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Effect of Plyometric Training on Selected Physical Fitness Variables among Women Basketball Players

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Abstract

The purpose of present study was to find out the effect of plyometric training on selected physical fitness variables among female basketball players of Annamalai University. For this purpose, twenty female basketball players, studying in various departments of Annamalai University, in the age group of 18 - 25 years were selected as subjects. The selected subjects were divided into two equal groups, in which, group – I (n = 10) underwent plyometric training and group – II (n = 10) acted as control which did not participate any special training but allowed to take part in their regular basketball training and playing programme. The training programme was carried out for this study was three days per week for eight weeks. Prior to and after the training period the subjects were tested for shoulder muscular strength, agility, explosive power in terms of vertical and horizontal distances. The shoulder muscular strength and agility were assessed by administering push-ups test and shuttle run. The explosive power in terms of vertical and horizontal distances was measured by administering Sergeant jump test and standing broad jump test respectively. The statistical tool used for the present study was Analysis of Covariance (ANCOVA). After applying the ANCOVA, it was found that the there was a significant improvement in the shoulder muscular strength, agility and explosive power in terms of vertical and horizontal distances for plyometric training group when compared with the control group. Moreover the result of the study shows that there was significant difference that was exists between plyometric training group and control group on selected criterion variables.

Keywords: Plyometric training, shoulder muscular strength, agility, explosive power in terms of vertical and horizontal distances.

Introduction

Plyometrics, known as "jump training" or "plyos", are exercises based around having muscles, exert maximum force in short intervals of time, with the goal of increasing both shoulder muscular strength and power. This training focuses on learning to move from a muscle extension to a contraction in a rapid or "explosive" manner, for example with specialized repeated jumping.[1,2] First popularized in the 1970s by state sports trainers in the former East Germany, it's based on scientific evidence showing that the stretch-shortening cycle prompts the stretch or “myotactic” reflex of muscle and improves the power of muscular contraction.[2] Plyometric training strengthens muscles and decreases impact forces on the joints, it may reduce the risk of injury in some people, especially in younger female basketball and soccer players who have a risk of anterior cruciate ligament (ACL) injury that's two to eight times higher than that of their male counterparts.[3]

Strength is the maximum force that can be developed in a muscle or group of muscles during a single maximal contraction. [4,6] The rate of force development is at the maximum for any type of muscle action is explosive power. In activities requiring high acceleration and output, explosive power training is necessary for maximum development.[5,7]

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Methodology

This study under investigation involves the experimentation of plyometric training on shoulder muscular strength, agility, explosive power in terms of vertical and horizontal distances. Female basketball players those who were studying in various departments, Annamalai University and aged between 18 and 25 years were selected. The selected female basketball players were randomly divided into two groups of fifteen each, out of which group – I (n = 15) underwent plyometric training, and group - II (n = 15) remained as control. The training programme was carried out for three days per week during morning session only (6 am to 8 am) for eight weeks. Shoulder muscular strength and agility were measured by administering push-ups test and shuttle run, explosive power in terms of vertical distances was measured by administering Sergeant jump and explosive power in terms of horizontal distances was

measured by administering standing broad jump.

After assessing the 1 RM test for all female basketball players in experimental group, the training load was fixed accordingly. Then the experimental group underwent plyometric training programme for 3 days per week for 8 weeks. The control group did not participate in any special training programme on strenuous physical activities apart from their day to day activities. The experimental group underwent their plyometric training programme under the instruction and supervision of the investigators.

The data were collected on selected criterion variables such as shoulder muscular strength, agility, explosive power in terms of vertical and horizontal distances were measured by using push-ups test, shuttle run, Sergeant jump and standing broad jump before and after the eight weeks of plyometric training programme as pre and post test. Analysis of covariance (ANACOVA) was applied to find out significant difference if any between the experimental and control group.

Results and Discussions

The data collected prior to and after the experimental periods on shoulder muscular strength, agility, explosive power in terms of vertical and horizontal distances on plyometric training group and control group were analysed and presented in the following table - I.

Table I. Analysis of Covariance and 'F' ratio for Shoulder Muscular Strength, Agility, Explosive Power in terms of Vertical and Horizontal Distances for Plyometric Training Group and Control Group

Variable Name	Group Name	Plyometric Training Group	Control Group	'F' Ratio
Shoulder Muscular Strength	**Pre-test Mean ± S.D**	18.25 ± 1.10	17.39 ± 1.19	0.979
	Post-test Mean ± S.D.	20.39 ± 1.68	17.86 ± 1.77	9.793*
	Adj. Post-test Mean ± S.D.	21.86	17.91	12.886*
Agility	**Pre-test Mean ± S.D**	18.89 ± 0.893	18.33 ± 0.897	0.7263
	Post-test Mean ± S.D.	17.93 ± 0.776	18.56 ± 0.773	26.39*
	Adj. Post-test Mean ± S.D.	17.167	18.731	30.887*
Explosive Power in terms of Vertical Distances	**Pre-test Mean ± S.D**	42.31 ± 1.22	42.36 ± 1.09	1.0001
	Post-test Mean ± S.D.	48.32 ± 0.99	42.32 ± 6.56	5.533*
	Adj. Post-test Mean ± S.D.	47.59	52.41	10.22*
Explosive Power in terms of Horizontal Distances	**Pre-test Mean ± S.D**	1.22 ± 1.296	1.29 ± 1.022	0.099
	Post-test Mean ± S.D.	1.01 ± 0.98	1.21 ± 1.10	4.59*
	Adj. Post-test Mean ± S.D.	1.12	1.10	5.11*

* Significant at .05 level of confidence.

(The table value required for significance at .05 level of confidence with df 1 and 18 and 1 and 17 were 4.41 and 4.45 respectively).

Table - I showed that there was a significant difference between plyometric training group and control group on shoulder muscular strength, agility, explosive power in terms of vertical and horizontal distances. Further the results of the study showed that there was a significant improvement on shoulder muscular strength, agility due to eight weeks of plyometric training programme. The result of the study also shows that there was a significant improvement in explosive power in terms of vertical and horizontal distances for plyometric training group when compared with the control group.

Conclusions

1. There was a significant difference between plyometric training and control groups on shoulder muscular strength, agility, explosive power in terms of vertical and horizontal distances.

2. There was a significant improvement on shoulder muscular strength, agility after the eight weeks of plyometric training programme.
3. There was also a significant improvement in explosive power in terms of vertical and horizontal distances after the plyometric training programme.

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