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AUTHORS: Salaheldeen GHARIB

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ORIGINAL PDF URL: <https://dergipark.org.tr/tr/download/article-file/480266>

# Effect of functional strength training on snatch performance for weightlifters

Salaheldeen Gharib

*Department of Sports Training and Movement Science, Faculty of Physical Education for Girls, Alexandria University, Egypt.*

**Abstract.** This study aims to improve the functional strength (Strength – Power- Balance) using the Functional strength Exercises and knowledge and their impact on Snatch performance for lifters. Applied study on a sample of (12) weightlifters Registered Egyptian Federation of weightlifting/ Egypt of season 2016/2017, the researcher used experimental method to design two groups, one Functional strength group consisted of (6) lifter and the other control group of (6) lifter. Where the mean age of ( $20.17 \pm 3.97$  years) and height ( $166.00 \pm 3.29$  cm), weight ( $79.08 \pm 14.02$  kg) and age training ( $8.83 \pm 4.02$  years) for the Functional strength group, while the Mean age ( $18.83 \pm 2.14$  years), height ( $165.83 \pm 8.59$  cm), weight ( $69.07 \pm 5.91$  kg) and age training ( $6.33 \pm 3.14$  years) for the control group. Methods. The Functional strength group underwent a functional strength Exercises while the control group underwent Traditional exercises. Functional strength Exercises Continued for 12 Weeks 3 times per week and the training session lasted 90-120 a minute. The pre and post for the two control and Functional strength group a measured functional strength (Strength – Power-Balance) and snatch performance tests for the two groups. Statistical analysis of the experimental and control data SPSS was used to apply formulas statistical by calculating: Mean, Standard deviation, Mann-Whitney and Wilcoxon test. Results. The results showed the use of a functional strength Exercises resulted in an improvement statistically significant at a level of functional strength training and snatch performance for weightlifters. This study confirms that a functional strength (strength – Power- Balance) training improves snatch performance for lifters. Conclusions. The weightlifting Federation and attention by coaches trained in the application of a functional strength training weightlifters programs given the positive impact on the lifters.

**Keywords.** Functional strength, performance, snatch, weightlifters.

## Introduction

Weightlifting is one of the sports where there has been significant development of digital levels and performance of the lifters is linked to what they have of the qualities of a special physical (Vorobyev, 1978).

The muscular strength is of great importance in the distinctive sports by strength, Power, speed and immense balance the relative importance of muscle strength in sports activities that require skills or movements such as lifting, stretching and push weightlifting (Vorobyev, 1989; Ian, 2004; Ebada, 2011).

Functional strength training is one of the modern training methods. In addition, aims to reduce the strength resulting from the slow movement of the joints. In addition, result in multiple levels and integrated movements and does not depend on external restraints but uses the backbone to facilitate the movement focuses on strengthening the muscles of the Centre where the backbone is the origin of movement (Christine, 2000; Heba, 2013).

Functional strength training is the practice of motion against resistance weight bar, with an objective of improving a lifter strength, Power and Balance to perform a lift. However, functional strength training has taken a different course today, functional strength training is a range of total-body activities that build strength, Power, balance and coordination for general fitness, and improve lifters ability to perform lifting. Although functional strength training commonly is perceived as a form

Received: May 15, 2018 - Accepted: May 23, 2018 - Published: June 10, 2018

✉ S. Ghareb, e-mail; salaheldeengharib12@yahoo.com

**To cite this article:** Gharib S. Effect of functional strength training on snatch performance for weightlifters. Turk J Kin 2018; 4(2): 47-52.

**DOI:** 10.31459/turkjin.423727

of core training, core training could be considered a subset of functional strength training (Lohne-Seiler et al., 2013). Functional strength training is the basic training is the practice of unrestricted movement against resistance, focusing on stabilizer muscles of your back, abdomen and sides extends the same training to the entire body (Ng et al., 1998).

Functional strength training performed at 80% of 1RM at a maximal intended concentric speed would improve strength and power in functional strength tasks among elderly subjects more than traditional strength training at the same intensity and speed (Lohne-Seiler et al., 2013).

