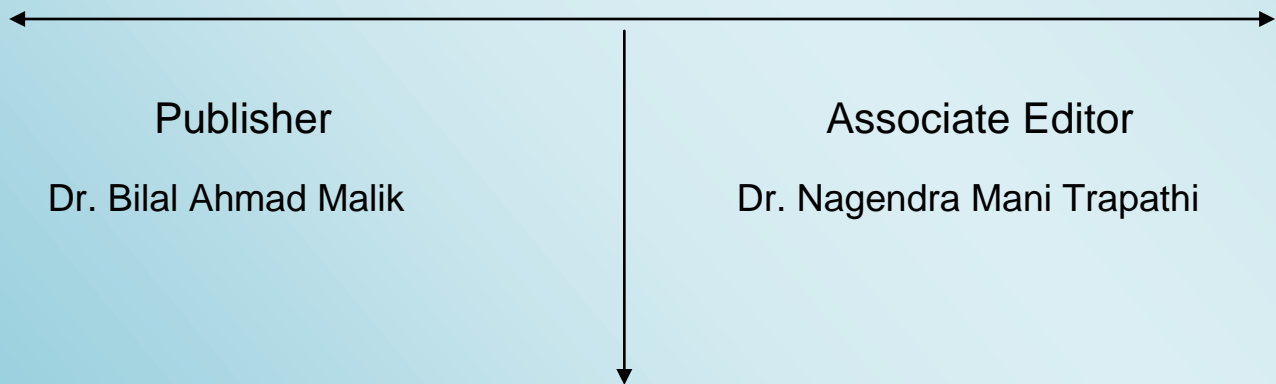# North Asian International Research Journal Consortium

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EFFECT OF PLYOMETRI TRAINING ON SELECTED BIOMOTOR ABILITIES OF UNIVERSITY BASKETBALL PLAYERS

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ABSTRACT

The purpose of the study was to find out the effect of plyometri training on selected biomotor abilities of university basketball players. The study was conducted on the tie basket ball player's women. Totally two groups, namely, control and Experimental group I consisting of 15 basketball players women who underwent tweel weeks practice in selected physical test and Plyometrics Training groups the control group did not undergo any type of training. The physical variables. The data were analyzed by 't' test and analysis of covariance (ANCOVA) and it was concluded that the selected physical test (Plyometrics Training groups) had significant ($p<0.05$).

Key words: Plyometrics Training, Biomotor Abilities

INTRODUCTION

Fitness is determined by what we do twenty four hours a day to live work sit, walk, think, eat and sleep fitness helps to enjoy the life. According to Bucher1 "fitness is the ability of an individual to live a full and balanced life. It involves physical, mental, emotional, social and spiritual factors and the capacity for their wholesome expression. "Biomotor" means "life movement" and so biomotor" abilities are those abilities that are necessary for functional human movement in any environment where you must maintain you own center of gravity over your own base of support. In short any environment where you have to support a load, without external support, while standing on your own feet. Dr. Tudor Bompa, Professor Emeritus from York University in Canada lists the biomotor abilities as: Strength, Endurance, Speed, Coordination, and Flexibility.

Sport training is done for improving sports performance. The sports performance as any other type of human performance is not the product of one single system or aspect of human personality. On the contrary it is the product of the total personality of the sports person. The personality of a person has several dimensions e.g.,

North Asian International Research Journal of Social Science & Humanities   ISSN: 2454-9827   Vol. 2, Issue 11, Nov. 2016

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physical physiological, social and psychic. In order to improve sports performance the social and psychic capacities of the sports person also have to be improved in addition to the physical and physiological ones. In other words the total personality of a sportsman has to be improved in order to improve his performance. Sport training therefore directly and indirectly aims at improving the personality of the sportsman. No wonder therefore sports training is an educational process.

