



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2018; 5(6): 22-25
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www.kheljournal.com
Received: 07-09-2018
Accepted: 08-10-2018

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Effects of plyometric with functional training on selected physical fitness physiological and skill performance variables of intercollegiate male football players

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Abstract

The purpose of this study was to find out the effects of plyometric with functional training on selected physical fitness physiological and skill performance variables of intercollegiate male football players. To achieve the purpose of the study, forty intercollegiate men football players from AVVM Sri Pushpam College, Poondi, Tanjore, Tamilnadu and Adaikala Madha Arts and Science College Tanjore, Tamilnadu were selected as subjects (20 from each college). They were divided into two equal groups in which each group consisted of twenty subjects (n=20). Group-I was the experimental group and Group-II served as control group (CG). The experimental group underwent plyometric training along with their Functional Training for 12 weeks and control group was not engaged in any training other than their routine football training. The following are the criterion variables (a). Physical fitness variables namely speed, leg explosive power and agility, (b). Physiological variables namely vital capacity, resting pulse rate and breath holding time (c). Skill variables namely dribbling, shooting and passing. They were tested using standard test methods and instruments before and after training. In order to analyze the training effects of each group on the selected physical fitness, physiological and skill variables, “t” ratio was used. The findings of the study showed that there was a significant reduction in the resting pulse rate and there were significant improvements in the variables namely speed, agility, leg explosive power, vital capacity, breath holding time, dribbling, shooting and passing between pretest and post-test of the experimental group. There was no significant difference in all of the selected variables between pretest and post-test of the control group.

Keywords: Plyometric training, functional training, speed, leg explosive power, agility vital capacity, resting pulse rate, breath holding time, dribbling, shooting, passing

1. Introduction

Sports training is a basic preparation of sportsman for better performance through physical exercise. It is based on scientific principles of aiming at education and performance enhancement, the improvement of general health and organic functions as well as increasing the strength and stability of the musculo-skeletal system (Singh, 1991) [1].

Plyometrics is the term now applied to exercises that have their roots in Europe, where they were first known simply as jump training. (Baechle, 1994). Plyometric training can take many forms, including jump training for the lower extremities and medicine ball exercises for the upper extremities. Jump training exercises were classified according to the relative demands they placed on the athlete. All the exercises are progressive in nature, with a range of low to high intensity in each type of exercise. The classification of exercises is jumps in place; standing jumps; multiple hops and jumps, bounding, box drills and depth jumps. (Haghighi *et al.* 2012) [4].

The ability to apply force rapidly (reactive force) is the major goal of plyometric training. Plyometrics are used to apply an overload to the muscles with speed – strength as a goal. The speed-strength ability is known as power. Plyometrics should not be considered an end in itself, but as part of an overall program (stretching, running, strength training nutrition, etc). After an athlete has begun a proper strength and conditioning program, plyometrics are used to develop speed–strength (Thirumalaikumar, 2002) [2].

Functional Training is how much certain movement will transfer into the actual activity of sport.

It is a matter of neural complexity and central nervous system demand. The literal meaning of the word Functional is “designed to be practical and useful, rather than attractive”. It provides an added advantage and improves overall performance, thereby helping the sports people achieve their goals. (Alauddin Shaikh, 2012)^[1].

Functional training involves training for specific skills of a game. Functional exercises are usually trained in upright positions and involve movements in multiple planes of motion simultaneously just like in sport (i.e. cricket, football, volleyball, athletics, etc.). (Deepak Kumar Dogra, 2015)^[3].

Functional training in football means the Training for a specific position or area of the field (like forwards, outside midfield, etc). Functional training involves training or practicing the specific demands of a position or a role. This can be for an individual player, or for a unit (i.e. defense). For example, A football coach may run a functional training session for forward play, dealing specifically how two forwards work together in attacking the third. Functional training should take place in the area of the field where that scenario would occur in a real game. The purpose of the present study was to find out the effects of plyometric training with functional training on selected physical fitness, physiological and skill variables of intercollegiate male football players.

2. Materials and methods

To achieve the purpose of this study, forty intercollegiate men football players from AVVM Sri Pushpam College, Poondi, Tanjore, Tamilnadu and Adaikala Madha Arts and Science College Tanjore, Tamilnadu were selected as subjects (20 from each college). The age of the subjects ranged from 18 to 25 years as per the college records. The subjects were divided into two equal groups in which each group consisted of twenty subjects (n=20). Group-I was the experimental group and Group-II served as control group (CG). The experimental group underwent plyometric training along with their Functional Training for 12 weeks and control group was not engaged in any training other than their routine football training. The following are the criterion variables (a). Physical fitness variables namely speed, leg explosive power and

agility, (b). Physiological variables namely vital capacity, resting pulse rate and breath holding time (c). Skill variables namely dribbling, shooting and passing.

