World Journal of Sport Sciences 3 (S): 683-686, 2010
ISSN 2078-4724


# Effect of Functional Strength Training on Certain Physical Variables and Kick of Twimeo Chagi among Young Taekwondo Players

*Gehan Elsawy*

Aquatic and Combat Sports Dept., Faculty of Physical Education for Girls, Zagazig University, Egypt

**Abstract:** The present study examined the Effect of functional strength training on strength, balance and performance level of Twimeo Chagi among Taekwondo Young Players. Twenty four young taekwondo players (mean +/- SD age, 13 +/- 1.9 years), divided into (2) group (experimental group -12 players) and (control group -12 players), the experimental group performed the functional strength training for (8) weeks. The tests was measured before and after the training program, the results indicated that, The increased significantly for balance and performance level of Twimeo Chagi after the training program and no increased significantly for Power, These data show that functional strength training can cause an increase, balance and performance level of Twimeo Chagi among Taekwondo Young Players.

**Key words:** Functional strength training · Twimeo Chagi · Balance · Power

## INTRODUCTION

Success in many sports depends heavily upon the athlete's explosive leg power and muscular strength. In jumping, throwing, track and field events and other activities, the athlete must be able to use strength as quickly and forcefully as possible. This display comes in the form of speed-strength or power [1].

Taekwondo was originally developed in Korea as a martial art and was based on a defensive strategy. It is now a highly regarded contemporary sport practised by people all over the world. For the purposes of competition, Taekwondo can be described as a combat sport consisting of sharp, strong angular moves and free-flowing circular movements in which an athlete uses bare hands and feet to repel an opponent. Since the successful use of kicking, both offensively and defensively, will score the athlete points, it is the most important objective in a Taekwondo competition [2].

As mentioned above, a successful performance in such a physically demanding sport needs a well-conditioned and well-trained program, aiming at improving aerobic and anaerobic capacity, speed, muscle strength, recovery and neuromuscular coordination during the training course. For example, the elite martial arts athletes need good strength, flexibility, balanced training, effective exercises, knee stability and conditioning to prevent the occurrence of injures and to improve further performance [3]. Muscular strength is the basic ability for athletes to control the more skills. Furthermore, how to improve the muscular strength is the problem which athletes and coaches often concerned about.

Optimum performance can be gained when muscles are used to complement each other to create unified movements. The strength coach often uses special exercises to get these muscles to work together automatically. It is not always strength, but rather coordination that will yield effective and efficient movement, as the punch or kick of a martial arts athlete.

The use of strength training in younger athletes is still controversial. The controversy focuses on three areas: Are children capable of making significant strength gains and increases in muscle mass in response to resistive strength training? Do these gains in strength improve athletic performance or increase the resistance of the child's tissue to injury? Do children have an unacceptable risk of injury from resistive strength? Training that negates any potential benefits from the technique? [4].

Functional training is more “real world” in terms of your training actually mimicking a broader spectrum of your daily movements. Functional Training is useful whether you are an athlete or recreational exerciser wanting to improve general health. Functional Training

**Corresponding Author:** Gehan Elsawy, Department of Aquatic and Combat Sports,
Faculty of Physical Education for Girls, Zagazig University, Egypt.

gives you better balance and muscular control during everyday movements. [5]. For example, teaching yourself to balance in a neutral or static position with both feet on the ground is a great beginning; however, in the real world you need the ability to balance and maintain control during movement. The human body must be able to achieve and maintain balance in a variety of different positions, planes/angles and conditions to be totally functional. "Functional balance" is dynamic just like real life. To achieve dynamic balance, you must train dynamically this means you got to move. [6].

Functional strength training is the practice of motion against resistance, with an objective of improving a participant's ability to perform a specific athletic activity [7].

However, in top clubs and fitness facilities throughout the country, functional strength training has taken a different course – today, functional strength training is a range of total-body activities that build strength, balance and coordination for general fitness and improve your ability to perform general, day-to-day activities [1].

Although functional strength training commonly is perceived as a form of core training, core training could be considered a subset of functional strength training. However, to the author's knowledge, a systematic analysis of the Functional strength training and Twimeo Chagi involved in Taekwondo is still lacking. Hence, the aim of this study was to determine the Effect of functional strength training on strength, balance and performance level of Twimeo Chagi among Taekwondo Young Players.

## MATERIALS AND METHODS

**Experimental Approach to the Problem:** Two groups (experimental and control),performed a pre and post training designed intervention in which static balance Test (SP),Co-Ordination Test (CO), leg muscles strength (LMS),back muscles strength (BMS) and Performance levels of Twimeo Chagi kick (PLTCK) were recorded. The experimental group (EG) (10 athletes) trained 2 hours per day 3 times a week on functional strength training besides the taekwondo training for ten weeks. The control group continued their normal training, while the experimental group completed the functional strength training program to see whether this type of training modality would have a positive or negative or no effect on (SP),(CO), (LMS), (BMS) and (PLTCK).

