

# EFFECT OF PLYOMETRIC TRAINING ON AGILITY AND EXPLOSIVE STRENGTH AMONG SOCCER PLAYERS

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**Abstract:** The purpose of the study was to find out the effect of plyometric training on agility and explosive strength among soccer players. To achieve the purpose of this study, 20 male intercollegiate soccer players were randomly selected as subjects from various affiliated colleges of Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India. Their age were ranged from 19 to 23 years. The selected participants were randomly divided into two groups such as Group 'I' underwent plyometric training (n=10) and Group 'II' acted as control group (n=10). Group 'I' underwent plyometric training for three alternative days and one session per day and each session lasted for 60 minutes for twelve week period. Group 'II' was not exposed to any specific training but they were participated in regular activities. The data on agility and explosive strength were collected and administering by Illinois Agility and Sargent Vertical Jump tests. The pre and posttests data were collected on selected criterion variables prior to and immediately after the training programme. The pre and post-test scores were statistically examined by the dependent 't' test and Analysis of co-variance (ANCOVA) for each and every selected variables separately. It was concluded that the experimental group had shown significantly improved in agility and explosive strength due to the effect of plyometric training. However the control group had not shown any significant improvement on any of the selected variables such as agility and explosive strength.

**Index Terms:** Plyometric Training, Agility, Explosive Strength, Soccer Players.

## I. INTRODUCTION

"Physical activity is probably the most enjoyable and yet most inexpensive form of preventive medicine"<sup>[1]</sup>. "Fitness is the ability of an individual to live a full and balanced life. It involves physical, mental, emotional, social and spiritual factors and a capacity for their wholesome expression"<sup>[2]</sup>. Training is the planned and systematic realization of measure (training contents and training methods) for the durable attainment of goal (training goals) in and through sport<sup>[3]</sup>.

The word plyometric originated from two Greek words, "plio", meaning "more" and "metric", meaning "to measure" or as described it "measurable increase",<sup>[4]</sup>.

Plyometric has been a very popular training technique used by many coaches and training experts to improve speed, explosive power output, explosive reactivity and eccentric muscle control during dynamic movements. An optimal level of strength, power, and force are necessary to maximize sprinting performance because sprinting requires a powerful start and a strong finish<sup>[5]</sup>. Plyometric are designed to enable muscles to contract to maximum extent in the shortest possible time<sup>[6]</sup>. Plyometric training is a very intense, high nervous system demand activity that must take into account four factors: training load, basic strength, skill and progression<sup>[7]</sup>.

Success of plyometric training programs is attributed to the transfer force from an eccentric to a concentric phase, which facilitates greater overall force development and faster speeds of movement<sup>[8]</sup>. Soccer is a game which calls for strenuous continuous thrilling action and therefore appeals to the youth of the world. It is one of the world's most popular games comprising of two teams trying to kick or head a ball to opposing goals<sup>[9]</sup>.

The main component of fitness for Soccer players are endurance, strength, speed, flexibility and power. The Soccer player will have to invest considerable time and effort to see a significant 'return' for his efforts that is an improvement in performance<sup>[10]</sup>.

Agility is generally defined as the ability to change direction quickly and effectively as nearly as possible at full speed<sup>[11]</sup>. It is the quality of a muscle to contract forcefully in the quickest possible time<sup>[12]</sup>.

## II. PURPOSE OF THE STUDY

The purpose of the study was to find out the effect of plyometric training on agility and explosive strength among soccer players.

## III. METHODOLOGY

To achieve the purpose of the study twenty male soccer players were randomly selected as subjects from various affiliated colleges of Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India. Their age ranged from 19 to 23 years. The researcher reviewed the available scientific journals, periodical, magazine, e-resources and research paper. Taking into consideration feasibility criteria, availability of the instrument and relevance of the variables of the present study the following dependent variables namely agility and explosive strength were selected. Similarly plyometric training was chosen as independent variable. The agility and explosive strength were assessed by Illinois Agility and Sargent Vertical Jump tests respectively. This study was conducted to determine the possibility cause and effect of plyometric training on agility and explosive strength among soccer players. The subjects were divided into two equal group consists of 10 each and named as experimental group (Group-I) and control group (Group-II). Group-I (n=10) underwent plyometric training and Group II (n=10) acted as control group. The control group was not given any treatment and the experimental group was given plyometric training for three alternative days per week, for a period of twelve weeks. The related group research design was used in this study. The collected data from the two groups prior to and after the experimental treatment on agility and explosive strength were statistically analyzed by using the

statistical technique of dependent ‘t’ test and analysis of covariance (ANCOVA). In all the cases 0.05 level of confidence was fixed as a level of confidence.

**VI. RESULT AND FINDINGS**

The effect of plyometric training on agility and explosive strength agility were analyzed and presented below.

