

THE EFFICIENCY OF FUNCTIONAL TRAINING ON REPETITIVE STRENGTH IN WOMEN

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ABSTRACT

The aim of this study was to determine the efficiency of functional training on repetitive strength of 30 female trainees (age: 28.6 ± 6.71) in the premises of aerobic studio "NIA" from Niš. There were two groups, one of which was performing 3-months experimental program of functional training, while the other group was the control one without any organized physical activity. Repetitive strength was estimated with Eurofit 30 seconds sit up test, straight leg abdominal strength test, squat test, single leg (left) squat test, single leg (right) squat test, chair push up test, push up test. In addition to analyzing the basic statistical parameters (mean and standard deviation) Student's t-test and analysis of covariance were used for calculating intragroup and intergroup relations and the assessment of working effect. Results showed that functional training had a positive effect on repetitive strength of female trainees after three months ($p < 0.01$).

Key words: recreational exercise, effect, strength, female trainees.

INTRODUCTION

Lately, we are faced the term of *functional training* or otherwise, *cross fit*. A very popular method of training, which is experiencing a major expansion. The uninformed would conclude that this is a new type of training in a sea of different forms of exercises which we are witnessing. However, the novelty refers only to the fact that this form of exercise now has a name, otherwise it has been used since ancient times, as it relies on the movements a man is performing in everyday life. People have always exercised in a way of using movements normally accompanying them during daily activities.

Functional training means purpose, therefore, functional training is purposeful training (Boyle, 2004). The characteristic of functional training is the fact that the movement is exercising, not a single muscle. The basis of the training refers not only to build muscle, for example, in aesthetic terms (eg. bodybuilding), but rather to bring someone's body into a situation to deal with everyday needs. In functional training there is no use of exercises that isolate one muscle, but those that engage more muscles and movements performed in several levels, not just one. According to Gambetta, Gray, Radcliffe & Soncrant (2002), movement from one joint which isolates a specific muscle is highly dysfunctional, while on the other hand, multiple joint movements that integrate multiple muscle groups are very functional.

This training builds strength, explosiveness, muscular endurance, speed, flexibility, improves cardiovascular and respiratory systems, increases range of motion, reduces body weight, shapes muscles, regulates the level of stress and so on. Exercise is not monotonous, not linked to the devices and machines, but also gives you the

freedom to exercise and makes it interesting. The exercise is performing with different props (ropes, elastic bands, dumbbells, medicine balls, kettlebell, balls and halfballs, balancers, bars, boxing equipment, steppers, etc.) and exercises practicing with body weight, at home, outdoors, at work, at the gym or specially designated place for this kind of exercise.

Functional training is also used in sport and recreation and its philosophy takes a different approach from the classic fitness training. Classic fitness training improves aerobic and anaerobic capacity, develops muscle strength, in a word, athletes/recreatives are reaching high level of basic physical qualities. However, the question is how it relates to sports achievement, and efficiency in daily work. On the other hand, with functional training, specific training funds improving results in real situation, sporting accomplishments, or everyday life in recreatives are using after establishing sufficient level of basic physical fitness (Foran, 2010, vii).

Therefore, based on the initial presumption that functional training should have an impact on repetitive strength, the idea of this study was to determine the effectiveness of functional training for recreational purposes on repetitive strength in women after three months of exercising.

WORKING METHOD

Research and testing process were conducted on a sample of 30 women (15 in the experimental group and 15 in the control group) at the premises of aerobic studio "NIA" from Niš (age: 28.6±6.71; height: 168.07±4.89; weight: 62.87±5.85; fat percentage: 29.85±5.16; BMI: 22.13±2.04). The aim of this study was to

determine the efficiency of functional training on repetitive strength of female trainees.

The study represented a quasi study with parallel groups (the sample was not random), viewed according to the criteria of methodological nature (Perić, 2000). There were two groups, one of which was performing 3-months experimental program of functional training, while the other group was the control one without any organized physical activity.

