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Effect of Functional Training on Physical Fitness Components on College Male Students-A Pilot Study

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Abstract: ***Introduction:*** *Functional Training is how much certain movement will transfer into the actual activity of sport; it's a matter of neural complexity and central nervous system demand. The aim of this study was to find out the effects of functional training on physical fitness components on college male students.*
Procedure*: 19 male students from the Dr. Meghnad Saha College of the Gour Banga University, were randomly selected as subjects and their age were 19-25 years served as Functional Training Exercises, its three days per week for the period of eight weeks functional training exercises were given for experiments of a single group design. The functional training exercises was conducted in Ladder Forward & Sideward, Medicine ball throw Overhead-2kg, 3kg & 4kg, Hamstrings/Leg Curl With Stability Ball, Lateral Step Ups, Side Punk/Four Point Stabilizations Series, Forward Step Ups, Modified Pull-Up, Foot elevated hip lifting with medicine ball, Press Up with Stability Ball, Medicine Ball Throw Sideward Direction-4kg, 3kg and 2kg etc. before functional training exercises the functional warming up was to applied for tuning up the all body parts. The selected subjects were measured of their physical fitness components, speed, endurance, muscular endurance, strength, explosive power, agility and flexibility. Descriptive statistics was calculation for statistical treatment.*
Finding: *The functional training exercises significantly increase speed, endurance, muscular endurance, strength, explosive power, flexibility and agility.*
Conclusion*: The functional training has significantly improved speed, endurance, muscular endurance, strength, explosive power, flexibility and agility.*
Keywords: *functional training, physical fitness components, neural complexity, central nervous system demand, descriptive statistics.*

I. Introduction

Functional Training is how much certain movement will transfer into the actual activity of sport. Functional training is a matter of neural complexity and central nervous system demand. The higher the central nervous system demand the more functional movement is there. The brain which control muscular movement thinks in terms of whole motion, not individual muscle. The primary goal of functional training is to transfer improvement achieve in one movement to enhancing the performance of another movement by affecting the entire neuromuscular system. Functional training is a method of training that is based on preparing the body for real-world challenges such as balance, stability, turning, bending, and lifting. Doing this ensures that the nervous system is working properly and that all parts of the body are used in the appropriate manner with the correct muscles firing at the right time, functional exercises are usually trained in upright positions and involve movements in multiple planes of motion simultaneously just like in sport (i.e. football, volleyball, athletics, etc.).

The effect of functional training on elderly people and disease and injured person were elaborately studies. Very recently the functional training has been coined in the advanced sports world and now it becomes a buzzword. Rosch D et al. (2000) examined that the effectiveness of functional training on football performance. They found that flexibility, power, speed, endurance and football skills improved after functional training. Oliver and Brezz (2009) examined the effect of functional balance training on women volleyball players. They found improvement in the fitness level. They recommended that functional balance activity are cost effective and should be added to any form of strength and conditioning program in an attempt to enhancing the programs effectiveness' and to develop functional postural activation will not only assist with functional performance, but also in the prevention of injury. Furthermore, experimental research conducted to ascertain the muscular fitness benefits of functional training is limited and focused specifically on improving function in older adults (Milton et al. 2008; de Vreede et al. 2005; Whitehurst et al. 2005).

The present researcher observed that in India the effectiveness of functional training in various sports has not yet been studied.

II. Methodology

Experimental design and assessment of outcome variables: Subject will be selected randomly from college and were assessed before and after eight-week training period using identical testing protocols. Individual participant testing sessions were performed at the college ground and completed within 3 hour. The test included measurements of speed, endurance, muscular endurance, strength, explosive power, flexibility and agility. All participants were instructed to perform each test to maximum affected and verbal encouragement was provided throughout each test. All participants were tested in a specific order so as to standardize the testing process: speed, endurance, muscular endurance, strength, explosive power, flexibility and agility.

Standardized procedures were followed for each of the assessment tests and are published in detail else-where. Speed was assessed via a 50 yard course and a finish line, manually using a handheld stop watches and stating clapper to collect the data and timed was recorded to the nearest 0.01 seconds. Endurance was measured via 600 yards course and manually using a handheld stop watches and starting clapper to collect the data. Muscular endurance was evaluated using a push-up bend knee sit-up in one minute. Strength was evaluated using a medicine ball through and distance was recorded by nearest 0.01 meter Explosive power was evaluated using a vertical jumping and using a wall and recorded by inch, and standing long jump using tape and jumping pit and distance was recorded to the nearest 0.01 meter. Agility was assessed the pre-agility shuttle run and timed was recorded to the nearest 0.01 seconds.