Training to improve functional strength include more than simply increasing the strength producing Power of a muscle or group of muscles. Rather, it need training to promote the coordinated working relationship between the nervous and muscular systems. Functional strength training include performing work against resistance in such a method that the improvements in strength directly promote the performance of movements so that a lifter movement are easier to perform. Simply stated, the primary goal of functional training is to transfer the improvements in strength completed in one movement to enhancing the performance of another movement by affecting the entire neuromuscular system (O'shea, 1987; Lohne-Seiler et al., 2013). Muscle power is also related to dynamic balance (Bean et al., 2003)

The snatch of the difficult lifts in performance, high capacity requires the completion of a consensual weightlifter. It also requires a lot of training to reach the optimal technical performance to develop to raise the maximum weight. The researcher has noted through its expertise in the field of weightlifting training programs lack the lifters to use functional strength training (Strength - Power - balance) of the muscles working in the snatch lift. Affecting the digital level muscles strength output stages for snatch performance. In addition, the weakness of the muscles in the weightlifter. Who is currently touring stem, which affect the speed of the bar during the second phase of the clouds full extension, Which affects negatively on the height of the weight column to the top and lack of speed makes it stop climbing before reaching the appropriate height. So that the lift can fall, down the bar and then receive the weight correctly. In addition, the weakness of the trunk muscles leads to the ability of the crane to maintain

its balance in the position of reception of gravity in the fall stage down the bar. To overcome the poor level of achievement is the development of functional strength affecting the balance of strength and flexibility in the performance of the snatch. Prompting the researcher, for this study to identify the impact of functional strength training improving snatch performance for weightlifter.

## Methods

Applied study on a sample of (12) weightlifters Registered Egyptian Federation of weightlifting/ Egypt of season 2016/2017, the researcher used experimental method to design two groups, one Functional strength group consisted of (6) lifter and the other control group of (6) lifter. Where the Mean age of ( $20.17 \pm 3.97$  years) and height ( $166.00 \pm 3.29$  cm), weight ( $79.08 \pm 14.02$  kg) and age training ( $8.83 \pm 4.02$  years) for the Functional strength group, while the Mean age ( $18.83 \pm 2.14$  years), height ( $165.83 \pm 8.59$  cm), weight ( $69.07 \pm 5.91$  kg) and age training ( $6.33 \pm 3.14$  years) for the control group Methods. The Functional strength group underwent a functional strength Exercises while the control group underwent Traditional exercises.

Pre-and post-test measurements were carried out, to measure the of functional strength, and snatch performance as follows Strength tests (Squat Front, Squat back, Good Morning), Power tests (Clean Power, Snatch Power) and balancing tests (Snatch balance- Dead lift) (Hori et al., 2006; Hamlyn et al., 2007; Pettitt et al., 2008; Ebada, 2011; Ebada & Abdel Hadi, 2018).

Training protocol: Subjects completed of training the functional strength. Where the experimental group underwent the training program of the functional strength of the muscles working in the high abduction. which contains exercises similar to the motor performance of the lift as follows, Snatch power, Back Drop in large Grip, Snatch Squat, Dead lift large Grip, Clean Power, Front squat, Back squat, Dead lift narrow Grip, Power jerk, Back jerk, jerk from split position, quarter squat, snatch pull and snatch. According to the following: The Functional strength Exercises Continued for 12 Weeks 3 times per week and the training session lasted 90-120 a minute (Fatouros, 2000; Ebada, 2003; Winchester, 2005; Newton, 2006). The components of the training load for the functional strength exercises were also formed using the intensity of 75-80% Weight 1RM Raise the lifter with repetitions

between 1-4 repetitions and groups of 2-3 groups per exercise and rest periods between exercises 10 seconds and between circles 1-2 minutes (Andrew, 2003; Ian, 2004; Lohne-Seiler et al., 2013). The control group was also subjected to the traditional program, which included training exercises to improve snatch lift, in addition, to warm up and pacification.

### Statistical Analyses

Statistical analysis of the experimental and control data SPSS was used to apply formulas statistical by calculating: Mean, Standard deviation, Mann-Whitney and Wilcoxon test.

