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Original article

EFFECT OF FUNCTIONAL STRENGTH TRAINING ON CERTAIN PHYSICAL VARIABLES AND PERFORMANCE LEVEL OF HAMMER THROW

NAGLAA ELBADRY[1]

Abstract

Objective. Functional strength training has become a popular buzzword in the fitness industry. Unfortunately, it is also subject to wide interpretation.At the extreme, some individuals believe that by mimicking the explosive, ballistic activities of high-level competitive athletes, they are training in a functional manner. All too often, however, such training programs greatly exceed the physiological capabilities of the average exerciser, which ultimately increases the possibility that an injury might occur.Most would agree that there is nothing functional about sustaining an injury due to improper training.In many respects, functional strength training should be thought of in terms of a movement continuum. The aim of this study was to investigate that Effect of functional strength training on certain physical variables for female college students.

*Methods.*Twenty female students fromSecond Grade at the Faculty of Physical Education for Girls, Helwan University for the academic year 2013/2014 AD, divided into (2) group. The experimental group (n = 10) performance functional strength training and control group (n = 10) performed traditional exercise. Subject's parents and coaches were required to read and complete a health questionnaire and informed consent document; there was no history of injuries, diabetes or recent surgery.

Results. The experimental group had significantly higher than the control group in core stability test, balance. In addition, No significant difference was found between the experimental group and the control group in power and strength.

Conclusion. Under the condition of our study, functional strength intervention for eight weeks has a beneficial effect on core stability test, balance of hammer throwplayers.

Key word: Functional Training, Hammer throw, Strength. Balance.

Introduction

Became athletic achievements and records achieved and shatter before going to the competitions on the athletic fields, according to the findings of the studies and scientific research, and thus became the competitions are in scientific laboratories.

Sports movement has seen in recent decades has made a big leap limit of human capabilities beyond all barriers and elevate to achieve the figures in the past of pure imagination.

Athletics is an exclusive collection of sporting events that involve competitive running, jumping, throwing, and walking. The most common types of athletics competitions are track and field, road running, cross country running, and race walking. The simplicity of the competitions, and the lack of a need for expensive equipment, makes athletics one of the most commonly competed sports in the world. Athletics is mostly an individual sport, with the exception of relay races and competitions, which combine athletes' performances for a team, score, such as cross-country.(Halliwell, & Gutteridge, 1999)

The hammer throw is one of the four throwing events in regular track and field competitions, along with the discus throw, shot put and javelin.

The effectiveness of the chucking part of the activities of the field, where it is divided to several sports such as (discus, javelin, shot put, hammer topple) and the need for the various components of fitness and different proportions among them according to the type of competition.

In addition, refers Jones, 2003, to be functional strength training is one of the forms of training recently used in the field of sports.

Cunningham, 2000, added that in the past ten years has become a functional strength training commonly used in the field of sports, and it uses under several names, such as functional training and integrated functional training.

The idea behind functional strength training is that the body is integrated, with hundreds of muscles working together to perform a variety of functions. Functional programs are designed to mimic everyday activities. These activities range from moving furniture to swinging a golf club.(Ron,2003)

Schmidt &Wulf, 1997, refers that all forms of kinetic origin of the spine. He adds that the term (functional) seems unclear slightly, functional are movements lead such movements that body is designed to perform in life, and so on trained athletes who use power drills functional with their athletes need to recognize the geometry of the human body and how it

[1] Faculty of physical education for girls, Helwan University, EGYPT
Email address:
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works in ordinary life.

Functional training is old news in the sports and rehabilitation world, but it was not until just a few years ago that it really came to my attention because I started seeing it catch on in a big way inside our health clubs. All of a sudden, the trainers had medicine balls, core balls, core boards, rubber tubing, stability balls, rollers and foam pads all over the place, whereas just five years ago, there wasn't a ball to be found in the entire joint (Michael, 2004).

Functional strength training simply means training our bodies to better perform the types of movements we use for everyday living. The time spent developing this specific strength; flexibility and agility have the optimum carry-over into daily activities (Mackelvie, et al., 2002).