Strength is a conditional ability i.e., it depends largely on the energy liberation processes in the muscles. Strength is also perhaps the most important motor ability in sports as it is a direct product of muscle contractions. All movement in sports is caused by muscle contractions. All movement in sports is caused by muscle contractions and therefore strength is a part and parcel of all motor abilities technical skill and tactical actions. Strength an strength training therefore, assume high importance for achieving good performance in all sports. The role of strength training for general health, good posture and for prevention of injuries is usually overlooked which in the long run can prove harmful. Zimmermann has very rightly pointed out the positive effects of strength training on muscles, bones, joints, heart, circulatory system, metabolism and nervous system.

Strength is ability of muscular or muscle groups to exert force against given resistance. Strength is determined by measuring the maximum time of force that can be exerted. This is referred to as one repetition maximal. Each person needs a certain level of strength. Without strength, it would be impossible to cany out most of the simple tasks that are necessity each day. It is interesting to note that approximately 95% of average Indian college girls lack sufficient strength to do one regular pull-ups.

Speed is the ability of an individual to make successive movement of the same kind in the shortest possible time. For fast reaction, quick acceleration, fast arm, leg and whole body movements by an ability to change direction. Speed maybe defined as the capacity of moving limb or part of the body lever system or whole body with the greatest possible velocity.

The endurance required for effort excess of 8 minutes duration and during which time there is no essential decrease in speed. The performance depends almost exclusively on aerobic efficiency as the time increases, so the aerobic role becomes more exclusive. These types of endurance should be considered as virtually synonyms with aerobic endurance/heart endurance etc. The endurance required resisting fatigue due to loading at sub maximum and maximum intensity (approximately 85 -100% maximum intensity) and predominantly aerobic production of

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energy it is essential in sports demanding this types of endurance that speed is not reduced due to fatigue or innovation inhibition.

Flexibility which is considered as range of motion around a joint the base for any movement,. To pick up a small object to sit, stand and to plant a nail into the well one should have flexibility though other factors like strength are also essential. The bones and muscles which form the locomotive system of out body cause movement in segment of one body and also in the whole body. It should be noted that the degree of joint flexibility is depended upon physicogical characteristics underlying the extensibility of the muscles and ligaments surrounding of joint. In addition to note the flexibility is significant in performing skills, the recent advancement in physical medicine and rehabilitation have indicated the importance of flexibility as it is related to general physical fitness.

The work plyometric is derived from the Greed work pleythien meaning 'to increase' or form the "measure" plyometrics refers to exercise that enable muscle to reach maximal strength n as short a time as possible. Jumping exercise are important in sports requiring high levels of speed strength (ability to exert maximum force during high-speed activity) to complete movements such as sprinting, jumping and throwing.

These types of exercises use the force of gravity (by having the athlete step off a box for example) to store energy in the muscles, and them immediately release the energy in the opposite direction.

METHODOLOGY

The purpose of the study was to find out the season plyometeric training on selected bio-/motorabilitites for Pondicherry University basketball players. To achieve these purpose thirty basketball players from Pondicherry University, studying in various departments and colleges were randomly selected as subjects. They were divided into two equal groups and each group consisted of 15 subjects. Group I underwent plyomteric training for three days per week for twelve weeks and group II acted as – control who did not participate any special training apart from the regular curricular activities. The subjects were tested on selected criterion variables such as leg strength, speed, cardio-respiratory endurance and flexibility at prior to and immediately after the training period.

North Asian International Research Journal of Social Science & Humanities   ISSN: 2454-9827   Vol. 2, Issue 11, Nov. 2016

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The selected criterion variables such as leg strength was measured by wusing leg lift with dynamometer, speed was measured by conducting 50 meters dash, cardio-respiratory endurance was assessed by administering John Cooper's 12 minutes run/walk test and flexibility was assessed by conducting sit and reach test. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between groups on each selected criterion variables separately. In all the cases, .05 level of confidence was fixed to test the significance, which considered as an appropriate.