**4.1 Agility**

Table-4.1: Computation of ‘t’ - ratio between pre and post test means of plyometric training and control groups on agility (seconds)

Criterion variables	Test	Plyometric Training Mean	Control Group Mean
Agility (seconds)	Pre test	16.96	16.81
	Post test	15.13	16.78
	‘t’ test	<b>12.05*</b>	0.96

\*Significant at 0.05 level. (Table value required for significance at .05 level for ‘t’ -test with df 9 is 2.26)

The table-4.1 shows that the pre-test mean value of plyometric training and control groups are 16.96 and 16.81 respectively and the post test means are 15.13 and 16.78 respectively. The obtained dependent t-ratio values between the pre and post test means of plyometric training and control groups are 12.05 and 0.96 respectively. The table value required for significant difference with df 9 at 0.05 level is 2.26. Since, the obtained ‘t’ ratio value of plyometric training group was greater than the table value, it was understood that plyometric training group had significantly improved the agility. However, the control group has not improved significantly. The ‘obtained t’ value is less than the table value, as they were not subjected to any specific training.

Table-4.2: Analysis of covariance on agility of plyometric training and control groups

Adjusted Post Test Means		Source of variance	Sum of squares	df	Mean square	F - ratio
Plyometric Training Group	Control Group	Between	366.62	1	366.62	<b>42.33*</b>
15.13	16.79	Within	147.22	17	8.66	

\* Significant at 0.05 level. Table value for df 1, 17 was 4.45

Table-4.2 indicates that the adjusted post test means values on agility of experimental and control groups are 15.13 and 16.79. The obtained f- ratio of 42.33 for adjusted post test mean is greater than the table value 4.45 with df 1 and 17 required for significance at 0.05 level of confidence. The results of the study indicate that there is a significant mean difference exist between the adjusted post test means of plyometric training and control groups on agility. The bar diagram shows the mean values of pretest, post test and adjusted post test on agility of plyometric training and control groups.

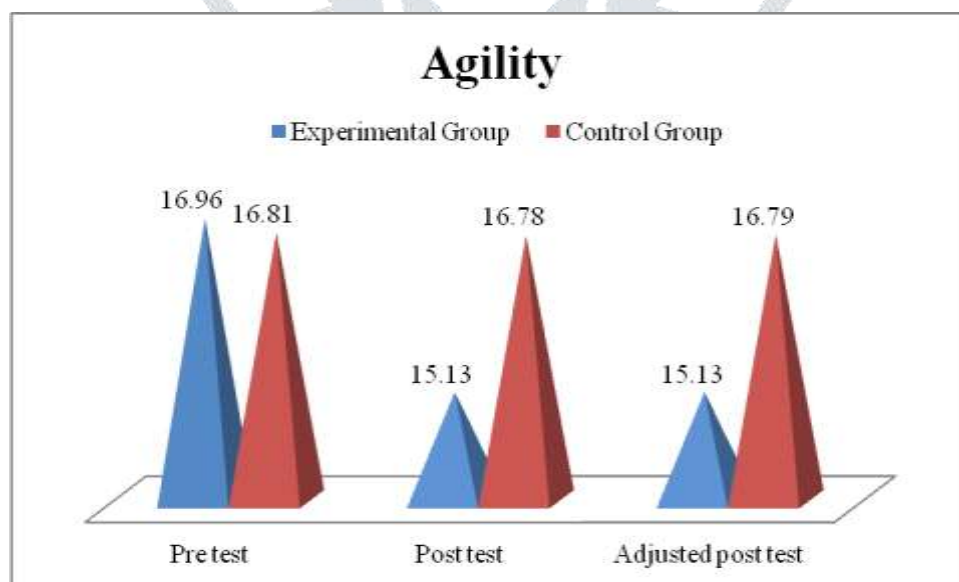


Fig-4.1:Pre, post and adjusted post tests mean values of plyometric training and control groups on agility.

4.2 Explosive Strength

Table- 4.3: Computation of ‘t’ - ratio between pre and post test means of plyometric training and control groups on explosive strength (Metres)

Criterion variables	Test	Plyometric Training Group Mean	Control Group Mean
Explosive strength (Meters)	Pre test	0.28	0.28
	Post test	0.35	0.30
	‘t’ test	9.68*	1.05

\*Significant at 0.05 level. (Table value required for significance at .05 level for ‘t’-test with df 9 is 2.26)

The table-4.3 shows that the pre-test mean value of plyometric training and control groups are 0.28 and 0.28 respectively and the post test means are 0.35 and 0.30 respectively. The obtained dependent t-ratio values between the pre and post test means of plyometric training and control groups are 9.68 and 1.05 respectively. The table value required for significant difference with df 9 at 0.05 level is 2.26. Since, the obtained ‘t’ ratio value of plyometric training group was greater than the table value, it was understood that plyometric training group had significantly improved on explosive strength. However, the control group has not improved significantly. The ‘obtained t’ value is less than the table value, as they were not subjected to any specific training.

