



# EFFECT OF PLYOMETRIC TRAINING ON SELECTED PERFORMANCE RELATED VARIABLES OF HIGH SCHOOL FEMALE HANDBALL PLAYERS

**Dr. Suma Joseph**

Associate Professor (Research Supervisor)  
Mount Carmel College of Teacher Education for Women  
M.G University, Kottayam, Kerala  
&

**Mr. Anoop Ninan**

Research scholar, School of Physical Education and Sports Sciences,  
M.G University, Kottayam, Kerala

## **Abstract**

The purpose of the study was to assess the "Effects of Plyometric Training on Selected Performance Related Variables of High School Female Handball Players". To achieve the purpose of the study, forty female handball players (N=40) of the Government Higher Secondary School, Vayakkara were selected as the subject. They were equally divided (N=20) into an Experimental group and Control group. Purposive random group design was employed for the study. The age ranged from 14 to 17 years. Explosive strength, strength endurance, flexibility, agility and speed were the performance related variables selected. The experimental group had to undergo plyometric training for three days in a week. i.e., on Monday, Tuesday and Friday for a period of six weeks. The plyometric training included exercises for the whole body, an intensity of the exercise was gradually increased by the use of more vigorous exercise after every two weeks. The data was statistically analyzed by applying Independent 't'-test. The 't'-test shows that there is a significant mean difference between the initial and final scores of experimental and control groups. The level of significance chosen was 0.05. level of confidence throughout the study with 19 degrees of freedom. Handball is a team game which requires a balance of all fitness quality. All the subjects of the experimental groups had undergone six weeks of plyometric training for seventy minutes, three days per week. From the statistical analysis it is evident that in the case of performance related variables such as explosive strength, strength endurance, flexibility, agility and speed significant changes were noticed after six-week of plyometric training.

**Keywords: Performance Related Variables, Handball, Plyometric Training**

## INTRODUCTION

Sports are timeless activities; one's that human have enjoyed since at least from ancient times, as exemplified by the Greek Olympic Games. Indeed, ethnographic and archeological evidence such as cave paintings and the accounts of early European explorers indicate sports may well go back to the very beginning of humankind. The physical education profession is entering one of the most exciting and dynamic eras in its history. Today's education not merely deals with mental enhancement of an individual, but also a source of physical activities that leads to all-round development of an individual. The best individual is one who is physically fit, mentally sound and sharp, emotionally balanced and socially well adjusted. It is therefore said that: 'physical education' is an integral part of 'Total education'. Generally physical education is misunderstood as merely physical activities or merely mass physical training or just drill. It is important to overcome this misconception of physical education.

Plyometrics is a type of exercise training designed to produce fast, powerful movements, and improve the functions of the nervous system, generally for the purpose of improving performance in sports. Plyometric movements, in which a muscle is loaded and then contracted in rapid sequence, use the strength, elasticity and innervations of muscle and surrounding tissues to jump higher, run faster, throw farther, or hit harder, depending on the desired training goal. Plyometrics is used to increase the speed or force of muscular contractions, providing explosiveness for a variety of sport-specific activities.

## OBJECTIVES OF THE STUDY

The purpose of the study was to find out the **“Effect of Plyometric Training on Selected Performance Related Variables of High School Female Handball Players”**.

## HYPOTHESIS

It was hypothesized that there will be a significant effect of plyometric training on selected performance related variables of high school female handball players.

## METHODOLOGY

The purpose of the study was to prepare the **“Effect of Plyometric Training on Selected Performance Related Variables of High School Female Handball Players”**. To achieve the purpose of the study Total forty (N=40) female handball players Government Higher Secondary School Vayakkara. was selected as the subject of the study and were equally divided (n=20) into an Experimental group and control group. Purposive random group design was employed. The age ranged from 14 to 17 years. Following performance related variables are selected. The experimental group had to undergo plyometric training for three days in a week. i.e., on Monday, Tuesday and Friday for a period of six weeks. The plyometric training included exercises for the whole body and the intensity of the exercise was gradually increased by the use of more vigorous exercise after every two weeks. The data was statistically analyzed by applying Independent 't' -test. The 't' test

brought out the significant mean difference between the initial and final scores of experimental and control group. The level of significance chosen was 0.05 level of confidence throughout the study with 19 degree of freedom. Handball is a team game which requires a balance of all fitness quality. All the subjects of the experimental groups had undergone six weeks of plyometric training for seventy minutes, three days per a week.

