The Effect of Functional Force Trainings on the Physical Efficiency, Force and Speed of Straight Punches Performance for Boxing Beginners

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Introduction and Problem of Research:

Sports training is from the modern sciences that achieved "significant" progress through its association with other sciences and benefiting from its theories, laws and research results. The importance of functional force trainings is that it indirectly affects the muscles, by transforming the increase in the force produced from a movement that can be used to improve nervous system performance and its complement, so all training programs should include functional force exercises . (19: 45), (20)

Functional force trainings have become widely practiced due to each person's need for force and balance when performing various routine activities in daily life in general and also the athlete should fulfill the requirements of the exercise activity in particular, where the trainings of the functional force focus on improving the force produced from the muscle to carry out various activities . (13: 1-3)

Ron Jones (2003) has referred that functional force trainings are considered one of the training forms that recently used which have an effective impact in the field of sport (18:37.(

Fabio Comana (2004) has stated that athletes practice functional force trainings in the field of sports under the name of specific trainings due to the similarity of performance in the trainings of the functional force and the specific trainings. However, the functional trainings differ from the specific trainings in that they focus on the muscles of the center (Pivotal force) since the backbone is the origin of the movement (15: 7).

The modern punching depends on the accuracy and force of punches and the speed of response with the change and diversification in the selection of punches, which achieve the purpose for which it was put with punches according to different play situations which confirmed by the results of the study of, "Ibrahim Shoaib" (2005) (1) "and Khaled Abdel- Mawjoud(2011) (7). (12: 63)

It is also not possible to achieve the performance of movements of the trunk properly including performance of continuous operations of balance only through composite cooperation between all the muscles of the center, and the availability of abdominal muscles at a good level with the presence of weak trunk muscles (back muscles) and the same applies when The flexed muscles of the trunk and back are strong and the abdominal muscles are weak, but all of these muscular groups share through an ideal harmony in the performance of all trunk motions and also maintain the spine in an appropriate position during motor performance (6: 412)

In the light of the above, the results of many previous studies and scientific research have agreed on the importance of using functional force trainings in the development of physical qualities and improving the skill performance in some sports activities.

From that, the functional force trainings are considered from the modern trainings methods such as Ibrahim Faraj`s study (2015)(2), Amr Al-Badri`s study (2015) (9), Ayman Muslim`s study (2014), (5), Moataz Najib`s study (2014)10), Walid Saleh`s study (2014), (11),Inger Soll and others study (2008) (16), Osama Abdel-Rahman`s study (2016)(4), Cymara and others study and Marjike and others study (2004)(17).

And through the work of the researcher as a coach of boxing sport for the team of the College and University, and reading many of the scientific references and previous studies specialized in the field of training in general and boxing training in particular such as (1, 2, 3, 5, 6, 8, 9, 11, 12, 13), he has noted that boxing is a sport that depends on the lower limb muscles in addition to the upper limb.

It is known that the amount of muscle in the lower limb for the boxers produces a large amount of force and ability but does not connect completely to the upper limb due to the weakness of the muscles of the center area which responsible for transfer of force from the lower limb to the upper one, which prompted the researcher to try to find a way to solve this problem.

The functional force works to support the area of the center, which helps to complete transfer for the force produced from one limb to another, and be in full flow not to lose the force from the center area, in addition to generating force in this area, which increases the amount of force transferred from the bottom of the body to high , which motivate the researcher to apply the trainings of the functional force and study their impact on the physical efficiency and force and speed of the performance of straight punches for boxing beginners.

Aims of the Research:

The research aims to study the effect of functional force trainings on:

1-Physical efficiency of boxing beginners.

2-The force of the performance of straight punches for boxing beginners.

3-Speed of the performance of straight punches for boxing beginners.

Research hypotheses:

1-There are statistically significant differences between the degrees averages of the post and pre measurements in physical efficiency for the research sample in favor of the post measurement.

2-There are statistically significant differences between the degrees averages of post and pre measurements in force of performance of the straight punches for the research sample in favor of the post measurement.

3-There are statistically significant differences between the degrees averages of post

and pre measurements in speed of performance of the straight punches for the research sample in favor of the post measurement.

Research Procedures:

Research Methodology:

-The researcher has used the experimental approach using "experimental design of one group by pre and post measurements" for its relevance to the nature and aims of the research.