TRAINING PROGRAM

During – the training period, the experimental group (Group-I) underwent (n=15 plyometric training for three days per week (alternative days) for twelve weeks. Every day the work out lasted for 30- to 45 minutes approximately including warming up and warming down periods.

Subjects in Group II as control were instructed not to participate in any strenuous physical exercise and specific training throughout the training program me. However, they performed regular activities as per the curriculum.

The training programmes carried out in the Pondicherry University used for the study. The Subjects underwent the respective programmes as per the schedules under the supervision of the investigator.

Each training session was conducted only in the morning time. Prior to every training session both the groups had a ten minutes warm-up exercise involving in the training programmes were questioned about their stature throughout the training period. None of them reported injury. However, muscle soreness and fatigue were reported in the early weeks, which subsided later.

North Asian International Research Journal of Social Science & Humanities **ISSN: 2454-9827** **Vol. 2, Issue 11, Nov. 2016**

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Table I
ANALYSIS OF COVARIANCE ON LEG STRENGTH OF PLYOMETRIC TRAINING GROUP AND CONTROL GROUP

	Control Group	Plyometrics Training goups	Source Of Variance	Sum of squares	d.f	Mean squares	F value
Pre Test mean	92.33	92.80	Between	1.633	1	1.633	0.62
			Within	73.73	28	2.633	
Post Test mean	97.13	92.33	Between	172.80	1	172.80	64.46*
			Within	75.07	28	2.681	
Adjusted Post test	97.26	92.12	Between	186.58	1	186.58	9.36*
			Within	55.14	27	2.042	

*Significant .05 level of confidence.

(The table values required for significance at .05 level confidences with df 1 and 28 and 1 and 27 were 4.20 and 4.21 respectively).

Table –III showed that the pre-test mean values of leg strength for plyometric trininggrouop and control; group were 92.33 ± 1.58 and 92.80 ± 1.74 respectively. The obtained "F" ratio value of 0.62 for pre test scores of Plyometric training group and control group leg strength was less than the required table value of 4.20 for significant with df 1 and 28 at .05 level of confidence. The post-test mean values for leg strength for plyometric training group and control group were 97.13 ± 1.60 and 92.33 ± 1.68 respectively. The obtained 'f' ratio value of 64.46for post - test scores of plyometric training group and control group was greater than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence.

The adjusted post –test mean values of leg strength for plyometric training group and control group were 97.26 and 92.12 respectively. The obtained 'f' eatio value of 91.36 for adjusted post-test scores of plyometric training group and control group were greater than required table value of 4.21 for significance with df 1 and 27 at .05 level of confidence.

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North Asian International Research Journal of Social Science & Humanities   ISSN: 2454-9827   Vol. 2, Issue 11, Nov. 2016

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THE MEAN VALUES OF PLYOMETRIC TRAINING GROUP AND CONTROL GROUP LEG STRENGTH WERE GRAPHICALLY REPRESENTED IN FIGURE-I
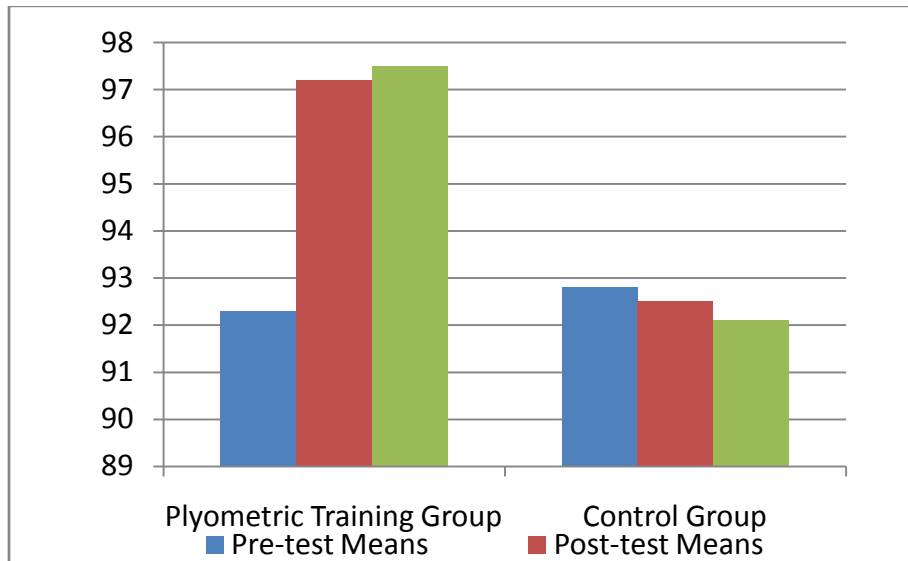