**Sample:** The sample consisted of 20 female taekwondo athletes(14.07±1.36 years old; 151±4.35 cm height; and 39.71±5 kg weight),, members of the elshorta club team. Training experience of all the participants ranged from 2 to 5 years. Subjects were required to read and complete a health questionnaire and informed consent document; there was no history of coronary heart disease, diabetes or recent surgery.

**Training Protocol:** 10-weeks in-season training program consisted of integrated, multi-planar (i.e. multiple directions) movement that involves acceleration, deceleration and stabilization. Typically, most programs involve uniplanar force production (i.e. force produced in a single direction). Very little time is dedicated to training that integrates motions in a variety of planes.trains the nervous system to function optimally thereby creating efficient and correct activation of the entire musculoskeletal system whilst in action.

**Testing Procedures:** Subjects were assessed before and after an 8-week training program Tests followed a general warm-up that consisted of running, calisthenics and stretching.

**Alternate Hand Wall Toss Test:** A mark is placed a certain distance from the wall (e.g. 2 meters, 3 feet). The person stands behind the line and facing the wall. The ball is thrown from one hand in an underarm action against the wall and attempted to be caught with the opposite hand. The ball is then thrown back against the wall and caught with the initial hand. The test continues for 30 seconds.

**Isometric Leg Strength Test:** This test measures back and leg strength by strength dynamometer, Procedure: Make sure the dial is reset to zero before you start. Stand upright on the base of the dynamometer with your feet shoulder width apart. Let your arms hang straight down to hold the center of the bar with both hands and with the palms facing toward the body. Adjust the chain so that the knees are bent at approximately 110 degrees. In this position your back should be bent slightly forward at the hips, your head should be held upright and you should look straight ahead. Then without bending your back, pull as hard as possible on the chain and try to straighten your legs, keeping your arms straight. Pull against the weight steadily (no jerky movements), keeping the feet flat

on the base of the dynamometer. Maximum performance will result when your legs are almost straight at the end of the lift. If not, adjust the chain length and starting position.

**Standing Stork Test:** Stand comfortable on both feet, Hands on your hip, Lift one leg and place the toes of that foot against the knee of the other leg.

**Performance levels of Twimeo Chagi kick (PLTCK):** Evaluation the Performance levels of Twimeo Chagi kick (PLTCK) by a committee contains 3 judges, the judge was assessed from 1 to 10 degree, consider that body form and style when the younger performed the skill of Twimeo Chagi kick (PLTCK).

**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 AND DISCUSSION

The primary purpose of this study was to determine if functional strength training, in addition to taekwondo workouts, the researcher hypothesized that there would be a significant difference between those who participated in a functional exercise group as opposed to those who were in the control group. Significant findings were found between pretest and posttest results for the (SP),(CO), (BMS) and (PLTCK). No significance was found for the (LMS). This proved the 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". There are a number of potential explanations for these findings:

In the fact that functional training stimulates the neuromuscular system. That is, it activates both the muscular fibers and the nervous system, so that slow-twitch fibers behave like fast-twitch fibers [3,8].Furthermore, resistance training increases motor neuron excitability and reflex potentiating, which may lead to better training conditions for subsequent plyometric exercises [9]. Higher EMG activity was discovered in

Table 1: Mean scores and percentage changes to (SP),(CO), (LMS), (BMS) and (PLTCK) for the experimental groups.

| | | Pre-training | | Post training | | | |
|---|---|---|---|---|---|---|---|
| Variables | Meas. Unit | Mean | SD | Mean | SD | Change average | T value |
| SP | S. | 3.99 | 0.19 | 4.18 | .23 | 4.76 | 9.75* |
| CO | Kg | 4.31 | 1.24 | 6.08 | 1.84 | 41.07 | 4.84* |
| LMS | KG | 55.2 | 3.75 | 59.00 | 3.26 | 6.88 | 2.11 |
| BMS | KG | 48.7 | 2.98 | 55.20 | 3.15 | 13.15 | 3.95 * |
| PLTCK | Degree | 6.11 | 1.17 | 8.19 | 1.22 | 34.04 | 4.63* |

The t-test showed significant changes between pre-and post training scores for all variables ($P \leq 0.05$) except (LMS)

Table 2: Mean scores and percentage changes to (SP),(CO), (LMS), (BMS) and (PLTCK) for the control group

| | | Pre-training | | Post training | | | |
|---|---|---|---|---|---|---|---|
| Variables | Meas. Unit | Mean | SD | Mean | SD | Change average | T value |
| SP | S. | 2.99 | 0.15 | 3.02 | .12 | 1.00 | 0.84 |
| CO | Kg | 4.31 | 1.67 | 4.88 | 1.84 | 24.49 | 1.77 |
| LMS | KG | 55.2 | 2.77 | 57.00 | 3.26 | 6.56 | 0.99 |
| BMS | KG | 48.7 | 2.53 | 49.76 | 3.15 | 4.71 | 1.54 |
| PLTCK | Degree | 6.11 | 1.62 | 6.81 | 1.22 | 9.49 | 1.67 |

The t-test showed no significant changes between pre-and post training scores for all variables ($P \leq 0.05$).