Table-4.4: Analysis of covariance on explosive strength of plyometric training and control groups

Adjusted Post Test Means		Source of variance	Sum of squares	df	Mean square	F – ratio
Plyometric Training Group	Control Group	Between	0.79	1	0.79	19.75*
0.35	0.29	Within	0.68	17	0.04	

\* Significant at 0.05 level. Table value for df 1, 17 was 4.45

Table-4.4 shows that the adjusted post test means values on explosive strength of experimental and control groups are 0.35 and 0.29 respectively. The obtained f- ratio of 19.75 for adjusted post test mean is greater than the table value 4.45 with df 1 and 17 required for significance at 0.05 level of confidence. The results of the study indicate that there is a significant mean difference exist between the adjusted post test means of plyometric training and control groups on explosive strength. The bar diagram shows the mean values of pre, post and adjusted post tests on explosive strength of plyometric training and control group.

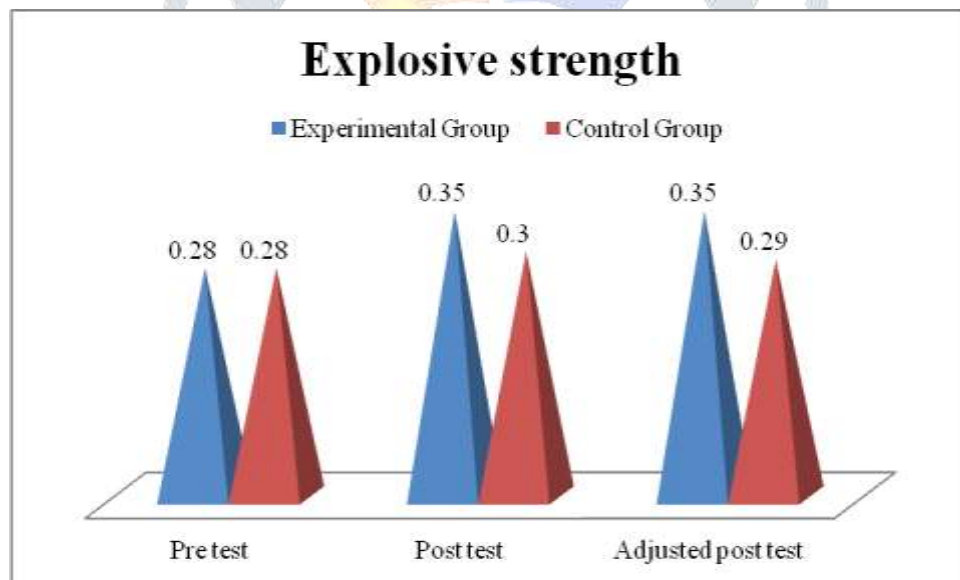


Fig-4.2: Pre, post and adjusted post tests mean values of plyometric training and control groups on explosive strength.

V. DISCUSSION ON FINDINGS

Santos & Janeira, (2011) conducted on the effects of plyometric training followed by detraining and reduced training periods on explosive strength in adolescent male basketball players. The former was submitted to a 10-week in-season plyometric training program, twice weekly, along with regular basketball practice. Simultaneously, the control group participated in regular basketball practice only. Moreover, we can state that both detraining and a reduced training program indistinctly contribute to maintenance of strength levels. These results highlight the unique 57 power that basketball-specific training seems to have on the sustainability and maintenance of sport performance.

Roopchand & Lue-Chin, (2010) studied the impact of three-week plyometric training programme on agility and jump performance in netball players. Eighteen net ball players were selected for the purpose of the study. At the end of the three weeks of training programme, the result of the study indicated that there were significant positive improvements on agility and jump performance.



Miller, Herniman, Ricard, Cheatham & Michael, (2006) determine if six weeks of plyometric training can improve an athlete's agility. Subjects were divided into two groups, plyometric training and a control group. The plyometric training group reduced time on the ground on the posttest compared to the control group. The results of this study show that plyometric training can be an effective training technique to improve an athlete's agility. From above these both supportive study I intent to conduct this study the result of the my study indicates that there was a significant improvement on agility and explosive strength due to the effect of plyometric training among soccer players when compared to control group.

Arumugam, (2015) conducted study on effect of small sided games training on speed and agility among soccer players; he concluded that the agility improved due to the effect of small sided games training. These studies are well supported to my study results.

## VI. CONCLUSIONS

1. There was significant improvement on agility due to the effect of plyometric training among soccer players.
2. There was significant improvement on explosive strength due to the effect of plyometric training among soccer players.
3. However the control group had not shown any significant improvement on any of the selected variables.

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