Functional Strength is a combination of all elements of fitness to produce peak performance for your specific needs. Whether your goal is to look better, feel better, or perform better - Functional Strength Training will help you achieve your fitness goals. Functional Strength begins with a thorough evaluation of your current fitness level to uncover your strengths and weaknesses. Based on the results of your evaluation, a program will be designed to complement your strengths and improve your weak points (Michael, 2004).

Comana, 2004, as a movements integrated and multi-level (frontal, transverse and sagittal) include acceleration and installation and deceleration, in order to improve motor ability, the central force (means the spine and the mid-body) and the efficiency of nerve and muscle

Refers .Hofe, 1995, to that strength training functional fit all individuals with different levels of training and aims to improve the relationship between the muscles and the nervous system by converting the increase in the strength gained from one movement to other movements, therefore motor control exercises is a necessary and important.

Sees Comana, 2004, that the functional strength exercises are a combination of strength training and balance exercises lead in the timing of one .

The aim of this study was to investigate that Effect of functional strength training on certain physical variables for female college students.

Material and Methods

Experimental Approach to the Problem

Two groups (experimental and control) performed a pre and post - training designed intervention in which Vertical Jump Test (VJ), Seated Medicine Ball Throw (SMBT) , leg strength (LS) back strength (BS) by the dynamometer , Dynamic strength test (DST) and Performance levels of hammer throwwere recorded. The experimental group (EG) (10 female students) trained 1 hour per day 3 times a week on functional training for eight weeks. The control group (10 female students) continued their normal training, while the experimental group completed a functional training program to see whether this type of training modality would have a positive or negative or no effect on physical variables.

Samples

Twenty female students fromSecond Grade at the Faculty of Physical Education for Girls, Helwan University for the academic year 2013/2014 AD, divided into (2) group. The experimental group (n = 10) performance functional strength training and control group (n = 10) performed traditional exercise.

Subject's parents and coaches were required to read and complete a health questionnaire and informed consent document; there was no history of injuries, diabetes or recent surgery.

Conditions of sample selection :

- Do not chronological age for at least 17 years and not more than 19 years .
- Have a desire to participate in the search and regularity until the end of the experiment .
- Do not have a previous history of patients or their injuries predecessor .
- Student's developments and non-survivors of the restart .
- Is enrolled in a school that people are taught by the researcher.

Testing Procedures

Subjects were assessed before and after eight weeks of functional strength training program all measurements were taken one week before and after training at the same time of day. Tests followed a general warm-up that consisted of running, calisthenics, and stretching.

The Core Muscle Strength & Stability Test

The objective of this evaluation is to monitor the development and improvements of an athlete's core strength and endurance over time. To prepare for the assessment will need:

- Flat surface
- Mat
- Watch or clock with second counter

Conducting the Test

- Position the watch or clock where you can easily see it
- Start in the Plank Exercise Position (elbows on the ground)Hold for 60 seconds
- Lift your right arm off the ground Hold for 15 seconds
- Return your right arm to the ground and lift the left arm off the groundHold for 15 seconds
- Return your left arm to the ground and lift the right leg off the groundHold for 15 seconds
- Return your right leg to the ground and lift the left leg off the groundHold for 15 seconds
- Lift your left leg and right arm off the ground Hold for 15 seconds
- Return you left leg and right arm to the ground
- Lift your right leg and left arm off the ground Hold for 15 seconds

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- Return to the Plank Exercise Position (elbows on the ground)Hold this position for 30 seconds

Good Core Strength

- If you can complete the test fully, you have good core strength.

Poor Core Strength.

- If you cannot complete the test fully, your core strength needs improvement.
- Poor core strength results in unnecessary torso movement and swaying during all other athletic movements. This results in wasted energy and poor biomechanics. Good core strength indicates that the athlete can move with high efficiency.
- If you are unable to complete the test practice, the routine three or four times each week until you improve.
- By comparing your results over time, you will note improvements or declines in core strength.