Table 3: Mean scores and percentage changes to (SP),(CO), (LMS), (BMS) and (PLTCK) for the Experimental and control groups

| | | Experimental group | | Control group | | |
|---|---|---|---|---|---|---|
| Variables | Meas. Unit | Mean | SD | Mean | SD | T value |
| SP | S. | 4.18 | .23 | 3.02 | .12 | 12.89 |
| CO | Kg | 6.08 | 1.84 | 4.88 | 1.84 | 2.67 |
| LMS | KG | 59.00 | 3.26 | 57.00 | 3.26 | 2.01 |
| BMS | KG | 55.20 | 3.15 | 49.76 | 3.15 | 3.75 |
| PLTCK | Degree | 8.19 | 1.22 | 6.81 | 1.22 | 3.17 |

The t-test showed significant changes between post training scores for all variables ($P \leq 0.05$) except (LMS).

the hamstring muscles during functional jumping indicates that more fast-twitch fibres were being recruited, which in time could have provided more propulsive power.

This fact may have contributed to the increments observed in the present study.It is postulated that the functional exercise will have a performance enhancing effect on the body activity [4].

Another explanation, the functional training emphasize on the core muscles, into their workout routine. Engaging in quality exercises that are specific to the body's central stabilizing region will produce results that will permeate all other elements of training, conditioning and performance. Previous researches demonstrated these results [10-14].

## CONCLUSION

Upper and lower body explosively levels of young female taekwondo players can be improved with functional training. These power level improvements are usually seen as essential in taekwondo performance. The use of functional Training is an adequate strategy of training process organization, having highly positive effects on practice of power and performance level.

## REFERENCES


1. Comana, F., 2004. Function training for sports. Human Kinetics, Champaign IL, pp: 22.
2. Luk, C., Y. Hong and D.P.K. Chu, 2001. Analysis of strategy used in taekwondo competition. Biomechanics Symposia / University of San Francisco, 19: 353.
3. Cunningham, C., 2000. The Importance of Functional Strength Training. Personal Fitness Professional magazine, American Council on Exercise publication, pp: 1.
4. Micheli, L.J., 1990. Strength training. Human Kinetics, USA, pp: 5.
5. Gaines, S., 2003. Benefits and Limitations of Functional Exercise. Vertex Fitness, NESTA, USA, pp: 13.
6. Jones, R., 2003. Functional Training,1: Introduction. Reebo Santana, Jose Carlos univ., USA, pp: 9.
7. Reynolds, M., 2003. What Makes Functional Training?. National Strength and Conditioning Association, 27: 50-55.
8. Heller, J., T. Peric, R. Dlouha, E. Kohlikova, J. Melichna and H. Novakova, 1998. Physiological profiles of male and female taekwon-do (ITF) black belts. J. Sports Sci.,16: 243-249.
9. Schmitz, D., 2003. Functional Training Pyramids. New Truer High School, Kinetic Wellness Department, USA, pp: 32.
10. Ali, O.A., 2008. Effect of functional strength training on bone mineral density and performance level of fleche and lunge for youth fencers. Preolympic Congress, China, 1: 124.
11. Cress, M.E., K.E. Conley, S,L. Balding, F. Hansen-Smith and J. Konczak, 1996. Functional training: muscle structure, function and performance in older women. J. Orthop Sports Phys Ther., 24: 4-10.
12. Swanik, K.A., C.B. Swanik, S.M. Lephart and K. Huxel, 2002. The effects of functional training on the incidence of shoulder injury in intercollegiate swimmers. J. Sport Rehabil, 11: 142-154.
13. Yasumura, S.T., A. Hamamura, M. Ishikawa, I.H.Y. Ueda, M. Takehara, H. Miyaoka, C. Murai, S. Murakami, M. Moriyama, K. Yamamoto, T. Yoshinaga and T. Takeuchi, 2000. Characteristics of functional training and effects on physical activities of daily living. Nippon Koshu Eisei Zasshi, 47: 792-800.
14. Bott, C. and L. Farmer, 2008. Maximizing core strength and stability training for kayakers. Property of Human Motion Inc, USA, pp: 456.