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Research Paper

# EXPERIMENTAL FACT OF EXPLOSIVE POWER SEQUENCING WITH PLYOMETRICS AND WEIGHT TRAINING AMONG MEN VOLLEYBALL PLAYERS

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**Abstract**

Explosive Power among men Volleyball Players was tested using the training package of plyometrics and weight training. To assess the effects, the score on the selected variable was recorded before and after the training schedule. The statistical significance was felt during the statistical analysis as the effect of the training for the scheduled duration which proves the impact of the training on the selected variable.

**Key words:** Weight Training, Plyometric Exercises, Explosive Power.

## Introduction

Strength is an important base upon which some other qualities are developed. Therefore the main physical quality needed in sports is strength. However is close examination of almost all spots, it can be seen that though strength is definitely important, development of other Parameters is also essential. Degree of muscular strength differs from individual to individual, player to player and activity to activity. The strength test is included in almost all test batteries of the fitness performance. This paper aims to study the contributing effects of plyometrics combined with weight training on explosive power among men volleyball players.

## Plyometric Training

Plyometrics derives its name from "Plethycin" to increase, combining with isometric. It is a resistance training activity that involves an interaction between muscles and the control. Plyometrics is defined as exercise that enables a muscle to reach maximum strength in a short time possible. For an exercise to be truly plyometric, it must be a movement preceded by an eccentric contraction.

## Weight Training

Training intensity is recognized as the most critical aspect of a conditioning regime. Intensity of training is often synonymous with training load (amount of weight per repetition). Intensity is most easily represented as a percentage of one's repetition maximum (RM) for an exercise. RM refers to the maximum number of repetition that can be performed with a load.

## Methodology

The selection of subjects was made at random. Thirty men volleyball players from Vellore district of Tamilnadu were selected and were divided into two equal groups, namely group 'A' and group 'B'. The group 'A' was an experimental group and group 'B' was a control group. The experimental group underwent the

selected training programme (Plyometric Training combined with Weight Training) for six weeks, whereas the control group did not undergo any training. The initial and final scores of the subjects were recorded before and after the training for comparison.

**Test Administration**

The test "Vertical Jump" was administered to find out the explosive power of the subjects. The highest range of jump reached in height was recorded in centimeters.

**Training schedule**

**Weight Training**

The subjects were asked to warm up and the maximum weight they can lift between 1 and 10 times were measured. Then they were asked to as many repetitions as they can with the maximum weight they selected earlier. The 1 RM (Repetition Maximum) was calculated by multiplying the weight times the number of repetitions time 0.025. 1 RM = Weight x Repetitions x 0.025. The principle behind this is for every 2.5 percent of one's 1 RM he drop, he can probably do one more repetition. Accordingly the load of the individual subject was fixed for the various exercise routines. The load dynamics of the training is given in the Table I.

**Table - I**

**Load Dynamics of the Weight training**

| Sl. No. | Weeks | Intensity % 1RM | Exercise Load (kgs) | | | |
|---|---|---|---|---|---|---|
| | | | Front Squat | Leg Curl | Leg Extension | Leg Thrust |
| 1 | 1 & 2 | 60 | 30 | 12 | 9 | 30 |
| 2 | 3 | 70 | 35 | 14 | 10.5 | 35 |
| 3 | 4 | 80 | 40 | 16 | 12 | 40 |
| 4 | 5 & 6 | 90 | 45 | 18 | 13.5 | 45 |

The weight training group underwent a progressive weight training programme for six weeks in the following exercises, aimed at improving leg strength and explosive power.

a) Back Squat
b) Leg Curl
c) Leg Extension
d) Leg Press

**Plyometric Training**

The Plyometric exercises were performed one in the stairs and two using 22 inch boxes.

**1. Stair climbing exercise**

The load and intensity of the exercises involved in the stair climbing are given in the Table – II.

**Table – II**

**Load and Intensity of the Stair Climbing Exercises**

| Types of Exercise | No. of Weeks | Repetition | Recovery time between repetition(min) |
|---|---|---|---|
| 1. Hopping up and down the Stairs using right leg. | 1x2 | 2 | 2 |
| | 3x4 | 3 | 2 |
| | 5x6 | 4 | 2 |
| 2. Hopping up and down the stairs using left leg. | 1x2 | 2 | 2 |
| | 3x4 | 3 | 2 |
| | 5x6 | 4 | 2 |
| 3. Hopping up and down the stairs using both legs. | 1x2 | 2 | 2 |
| | 3x4 | 3 | 2 |
| | 5x6 | 4 | 2 |

**2. Depth Jump**

For the purpose three wooden boxes of 22 inch height were kept at 3 feet distance from each other and arranged in a straight line. The subjects started the exercise by standing on the box and jump down between boxes 1 and 2 then jumped and claimed on box 2. With another jump he repeated this process till he jumped down form box no.3 and he runs back to box no 1. This process was continued nonstop for the specific time given in the Table-III.

