , differences percentage ranged between (7.39%-34.79%).

Table (17)
Differences between experimental and control groups in physiological measurements after experiment

Statistics / Tests		Experimental group (N=10)		Control group (N=10)		Differences Between averages	T Value	Differences Percentage %
		Mean	Standard Deviation	Mean	Standard Deviation			
Lung Function Tests	V C	7.73	0.79	7.19	0.76	0.54	1.56	6.99
	F V C	8.91	0.76	7.21	1.02	1.7	4.22*	19.1
	F E V 1	7.19	0.54	5.95	0.59	1.25	4.91*	17.31
	F E V 1 %	87.84	5.5	82.37	6.38	5.47	2.06	6.23
	P E F	13.34	0.64	10.14	1.81	3.2	5.29*	24.01
	F I V C	7.98	0.52	7.08	0.64	0.9	3.45*	11.28
	M V V	231.95	32.3	189.2	33.32	42.75	2.91*	18.43
Heart and Blood circle functions	Rest pulse	66.8	0.42	69.4	0.97	2.6	7.80*	3.89
	Pulse reserve	137.93	5.62	131.33	0.62	6.6	3.69*	4.79
PWC	Absolute	61.72	4.42	48.84	3.2	12.88	7.46*	20.87
	Relative	0.8	0.07	0.62	0.07	0.17	5.65*	21.81
VO_2max (Queen test)		241.6	38.53	204.9	37.31	36.7	2.16*	15.19

*** T significant at 0.05 level = 2.10**

Table (17) results reveal existent of significant differences between experimental and control groups after experiments in all physiological measurements (except two measurements) tests as that T value ranged between (2.16-7.80) and these values are significant at 0.05 level , differences percentage ranged between (3.89%-24.01%).

Table (18)
Differences between experimental and control groups in Scuba unit put on/off time (sec) after experiment

Statistics Tests	Experimental group (N=10)		Control group (N=10)		Differences Between averages	T Value
	Mean	Standard Deviation	Mean	Standard Deviation		
Performance time	40.63	5.78	50.05	3.73	9.42	4.33*

Table (18) results reveal existent of significant differences between experimental and control groups after experiments in Scuba unit put on/off time as that T value ranged was (4.3380) which is significant at 0.05 level , differences percentage ranged between (3.89%-24.01%).

Discussion:

The extent physical responses depend on vital body system functional development, where research results indicate the positive impact of training on improving fitness level , Table (16) shows the significant superiority of experimental group on control group at 0.05 level in physical tests after experiment; which is attributed to the improved physical and functional status of vital body systems as a result of regularity in physical preparation programs and different intensity step exercise program accompanied with music for a period of (10) weeks and also diversity in exercise forms in the proposed program, which requires involvement of arms and legs in multiple directions , Brick (2001, 502), Westcott (2002, 167) Kostich study (2002) indicate that step exercises have positive effect on improving individual's physical fitness level, thereby first hypothesis could be accepted, where the experimental group outperformed the control group in post-physical measurements .

In light of the differences between experimental group control group in physiological measurements after the experiment , it is clear from table (17) that there are significant differences at the 0.05 level in all physiological measurements in favor of experimental group except for vital capacity (VC) and forced expiratory volume of air % (FEV_1%), where improvement percentage were 6.99% , 6.23 %, respectively , Researcher attributes significant differences in some of respiratory functions in favor of experimental group to respiratory system efficiency and effectiveness positive development as one of the manifestations of adoption for proposed program , which directed to affect circulatory and respiratory system, these results are consistent with what referred by Eastwood et al (2001, 95) about effect of sports training to improve some physiological measurements, and what previously mentioned show superiority of experimental group over control the post measurement for physiological variables, and so second hypothesis could be accepted: There are statistically significant differences between pre and post measurements in some functional responses level for experimental and control group in favor of experimental group.

Comparing the differences between experimental group and control group in performance time (scuba unit put on / off) after the experiment show that progress in physical , and physiological tests positively affect skill performance time as shown in the table (18), where T value was 4.33 which is significant at 0.05 level in favor of experimental group , the study confirms Kostsh (2002) , Mustafa Noor et al (2002), Wylagala et al (2007) studies confirm that use of step exercises lead to upgrading physical, and physiological level, which in turn affect skill performance level, and so third hypotheses could be accepted: There are statistically significant differences between pre and post measurements in improving performance time for experimental and control group in favor of experimental group.

Conclusions:

- The proposed training program for different intensity step exercises accompanied with music has positive effect on improving some physical abilities level, functional responses – divers' skill performance level.

Recommendations:

- It is possible to employ different intensity step exercises accompanied with music in physical efficiency development training with what it include from aerobic and anaerobic abilities by controlling performance rates and performed step exercises' nature.
- Using varied load (wave) training method) to improve physical and functional abilities, and performance level in some sports activities.
- Using step box as training mean because of its positive impact in improving physical and functional abilities, and skill performance level

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