Repetitive strength was evaluated by the following tests:

1. Eurofit 30 seconds Sit Up Test **SITUP**
2. Straight Leg Abdominal Strength Test **LEGAB**
3. Squat Test **SQUAT**
4. Single leg (left) Squat Test **LEFT**
5. Single leg (right) Squat Test **RIGHT**
6. Chair Push Up Test **CHAIR**
7. Push Up Test **PUSH**

Tests of repetitive strength was taken from the website [TopendSports
http://www.topendsports.com/testing/tests/index.htm](http://www.topendsports.com/testing/tests/index.htm).

After the testings before and after the completion of 3-months work with the experimental group of women, the processing of raw data was obtained. In addition to analyzing the basic statistical parameters (mean and standard deviation) Student's t-test and analysis of covariance (Statistica 7.0) were used for calculating intragroup and intergroup relations and the assessment of working effect.

Experimental treatment

The experimental group was composed of respondents who were included in aerobic exercise program group for the last three months. Trainings were organized three times a week (monday-wednesday-friday) for a period of 45 minutes. The concept of the training included the 10-minutes warm-up in order to prepare the body for the heavier workload in the main part of the training which formed the base of functional training. The structure of functional training for a period of 25 minutes was carried out by the method of circuit training where every athlete went through a series of basic exercises: degradation, chin-ups, exercises with Russian bell, medicine ball exercises, exercises with dumbbells, skipping rope, different types of squats with and without weights, different jumps, exercises with elastic bands, steppers. The aim of this kind of training was to improve body composition, body fat burning, increasing of muscle strength. In the final part of the training for a period of 10 minutes, stretching exercises

and relaxation were performed in order to calm the organism.

The organization of circuit training meant three separate circles with five stations. Within each circle, one group of five respondents trained. After the completion of work on one circle, groups were rotated, thereby passing all three circles on each training. Intensification of training was changed on every two to three weeks, in terms of increasing the volume and intensity of work (number of repetitions, time performance, the weights) on the basis of subjective feeling of respondents.

The content of the first circle:

- Cross fit rope skipping (20, 40, 60, 80sec)
- Sit ups with dumbbells (1, 3, 5kg)
- Step forward with and without olympic bar
- Deep wide squat with kettlebell (2, 3, 5kg)
- Endurance with hands on medicine ball in plank position (20, 40, 60, 80sec)

The content of the second circle:

- Two feet skipping of the stepper
- Squats with dumbbells (1, 3, 5kg)
- Knee up on double stepper (with or without load – dumbbells or medicine balls)
- Side walking in squat position in both sides with red elastic band tied under the knees (5, 8, 12 and 15 repetitions with 4 steps in both sides)
- Endurance in pull-ups (20, 40, 60sec)

The content of the third circle:

- Vertical jumps with medicine ball (1, 3, 5 kg)
- Push ups (on knees and ordinary kind)
- Ladders for agility
- Step backward with trunk rotation with and without load (3, 5kg)
- Endurance in deep squat on balancer (10,15, 20 and 25sec)

RESEARCH RESULTS

Table 1: Differences between initial and final testings in experimental and control group (T-test)

Variables	Experimental group				Control group			
	Mean (i)	Mean (f)	t	P-level	Mean (i)	Mean (f)	t	P-level
<i>SITUP</i>	19.47	23.13	-9.81	.000**	10.93	11.40	-2.43	.029*
<i>LEGAB</i>	18.40	22.33	-13.10	.000**	14.53	14.73	-1.00	.334
<i>SQUAT</i>	28.93	32.60	-13.57	.000**	20.67	20.80	-0.49	.634
<i>LEFT</i>	27.53	30.87	-9.60	.000**	16.60	17.20	-4.58	.000**
<i>RIGHT</i>	28.87	32.80	-11.90	.000**	16.60	16.93	-1.78	.096
<i>CHAIR</i>	20.47	25.00	-15.60	.000**	16.27	16.87	-3.15	.007**
<i>PUSH</i>	21.27	25.47	-11.04	.000**	15.53	16.13	-3.15	.007**

Legend: (i) – initial testing
(f) – final testing

With the analysis of results (Table 1) it can be concluded that there was a statistically significant difference in experimental group in all tests of repetitive strength at the confidence level of 99%.