## Results

Table 1 shows significant statistical differences of Pre -test experimental and control groups in functional strength and snatch performance for weightlifter, where the value of  $p > 0.05$  in all variables indicating the absence of significant differences between the two groups points to the equal sample before executing the experiment.

Table 2 shows the results of significant statistical differences between pre-and post-test for control group in functional strength and snatch performance. Where the value of  $p < 0.05$  in all variables search which shows statistically significant differences between pre and post measurement for posttest.

**Table 1**

Significance of differences between the Pre -test experimental and control groups in functional strength and snatch performance for weightlifter.

Variables		Control group		Functional strength group		Z	p
		Mean	SD	Mean	SD		
Strength	Squat Front (kg)	126.67	19.15	151.67	44.46	-0.816	0.414
	Squat back (kg)	152.50	22.53	178.33	47.92	-0.816	0.414
	Good Morning (kg)	75.00	8.94	80.67	12.13	-1.056	0.291
Power	Clean Power (kg)	81.67	27.33	100.00	27.39	-1.216	0.224
	Snatch Power (kg)	76.17	12.97	84.17	20.35	-0.835	0.404
Balance	Dead lift (kg)	105.00	28.81	129.17	44.99	-1.056	0.291
	Snatch balance (kg)	110.67	10.76	119.33	15.97	-1.218	0.223
Performance	Snatch (kg)	86.67	11.69	101.67	27.51	-0.742	0.458

**Table 2**

Significance of differences between pre-and post-test for control group in functional strength and snatch performance for weightlifter.

Variables		Pre-test		Post-test		Z	p
		Mean	SD	Mean	SD		
Strength	Squat Front (kg)	126.67	19.15	137.50	18.64	-2.333	0.020*
	Squat back (kg)	152.50	22.53	162.50	22.53	-2.449	0.014*
	Good Morning (kg)	75.00	8.94	85.00	8.94	-2.449	0.014*
Power	Clean Power (kg)	81.67	27.33	93.33	25.63	-2.333	0.020*
	Snatch Power (kg)	76.17	12.97	87.00	10.95	-2.333	0.020*
Balance	Dead lift (kg)	105.00	28.81	115.00	28.81	-2.449	0.014*
	Snatch balance (kg)	110.67	10.76	120.67	10.76	-2.449	0.014*
Performance	Snatch (kg)	86.67	11.69	97.50	10.37	-2.333	0.020*

\*  $p < 0.05$

**Table 3**

Significance of differences between pre-and post-test for Functional strength group in functional strength and snatch performance for weightlifter.

Variables		Pre-test		Post-test		Z	p
		Mean	SD	Mean	SD		
Strength	Squat Front (kg)	151.67	44.46	190.83	39.68	-1.992	0.046*
	Squat back (kg)	178.33	47.92	221.67	37.77	-2.207	0.027*
	Good Morning (kg)	80.67	12.13	107.33	10.54	-2.207	0.027*
Power	Clean Power (kg)	100.00	27.39	134.17	22.00	-2.207	0.027*
	Snatch Power (kg)	84.17	20.35	111.67	16.93	-2.207	0.027*
Balance	Dead lift (kg)	129.17	44.99	178.33	22.95	-2.201	0.028*
	Snatch balance (kg)	119.33	15.97	146.33	15.77	-2.207	0.027*
Performance	Snatch (kg)	101.67	27.51	135.83	22.00	-2.207	0.027*

\*  $p < 0.05$

**Table 4**

Significance of differences between the post -test functional strength and control groups in functional strength and snatch performance for weightlifter.

