



Effect of Plyometric Training and Combination of Weight And Plyometric Training on Selected Physical Fitness Variables of College Men Handball Players

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Abstract

The purpose of the study was to find out the effect of plyometric training and combination of weight and plyometric training on selected physical fitness variables of college men handball players. To achieve this purpose, 45 male students studying in the various colleges of Pulwama District were selected. They were divided into three equal groups and each group consisted of 15 subjects. Group-I performed plyometric training, group- II performed combination of weight and plyometric training and group-III acted as control group. Muscular strength, strength endurance and explosive power were selected as criterion variables. The collected data were statistically examined for significant difference if any, by applying Analysis of Covariance (ANCOVA). Since three groups were involved, ScheffeS test was used as post-hoc test to find out any difference between the groups. The result of the study shows that there was significant improvement for plyometric training and combination of weight and plyometric training of men college handball players on selected criterion variables.

Keywords: Physical Fitness; Plyometric Training; Weight; handball players

INTRODUCTION

Weight training, also called as resistance training or strength training, is pitting muscles against a resistance such as a weight or other type of resistance, to build the strength, anaerobic endurance, and or size of skeletal muscles. A well-rounded program of physical activity includes strength training, to improve bone, joint function, bone density, muscle, tendon and ligament strength, as well as improves heart and lung fitness. These activities should work all the major muscle groups of our body (*legs, hips, back, chest, abdomen, shoulders, and arms*). Plyometric is a method of developing explosive power, an important component of the athletic performance as plyometric movements are performed in a wide spectrum of sports. In handball, it can be played more skillfully when players have the power that combines with strength and speed to develop explosive power for participating in various sports activities. To give top quality performances for the full playing time over a whole series of handball matches in addition to all that we have outlined above, outstanding physical condition and a high standard of physical capabilities are necessary. The plyometric exercises improve significantly in developing physical

fitness variables and skill performance of football players. The fundamental principles of resistance training are that exercise should be brief, infrequent, and intense. Exercises are performed with a high level of effort, or intensity, where it is thought that it will stimulate the body to produce an increase in muscular strength and size. Advocates of progressive resistance training believe that this method is superior for strength and size building than most other methods. As strength increases, progressive resistance training techniques will have the weight/resistance increased progressively where it is thought that it will provide the muscles with adequate overload to stimulate further improvements progressive resistance training, training schedules should allow adequate time between workouts.

Methodology

The purpose of the study was to find out the effect of plyometric training and combination of weight and plyometric training on selected physical fitness variables of college men handball players. To achieve this purpose, 45 male students studying in the various colleges of Pulwama District were selected. They were divided into three equal groups and each group consisted of 15 subjects. Group-I performed plyometric training, group-II performed combination of weight and plyometric training and group- III acted as control group. Muscular strength, strength endurance and explosive power were selected as criterion variables.

Training Programme

The experimental group-I performed plyometric training, group-II performed combination of weight and plyometric training and group-III acted as control group who did not participate any special training apart from the regular curricular activities. The subjects of experimental group- I performed plyometric training with the training intensity of 65-80% of their 1RM and the subjects of experimental group-II performed combination of weight and plyometric training with the training intensity of 65-80% of their 1RM. After assessing the 1 RM of experimental group subjects, the training load was fixed accordingly. Then the experimental group underwent respective training programmes for 3 days per week for 12 weeks under the instruction and supervision of the investigator.

Statistical Technique

The data were collected on selected criterion variables such as muscular strength, strength endurance and explosive strength were measured by using Push-ups, sit-ups and Sergeant jump at before and after the twelve weeks of plyometric and combination of weight and plyometric training as pre and post test. Analysis of covariance (ANCOVA) was applied to find out significant difference if any between the experimental and control group.

ANALYSIS OF THE DATA

The influence of plyometric and combination of weight and plyometric training on each of the selected criterion variables were analyzed and presented below.