## ANALYSIS OF THE DATA

The 't' test brought out the significant mean difference between the initial and final scores of experimental and control groups. The mean differences for the groups are presented in the following tables and figures. The level of significance chosen was 0.05 level of confidence throughout the study with 19 degree of freedom.

**Table 1**

### t-ratio of experimental and control group on vertical jump

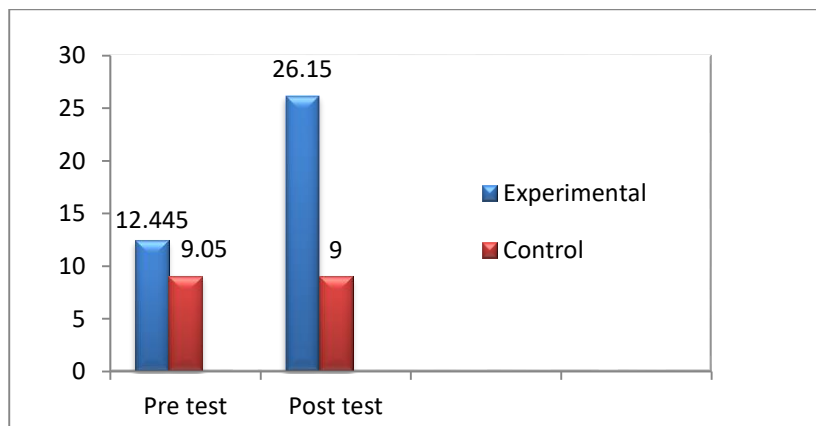
Control Factors	Pre-test			Post-test			t-ratio	
	N	Mean	SD	N	Mean	SD	Pre	Post
<b>Experimental</b>	20	12.44	2.69	20	26.15	4.85	4.351	14.070*
<b>Control</b>	20	9.05	2.21	20	9.0	2.47		

\*Significant at the 0.05 level of confidence

The above table 2 indicates that, there was a significant difference between the pre-test and post-test performance on vertical jump, since the calculated 't' value of 14.07 is higher than tabulated 't' value of 2.093 at 0.05 level of significance with 19 degree of freedom. In the case of control group there was no significant difference.

**Figure 1**

### Illustration of Pre and Post Mean Score of Vertical Jump



**Table 2**  
**t-ratio of experimental and control group on push ups**

Control Factors	Pre-test			Post-test			t-ratio	
	N	Mean	SD	N	Mean	SD	Pre	Post
Experimental	20	21.3	8.46	20	29.80	5.94	1.367	3.306*
Control	20	24.5	6.16	20	23.75	5.62		

\*Significant at the 0.05 level of confidence

The above table 3 indicates that there was a significant difference between the pre-test and post-test performance on push-ups, since the calculated 't' value of 3.306 is higher than the tabulated 't' value of 2.093 at 0.05 level of significance with 19 degree of freedom. In the case of control group there was no significant difference.

**Figure 2**

**Illustration of pre- test and post-test score of push ups**

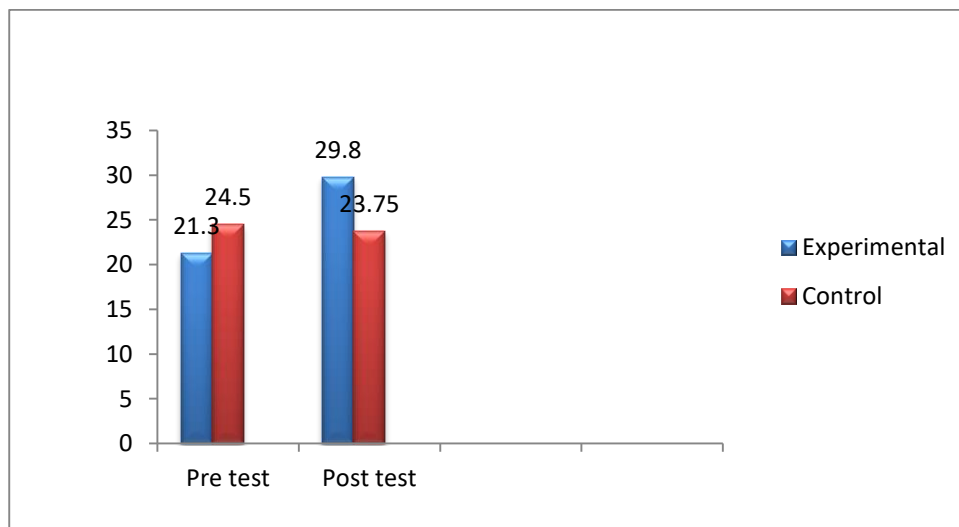


Table 3

**t-ratio of experimental and control group on sit & reach**

Control Factors	Pre test			33Post test			t-ratio	
	N	Mean	SD	N	Mean	SD	Pre	Post
Experimental	20	22.25	4.82	20	26.05	4.74	3.768	7.079*
Control	20	16.75	4.39	20	16.35	3.88		