Table – II

ANALYSIS OF COVARIANCE ON LEG SPEED OF PLYOMETRIC TRAINING GROUP AND CONTROL GROUP

	Control Group	Plyometrics Training goups	Source Of Variance	Sum of squares	d.f	Mean squares	F value
Pre Test mean	7.51	7.49	Between	0.0004	1	0.0004	0.52
			Within	0.22	28	0.0008	
Post Test mean	7.45	7.51	Between	0.0025	1	0.0025	2.35*
			Within	0.308	28	0.0011	
Adjusted Post test	7.44	7.52	Between	0.0052	1	0.0042	33.92*
			Within	0.0042	27	0.00015	

*Significant .05 level of confidence.

(The table values required for significance at .05 level of confidence with df 1 and 28 and 1 and 27 were 4.20 and 4.20 and 4.21 respectively).

North Asian International Research Journal of Social Science & Humanities   **ISSN: 2454-9827**   **Vol. 2, Issue 11, Nov. 2016**

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Table – IV showed that the pre-test mean values of speed for plyometric training group and control group were 7.51 ± 0.008 and 7.49 ± 0.01 respectively. The obtained 'F' ratio value of 0.52 for pre test scores ofplometric training group and control group on speed was less than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence.

The post-test mean values for speed for plyometric training group and control group were +0.01 and 7.51+0.113 respectively. The obtained 'F' ratio value of 2.35 for post-test scores of plyometric training group and control group was lesser than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence.

The adjusted post-test mean values of speed for plyometric training group and control group were 7.44 and 7.52 respectively. The obtained 'F' ratio value of 33.92 for adjusted post-test scores of plyometric training group and control group were greater than the required table value of 4.21 for significance with df 1 and 27 at .05 level of confidence.

