



EFFECT OF PLYOMETRIC TRAINING ON SELECTED PHYSICAL FITNESS AND PHYSIOLOGICAL VARIABLES AMONG MALE BASKETBALL PLAYERS

Dr. S. CHIDAMBARA RAJA

Associate Professor, Department of Physical Education and Sports Sciences, Annamalai University.

Abstract

The purpose of present study was to find out the effect of plyometric training on selected physical fitness and physiological variables among male basketball players of Annamalai University. For this purpose, twenty male basketball players, studying in various classes and 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 leg strength, muscular endurance, resting pulse rate and vital capacity. The leg strength and muscular endurance were assessed by using dynamometer. The resting pulse rate was assessed by counting the arterial pulse for one minute at resting condition and vital capacity was assessed by using wetspirometer respectively. The statistical tool used for the present study was Analysis of Covariance (ANCOVA). After applying the ANCOVA, it was found that there was a significant improvement in the leg strength, muscular endurance, resting pulse rate and vital capacity for plyometric training group when compared with the control group. Moreover the result of the study shows that there was significant difference that was existed between plyometric training group and control group on selected criterion variables.

Key words: *Plyometric training, leg strength, muscular endurance, resting pulse rate and vital capacity.*

INTRODUCTION

Training is a systematic process of repetitive progressive exercise of work involving, learning and acclimatization.[1] Training means, various physical exercises and other objects methods and procedures, which are used for the improvement maintenance and recovery of performance capacity and performance

readiness. [2] In sports the word training is generally understood to be a synonyms of doing physical exercise. In a narrow sense training is physical exercise for the improvement of performance.[2]

Plyometrics, also 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 speed 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.[3.4] 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.[5]

Plyometric training strengthens muscles and decreases impact forces on the joints, it may reduce the risk of injury in some people, especially in younger male 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. [6]

Strength is the maximum force that can be developed in a muscle or group of muscles during a single maximal contraction. [7] 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.[8] Pulse rate is nothing but heartbeat and the number of time heartbeats per minute.[9] Vital capacity is the maximal volume of gas that can be inspired from the resting expiratory level.[10]

MATERIALS & METHODS

This study under investigation involves the experimentation of plyometric training on leg strength, muscular endurance, resting pulse rate and vital capacity. Male basketball players those who were studying in various departments, Annamalai University and aged between 18 and 25

years were selected. The selected male 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. Leg strength and muscular endurance were measured by using dynamometer and sit-ups test. Resting pulse rate was assessed by asking the players to lie down (resting condition) and count the arterial pressure for one minute. Vital capacity was assessed by using wetspirometer.

After assessing the 1 RM test for all male 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 regular basketball practicing and playing sessions. 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 leg strength, muscular endurance, resting pulse rate and vital capacity were measured by using leg lift with the dynamometer, sit-ups test, counting the arterial pressure at resting condition and wetspirometer 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.

ANALYSIS OF DATA

The data collected prior to and after the experimental periods on leg strength, muscular endurance, resting

pulse rate and vital capacity of plyometric training group and control group were analysed and presented in the following table - I.

Table – I

Analysis of Covariance and ‘F’ ratio for Leg Strength, Muscular endurance, Resting Pulse Rate and Vital Capacity for Plyometric Training Group and Control Group

Variable Name	Group Name	Plyometric Training Group	Control Group	‘F’ Ratio
Leg Strength (in kgs.)	Pre-test Mean ± S.D	58.66 ± 1.08	58.97 ± 1.21	0.88
	Post-test Mean ± S.D.	62.12 ± 1.00	58.99 ± 1.58	28.33*
	Adj. Post-test Mean	62.28	60.10	31.21*
Muscular Endurance (nos. /min)	Pre-test Mean ± S.D	50.27 ± 1.11	50.10 ± 1.00	0.97
	Post-test Mean ± S.D.	54.55 ± 1.09	50.87 ± 1.05	32.28*
	Adj. Post-test Mean	54.39	50.65	44.73*
Resting Pulse Rate (nos. /min)	Pre-test Mean ± S.D	67.41 ± 2.31	68.10 ± 1.89	1.861
	Post-test Mean ± S.D.	66.29 ± 1.013	68.93 ± 2.11	4.893*
	Adj. Post-test Mean	66.086	68.693	12.513*
Vital Capacity (in ltrs.)	Pre-test Mean ± S.D	3.36 ± 0.0963	3.33 ± 0.0863	0.735
	Post-test Mean ± S.D.	3.93 ± 0.0761	3.46 ± 0.0961	4.19*
	Adj. Post-test Mean	4.015	3.414	9.861*

* 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).

RESULTS

Table - I showed that there was a significant difference between plyometric training group and control group on leg strength, muscular endurance, resting pulse rate and vital

capacity. Further the results of the study showed that there was a significant improvement on leg strength and muscular endurance, due to eight weeks of plyometric training programme. The result of the study also shows that there was a significant reduction in resting

pulse rate and an improvement vital capacity for plyometric training group when compared with the control group.

CONCLUSIONS

1. There was a significant difference between plyometric training and control groups on leg strength, muscular endurance, resting pulse rate and vital capacity.

2. There was a significant improvement on leg strength, muscular endurance, vital capacity and a significant reduction in resting pulse rate after the eight weeks of plyometric training programme.

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