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EFFECT OF PLYOMETRIC TRAINING AND HANDBALL PRACTICE ON SELECTED MOTOR FITNESS VARIABLES AMONG COLLEGE MEN

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Abstract
The purpose of the study was to find out the effect of plyometric training and handball practice on selected motor fitness variables among college men. To archive this purpose of the study forty five college men from Vellammal College of engineering and technology, Madurai, were randomly selected as subjects. The age of the subjects ranged between 21 to 25 years. The selected subjects were divided into three equal groups of fifteen subjects each. The experimental group – 1(n=15) underwent plyometric training, the experimental group – 2 (n = 15) underwent handball practice training and control group-3 (n= 15) did not participate in any special training programme apart from their regular activities. All the subjects of three groups were tested on selected criterion variables such as agility and muscular strength endurance at prior to immediately after the training. The Analysis of Covariance was used for interpreting the results. On the basis of the results the impact of plyometric and handball practice training has significantly contributed to the improvement agility and muscular strength endurance.

Key Words: Plyometric Training, Handball, Agility, Muscular Strength Endurance.

INTRODUCTION

Plyometrics, also known as "jump training" or "plyos", are exercises in which muscles exert maximum force in short intervals of time, with the goal of increasing power (speed-strength). This training focuses on learning to move from a muscle extension to a contraction in a rapid or "explosive" manner, such as in specialized repeated jumping (Chu 1998). Fred Wilt, a former US Olympic long-distance runner, is credited with coining the term plyometrics. Plyometrics are primarily used by athletes, especially martial artists, sprinters and high jumpers, (Starks, 2013) to improve performance, (Yessis, 2009) and are used in the fitness field to a much lesser degree (Yessis, 2013).

Since its introduction in the early 1980s, two forms of plyometrics have evolved. In the original version of plyometrics, created by Russian scientist Yuri Verkhoshansky, it was defined as the shock method (Verkhoshanski, 1966,1967). In this, the athlete would drop down from a height and experience a "shock" upon landing. This in turn would bring about a forced eccentric contraction which was then immediately switched to a concentric contraction as the athlete jumped upward. The landing and takeoff are executed in an extremely short period of time, in the range of 0.1- 0.2 seconds. The shock method is the most effective method used by athletes to improve their speed, quickness, and power after development of a strong strength base (Verkhoshanski, 1967). The second version of plyometrics, seen to a very great extent in the United States, relates to doing any form of jump regardless of execution time. Such jumps cannot be considered truly plyometric (as described by Verkhoshansky) since the intensity of execution is much lower and the time required for transitioning from the eccentric to the concentric contraction is much greater.

Handball is played by approximately 19 million players distributed between 800 thousand teams across 167 member federations listed by the International Handball Federation. The sport requires that handball players possess various technical skills (e.g. shooting and passing) and fitness components (e.g. jumping ability, speed, endurance) to reach the highest levels (Marques and Gonzalez-Badillo, 2006; Ronglan et al., 2006; Buchheit et al., 2009; Ingebrigtsen and Jeffreys, 2012; Ingebrigtsen et al., 2012).

METHODOLOGY

The purpose of the study was to find out the effect of plyometric training and handball practice on selected motor fitness variables among college men. To archive this purpose of the study forty five college men from Vellammal College of engineering and technology, Madurai, were randomly selected as subjects. The age of the subjects ranged between 21 to 25 years. The selected subjects were divided into three equal groups of fifteen subjects each. The experimental group – 1(n=15) underwent Plyometric training, the experimental group – 2 (n = 15) underwent Handball practice training and control group-3 (n= 15) did not participate in any special training programme apart from their regular activities. The experimental groups were subjected to the training during morning hours for Three days for twelve weeks. The Plyometric training and Handball Practice training was selected as independent variables and the selected criterion variables such as Agility and Muscular strength endurance at prior to immediately after the training programme by using shuttle run and bent knee sit-ups

respectively. The experimental design selected for this study was pre and post test randomized design. The data were collected from each subject before and after the training period and statistically analyzed by using analysis of covariance

ANALYSIS OF DATA

The influence of Plyometric training and Handball practice training on each variable was analyzed separately and presented below.

RESULTS

AGILITY

Table 1 shows the analyzed data on Agility. The pre-test means of agility were 14.17 for experimental group I, 14.33 for experimental group II and 12.72for control group. The obtained "F" ratio was 3.012. The post-test means of agility were 12.60 for experimental group I, 11.97 for experimental group II and 12.20 for control group. The obtained "F" ratio was 35.84. The adjusted post-test means of agility were 12.09 for experimental group I, 11.34 for and experimental group II and 13.35for control group. The obtained "F" ratio was 78.30. Since, three groups were compared, and whenever they obtained 'F' ratio for adjusted post test was found to be significant, the Scheffe's post hoc test is to be employed to find out the significance for the paired mean differences and it was presented in Table 2.