THE MEAN VALUES OF PLYOMETRIC TRAINING GROUP AND CONTROL GROUP ON SPEED WERE GRAPHICALLY REPRESENTED IN FIGURE – II.
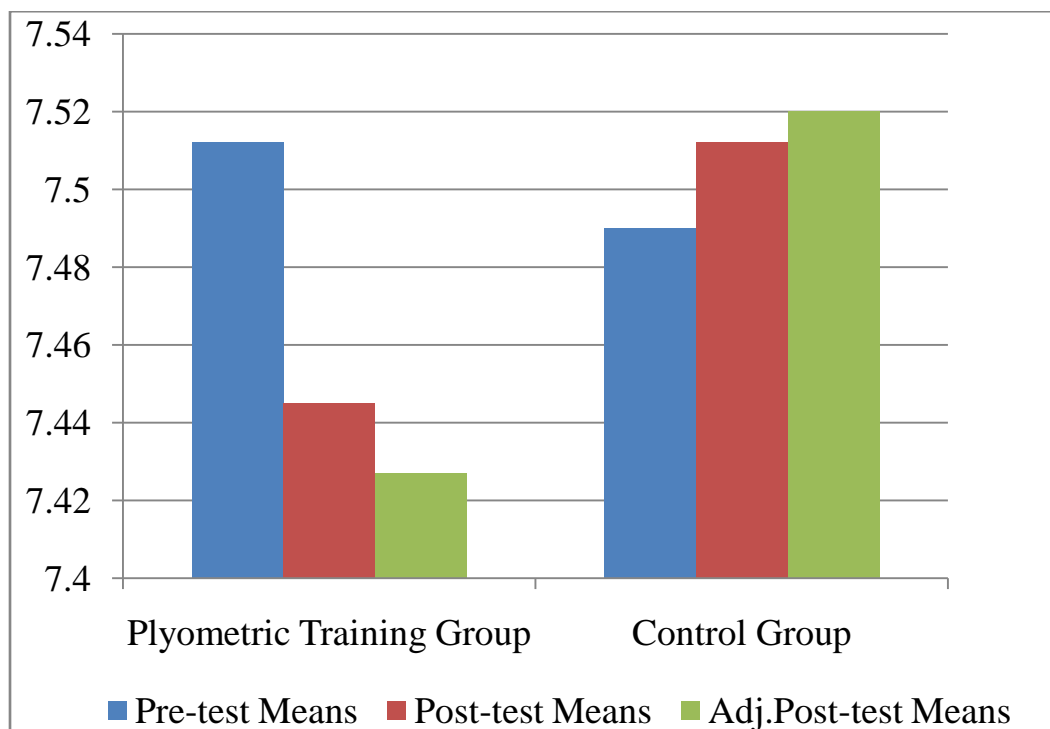
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Table III

ANALYSIS OF COVARIANCE ON LEG CARDIO REPERTORY ENDURANCE OF PLYOMETRIC TRAINING GROUP AND CONTROL GROUP

	Control Group	Plyometrics Training goups	Source Of Variance	Sum of squares	d.f	Mean squares	F value
Pre Test mean	2088.00	2104.67	Between	2083.33	1	2083.33	0.64
			Within	9141.33	28	3264.76	
Post Test mean	2095.33	2135.33	Between	12.000.33	1	12.000.33	4.28*
			Within	78546.67	28	2805.24	
Adjusted Post test	2102.05	2128.62	Between	5174.92	1	5174.92	709.23*
			Within	19149.15	27	709.23	

*Significant .05 level of confidence.

(The table values required for significance at .05 level of confidence with df 1 and 28 and 1 and 27 were 4.20 and 4.20 and 4.21 respectively).

Table – V showed that the pre-test mean values of cardio-respiratory endurance for plyometric training group and control group were 2104.67 + 55.40 and 2088.00 + 55.82 respectively.

The obtained, 'F' ratio value of 0.64 for pre test scores of plyometric training group and control group on cardio-respiratory endurance was less than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence.

The post-test mean values for cardio-respiratory endurance for plyometric training group and control group were 2135.33 + 54.36 and 2095.33 + 51.33 respectively. The obtained 'F' ratio value of 4.28 for post- test scores of plyometric training group and control group was greater than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence.

The adjusted post-test mean values of cardio-respiratory endurance for plyometric training group and control group were 2128.62 and 2102.05 respectively. The obtained 'F' ratio value of 7.30 for adjusted post-test

North Asian International Research Journal of Social Science & Humanities   ISSN: 2454-9827   Vol. 2, Issue 11, Nov. 2016

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scores of plyometric training group and control group were greater than the required table value of 4.21 for significance with df 1and 27 at 0.05 level of confidence.

