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Original Research Paper

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EFFECT OF PLYOMETRIC TRAINING AND WEIGHT TRAINING ON LEG EXPLOSIVE POWER AMONG COLLEGE MEN STUDENTS

K. Sakthivel — Ph.D (Full Time Research Scholar), Periyar Maniammai University, Thanjavur, Tamil Nadu

Dr. D. Ramesh* — Asst. Physical Director, Periyar Maniammai University, Thanjavur, Tamil Nadu
*Corresponding Author

ABSTRACT

The present study was to investigate the effect of Plyometric training and weight training on leg explosive power among college men students. To achieve this purpose of the study sixty (N=45) college men students were selected from Alagappa university college of physical education, Karaikudi, Tamil Nadu state, India, during the year 2018-19. The subject's age ranges from 17 to 23 years. The selected subject were divided into three equal groups consists of fifteen subject each namely two experimental groups and control group from college students. The experimental group I underwent Plyometric training group (PTG) and experimental group II underwent Weight training group (WTG) programme for six weeks. The control group was not taking part in any exercise during the course of the study. The dependent variable leg explosive power parameter selected for the study, it was measured by cooper standing broad jump unit of meters .Pre-test was taken before the exercise period and post- test was measured immediately after the six weeks exercise period. The data collected from the three groups were statistically analyzed for significance, the analysis of covariance (ANCOVA) was used and the F ratio was found out. The Scheffe's test is applied as post-hoc test to determine the paired mean differences. The level of significance will be fixed at .05 level of confidence for all the cases. These results suggest that both Plyometric training group and weight training group improve leg explosive power compared than the control group.

KEYWORDS : Plyometric training, Weight training and Leg explosive power

INTRODUCTION

Plyometric exercise tends to be performed in a much more explosive way than traditional strength training. Plyometric training requires the athlete to rapidly develop force, promoting the development of muscular power. The dynamic nature of plyometric training allows for greater improvements in the maximal rate of force development and thus power, in comparison to traditional weight training methods.Plyometric exercise do not involve a large deceleration phase during concentric movement, which occurs in traditional strength training, as the body does not have to achieve zero velocity at the end of the exercise. Thus plyometric exercise involves the production of high forces and accelerations throughout the entire range of motion, specific to most competitive movements.Plyometric exercise tends to be performed in a much more explosive way than traditional strength training. Plyometric training requires the athlete to rapidly develop force, promoting the development of muscular power. The dynamic nature of plyometric training allows for greater improvements in the maximal rate of force development and thus power, in comparison to traditional weight training methods. **Donald A. Chu, (1992)**

Weight training is a popular form of strength exercise usually performed by individuals who are mainly concerned to maintain or enhance overall fitness and strength. Such programme consists of resistance exercises for different body partly. Exercise, mechanics, free weight or body weight bearing exercises are used to produce resistance. Fitness weight training is for the newcomer to the weight room wanting to get into shape and for the serious weight trainer seeking to compete in body building contests. Fitness weight training features tips for starting an individualized weight training program from choosing the proper and desired weight training outcomes. Fitness weight training also has six color-coded workout zones containing fifty progressive workouts. Weight training programs also have a significant effect on changing body composition but do not appear to body weight. The changed composition result from an increase in lean body mass and fat loss. The final result would be decrease in relative fat. By using heavy weights in combination with fewer repetitions showed a larger increase in lean body mass than two other studies that used lighter weights and a higher number of repetitions. These findings showed the specificity of training and generally indicated that weight and repetition is beneficial for increasing strength, losing fat and at the same time, not building bulky muscles.

A standing long jump is often used as a functional test to assess leg power, but the test may underestimate the athlete's true potential if the athlete does not use the best possible technique. The selection of takeoff angle is one of the most important technique variables. Masaki Wakai studied the effects of changes in takeoff angle on performance in the standing long jump. The aim was to identify the optimum takeoff angle and to explain the underlying biomechanics of the standing long jump. **Wakai, M. and Linthorne, N.P. (2005).**

Methods & Materials

This study was selected sixty (N=45) college men students were selected from Alagappa university college of physical education, karaikudi , Tamil Nadu state, India, during the year 2018-19. The subject's age ranges from 17 to 23 years. They were divided into three groups namely Plyometric training group (Experimental group I), Weight training group (Experimental group II), and control group (group III) each consists of 15 subjects. The experimental groups (I & II) were subjected to six weeks of Plyometric training and weight training respectively, and the group III acted as control. The experimental groups I used exercises of Squat Jump, Burpee & Combination Bound ,Drop Push-up ,Plyometric Sit Ups ,Depth Jump ,(45 cm Height) and experimental group II used exercises Military Press, Half Squat, Leg Press, Bench Press, Inclined Sit Ups and the load given were progressively increased from 50%,60%,70% intensity level Plyometric training and weight training drills respectively for one hour per day for three days a week for a period of six weeks. The subjects of all the three groups were tested on leg explosive power prior to and after the training period.