Table-I: Analysis of Covariance and ‘F’ ratio for Muscular Strength, Strength Endurance and Explosive Strength of Experimental Groups and Control Group:

Variables Name	Group Name	P TGroup	CWPTGroup	Control Group	‘F’ Ratio
	Pre-test Mean ± S.D	9.90 ± 0.035	9.20 ± 0.321	9.13 ± 0.542	1.96
Muscular strength	Post-test Mean ± S.D	10.8 ± 0.91	12.7 ± 0.83	9.10 ± 0.03	16.45*
	Adj.Post-test Mean ± S.D	12.16	12.55	9.44	35.14*
Strength endurance	Pre-test Mean ± S.D	12.3 ± 1.3	12.3 ± 1.4	12.2 ± 1.31	0.328
	Post-test Mean ± S.D	13.5 ± 1.	13.9 ± 1.58	12.0 ± 1.7	5.08*
	Adj.Post-test Mean ± S.D	13.38	13.8	12.1	10.40*
Explosive power	Pre-test Mean ± S.D	23.3 ± 1.28	23.8 ± 1.13	23.2 ± 1.45	0.328
	Post-test Mean ± S.D	25.5 ± 1.22	25.9 ± 1.43	23.5 ± 1.41	8.00*
	Adj.Post-test Mean ± S.D	25.122	25.39	23.28	11.21*

Table – I showed that there was a significant difference among experimental and control group on muscular strength, strength endurance and explosive strength.

Table-II: Scheffe’s test for the difference between the adjusted post-test mean of muscular strength

Adjusted Post-test Mean				
Strength Endurance				
Plyometric Training Group	Combination of Weight and Plyometric Training Group	Control group	Mean Difference	Confidence interval at .05 level
12.16	12.55		0.37	2.09
12.16		9.44	2.75*	2.09
	12.55	9.44	3.13*	2.09

Table – II shows that the adjusted post-test mean difference in muscular strength between Plyometric training and control groups (2.75) and combination of weight and plyometric training and control groups (3.13) were significant at .05 level of confidence. But there was no significant difference between plyometric and combination of weight and plyometric training groups (0.37) on muscular strength after the training programme.

Table-iii: Scheffes test for the difference between the adjusted post-test mean of strength endurance

Adjusted Post-test Mean				
Strength Endurance				
Plyometric Training Group	Combination of Weight and Plyometric Training Group	Control group	Mean Difference	Confidence interval at .05 level
13.38	13.8		0.42	1.11
13.38		12.1	1.28*	1.11
	13.8	12.1	1.70*	1.11

Table – III shows that the adjusted post-test mean difference in muscular endurance between plyometric training and control groups (1.28) and combination of weight and plyometric training and control group (1.70) were significant at .05 level of confidence. But there was no significant difference between plyometric and combination of weight and plyometric training groups (0.42) on muscular endurance after the training programme.

Table–IV: Scheffès test for the difference between the adjusted post-test mean of explosive strength

Adjusted Post-test Mean				
Strength Endurance				
Plyometric Training Group	Combination of Weight and Plyometric Training Group	Control group	Mean Difference	Confidence interval at .05 level
25.122	25.39		0.269	1.763
25.122		23.28	1.86*	1.763
	25.39	23.28	2.14*	1.763

Table – IV shows that the adjusted post-test mean difference in explosive strength between plyometric training and control groups (1.86) and combination of weight and plyometric training and control groups (2.14) were significant at .05 level of confidence. But there was no significant difference between plyometric and combination of weight and plyometric training groups (0.269) on explosive strength after the training programme.

Discussion

Research on the effect of weight and plyometric training on health and fitness determinants revealed that weight and plyometric training, like other types of exercise, improves physical performance and number of health parameters (Miller, *et al.*, 1984; Poehlman, 1992; Stone, 1991; Toth, *et al.*, 1995). Almost every study revealed an increase in muscular strength, power muscular endurance, flexibility and jumping ability due to weight training compared with other training. Plyometric training is an

effective intervention to improve muscle power without adverse effects on joint laxity (Bieler&Sobol, 2014), mobility and muscle strength (Krist, Dimeo and Keil, 2013). Supervised plyometric training represents an efficacious intervention for improving strength with residual benefits lasting longer than previously expected (Sherk *et al.*, 2012), strength and power-related measurements (Rønnestad *et al.*, 2008) Hanson *et al.*, (2009) suggested that changes in strength, power, and fat free mass are predictors of strength training induced improvements in functional tasks. Dorgo *et al.*, (2009) found significant improvements in muscular strength and muscular endurance of the manual resistance training and weight and plyometric training groups.

CONCLUSIONS

The results of the study shown that there was a significant improvement on selected motor fitness components of college men handball players due to the effect of plyometric and combination of weight and plyometric training however, no significant differences were found between the experimental groups.

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