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THE MEAN VALUES OF TRAINING GROUP AND CONTROL GROUP AND CARIO-RESPIRATORY ENDURANCE WERE GRAPHICALLY REPRESENTED IN FIGURE-III.
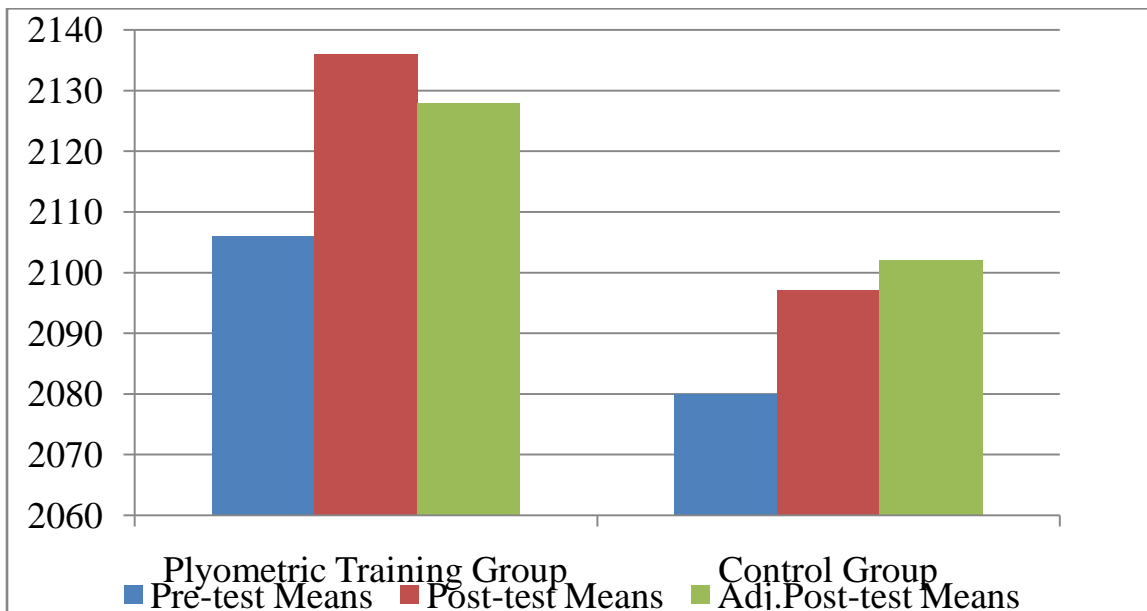

Table IV

ANALYSIS OF COVARIANCE ON FLEXIBILITY OF PLYOMETRIC TRAINING GROUP AND CONTROL GROUP

	Control Group	Plyometrics Training goups	Source Of Variance	Sum of squares	d.f	Mean squares	F value
Pre Test mean	22.07	21.93	Between	0.133	1	0.133	0.031
			Within	119.87	28	4.28	
Post Test mean	22.27	24.00	Between	22.53	1	22.53	6.38*
			Within	98.93	28	3.53	
Adjusted Post test	22.22	24.05	Between	25.24	1	25.24	23.72*
			Within	28.73	27	1.064	

*Significant .05 level of confidence.

North Asian International Research Journal of Social Science & Humanities   ISSN: 2454-9827   Vol. 2, Issue 11, Nov. 2016

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(The table values required for significance at .05 level of confidence with df 1 and 28 and 1 and 27 were 4.20 and 4.21 respectively).

Table – VI showed that the pre-test mean values of flexibility for plyometric training group and control group were 21.93 ± 1.79 and 22.07 ± 2.31 respectively. The obtained 'F' ratio value of 0.031 fir ore test scores of plyometric training group and control group on flexibility was less than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence.

The post-test mean values for flexibility for plyometric training group and control group were 24.00 + 1.77 and 22.27 + 1.98 respectively. The obtained 'F' ratio value of 6.38 for post-test scores of plyometric training group and control group was higher than the required table value of 4.20n for significance with df 1 and 28 at .05 level of confidence.

The adjusted post-test mean values of flexibility for plyometric training group and control group were 24.05 an 22.22 respectively. The obtained 'T' ratio value of 23.72 for adjusted post-test scores of plyometric training group and control group were greater than the required table value of 4.21 for significance with df 1 and 27 at .05 level of confidence.