In control group, statistically significant difference was observed in sit ups (*SITUP* .029) at the confidence level of 99%, while the level of confidence is 95% in single leg (left) squat test (*LEFT* .000), chair push up test (*CHAIR* .007) and push up test (*PUSH* .007).

Table 2: The effect of experimental treatment (analysis of covariance)

MANCOVA	F-test	P-level
		4.34
ANCOVA	F-test	P-level
<i>SITUP</i>	148.66	.000**
<i>LEGAB</i>	66.76	.000**
<i>SQUAT</i>	157.19	.000**
<i>LEFT</i>	224.05	.000**
<i>RIGHT</i>	248.60	.000**
<i>CHAIR</i>	193.37	.000**
<i>PUSHUP</i>	173.26	.000**

Table 2 shows the analysis of covariance on group and individual level. By using this analysis the possible effect achieved by conducting the program on the development of repetitive strength of trainees is determined.

Group level of analysis of covariance showed a statistically significant difference between two groups at a significance level greater than .01 (P-level = .008), confirmed by the value of F-test (4.34). Existing difference occurred under the influence of functional training on the development of repetitive strength of trainees. The individual level further confirmed the existence of significant differences between two groups in all tests of repetitive strength with different levels of stakes in existing difference.

DISCUSSION AND CONCLUSION

Functional training belongs to high-intensity training, in which any given activity requires coordination, speed, explosiveness and muscle strength. As already mentioned, it was successfully used both in sport and recreation. It is very popular for practitioners/athletes, however, it is also very popular for researchers in sport science. Researches suggest the quality of this type of training, and it is even considered proven the most effective way of conditioning training of athletes (Foran, 2010, viii).

Researches in sport on functional training provide very positive results. Labib (2014) indicates the positive results of functional training on oxidative stress and core stability test, balance of female handball players, while with male handball players the level of speed and agility was

significantly increased (Shaikh, 2015). In a survey conducted by Elsayy (2010), working with taekwondo fighters he came to the conclusion that functional training contributed to improving the balance. To similar results Ming-min & Qing (2013) have come in badminton. In addition to balance, after 6-week functional training they also noted improving of working ability of muscle and the efficiency of force transfer. In population of kinesiology students, moderately trained, the research of Tomljanović, Spasić, Gabril, Uljević & Foretić (2011) indicated improvements by functional training in postural control and precise coordination.

Functional training for recreational purposes can be traced through numerous studies in recent years. Weiss et al. (2010) investigated the use of functional training on muscular endurance ability of adult non-athletes and they found beneficial effect on strength, flexibility and endurance.

Wiszomirska, Krynicki, Kaczmarczyk & Gajewski (2014) determined the impact of functional training on posture and body composition in women older than 60 years. After three months of work a decrease in body weight for 1.61 kg was recorded, which was contributing to the reduction of body mass index (0.35); adipose tissue was reduced by 26.1%, while the muscle tissue significantly increased. Regarding the stability of posture, a statistically significant improvement was also noted. In his master thesis, Smith (2014), examined the effect of functional training on metabolic rate in women from 35 to 60 years old and he found that the improvement was observed both in absolute and relative level. The research that has been done on this occasion mainly took its cue from existing papers which showed positive effects of functional training in a variety of segments both human mobility and body composition. In some papers, functional

training was observed independently, and in certain researches it was compared with conventional or other types of training. In any case, it was mainly marked by good results which showed good performance of this working method. When we are talking about repetitive strength in this paper, trainees have been monitored for a period of three months, three times a week for 45 minutes for each training session. The concept of training was related to the circuit form of organization mostly with strength training exercises in order to improve body composition, to burn fat and to increase muscle strength. After getting the result, first of all we can see obvious changes, analyzed by T-test, in the experimental group in all individual tests ($p < 0.01$), as well as statistically significant changes in the multivariate level ($p < 0.05$), which was analyzed by canonical discriminant analysis. Finally, analysis of covariance recorded statistically significant improvement in repetitive strength at the time when the results of the experimental group were compared with the control group ($p < 0.01$).

Initial presumption may be characterized as true, because the functional training program that has been offered, gave positive results in repetitive strength. This is just one small part of human motorics that can be treated with this type of training, however, the other areas of motoric abilities will be discussed about in future researches.

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