Research community:

The research community is represented in the Arising from boxers registered in the Egyptian Federation of Boxing "Assiut branch" for boxing for sports season 2017/2018 their number is (20) boxers. attachment (2)

Research sample:

The basic research sample was selected in a deliberate manner Arising from boxers registered in the Egyptian Boxing Federation "Assiut Branch". Their number is (12) boxers with different weights and (8) boxers for the Exploratory sample. Table (1) shows a description of the individuals in the sample.

Table (1) Statement of the research sample and its affiliated clubs

Sports institutions Military	*Basic sample*	*Exploratory sample*	*Weight*
- Young Muslims Association	1	1	48- 50
- Nasser Youth Center	5	3	46-48- 50
West of the country	1	2	48-52
Military Establishment	5	2	60- 48- 66- 54
Total	12	8	_

Table (1) shows that the number of basic sample is (12) boxers, and the number of exploratory sample is 8 boxers

Reasons of selecting a research sample:

All the members registered in the Egyptian Boxing Federation.•

•The desire of trainer and research sample to apply the proposed exercises.

:Homogeneity among the members of the research sample-

The researcher has conducted the measurements of homogeneity in order to find the torsion coefficient for the members of the basic research sample before starting applying the proposed training program to indicate the homogeneity of the members of the basic research sample to ensure the moderation in the basic research variables that may affect the results of the research as shown in table (2)

Table (2)Arithmetic average, mean, standard deviation, and torsion coefficient for variables of age, height, weight, training age of individuals of the research sample n = 12

Statement / variables	measurements	Measurement unit	Statistical indications of characterization		
			Arithmetic average	standard deviation	Torsion coefficient
Basic	Age	Year / month	12.67	..49	-..81
	Length	meter/ cm	143.17	3.97	-..59
	weight	Kg / g	51.83	5.87	1.54
	Training age	Year / month	2.42	0.90	-..15

Table (2) shows that the values of the torsion coefficients in the variables under study were limited to (± 3). This indicates that the distributions are closer to moderation in (age, height, weight, training age) variables which refers to harmony of the sample.

Data collection tools:

The researcher has identified the tools and devices used on the research sample through the researcher`s knowledge of the scientific references and previous Arab and foreign studies specialized in sports training in general and boxing training in particular.

Used Tools:*

-Expert consultation questionnaire on the identification of axes and periods of the functional force training. Attachment (3)

-Expert consultation questionnaire on determining the most appropriate functional force trainings. Attachment(4)

Physical efficiency test (lahar Fard). Attachment(5 / a)-

-Physical efficiency registration form (lahar Fard) (designed by the researcher). Attachment(5 / b)

-Punch force registration form (designed by the researcher). Attachment (6 / b)

-Punch speed registration form (designed by the researcher) Attachment (7 / b)

Used Devices: *

Medical balance to measure weight in kilograms-

-Resist meter for length measurement (in centimeter).

-Stopwatch for measuring time.

-Baller Watches. - Jumping box.

-Measurement Device of Punch Performance Force (PFM). Attachment(6 / a)

-Measurement Device of Punch Performance Speed (PSM). Attachment(7 / a)

- Dumbbells, Sandbags - legal gloves. -Elastic cords.

- Swedish seats. - Swiss balls. Medical Balls

Scientific transactions used in the research:

The researcher has conducted the scientific transactions on sample of the research community (exploratory sample), which did not participate in the basic experiment, which was (8) boxers from beginners. Physical fitness, force and speed of straight

punches were measured.

The researcher used the validity of differentiation by conducting measurements on a distinctive sample. They are boxers of the military establishment and Nasser Youth Center. They are four boxers, who distinguished by physical efficiency, physical and skill performance, training age, competitions. The indistinctive group are from Young Muslims Association, Nasser Youth Center and West of the country which was 4 boxers, and this measurement was conducted in the period from 19/7/2017 to 21/7/2017. The researcher has calculated the significance of the differences between the two distinctive and indistinctive groups to verify the validity ,and testing and retesting to ensure the consistency of physical fitness, strength and speed of straight punches The highest value of calculated T for the performance speed of the right punch in the head is (10.95) and the lowest value for the performance speed of the left punch in the head is (5.29) to confirm the validity of the devices and tests. The highest value of the correlation coefficient of the performance strength of the right punch in the head is (0.99) and the lowest value of the performance speed of the left punch in the head is (0.96) to ensure the stability of the devices and tests. After conducting the scientific transactions, the researcher has conducted a homogeneity between the search variables and Table (3 illustrates this.