Static strength test (LS) (BS)

A Takei leg and back dynamometer was used to measure the static leg strength. The subjects stood on the dynamometer platform and crouched to the desired leg bend position, while strapped around the waist to the dynamometer. At a prescribed time they exerted a maximum force straight upward by extending their legs. They kept their backs straight, head erect and chest high. 3 trials were allowed to the subjects and the best score was taken. Subjects had a rest between the trials (Jensen &Fisher).

Hand Grip Strength Test

The purpose of this test is to measure the maximum isometric strength of the hand and forearm muscles.

The subject holds the dynamometer in the hand to be tested, with the arm at right angles and the elbow by the side of the body. The handle of the dynamometer is adjusted if required - the base should rest on first metacarpal (the heel of the palm), while the handle should rest on middle of four fingers. When ready the subject squeezes the dynamometer with maximum isometric effort, which is maintained for about 5 seconds. No other body movement is allowed. The subject should be strongly encouraged to give a maximum effort.

Dynamic balance

Dynamic balance is very important in sports which need too many joint awareness, and overall proprioception. Balance test investigated by 5 m-timed-up-and-go-test (5m-TUG). Subjects performed 5-TUG with time taken to rise from a chair, walk a set distance 5 m, turn around, walk back and sit down. Each subject was given 2 practice trials performed to familiarize. All subjects completed three trials with 1 min recovery between trials. The less time for each trial was recorded.**Statistical analysis.**All statistical analyses were calculated by the SPSS statistical package. The results are reported as means and standard deviations (SD). Differences between two groups were reported as mean difference ±95% confidence intervals (meandiff± 95% CI). Student's t-test for independent samples was used to determine the differences in fitness parameters between the two groups. The $p<0.05$ was considered as statistically significant.

Results

Table 1. Anthropometric Characteristics Training experience of the Groups (Mean ± SD)

Group	N	Age [years]	Weight [kg]	Height [cm]
Experimental	10	18.33 ± 0.5	69 ± 2.9	167 ± 2.95
Control	10	18.29 ± 0.8	68 ± 3.1	168 ± 3.11

Table 1 shows the age and anthropometric characteristics of the subjects. There were no significant differences were observed in the anthropometric characteristics and Training experience for the subjects in the different groups.

Table 2. Mean ± SD and "T" Test between the two Groups (experimental and control) in Dynamic balance, Hand Grip Strength, Static strength test (LS) (BS)andPerformance level of running a shoot

Variables		Experimental group		Control group		Sign.
		Before	After	Before	After	
Dynamic balance	Deviation to the right(A)	9.27 ±1.75	7.43 ±1.86	8.63 ±1.92	8.24 ±1.93	S
	Deviation to the left (A)	12.32 ±1.82	8.11±1.92	10.57 ±1.73	9.52 ±1.82	S
	Deviation to the right(B)	13.35±2.35	9.68±2.15	13.62 ±2.33	11.69 ±2.43	S
	Deviation to the left (B)	14.35 ±2.58	10.91 ±2.77	15.75 ±2.95	14.41 ±2.81	S
Core strength		5.00 ±1.00	7.00±1.00	5.00 ±1.00	6.00±1.00	S
Handgrip Strength		20.53±2.37	22.40±2.44	20.46±2.42	21.39±2.51	NS
Static strength test (LS)		78.17±7.75	86.00±8.91	78.29±6.62	80.20±7.81	NS
Static strength test (BS)		58.12±4.87	65.72±5.73	58.38±5.31	59.65±4.83	S
Performance level		9.12±0.27	10.24±0.24	9.14±0.17	9.25±0.23	S

Table 2 shows that:

1.Significant Difference between the experimental group and control group in Dynamic balance. Static strength test (BS) core strength and Performance level of hammer throw for posttest to the experimental group.

