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

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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 from Second 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 throwers.

Key word: Functional Training, Hammer throw, Strength, Balance.
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 from Second 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 ground Hold for 15 seconds
- Return your left arm to the ground and lift the right leg off the ground Hold for 15 seconds
- Return your right leg to the ground and lift the left leg off the ground Hold 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
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)**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Age [years]</th>
<th>Weight [kg]</th>
<th>Height [cm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>10</td>
<td>18.33 ± 0.5</td>
<td>69 ± 2.9</td>
<td>167 ± 2.95</td>
</tr>
<tr>
<td>Control</td>
<td>10</td>
<td>18.29 ± 0.8</td>
<td>68 ± 3.1</td>
<td>168 ± 3.11</td>
</tr>
</tbody>
</table>

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) and Performance level of running a shoot**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Experimental group</th>
<th>Control group</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td>Before</td>
</tr>
<tr>
<td>Dynamic balance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deviation to the right(A)</td>
<td>9.27 ±1.75</td>
<td>7.43 ±1.86</td>
<td>8.63 ±1.92</td>
</tr>
<tr>
<td>Deviation to the right(B)</td>
<td>12.32 ±1.82</td>
<td>8.11 ±1.92</td>
<td>10.57 ±1.73</td>
</tr>
<tr>
<td>Deviation to the left(A)</td>
<td>13.35±2.35</td>
<td>9.68±2.15</td>
<td>13.62±2.33</td>
</tr>
<tr>
<td>Deviation to the left(B)</td>
<td>14.35±2.58</td>
<td>10.91±2.77</td>
<td>15.75±2.95</td>
</tr>
<tr>
<td>Core strength</td>
<td>5.00 ±1.00</td>
<td>7.00±1.00</td>
<td>5.00 ±1.00</td>
</tr>
<tr>
<td>Handgrip Strength</td>
<td>20.53±2.37</td>
<td>22.40±2.44</td>
<td>20.46±2.42</td>
</tr>
<tr>
<td>Static strength test (LS)</td>
<td>78.17±7.75</td>
<td>86.00±8.91</td>
<td>78.29±6.62</td>
</tr>
<tr>
<td>Static strength test (BS)</td>
<td>58.12±4.87</td>
<td>65.72±5.73</td>
<td>58.38±5.31</td>
</tr>
<tr>
<td>Performance level</td>
<td>9.12±0.27</td>
<td>10.24±0.24</td>
<td>9.14±0.17</td>
</tr>
</tbody>
</table>

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

**Discussion**

This study assessed the effects of an eight 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 throw players.

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