Table (3)Arithmetic average, standard deviation, and torsion coefficient for the research sample in the research basic variables (physical efficiency - physical skill variables) n = 12

Measurement		physical efficiency	Measurement unit	Arithmetic average	standard deviation	torsion coefficient
physical and skill variables	Straight Punch Performance Force	Right in the head	Degree	39.33	1.87	0.33
		left in the head	Kg	34.75	1.51	0.09
	Straight Punch Performance speed	Right in the head	Kg	63.73	2.23	0.86
		left in the head	m/s	4.99	0.28	0.94
			m/s	4.44	0.14	0.20

Table (3) shows that the values of the torsion coefficients in the variables under study have been limited to (±3).

This indicates that the distributions are approaching the moderation in each of the variables (under study) indicating the homogeneity of the sample. The researcher has studied the types of load and training trends to use in the regulation of the training of the functional force and table (6).

Table (4) Types of load and training trends used in research

Load types / measurements	Average	High	Maximum
Pulse rate	120-150 p/m	150-180 p/m	180-200 p/m
load direction	Pneumatic	Mixed (pneumatic_ non-	Non-pneumatic

Table (4) shows the pulse rate and degrees of load and its trends, which are used in the training modules.

Exploratory study:

The researcher has adopted the results of the exploratory study conducted in the period from 19/7/2017 to 2/8/2017 on a sample of (8) boxers represented the basic research sample and from outside the basic sample outside in the methods of implementation of the proposed training program to improve the physical efficiency and the force and speed of the straight punch performance.

-Steps of Research :

The researcher has carried out the trainings of the functional force (on the basic sample of research) as follows:

A) Conducting the pre-measurements:

The researcher has conducted the pre-measurements of the variables under study on Thursday, 3/8/2017, which included measuring of physical efficiency, force and speed of straight punches for boxing beginners.

B. Application of the proposed training program:

The researcher applied the proposed training program from 5/8/2017 to 27/9/2017 (for eight weeks, three training units per week).

***General framework of the proposed training program:**

-Steps to prepare the proposed training program:

The researcher put the training trainings of functional force for boxing players in the stage of 12: 13 years, through:

-Reference survey of Arab and foreign references, which deals with the basics of trainings of the functional force.

-Access to research and studies on the trainings of the functional force.

-Aims of the proposed training program:

The proposed training program using functional force trainings aims at:

Increase the physical efficiency, the force and speed of straight punch performance among boxing beginners.

The duration of the proposed training program is set at (8) weeks starting from Saturday 5/8/2017 and ending on Wednesday 27/9/2017. Through an expert opinion poll.

-The content of the proposed training program:

The researcher has designed the proposed training program in accordance with the scientific basis, the reference survey and opinions of the experts.

-Conducting the post measurements:

-All measurements should be taken as what conducted in the pre measurement. -

The researcher conducted the post measurements of the variables under study, on Thursday, 28/9/2017, which included measuring:

Physical efficiency, and force and speed of straight punches for boxing beginners.

***Presentation and discussion of the results.**

(First): View the results:

-View the results of the first hypothesis

* "Physical efficiency" under study

Table (6) Significance of differences between degrees and improvement percentage in pre and post measurements in physical efficiency for the sample of research N = (12)

measurements	Measurement unit	Pre-measurement		Post measurement		Differences between averages	Calculated T value	improvement percentage
		S	A±	S	A±			
physical efficiency	degree	39.33	1.87	45.14	1.30	5.81	17.59	14.77

The tabular T value at (0.05) = 1.80

Table (7) and Figure (1) show that there are statistically significant differences between the degrees averages pre and post measurements in the physical efficiency for the research sample in favor of post measurement, where the calculated value of T (17.59%) and improvement percentage (14.77%) which indicating that the calculated value of T is greater than the tabular value of T at (0.05) and the improvement percentage in favor of the post measurement for the research sample.