2.No Significant Difference between two groups in Handgrip Strength and Static strength test (LS)

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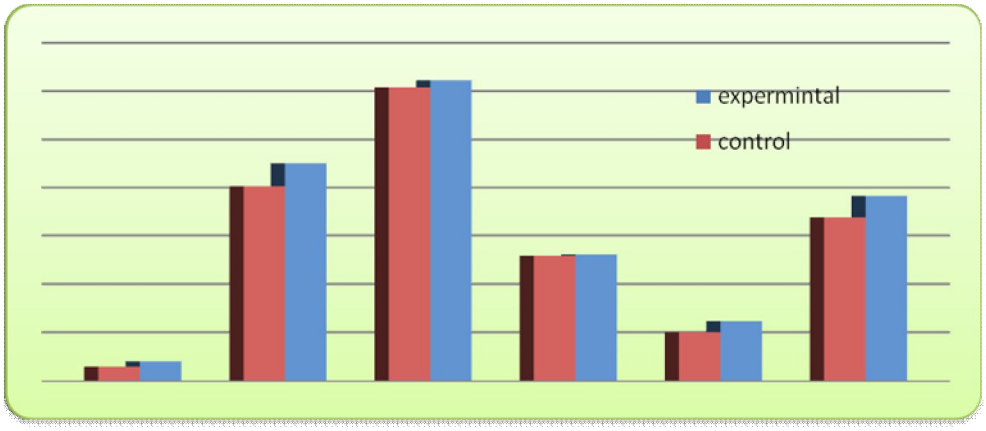

Fig 1 shows the differences between the two groups (experimental and control) in Dynamic balance, Hand Grip Strength, Static strength test (LS) (BS) core strengthandPerformance level of hammer throw.

Discussion

This study assessed the effects of aneight weeks functional training program, on the powerful, complex movement performances, Experimental results indicated that all variables were significantly increased in the experimental group only after the functional training program.

The researchers believed that, the training program which designed and implicated on the experimental group were affected and improvement this variable. In addition, the functional training work on the accuracy of neural signals flying to muscle fibre, which would generate daytime systolic intramuscularly works to raise the other sensory organs, thereby increasing the number of motor units in the working muscles on these joints, which is one of the necessities of consistency of performance at full speed and less effort.

Both research and anecdotal evidence suggest that functional strength training leads to better muscular balance and joint stability, which in turn results in fewer injuries and increased performance

Current research shows that using natural, continuous, and integrated movements incorporating the use of gravity along with your own body weight or free weights is the best approach to building strength. This type of strength training is called "functional strength training".

The importance of functional strength training explains Scott Gaines, 2003 that all training programs should include exercises functional strength, and proves it by saying that if we noticed the players during their competitions. We find that the centre of gravity of the body is a constant and ever changing, especially in the activities that require movement's front and rear

And the difference between the quality of training and functional training refers Cunningham, 2000, to be functional training exercises performed on the movements of the exercises quality is typically on the muscles, especially the nature of the performance, in addition, they are considered a key part of the basics of job training.

The researcher believes that the contest topple the hammer is one of the hardest and most enjoyable field competitions, and due to the multiplicity of stages of technical performance, and the muscles play a major role in the centre achieve athletic achievement.

Based on the foregoing, the researcher conducting the study titled "The Impact of functional strength training on some of the variables of physical and digital level to overthrow the hammer with students in the Faculty of Physical Education.

This is confirmed Vom Hofe, 1995, that muscle strength and balance of the key elements of the exercises functional, Integration between muscle strength and speed motor resulting in the ability of muscle or strength characteristic speed, the integration between muscle strength and balance is produced by the strength and functional.

Schmitz, 2003, refers to that functional training has the characteristics and attributes of the most important:

- Increase bone density, thereby reducing the risk of injury due to osteoporosis.
- Improve coordination through the development of proprioceptive feedback mechanisms .
- Develop systems of muscles rather than individual muscles, thereby reducing the risk of tears in ligaments and tendons.
- Increase the strength and power to perform throughout a range of motion for a specific sport or activity.
- Increase resting metabolic rate by increasing lean body mass so more calories will be burned during inactivity.
- Improve use of oxygen throughout the body.
- Improve appearance through overall muscle tone.

Conclusion

Under the condition of our study, functional strength intervention for eight weeks has a beneficial effect on core stability test, balance of hammer throwplayers.

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