Eight upper body plyometric exercises and fourteen lower body plyometric exercises were selected for the training. The upper body plyometric exercises were Overhead throw, over back toss, side throws, explosive start throws, slams, single arm overhead throw, squat throws and plyo-push ups. The lower body plyometric exercises were squat jumps, lateral jump to box, split squat jumps, tuck jump, lateral box push off, bounding, bounding with rings, box drill with rings, lateral hurdle jumps, single leg tuck jumps, zigzag hops, single leg lateral hops and depth jump.

Twelve skill specific functional training exercises in the form of functional training games were selected for the training. They were of three types. 1. Dribbling related: Closed space dribbling, circle dribbling, zig-zag dribbling and doggies dribbling. 2. Passing related: pressure passing, triangle passing, four corner passing and relay passing. 3. Shooting related: simple shoot, turn and shoot, cone kick down and penalty box shooting.

The dependent variables were measured by their respective standard test methods before and after training period as follows. Physical fitness variables namely speed, leg explosive power and agility were measured by 50m dash test, standing long jump (broad jump) and Illinois agility run test respectively. Physiological variables namely vital capacity, resting pulse rate and breath holding time were measured by a standard digital spirometer, manually counting the pulse from radial artery (radial pulse method) and manually measuring the time using a stop watch respectively. Skill variables namely dribbling, passing and shooting were tested by their respective Mor-Christian Soccer ability tests.

In order to analyze the training effects of each group on the selected physical fitness, physiological and skill variables, “t” ratio was used.

3. Results and discussion

Significance of mean gains / losses between pre test and post test on the selected variables of the experimental group are presented in Table – I.

Table 1: Significance of mean gains / losses between pre test and post test on selected variables of the experimental group

S. No	Variables	Pre Test mean	Post Test mean	Mean diff.	Std.Dev	Std. Er. of mean	Correlation	‘t’ ratio
Physical Fitness Variables								
1	Speed	7.534	6.411	1.123	0.278	0.062	0.064	18.03*
2	Agility	15.873	13.986	1.886	0.177	0.039	0.755	47.53*
3	Leg Explosive Power	232.95	242.65	9.7	1.341	0.3	0.956	32.33*
Physiological Variables								
4	Vital capacity	3.669	3.846	0.176	0.017	0.003	0.508	45.55*
5	Resting pulse Rate	77.5	74.95	2.55	0.510	0.114	0.879	22.34*
6	Breath Holding Time	29.504	33.73	4.226	1.185	0.265	0.431	15.94*
Skill Performance Variables								
7	Dribbling	32.171	28.198	3.973	0.601	0.134	0.813	29.53*
8	Shooting	42.10	68.40	26.3	4.868	1.088	0.735	24.16*
9	Passing	4.45	9.30	4.850	0.988	0.221	0.852	21.95*

*Significant at 0.05 level

An examination of table – I indicates that the obtained ‘t’ ratios are 18.03, 47.53, 32.33, 45.55, 22.34, 15.94, 29.53, 24.16 and 21.95 for speed, agility, leg explosive power, vital capacity, resting pulse rate, breath holding time, dribbling, shooting and passing respectively. The obtained ‘t’ ratios on

the selected variables are found to be greater than the required table value of 2.09 at 0.05 level of significance for 20 degrees of freedom. So it is found to be significant. The results of this study are statistically significant and explained their effects positively.