Variables		Control group		Functional strength group		Z	p
		Mean	SD	Mean	SD		
Strength	Squat Front (kg)	137.50	18.64	190.83	39.68	-2.410	0.016*
	Squat back (kg)	162.50	22.53	221.67	37.77	-2.500	0.012*
	Good Morning (kg)	85.00	8.94	107.33	10.54	-2.589	0.010*
Power	Clean Power (kg)	93.33	25.63	134.17	22.00	-2.258	0.024*
	Snatch Power (kg)	87.00	10.95	111.67	16.93	-2.104	0.035*
Balance	Dead lift (kg)	115.00	28.81	178.33	22.95	-2.656	0.008*
	Snatch balance (kg)	120.67	10.76	146.33	15.77	-2.254	0.024*
Performance	Snatch (kg)	97.50	10.37	135.83	22.00	-2.827	0.005*

\*  $p < 0.05$

Table 3 shows the results of significant statistical differences between pre-and post-test for experimental group in functional strength and snatch performance for weightlifter. Where the value of  $p < 0.05$  to all variables search which shows statistically significant differences between pre and post measurement for posttest.

Table 4 shows significant statistical differences between the posttest experimental and control groups in functional strength and snatch performance for weightlifter. Where the value of  $p < 0.05$  in all research variables indicating that there are statistically significant differences between the control and the Functional strength group for the Functional strength group.

## Discussion

Results statistical analysis of Table 2 existence of statistically significant differences at the level of 0.05, where the value of  $p < 0.05$  in measurements of functional strength (Strength - Power - balance) and snatch performance between tow measurements pre- and post-test control group and in favour of post measure. The researcher sees that the improvement of the control group mainly due to the regularity of training, the implementation of the program, which includes the exercise of assistance applied to the control group

This is consistent with the results of studies (Ebada 2008; Ebada & Abdel Hadi 2018), which indicated the superiority of dimensional measurement to measure the group's tribal officer in

tests of muscular strength and the level of achievement to snatch lift due to the impact of the assistance exercises to improve the level of achievement to snatch lift.

Results also showed the Table 3 statistically significant differences at the level of 0.05, where the value of  $p < 0.05$  in the functional strength and snatch performance lift between pre and post-test of the experimental group in favour of the post measurement. This progress is due to the impact of the researcher progress Development Training progress strength to muscles strong center and linking the lower valuation of the top party working in the snatch has led to improved performance level to snatch lift to Functional strength group. The most important features of the functional strength training is to strength on the center emphasizes the core, where the muscles strong center linking the upper and lower muscle strength training improve stem center and balance (Dave, 2003). That balance is a key element in career training, not only the balance between the power and flexibility of the muscles working in performance (Fabio, 2004). The results of this study are consistent with the study of both (Cress et al., 1996) that the functional strength training contribute to improve muscular strength, balance and performance level.

It also agrees with the results of the study of each (Brewer et al., 2008, Ebada, 2008), which showed that the improved performance level weightlifting depends on the development of Power resulting from the strength and speed during the snatch lift performance.

The results of Table 4 showed statistically significant differences in the telemetry between the control groups and the functional strength at the level of 0.05 as the value of  $p < 0.05$  in the functional strength and snatch performance tests for the functional strength group (Heba, 2013). The superiority of the functional strength group is due to the control in the functional strength group measurements of the lifter muscles during high snatch. To use functional strength training to improve the snatch performance of increase to the functional strength group.

Muscle strength, defined as the product of strength and speed (Power = strength  $\times$  speed), therefore declines more than muscle strength (Skelton, 1994). Muscle strength has been shown to be positively associated with the power to perform activities of daily living and may be a stronger

predictor of functional dependency than muscle strength is (Foldvari et al., 2000; Bean et al., 2003; Lohne-Seiler et al., 2013).

The weightlifting depends on an element of strength. The Strength is closely linked to the degree of compatibility between the muscles involved in the performance (Ebada, 2016), As well as contribute significantly to the production of more muscular strength and increase the force function improve the level of achievement of the Junior weightlifters (Ng et al., 1998; Ibrahim, 2015).

## Conclusions

The experimental group achieved a significant increase in the functional strength tests (Strength - Power - balance) and snatch performance of the abduction boost due to the performance of the functional strength training which was subjected to the training of the functional strength. The functional strength group outperformed the control group in the strength, strength and balance of the muscles at the top of the snatch, leading to improved performance. Functional strength training is recommended for trainees training programs to improve snatch performance lift. The weightlifting Federation and attention by coaches trained in the application of a functional strength training weightlifters programs given the positive impact on the lifters.

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