THE RESULTS OF THIS STUDY SHOWED THAT THERE WAS A SIGNIFICANT DIFFERENCE BETWEEN PLYOMETRIC TRAINING GROUP AND CONTROL GROUP ON FLEXIBILITY WERE GRAPHICALLY REPRESENTED IN FIGURE – IV.
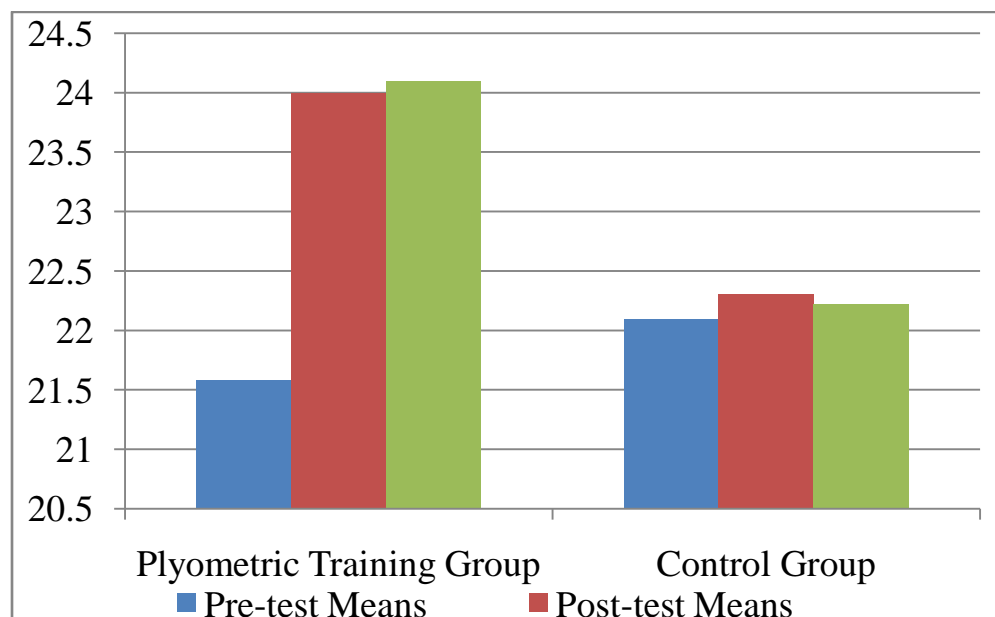
RESULTS

The purpose of the study was to find out the of plyometric training on selected biomotor abilities of Madras University basketball players. To achieve this purpose thirty basketball players form Pondicherry University, studying in various departments were randomly selected as subjects. They were divided into two equal groups and each group consisted od 15 subjects. Group I underwent plyometric training for three days per week for twelve, weeks and group II acted as control who did not participate any special training apart from the regular curricular activities.

The subjects were tested on selected criterion variables such as leg strength, speed, cardio-respiratory endurance and flexibility at prior to and immediately after the training period. The selected criterion variables such as leg strength was measured by using leg lift with dynamometer, speed was measured by conducting 50 metrs dash, cardio-respiratory endurance was measured by using John Cooper's 12 minutes run/walk test and flexibility was measured by using sit and reach test. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between groups on each selected criterion variables separately. In all the cases, .05 level of confidence was fixed to test the significance, which was considered as an appropriate.

CONCLUSIONS

Based on the results of the study, the following conclusions were drawn:

There was a significant difference between plyometric training group and control group on leg strength. There was a significant difference between plyometric training group and control group on speed. There was a significant difference between plyometric training group and control group on cardio-respiratory endurance. There was a significant difference between plyometric training group and control group on flexibility. There was a significant improvement on selected criterion variables such as leg strength, speed, cardio-respiratory endurance and flexibility due to the plyometric training.

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> Dreams are not what you see in sleep,
>
> it is the thing that doesn't let you sleep.
>
> - APJ Abdul Kalam