**Table – III**
**Load Intensity of the Depth Jump Exercise**

| Sl. No | No. of Weeks | Duration of Hour | No. of Repetitions | Recovery Time |
|---|---|---|---|---|
| 1 | 1 x 2 | 2 Min | 2 | 2 |
| 2 | 3 x 4 | 3 Min | 2 | 2 |
| 3 | 5 x 6 | 4 Min | 2 | 2 |

**Statistical Technique**

The data collected from both the groups were statistically analyzed by using ANCOVA. To make adjustment for difference in initial means, the adjusted post means were calculated. The criterion for statistical significance was set at 0.05 level of confidence. Since two groups were involved, whenever the 'F'-ratio was found to be significant for adjusted post test means. In all the cases to test the significance 0.05 level of confidence was utilized.

**Results of Explosive power** **Table – IV**

**Analysis of mean differences between pre and post test for the Experimental group and Control group on Explosive power.**

| Group | Pre Test Mean (CM) | Post Test Mean (CM) | Mean Difference |
|---|---|---|---|
| Control | 57.73 | 58.06 | 0.33 |
| Experimental | 57.93 | 66.53 | 9.60 |

The pretest means for Experimental and Control groups were 57.93 and 57.73 respectively, which indicates that the groups were equally good on their pre test performance. This points out that the initial mean difference among the groups were not significant. Referring the table IV, the post test means were 66.53 and 58.06 on experimental group and control groups respectively, showed that the mean gain on the experimental group was due to the effect of plyometric exercises combined with weight training. On the other hand control group doesn't show any significant difference.

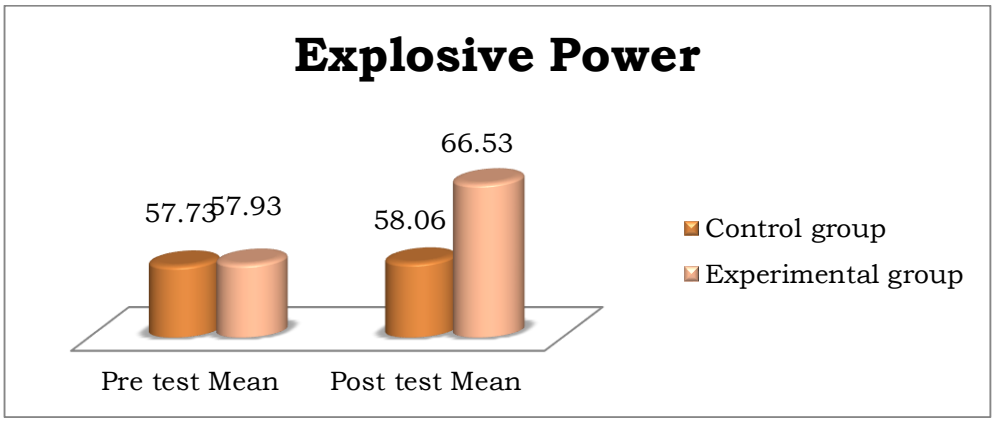
**Table-IV**

**Analysis of co-variance of the means for the Experimental group and the Control group on Explosive power**

| Source | df | Sum of Squares | MS | F-ration |
|---|---|---|---|---|
| Between group | 2 | 2042.47 | 1021.24 | 12.80* |
| Within group | 28 | 2233.52 | 79.78 | |

The statistical Significance was at both the level of confidence. F-ratio was found out using ANCOVA resulted as 12.80, which was significantly higher than the tabulated F-ratio of 3.34 (df 2 and 28) at the 0.05 level of confidence. It was quite evident from the Table-IV, that the mean difference between experimental and control group showed significant difference in their mean. Figure - A clearly show the differences. The result clearly proves that experimental group gained more significance in explosive power due to the training process.

**Figure – A**
**Mean difference of Explosive Power in pre and post tests**




**Conclusion**

From the result of the study, it was found that the designed plyometric exercises combined with weight training has made a significant statistical enhancement in explosive power among the men volleyball players which proves the fact that the selected package of training is suitable for developing explosive power for women volleyball players.

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