Training Protocols: The functional training protocols will be prepared with the help of latest literature and national and international experts. This research work will be done with the cooperation and collaboration of NSNIS, Kolkata, Bangalore and Patiala centre to prepare training protocols. A separate training protocol for 1st day, 2nd day and 3rd day of 8 weeks training session;

Table-1: 1ST Week to 8TH Week- 1ST Day Training Programs

A. Functional Training Linear Warming Up

Name of Training	Execution/Time	Repetitions	Recovery	Total Time
1. High Knee Walk	20m/30 Seconds	3	Walk back/20m	3min.
2. High Knee Skip	20m/30 Seconds	3	Walk back/20m	3min.
3. High Knee Run	20m/30 Seconds	3	Walk back/20m	3min.
4. Heel-ups	20m/30 Seconds	3	Walk back/20m	3min.
5. Straight Leg Skip	20m/30 Seconds	3	Walk back/20m	3min.
6. Backward Run	20m/30 Seconds	3	Walk back/20m	3min.
7. Backward & Forward Lunge Walk	20m/30 Seconds	3	Walk back/20m	3min.

B. Functional Training Exercises Programs

Name of Training	Execution/Time	Repetitions	Recovery	Total Time
8. Push up with stability ball	30 sec	10	Walk back/20m	3min
9. Hamstrings curl stability ball	30 sec	10	Walk back/20m	3min
10. Multi-directional lunge with weight (2kg+2kg weight)	30 sec	10	Walk back/20m	3min
11. Step up(forward)	30 sec	10	Walk back/20m	3min
12. Foot elevated hip lifting with medicine ball	30 sec	10	Walk back/20m	3min
13. One leg bench squat	30 sec	10	Walk back/20m	3min
14. Oblique bridge	30 sec	10	Walk back/20m	3min

N.B. 30 sec. recovery time by walk/ walk back after one repetition all the above exercises.

Table-2: 1ST Week to 8TH Week -2ND Day Training Programs

A. Functional Training Alternative Linear Warming Up

Name of Training	Execution/Time	Repetitions	Recovery	Total Time
1. High Knee Walk with External Rotation	20m/30 Seconds	3	Walk back/20m	3min.
2. Heel-up with Internal Rotation	20m/30 Seconds	3	Walk back/20m	3min.

3. Overhead Lung Walk	20m/30 Seconds	3	Walk back/20m	3min.
4. Walking Heel-ups with Straight Leg Dead lift	20m/30 Seconds	3	Walk back/20m	3min.
5. Straight Leg Skip	20m/30 Seconds	3	Walk back/20m	3min.
6. Backward Lung Walk with Twist	20m/30 Seconds	3	Walk back/20m	3min.
7. Straight Leg Crossover	20m/30 Seconds	3	Walk back/20m	3min.

B. Functional Training Exercises Programs

Name of Training	**Execution/Time**	**Repetitions**	**Recovery**	**Total Time**
8. Ladder Exercise-side & forward direction	30 sec	10	Walk back/20m	3min
9. Multidirectional Lung with weight(2kg+2kg Weight)	30 sec	10	Walk back/20m	3min
10. Modified Pull-ups	30 sec	10	Walk back/20m	3min
11. Step up(Lateral)	30 sec	10	Walk back/20m	3min
12. Medicine ball Throw (overhead-2kg, 3kg &4kg).	30sec	10	Walk back/20m	3min
13. Push-up with Stability ball	30 sec	10	Walk back/20m	3min
14. Diagonal Plate Raise	30 sec	10	Walk back/20m	3min

N.B. 30 sec. recovery time by walk/ walk back after one repetition all the above exercises.

Table-3: 1ST Week to 8TH Week -3RD Day Training Programs

A. Functional Training Alternative Linear & Lateral Warming Up

Name of Training	**Execution/Time**	**Repetitions**	**Recovery**	**Total Time**
1. High Knee Walk with External Rotation	20m/30 Seconds	3	Walk back/20m	3min.
2. Heel-up with Internal Rotation	20m/30 Seconds	3	Walk back/20m	3min.
3. Overhead Lung Walk	20m/30 Seconds	3	Walk back/20m	3min.
4. Walking Heel-ups with Straight Leg Dead lift	20m/30 Seconds	3	Walk back/20m	3min.
5. Straight Leg Skip	20m/30 Seconds	3	Walk back/20m	3min.
6. Backward Lung Walk with Twist	20m/30 Seconds	3	Walk back/20m	3min.
7. Straight Leg Crossover	20m/30 Seconds	3	Walk back/20m	3min.
8. Lateral Squat	20m/30 Seconds	3	Walk back/20m	3min.
9. One Two Stick	20m/30 Seconds	3	Walk back/20m	3min.
10. One Two Cut	20m/30 Seconds	3	Walk back/20m	3min.

