IMPACT OF MAXIMUM POWER TRAINING WITH AND WITHOUT PLYOMETRIC TRAINING ON SELECTED STRENGTH PARAMETERS OF MEN HANDBALL PLAYERS

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Abstract
The purpose of this study was to find out the impact of maximal power training with and without plyometric training on selected strength parameters of inter-collegiate men handball players. To achieve the purpose of the present study, sixty handball players were selected as subjects from Madurai Kamaraj University affiliated colleges namely SVN College, Nagamalai, The American College, Madurai, Thiagarajar College, Madurai and GTN College, Tamilnadu, India and their ages ranged from 18 to 24 years. The sampling technique used was simple random sampling method, where each individual is given a number and a table of random numbers was used for selection of subjects. The pre test and post test design was used as experimental design in which sixty subjects were divided into three groups of twenty each. No attempt was made to equate the groups in any manner. Group-I underwent Maximal power training with plyometric training, Group-II underwent Maximal power training and Group-III acted as Control group. The data collected data from the three groups prior to and immediately after the training programme on the selected criterion variables were statistically analyzed with descriptive statistics, paired 't'-test, univariate analysis of covariance (one-way ANCOVA), and the post hoc pair wise comparison using the Scheffe's test analysis. In all the cases 0.05 level of confidence was fixed as a level of confidence to test the hypotheses.

Key Words: Maximal Power Training, Plyometric Training, Handball.

Introduction

Power is an essential quality in many sports and games for, it represents the effective combination of strength and speed. Increase in strength or speed will increase power, and when power increases, more work can be done in less time. Power refers to the explosiveness of body movement or the rate at which force is produced. As such, it involves two elements: strength to produce the force and speed to increase the rate at which it is applied. Thus, power can be increased either by improving strength or speed of movement or by both. Most sports require power, muscular endurance or both. The main characteristic of a maximum power training programme is involving exercise of all or at least most of the neuromuscular units. Everyone aiming to develop maximum strength must, therefore, frequently employ maximum and super maximum stimuli. Maximal power training exercises must be employed to activate the motor units more quickly to encourage better nervous system adaptation Wilson (1994).

Plyometrics alludes to practice that empowers a muscle to achieve greatest power in the briefest conceivable time. With a concentric muscle development, the muscle abbreviates while it contracts. With a capricious muscle constriction, the muscle protracts while it is applying power. The muscle is stacked with an erratic (extending) activity, pursued quickly by a concentric (shortening) activity. A muscle that is extended before a concentric withdrawal, will contract all the more powerfully and all the more quickly (Chu, 1998).

Handball is an ideal synthesis of three fundamental athletic disciplines of running, jumping and throwing. Therefore it is not only a purely competitive sport but also a fine sport to be taken up with advantage by many for purposes of training and health. The player must have the capacity to begin rapidly, he should be a persisting sprinter, he should have the capacity to skillfully hoodwink his adversary, he should have the capacity to quickly get the ball or catch it noticeable all around, he should pass the ball with accuracy to his partners and he should have the capacity to execute a wide range of tosses; so, his body, his arms and his legs should be amicably prepared (Barbara, 2011).

Methodology

The purpose of this study was to find out the impact of maximal power training with and without plyometric training on selected strength parameters of inter-collegiate men handball players. To achieve the purpose of the present study, sixty handball players were selected as subjects from Madurai Kamaraj University affiliated colleges namely SVN College, Nagamalai, The American College, Madurai, Thiagarajar College, Madurai and GTN College, Tamilnadu, India and their ages ranged from 18 to 24 years. The sampling technique used was simple random sampling method, where each individual is given a number and a table of random numbers was used for selection of subjects. The pre test and post test design was used as experimental design in which sixty subjects were divided into three groups of twenty each. No attempt was made to equate the groups in any manner. Group-I underwent Maximal power training with plyometric training, Group-II underwent Maximal power training and Group-III acted as Control group. The data collected data from the three groups prior to and immediately after the training programme on the selected criterion variables were statistically analyzed with descriptive statistics, paired 't'-test, univariate analysis of covariance (one-way ANCOVA), and the post hoc pair wise comparison using the Scheffe's test analysis. In all the cases 0.05 level of confidence was fixed as a level of confidence to test the hypotheses.

Results

TABLE – I
MEAN, STANDARD DEVIATION AND ADJUSTED MEAN FOR EACH DEPENDENT VARIABLE BY THE MAXIMAL POWER TRAINING WITH PLYOMETRIC GROUP

Sl.No	Variables	Pre Test		Post Test		Adjusted Mean
		Mean	SD (±)	Mean	SD (±)	
1	Grip strength	52.20	1.57	57.33	1.98	57.34
2	Upper body strength	5.55	0.36	6.85	0.35	6.85

The table – 4.1 shows that the pre test mean and standard deviation values of grip strength and upper body strength for Maximal power training with plyometric training group were 52.20 ± 1.57 and 5.55 ± 0.36. The post test mean and standard deviation values of grip strength and upper body strength for maximal power training with plyometric training group are 57.33 ± 1.98 and 6.85 ± 0.35. The adjusted post test means of grip strength and upper body strength for maximal power training with plyometric training group are 57.34 and 6.85.