To ascertain leg explosive power parameter measured by standing broad jump tests accordingly the mean value count by meter.

Statistical Technique

The significance of the difference among the means of experimental group was found out by pre-test. The data were analyzed analysis of covariance (ANCOVA) technique was used with 0.05 levels as confidence. Analysis was performed using SPSS 20.0 (SPSS Inc Software).

RESULTS & INTERPRETATION

Table No.1.Analysis of Covariance for the Pre, Post and Adjusted Post Test Means Values for Plyometric training group, Weight training group and Control group on Leg explosive power (Leg explosive power mean value measure by meter)

Test	Plyometric training group	Weight training group	Control group	Source of variance	Sum of square	df	Mean square	'F' ratio
Pre test Mean	2.198	2.20	2.203	Between	0.00028	2	0.00014	0.002
SD	0.252	0.25	0.25	Within	2.65	42	0.063	
Post test Mean	2.23	2.22	2.21	Between	0.048	2	0.0241	0.038
SD	0.25	0.29	0.25	Within	2.64	42	0.063	
Adjusted post test mean	2.24	2.22	2.21	Between	0.0068	2	0.0034	40.143*
				Within	0.0035	41	0.000085	

*Significant at 0.05 level of confidence. Table value required for significance at 0.05 level with df 2 and 42 and 2 and 41 is 3.22.

It is clear from Table I that the pre test mean value of Standing broad jump for plyometric group is 2.198, weight training group is 2.20 and control group is 2.203. The obtained F-ratio 0.002 is less than the table value of 3.22 required for df 2 and 42 at 0.05 level of significant. It is inferred that there is statistically no significant variation among plyometric group, weight training group and control group before the commencement of training programme.

From Table I we can understand that the post test mean scores secured by the plyometric group, weight training group and control group are 2.23, 2.22 and 2.21 respectively. The F-ratio of 0.038 arrived at the statistical calculation is less than the table value of 3.22 required for df 2 and 42 at 0.05 level of significance. It reveals that all the three groups have demonstrated no significant variations on Standing broad jump at the end of training programme.

Table I further shows that the adjusted post test mean values for plyometric group, is 2.24, weight training group is 2.22 and control group is 2.21. The obtained F-ratio 40.143 and is higher than the table value of 3.22 required for df 2 and 41 at 0.05 level of significance. It is found that significance difference exist among the three groups on Standing broad jump, after adjusting the initial mean difference on the post test mean.

Table II Scheffe's test for the differences between the adjusted post-test paired means on Leg explosive power (Leg explosive power means count by meter)

Plyometric training group	Weight training group	Control group	Mean difference	C.I value
2.24	2.22	-	0.02	0.0087
2.24	-	2.21	0.03	
-	2.22	2.21	0.01	

The post hoc test was used to compute the confidence interval for the adjusted post test means and to the significance of the mean difference. The confidence interval for Standing Broad Jump was 0.0087.

The table II (a) presented for showing the adjusted post test means of Plyometric, weight training and control groups. The adjusted post test means difference between the groups of Plyometrics and Weight training groups was 0.02. When computed with the confidence interval the value was lower. The results of the study indicated that there was no significant improvement in the Standing Broad Jump in both plyometric and weight training groups.

The adjusted post test mean difference between plyometric and control group was 0.03 when compared with the confidence interval 0.0087, the obtained value was higher. The results of the study indicated that there was significant improvement in Standing Broad Jump as a result of Plyometirc training.

The adjusted post test mean difference between Weight training and control group was 0.01. When compared with confidence of interval 0.0087, the obtained value was higher. The results of the study indicated that there was significant improvement on Standing Broad Jump as a result of Weight Training.

The result of the study indicated that there was significant improvement in Standing Broad Jump as a result Plyometric training and Weight training groups. As per the result of the study Plyometric training group were improved Standing Broad Jump better when compared to Weight training groups.

DISCUSSION OF FINDING

Improvement in leg explosive power was significant for all the training groups, i.e. group – I (Plyometric training group) and group - II (Weight training group). Lyttle Andrew D., G.J.Wilson and K.J.Ostrowski. (1996) found that there was a significant improvement in leg explosive power in Plyometric training and Weight training programme.

CONCLUSION

After completion of all work following conclusions were draw by the researcher:

1. Plyometric training group was possessed improved leg explosive power than the weight training group and control group.
2. Weight training group was possessed improved leg explosive power than the control group.

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