\*Significant at the 0.05 level of confidence

The above table 4 indicates that there was a significant difference between the pre and post test performance on sit and reach, since the calculated 't' value of 7.079 is higher than the tabulated 't' value of 2.093 at 0.05 level of significance with 19 degree of freedom. In the case of the control group there was no significant difference.

Figure 3

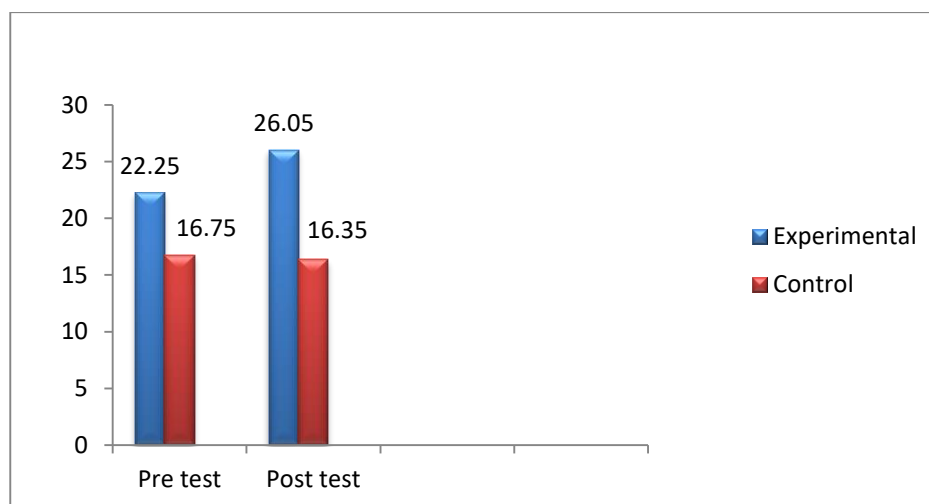
**Illustration of pre-test and post-test mean score of sit & reach**

Table 4

**t-ratio of experimental and control group on shuttle run**

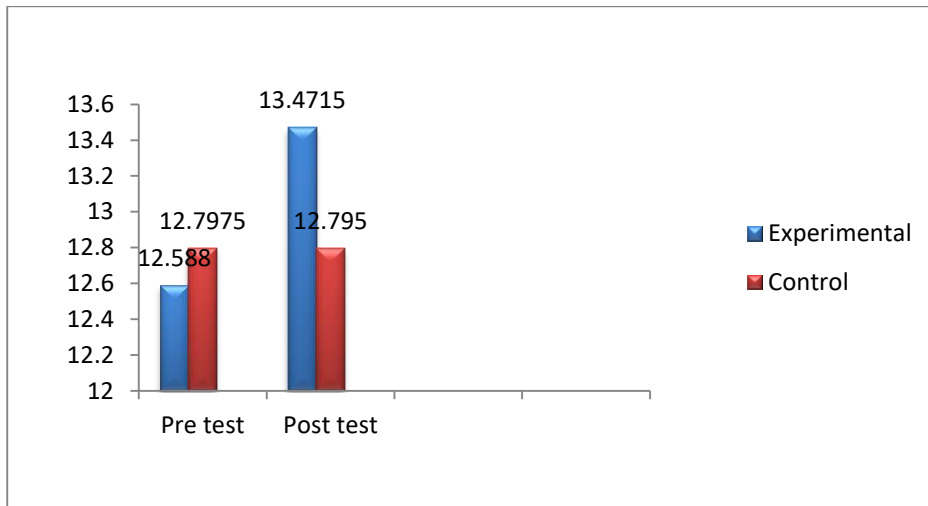
Control Factors	Pre test			Post test			t-ratio	
	N	Mean	SD	N	Mean	SD	Pre	Post
Experimental	20	12.58	.51	20	13.47	.65	.787	2.328*
Control	20	12.79	1.07	20	12.79	1.12		

\*Significant at the 0.05 level of confidence

The above table 5 indicates that there was a significant difference between the pre-test and post-test performance on shuttle run, since the calculated ‘t’ value of 2.328 is higher than the tabulated ‘t’ value of 2.093 at 0.05 level of significance with 19 degrees of freedom. In the case of the control group there was no significant difference.