TABLE – II
MEAN, STANDARD DEVIATION AND ADJUSTED MEAN FOR EACH DEPENDENT VARIABLE BY THE MAXIMAL POWER TRAINING GROUP

Sl.No	Variables	Pre Test		Post Test		Adjusted Mean
		Mean	SD (±)	Mean	SD (±)	
1	Grip strength	52.77	1.53	55.76	0.93	55.73
2	Upper body strength	5.50	0.30	6.48	0.46	6.49

The table – II shows that the pre test mean and standard deviation values of grip strength and upper body strength for maximal power training group were 52.77 ± 1.53 and 5.50 ± 0.30. The post test mean and standard deviation values of grip strength and upper body strength for maximal power training group are 55.76 ± 0.93 and 6.48 ± 0.46. The adjusted post test means of grip strength and upper body strength for maximal power training group are 55.73 and 6.49.

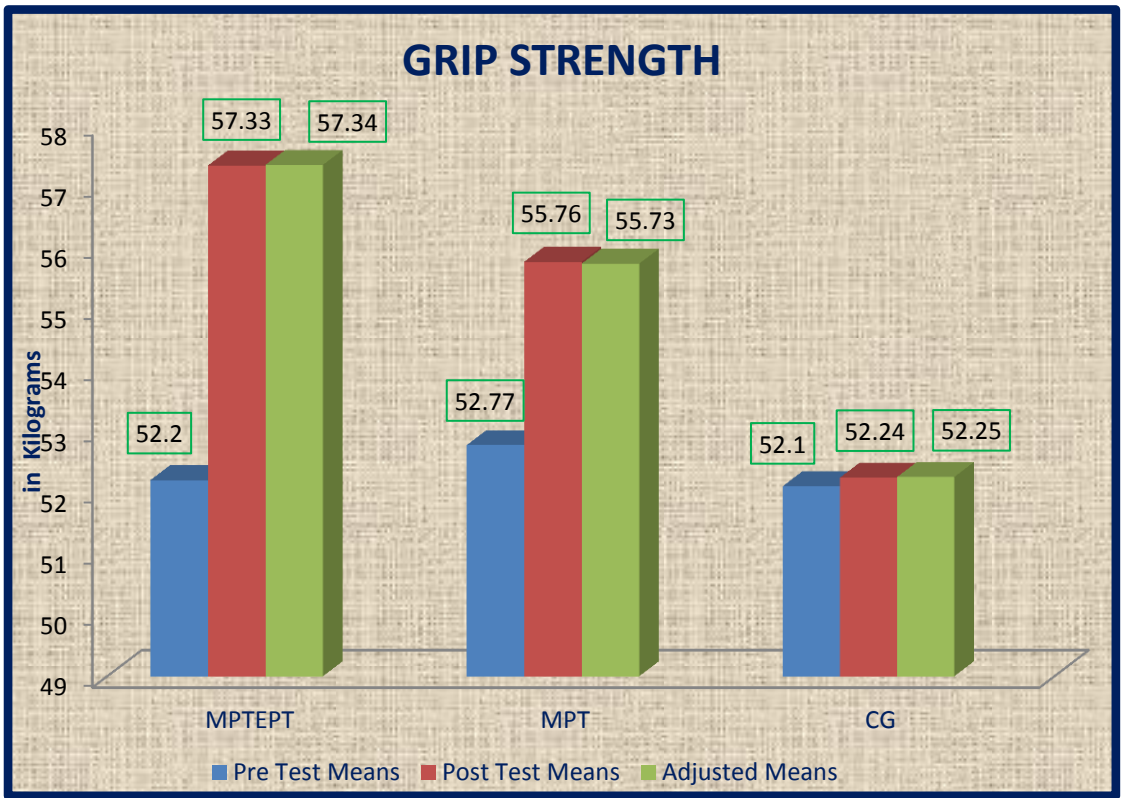

Figure – I: Mean values of pre, post and adjusted post tests of maximal power training with plyometric training, maximal power training and control group on grip strength.

TABLE – III
MEAN, STANDARD DEVIATION AND ADJUSTED MEAN FOR EACH DEPENDENT VARIABLE BY THE CONTROL GROUP

Sl.No	Variables	Pre Test		Post Test		Adjusted Mean
		Mean	SD (±)	Mean	SD (±)	
1	Grip strength	52.10	1.05	52.24	1.15	52.25
2	Upper body strength	5.60	0.31	5.62	0.26	5.62

The table – 4.3 shows that the pre test mean and standard deviation values of grip strength and upper body strength for control group were 52.10 ± 1.05 and 5.60 ± 0.31. The post test mean and standard deviation values of grip strength and upper body strength for control group are 52.24 ± 1.15 and 5.62 ± 0.26. The adjusted post test means of grip strength and upper body strength for control group are 52.25, 5.62.