Table 2 shows the Scheffe's post-hoc test results. The ordered adjusted final mean difference for agility of experimental groups I, II and control group were tested for significance at 0.05 level of confidence against confidential interval value. The mean differences between experimental group I and experimental group II, experimental group I and control group and experimental group II and control group were 0.75, 1.26 and 2.01 respectively and it was seen to be greater than the confidential interval value of 0.18. Hence all the comparisons were significant.

Table 1, Analysis of Covariance of Pre-Test Post Test and Adjusted Post Test on Agility of Different Groups (Scores in Seconds)

Test	EXP G-I	EXP G-2	CG	SV	SS	Df	MS	F Value
Pretest								
Mean	14.17	14.33	12.72	Between	43.047	2	21.523	3.012
				Within	25.229	42	0.601	
Post test								
Mean	12.60	11.97	12.20	Between	3.007	2	1.503	35.84*
				Within	20.833	42	0.496	
Adjusted Post test								
Mean	12.09	11.34	13.35	Between	13.333	2	6.551	78.30*
				Within	3.491	41	0.085	

* Significant at .05 level of confidence.

Table- 2,Scheffe's Post Hoc Test Mean Differences On agility among Three Groups (Scores in seconds)

Experimental Group I	Experimental Group II	Control Group	Mean Differences	Confidence Interval Value
12.09	11.34	-	0.75*	0.18
12.09	-	13.35	1.26*	0.18
-	11.34	13.35	2.01*	0.18

* Significant at .05 level of confidence.

MUSCULAR STRENGTH ENDURANCE

Table 3 shows the analyzed data on muscular strength endurance. The pre-test means of muscular strength endurance were 19.10 for experimental group I, 19.70 for experimental group II and 19.80 for control group. The obtained "F" ratio was 0.40. The post-test means of muscular strength endurance were 21.10 for experimental group I, 22.90 for experimental group II and 19.90 for control group. The obtained "F" ratio was 8.96. The adjusted post-test means of muscular strength endurance were 21.34 for experimental group I, 22.81 for and experimental group II and 19.76 for control group. The obtained "F" ratio was 15.05.

Table - 3 Analysis of Covariance of Pre-Test Post Test and Adjusted Post Test on Muscular Strength Endurance of Different Groups (Scores in numbers)

Test	EXP G-I	EXP G-2	CG	SV	SS	Df	MS	F Value
Pretest								
Mean	19.10	19.70	19.80	Betwe en	2.87	2	1.43	0.40
S.D.	2.08	2.11	1.40	Within	96.60	42	3.58	
Post test								
Mean	21.10	22.90	19.90	Between	45.60	2	22.80	8.96*
S.D.	1.40	1.79	1.19	Within	68.70	42	2.54	
Adj-Post test								
Mean	21.34	22.81	19.76	Between	46.63	2	23.31	15.05*
				Within	40.28	41	1.55	

* Significant at .05 level of confidence.

Since, three groups were compared, and whenever they obtained 'F' ratio for adjusted post test was found to be significant, the Scheffe's post hoc test is to be employed to find out the significance for the paired mean differences and it was presented in Table 4.

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Table 4,Scheffe's Post Hoc Test Mean Differences on Muscular Strength Endurance among three Groups (Scores in numbers)

Experimental Group I	Experimental Group II	Control Group	Mean Differences	Confidence Interval Value
21.34	22.81	-	1.47*	1.44
21.34	-	19.76	1.58*	1.44
-	22.81	19.76	3.05*	1.44

* Significant at .05 level of confidence.

Table 4 shows the Scheffe's post-hoc test results. The ordered adjusted final mean difference for muscular strength endurance of experimental groups I, II and control group were tested for significance at 0.05 level of confidence against confidential interval value. The mean differences between experimental group I and experimental group II, experimental group I and control group and experimental group II and control group were 1.47, 1.58 and 3.05 respectively and it was seen to be greater than the confidential interval value of 1.44. Hence all the comparisons were significant.

CONCLUSIONS

It was found that plyometric and hand ball skill training improve agility and muscular strength endurance. However plyometric training is far more superior to the skill based hand ball training. Hence it is concluded that to improve agility and muscular strength endurance plyometric training is desirable.

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