**Figure 4**

**Illustration of pre-test and post-test mean score of shuttle run**



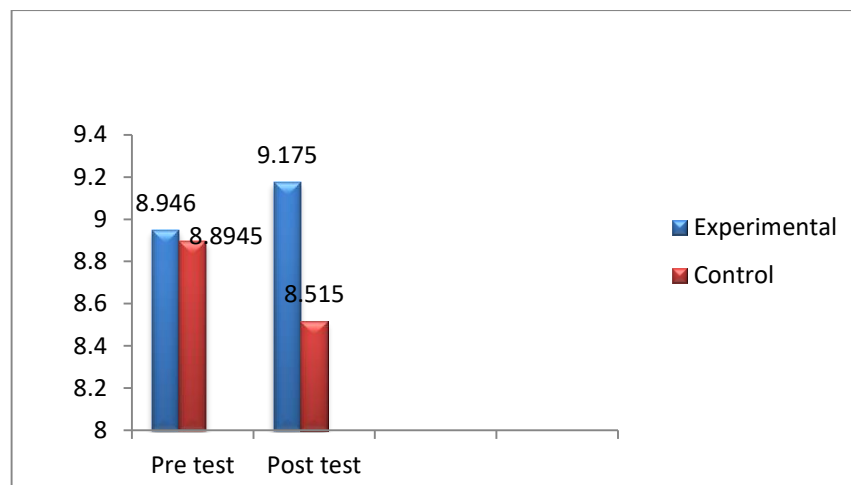
**Table 5**

Control Factors	Pre test			Post test			t-ratio	
	N	Mean	SD	N	Mean	SD	Pre	Post
Experimental	20	8.94	.66	20	9.17	.77	.271	3.197*
Control	20	8.89	.53	20	8.51	.50		

**t-ratio of experimental and control group on 50-yard dash**

\*Significant at the 0.05 level of confidence

The above table 6 indicates that there was a significant difference between the pre and post test performance on 50 yard dash, since the calculated ‘t’ value of 3.197 is higher than tabulated ‘t’ value of 2.093 at 0.05 level of significance with 19 degree of freedom. In the case of control group there was no significant difference.

**Figure 5****Illustration of pre-test and post-test mean score of 50-yard dash****Result**

On the basis of the findings of the study the hypothesis stated that there will be a significant effect due to six weeks of plyometric training on selected performance related variables of high school female handball players is accepted.

**Conclusions**

The results of the study permit the following conclusions;

- Participation in six weeks of plyometric training programme resulted in improvement of Explosive strength of high school female handball players
- Participation in six weeks of plyometric training programme resulted in improvement of strength endurance of high school female handball players
- Participation in six weeks of plyometric training programme resulted in improvement of flexibility of high school female handball players.
- Participation in six weeks of plyometric training programme resulted in improvement of agility of high school female handball players.
- Participation in six weeks of plyometric training programme resulted in improvement of speed of high school female handball players.

## Recommendations for the further study

- Awareness should be given to school students regarding the benefits of plyometric training.
- Plyometric training should be incorporated in the fitness training programme for the students to develop performance related physical fitness.
- Similar study can be undertaken for a longer duration of training and increasing the intensity.
- Similar study will be undertaken by involving other types of plyometric exercises in training schedule.

## References

- **Brown, E. Lee. And Ferrigno, A.Vance;** “Training for speed, agility, and quickness”-Illionis, Human Kinetics 2nd edition (2005).
- **Elaudio Gil Soares de Araujo;** “An innovative flexibility assessment method”, Human Kinetics (2004) (p, 3-5).
- **Hardayal Singh;** “Science of sports training”, D.V.S Publications, 4<sup>th</sup> edition, 1997 (p.2, 13-14).
- **James, C.Radcliffe and Robert, C. Raventinos;** “High powered plyometrics.” Human kinetic publishers, copyright (1999) (p, 1).
- **Mishra Sharad Chandra;** “Methods of physical education”, Sports publication New Delhi (2009).
- **Narasimham T.K;** “Principles of sports training”, Crescent publishing corporation, (2008) (p, 85-87,115,162)