

## Effect of Plyometric and Maximal Power Training on Anaerobic Power

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### ABSTRACT

The purpose of the study was to find out the effect of plyometric training and maximal power training on leg strength. To achieve this purpose of the study, forty-five male student studying in the department of physical education and sports sciences, Annamalai University, Annamalai nagar, were selected as subjects at random. The age group is between 18 -22 years. The subjects were divided into three equal groups of fifteen each Group I underwent plyometric training programme and group II underwent maximal power training programme for three days per week for twelve weeks and Group III acted as control, which did not participate in any special training programme apart from regular physical activities as per the curriculum. Anaerobic Power was the variable it was measured by Margaria-Kalamen test, all the subjects were tested on anaerobic power<sup>1</sup> prior to and immediately after the training programme. The analysis of covariance was used to analyze the significant difference, if any, among the groups. 0.05 level of confidence was fixed as the level of significance to test the "F" ratio obtained by the analysis of covariance, which was considered as appropriate. The results of the study revealed that there was significant difference among, plyometric training group, maximal power training group and control group on Anaerobic power. It was found that there was a significant improvement on anaerobic power due to plyometric training and maximal power training.

### KEYWORDS

Plyometric Training, Maximal Power Training and Anaerobic Power.

### Introduction

Sports training aims at achieving higher performance in sports competition. In order to achieve high performance, sports training is based on -systematic, facts and principles and it is done in a planned and scientific manner. A system most suitable for achieving high performance has to be first, made on the basis of which sports training is planned, it is always assessed, organized and improved by a coach or sports teacher or some other person. The sports training aims at finding hidden reserves and makes the sports person aware of it. It also aims at greater development of the reserves. The sports person can be able to control their day routine in such a manner that they are able to do training once or twice a day with high effect. Sport training is basically an educational process. So it strives to develop all the aspects of personality. It is a continuous process of perfection and factors and creation of means and methods of improving sports performance and factors of performance (Reaburn and courts, 2000).

Plyometric training is very specific in nature but very broad in applicability. Improving the performance requires using the principles of specific training and progress. The golden rule of any conditioning programme is specificity. This means that the movement you perform should be watched, as closely as possible, the movements encountered during completion. For example, the volleyball player should increase vertical jump height. The drop jump or box jump may be the right exercise to be used. (Herro, 2006).

### Methodology

Maximal power training group and plyometric training group underwent their respective training programmes for twelve weeks for three days per week. Training was given in the morning session only. The training session included warming up and limbering down every day. The work out lasted for 45 to 60 minutes approximately. The experimental group were given plyometric training and maximal power training as given in the tabular column below.

**Table 1. Plyometric Training Programme**

S.No	Name of the Exercises	Duration in Minutes	Intensity (Repetitions)	No. of Sets	Recovery between the sets in Mins
1.	Squat Jump	3	10	2	2
2.	Hopping	3	10	2	2
3.	Bouncing	3	10	2	2
4.	Pounding	3	10	2	2
5.	Zig -Zag jumping	3	10	2	2
6.	Galloping	3	10	2	2

**Table II. Maximal Power Training Programme**

SNO	Name of the exercises	Weight in KGS	Duration in minutes	Intensity (Repetitions)	No. of set	Recovery between the exercises in minutes
1.	Military press (with barbell)	10	3 to 5	8	1	2
2.	Leg curl (Multi station)	5	3 to 5	8	1	2
3.	Lunges (with barbell)	10	3 to 5	8	1	2
4.	Sit ups (With weight plates)	10	3 to 5	8	1	2
5.	Half squats (multi station)	10	3 to 5	8	1	2
6.	Heels raise (Multi station)	5	3 to 5	8	1	2
7	Bent over rows (with barbell)	10	3 to 5	8	1	2
8.	Leg extension (multi station)	5	3to5	8	1	2

## Analysis of the Data

The influence of plyometric training and maximal power training on anaerobic Power variable was analysed separately and presented below.

The analysis of covariance on anaerobic power of pre and post test for maximal power training group and plyometric training group and control group is pretend in table - III.

**Table III. Analysis of Covariance on Anaerobic Power of Pre and Post Test for Plyometric Training, Maximal Power Training and Control Groups**

Test	Plyometric training group	Maximal power training group	Control group	Source of variance	Sum of squares	Df	Meen square	"F" Raito
Pre test Mean	97.81	98.66	95.06	Between	106.52.	2	53.26	2.87
S.D	3.53	3.11	5.78	within	777.48	42	18.51	
Post test Mean	103.65	108.12	96.50	Between	1030.64	2	515.32	21.34
S.D.	5.76	3.45	5.24	Within	1014.35	42	24.15	
Adjusted Post test Mean	103.16	106.97	98.14	Between	520.42	2	260.21	19.48
				Within	547.54	41	13.35	

\* Significant at 0.05 level of confidence. (The table values required for significance at 0.05 level of confidence for 2 and 42 and 41 are 3.22 and 3.23 respectively)

Table - III shows that the Pre - test mean values on anaerobic power for plyometric training, maximal power training and control as 97.81,98.66 and 95.06 respectively. The obtained 'F' ratio of 0.06 for pre - test scores of plyometric

training maximal power training and control groups on anaerobic power was less than the required table value of 3.22 for df 2 and 42 for significance at 0.5 level of confidence. So it is not significant the post - test mean values on anaerobic power for plyometric training, maximal power training and control group as 103.65, 108.12 and 96.50 respectively. The obtained 'F' ratio value of 21.34 for post - test scores of plyometric training, maximal training and control group was more than the required table value of 3.22 for df 2 and 42 for significance at 0.05 level of confidence. Hence it is significant. The adjusted post - test mean of Plyometric training group and maximal power training groups and control as 103.16, 106.97 and 98.14 respectively. The obtained "F" ratio of 19.48 for adjusted post - test means is more than the table value of 3.23 for df 2 and 41 for significance 0.05 level of confidence on anaerobic power.

The results of the study indicated that there was a significant difference between the adjusted post - test means of plyometric training, maximal power training and control group on anaerobic power.

Since three groups were compared and the adjusted Post test was found to be significant, the Scheffé's test was used to find out the paired mean differences and presented in table - IV.

**Table IV.** The Scheffé's test for the differences between paired means on anaerobic power

Plyometric training group	Maximal power training group	Control group	Mean Differences	Confidence interval value
103.16	106.97	-	3.18*	3.37
103.16 103.16	-	98.14	5.02	3.37
-	<b>106.97</b>	98.14	8.83	3.37

\* Significant at 0.05 level of confidence

Table IV reveals that the difference between the adjusted post- test means on anaerobic power between plyometric training and maximal power training group is 3.18, which is statistically significant at 0.05 level of confidence. The adjusted post-test mean difference between maximal power training group and control group, plyometric training and control group were 5.02 and 8.83 respectively, which is higher than the confidence interval of 3.37 so it is significant at 0.05 level of confidence.

## Results and Discussion of Findings

The result of the study indicates that plyometric training resulted a significant improvement in developing the anaerobic power. The difference between adjusted post - test means between plyometric training and maximal power training groups is found to be not significant. However, the mean of maximal power training group is better than plyometric training group.

The results of the study also showed that there was a significant difference between maximal power training group and control group, plyometric training group and control group on anaerobic power.

The results were in confirmation with the findings of numerous studies published recently. Anaerobic power improved through maximum strength programme. (Lammer, 2007) and (Linda B Kaufman, 2007), and also the investigation clearly pointed out that plyometric training would help to improve the leg strength (Herrero, 2006).

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