B. Functional Training Exercises Programs

Name of Training	Execution/Time	Repetitions	Recovery	Total Time
11. Ladder Forward & Sideward	30 sec	10	Walk back/20m	3min
12. Medicine ball Throw Overhead(2kg, 3kg & 4kg)	30 sec	10	Walk back/20m	3min
13. Hamstrings/Leg Curl With Stability Ball	30 sec	10	Walk back/20m	3min
14. Lateral Step Ups	30 sec	10	Walk back/20m	3min
15. Side Punk/Four Point Stabilizations Series	30sec	10	Walk back/20m	3min
16. Forward Step Ups	30 sec	10	Walk back/20m	3min
17. Modified Pull-Up	30 sec	10	Walk back/20m	3min

18. Foot elevated hip lifting with medicine ball	30sec	10	Walk back/20m	3min
19. Press Up with Stability Ball	30 sec	10	Walk back/20m	3min
20. Medicine Ball Throw Sideward Direction(4kg, 3kg & 2kg).	30 sec	10	Walk back/20m	3min

N.B. 30 sec. recovery time by walk/ walk back after one repetition all the above exercises.

Statistical analysis:

Descriptive statistics were used to determine the mean, standard deviation, and mean percent change for each of the baseline tests. Dependent t tests were employed to determine differences in the percent change be pre-test and post-test.

III. Results And Discussion

Results

On the basis of collected data on speed, endurance, muscular endurance, strength, explosive power, flexibility and agility, before and the eight weeks of functional worming up and functional training exercises programs presented in the Table No. 4.

Table- 4: Measurement of Physical fitness components of 19 subjects participants*

Variables	n	Pre test training	Post test	% of change.
Speed,	19	7.482 #0.506	7.266 #0.493	2.995 #2.055
Endurance,	19	129.653 #8.396	116.774 #11.253	11.532 #7.612
Agility.	19	10.438 #0.553	10.037 #0.489	4.022 #3.403
Strength,	19	3.245 #0.406	3.811 #0.464	14.267 #9.987
Explosive power	19	2.172 #0.220	2.292 #0.200	5.298 #2.765
Flexibility	19	6.105 #1.853	7.947 #1.810	23.797 #10.408
Muscular endurance	19	23.947 #9.623	27.158 #9.558	13.207 #6.419

*data presented as mean # standard deviation; post training value significantly ($p<0.05$) greater than pre training value.

IV. Discussion

Table 4 summarized and presents the data from all the outcome measures that were tested in the current study. Table 4 shows all of the physical fitness components (speed, endurance, muscular endurance, strength, explosive power, flexibility and agility) tested in the study, a significantly ($p<0.05$) greater mean percent changes through the functional training programs. The hypothesis that functional training would improve physical fitness components was fully supported by the current data. Weiss.T et al. (2010) found similar results in 7-weeks of functional training resistance training on muscular fitness outcomes in young adults.

The results of the current study identified specific improvements over the majority of the performance components. Table 4 shows that the speed and endurance, means and standard deviation both were laser than the pre test from post test. The reason for the finding might be attributed to the fact that the selected functional exercises have got significant influence on speed and endurance. This was positively affected on the speed and endurance of the different of sports and track & field.

The strength, explosive power and flexibility were significantly improved by the functional training programs, table 4 shows that the strength, explosive power and flexibility were pre-test value were less than post-test values. Muscular endurance also significantly increased at 0.05 level of confidence were shows the table 4.

The current study demonstrated that within the college students, the functional training exercises can lead to better performance and to similar benefits in basic physical fitness components. The functional training exercises demonstrated improvements in speed, endurance, muscular endurance, strength, explosive power, flexibility and agility. Weiss.T et al. (2010) also found similar results in 7-weeks of functional training resistance training on muscular fitness outcomes in young adults.

Possible limitations include intertester variability and application of RPE as an intensity method. Regarding intertester variability, the testers all followed the same standardized testing protocol, but may have hard slight variations in test administration and motivation given. Also, the degree to which the participants understood the RPH scale may have been a potential limitation. While Sweet et al. (2004) found that the session RHP method was a reliable and useful method to provide progressive increases in resistance; it does depend on understanding the RHP scale. Further research incorporating a functional training program resembling common actions in a college- aged population or with sports persons would be interesting.

V. Conclusion

In conclusion, the present investigation observed a significant improvement of physical fitness components (speed, endurance, muscular endurance, strength, explosive power, flexibility and agility). This study suggests that functional training exercises could serve as an alternative and potentially more creative method for improving performance in college student and as well as to be applied to all the sports persons of all elementary level to international levels.

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