-Presentation of the results of the second hypothesis :

*The force of straight punch performance:

Table (7) The significance of the differences between the degrees averages and the improvement percentage in pre and post measurements in the force of the straight punch performance for the research sample n = 12

measurements		Measurement unit	Pre-measurement		Post measurement		Differences between averages	Calculated T value	improvement percentage
			S	A±	S	A±			
force of the straight punch performance	Right in head	Kg	75.34	1.51	84.37	1.48	9,03	31.22	11.99
	Left in head	kg	73.63	2.23	82.16	2.29	8,53	11.89	11,58

The tabular T value at (0.05) = 1.80

Table (7) and Figure (2) show that there are statistically significant differences between the degrees averages of the pre and post measurements in the performance of the straight punch for the research sample in favor of post measurement, where the calculated value of T is (31.22) and the improvement percentage (11.99%) in the force of the right straight punch performance and

the calculated value of T is (11.89) and the improvement percentage (11.58%) in the force of the left straight punch performance, indicating that the calculated value of(T) is greater than the tabular value of T at (0.05) level and improvement percentage in favor of the post measurement for the research sample.

View the results of the third hypothesis:

*Straight punch performance speed

Table (8) The significance of the differences between the degrees averages and the improvement percentage in pre and post measurements in the speed of the straight punch performance for the research sample N = (12)

measurements		Measurement unit	Pre-measurement		Post measurement		Differences between averages	Calculated T value	improvement percentage
			S	A±	S	A±			
force of the straight punch performance	Right in head	m/s	4.99	0.28	6.55	0.53	1.56	13.98	31.26
	Left in head	m/s	4.44	0.14	5.93	0.26	1.49	16.57	33.56

The tabular value of T at (0.05) level = 1.80

Table (8) shows that there are statistically significant differences between the degrees averages of the pre and post measurements in the speed of the straight punch performance for the research sample in favor of post measurement, where the calculated value of T is (13.98) and the improvement percentage (31.26%) in the speed of the right straight punch performance, the calculated value of (t) (16.57%) and the improvement percentage (33.56%) in the speed of the left straight punch performance, indicating that the calculated value of T is greater than the tabular value of T at (0.05) level and the improvement percentage in favor of post measurement for the research sample.

Second: Discussion of results:

1-Discussing the first hypothesis results

Table (7) shows that there are statistically significant differences between the degrees averages of pre and post measurements at level 0.05 for physical efficiency in favor of post measurement, where the calculated value of T is.(17.59%) and improvement percentage is (14.77%) which indicating that the calculated value of T is greater than the tabular value of T at (0.05) level and the improvement percentage in favor of the post measurement for boxing beginners (sample research).

The researcher attributed the reason for these differences that the use of functional force trainings have a positive impact in the development of skill performance in the force and speed of straight punches for boxing beginners.

This was agreed with Ibrahim Faraj`s study (2015) (2), Amr Al-Badri`s study (2015), 13 Ayman Mesalm`s study (2014), and Mu'taz Najib`s (2014) (15) that functional force trainings have a positive effective impact in developing and raising the physical efficiency of the players.

This is indicated by the results of Walid Saleh`s study (2014), (16), Inger soll`s study (2008) (22), and Osama Abdel Rahman`s study (2016) (7) that the functional force trainings generally raising the physical efficiency of the players, especially the development of force, speed and balance, which has an effective impact in improving the skill performance of players. Ron Jones (2003) contends that functional force trainings are one of the most recently used forms of training and have an effective impact on sports (26:37).

The researcher explained that the trainings of functional force are one of the most important modern exercises that lead to the increase the physical efficiency, which ensures the element of force, speed and balance during the performance of the test for the boxing beginners. Scott Gaines (2003) and Fabio Comana (2004) agree that balance is basic element in functional force training, not just the balance between force and flexibility or working and non-working muscles and this is an important interactive feature in the functional trainings, but it is also one of the methods used in sports training. The functional force is represented in the player's ability to stand one foot and at the same time be able to move the other body members (27:36), (21: 75)

This is confirmed by the results of Ibrahim Faraj`s study (2015), (2), Amr Al-Badri`s study (2015),(13), Ayman Mesalem (2014)(8), Walid Saleh`s study (2014)(16) and Osama Abdul Rahman`s (2016) (7) that the trainings of functional force lead to improve balance, force and speed during the skill performance in games, which leads to a positive result for players.