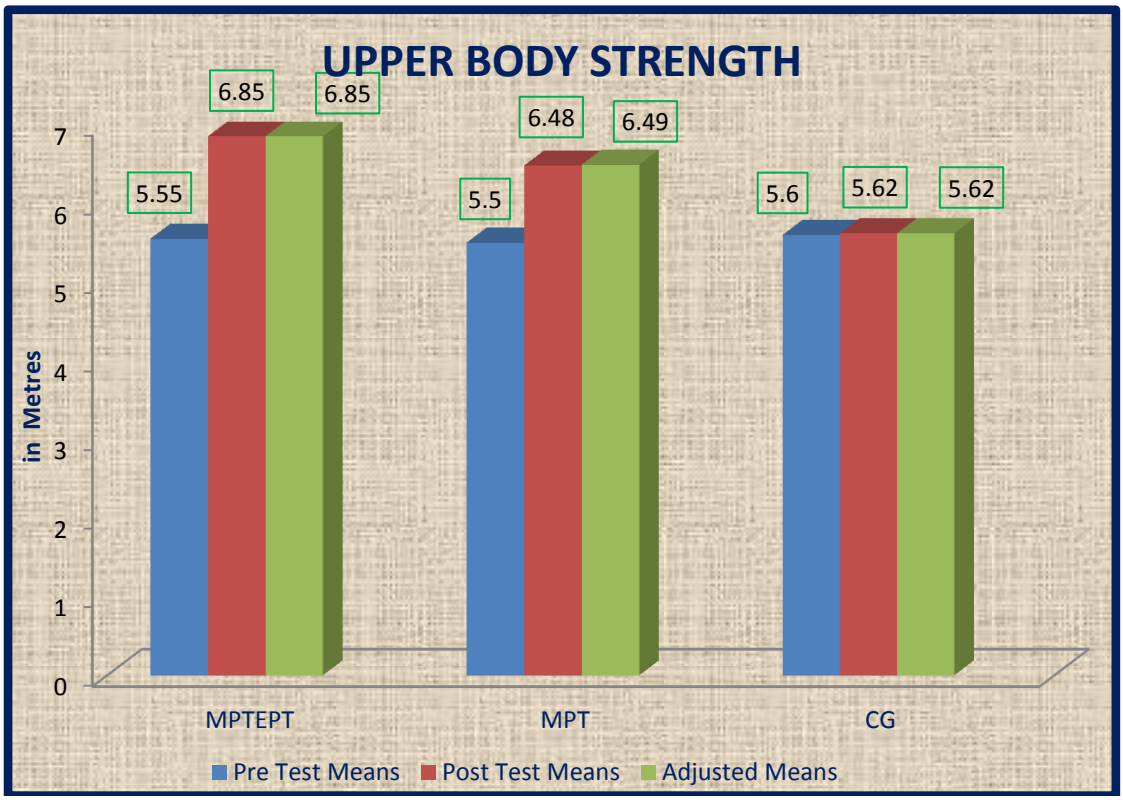

Figure – II: Mean values of pre, post and adjusted post tests of maximal power training with plyometric training, maximal power training and control group on upper body strength.

TABLE – III
RESULTS OF ANALYSIS OF COVARIANCE FOR THE SELECTED DEPENDENT VARIABLES AMONG THREE GROUPS

Variables	Obtained 'F'-ratio	Eta2	Account of Variance
Grip strength	64.46*	0.697	69%
Upper body strength	57.06*	0.671	67%

* Significant at 0.05 level
(The table value required for 0.05 level of significance with df 2 & 56 is 3.16)

From the above table it is observed that the obtained 'F'-ratio values of grip strength and upper body strength, among the adjusted post test means of the experimental groups were 64.46 and 57.06. The table value required for significance at 0.05 level of confidence with df (2 and 56) is 3.16. The obtained 'F' –ratio values were found to be greater than the table value hence, it indicated that there was significant difference among the experimental groups on grip strength and upper body strength of the handball players. The effects accounted for

69% of the variance on Grip strength (Eta2=0.697), 67% of the variance on upper body strength (Eta2=0.671).

TABLE – IV
SUMMARY OF THE SCHEFFE'S POST HOC PAIRWISE COMPARISONS AND EFFECT SIZE

Variables	MPTWPT Vs MPT	MPTWPT Vs CG	MPT Vs CG	C.I. Value
Grip strength	1.61*	5.09*	3.48*	1.14
Upper body strength	0.36*	1.23*	0.87*	0.29

CI value – Confidence Interval value of Scheffe's post hoc test.
*Significant at 0.05 level

The above table indicated that the post hoc pairwise mean difference values between the adjusted post test mean values of maximal power training with plyometric training and maximal power training groups on selected dependent variables such as grip strength and upper body strength were 1.61 (CI=1.14) and 0.36 (CI=0.29). The adjusted post test mean values of maximal power training with plyometric training and control groups on the development of grip strength and upper body strength were 5.09 (CI=1.14) and 1.23 (CI=0.29). the adjusted post test mean values of maximal power training and control group on the development of grip strength and upper body strength were 3.48 (CI=1.14) and 0.87 (CI=0.29).

Conclusion

1. The result reveals that grip strength and upper body strength the maximal power training with plyometric training group showed significant differences than the maximal power training and control group.

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