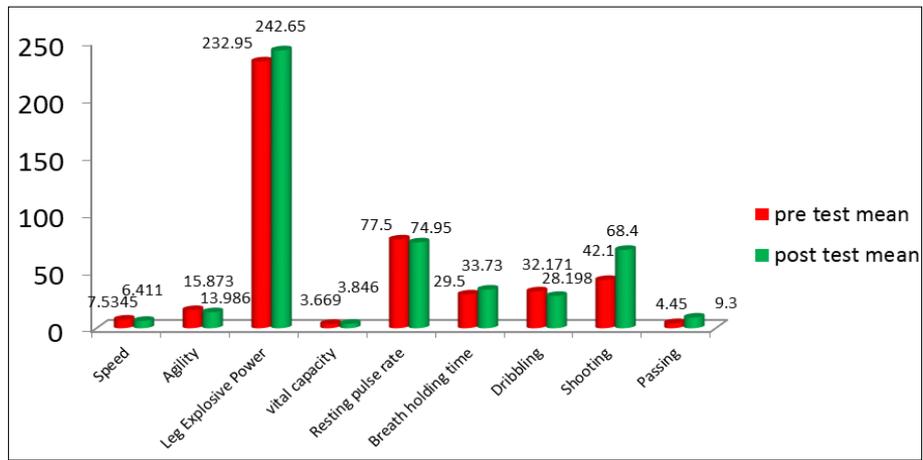


Fig 1: Pre test and post test mean values of experimental group on selected criterion variables

Significance of mean gains / losses between pre test and post test on the selected variables of control group are presented in table-II.

Table 2: Significance of Mean Gains / Losses between Pre Test and Post Test on Selected Variables of Control Group

S. No	Variables	Pre Test mean	Post Test mean	Mean diff.	Std. Dev	Std. Er. of mean	Correlation	't' ratio
Physiological variables								
1	Speed	7.54	7.543	0.001	0.011	0.002	0.979	0.21
2	Agility	15.883	15.886	0.003	0.023	0.005	0.980	0.49
3	Leg Explosive Power	233.55	232.60	0.950	4.774	1.067	0.614	0.89
Physical fitness variables								
4	Vital capacity	3.669	3.669	0.000	0.005	0.001	0.871	0.14
5	Resting pulse Rate	77.55	77.35	0.20	0.696	0.156	0.790	1.28
6	Breath Holding Time	29.47	29.567	0.095	0.385	0.086	0.918	1.09
Skill performance variables								
7	Dribbling	32.166	32.173	0.007	0.244	0.054	0.954	0.11
8	Shooting	42.40	42.50	0.10	3.275	0.732	0.905	0.13
9	Passing	4.30	4.35	0.050	0.826	0.185	0.713	0.33

*Significant at 0.05 level

An examination of table – II indicates that the obtained ‘t’ ratios are 0.21, 0.49, 0.89, 0.14, 1.28, 1.09, 0.11, 0.13, 0.33 for speed, agility, leg explosive power, vital capacity, resting pulse rate, breath holding time, dribbling, shooting and passing respectively. The obtained ‘t’ ratios on the selected

variables are found to be lesser than the required table value of 2.09 at 0.05 level of confidence. So it is insignificant for 20 degrees of freedom. The results of this study are statistically insignificant and explained their effects negatively.

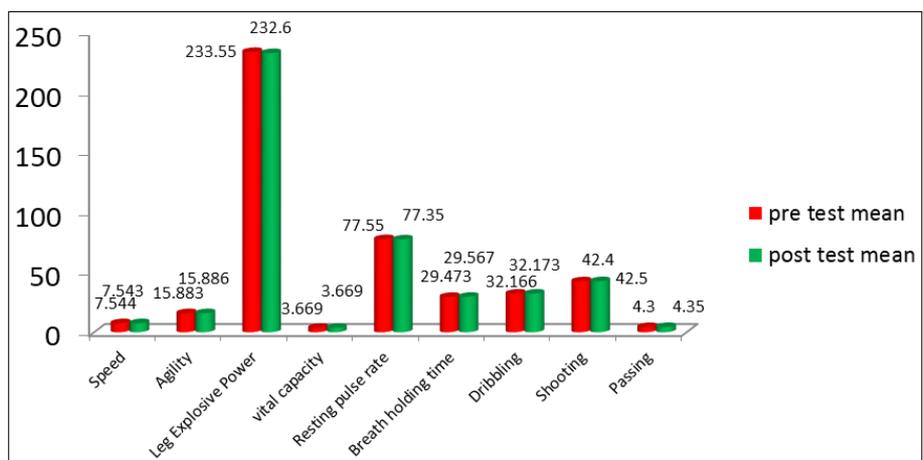


Fig 2: Pre test and post test mean values of control group on selected criterion variables

4. Conclusion

The findings of the study showed that there was a significant reduction in the resting pulse rate and there are significant improvements in the variables namely speed, agility, leg explosive power, vital capacity, breath holding time, dribbling, shooting and passing between pretest and post-test

of the experimental group. The findings of the study showed that there is no significant difference in all of the selected variables between pretest and post-test of the control group. Hence it was concluded that Plyometric with functional training had significantly improved the selected criterion variables of intercollegiate male football players.

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