2-Discussing the results of the second hypothesis:

Table (8) shows that there are statistically significant differences between the degrees averages of the pre and post measurements in the force of performance of the straight punch for the research sample in favor of post measurement The calculated value of (31.22) and the improvement rate (11.99%). The force of the right straight right punch performance and the calculated value of T is (11.89) and the improvement percentage (11.58%) in the force of the left straight punch performance, indicating that the calculated value (T) is greater than the tabular value of T at (0.05) level in favor of the post measurement for the research sample.

The researcher attributes this to that the sample members exercise the experimental program using the proposed trainings of the functional force, which included exercises of a special quality of the functional force using free exercises, and exercises elastic resistors such as elastic ropes, and Swiss balls.

This is confirmed by Baha Salama (1994) (11) that the production of muscular force is related to the compatibility degree of the muscular group response for the signal issued by the central nervous system, whenever the compatibility between the muscles and nerves feeding them is high, the result of the force is high and by improving the muscular neurosis compatibility, a degree of mastery of motor skills become high.

The modern punching depends on the accuracy and force of the punches and the speed of response with the change and variation in the selection of punches,

which achieve the purpose for which it was established with punches according to the different play situations and confirms this, "Ibrahim Shoaib"`s study (2005) (1). (17: 63)

The researcher believes that the central ability, which is among the elements of functional programs, includes movements characterized by the production of power and transferring to an immediate speed and this is an important interactive feature in the trainings of the functional force.

This is consistent with Ibrahim Faraj`s study (2015), (2), Amr Al-Badri`s study (2015), (13), Ayman Mesalem`s study (2014)(8), Mu'taz Najib`s study (2014) (15), Walid Saleh`s study, study of Inger soll and others. (2008)( 22), Osama Abdel Rahman`s study (2016)(7), Cymara`s study (2004)(20) and study of Marjeky and others (2004) (23)

Table (9) shows that there are statistically significant differences between the degrees averages of the pre and post measurement in the speed of straight punch performance of the research sample in favor of the post measurement", where the calculated value of T is (13.98) and the improvement rate (31.26%) in the speed of the right straight punch performance, and the calculated value of T is (16.57) and the improvement rate (33.56%) indicating that the calculated value of T is greater than the tabular T value at (0.05) level. The improvement rate is in favor of the post-measurement in the research sample.

The researcher attributed the reason of these differences to the use of functional force training, which had a positive effect in developing the speed of the straight punches of boxers. This was agreed with Ayman Mesalem`s study (2014), (8), Walid Saleh`study (2014), and Osama Abdul Rahman`s study (2016) (7) that the training of the functional force had an effective effect on the development of elements of balance ,force and speed.

Ron Jones (2003) (26) confirms that functional force trainings are one of the most recently used training forms and also have an effective impact in the field of sport. This is confirmed by the results of Ibrahim Faraj`s study (2015) (2), Amr Al-Badri`s study (2015), Inger soll`s study (2008) (22) that the training of functional trainings lead to the development of speed during skillful performance which lead to higher levels during sports competition.

In this regard, Michael Boyle (2004) 25 adds that functional force training is characterized by producing force and converting it to immediate speed, which is an important interactive feature in functional trainings

Conclusions and Recommendations:

First: Conclusions

Within the limits of the aims, hypotheses and procedures of the research and presentation and discussion of results the researcher concludes the following‹

-The proposed functional force trainings have a positive effect on the improvement of physical efficiency, which led to improve the elements of balance, flexibility and skillful performance for boxing beginners.

-The proposed functional force trainings have a positive and effective effect on

improving and increasing the force of the straight punch, which led to improve the skill performance of the boxing beginners.

-The proposed functional force trainings have a positive and effective effect on improving and increasing the speed of the straight punch which led to improve the skill performance of the boxing beginners.

-There is a positive extreme correlation relationship between physical efficiency and the force and speed of straight punch for boxing beginners.

Second: Recommendations:

-The need to use the proposed functional force trainings due to their positive impact on improving and raising physical efficiency, which led to improve the elements of balance, flexibility and the skillful performance for boxing beginners.

-The need to use of functional force trainings for boxing beginners because of their positive and effective effect on improving and increasing the force and speed of straight punch during matches.

-Pay attention to establish training programs using functional force trainings according to the scientific foundations of different age groups of boxing players.

-Provide the necessary tools and equipment for the trainings of the functional force sufficiently in accordance with the modernity and security and safety requirements.

-Pay attention to conduct other similar researches for use in the field of boxing training in different age stages.

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