

## EFFECT OF PLYOMETRIC TRAINING ON MUSCULAR ENDURANCE OF FOOTBALL PLAYERS

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### ABSTRACT

The study was conducted to find out the effect of plyometric training on muscular endurance of football players. For this study, total thirty (30) male football players (18-24 years) from Government College of Physical Education Gadoora Ganderbal, Jammu and Kashmir, India were selected as the subject. The subjects were randomly assigned in Experimental Group (n=15) and Control Group (n= 15) groups. The Experimental Group was engaged in supervised plyometric training programme for 4 weeks for three (3) days in a week alternatively on Monday, Wednesday and Friday. The Control Group was kept under regular football practice without any specific training however, the test was conducted for them. For this study Bent Knee Sit-Ups was selected as the test items. Pre and Post test data was administered on the subjects before and after the completion of the plyometric training programme on Bent Knee Sit-Ups. The collected data were analyzed using descriptive statistics and paired t-test. As the 't' value is calculated as 9.209, which is found significant at 0.05 level of confidence with the tabulated value of t (0.05) (29) = 2.045 at 29 degree of freedom. It exhibits the significant difference in mean values among calculated and tabulated 't' value of Experimental and Control Group on Bent Knee Sit-Ups of Football Players. On the basis of findings it was concluded that Bent Knee Sit-Ups had shown significant effect after 4 weeks of plyometric training on the football players.

**Keywords:** Plyometric training, Muscular Endurance, Bent Knee Sit-Ups, Football.

### Introduction

Plyometrics are training techniques used by athletes in all type of sports to increase strength and explosiveness (Chu, D.A. 1998 & Patir, K. & Singh, L.S. (2021). Plyometric Training consists of dynamic and rapid stretching of muscles (eccentric action) immediately followed by a concentric of shortening action of the same muscles and connective tissues (Hakkinen, K. et al., 1985 & Ford, J.R. et al., 1983).

Endurance is characterized by the maintenance of working capacity and by the degree of resistance of the organism against fatigue and against the influence of unfavourable environment conditions. It is also characterized by the pace of recovery after a tiresome activity. Endurance enables a sports person to maintain rhythm, concentration and mental alertness during training and competition (Uppal, A.K., 2009, & Mengesh, M. et al., 2015).

### Purpose of the Study

The main purpose of the study was to investigate the Effect of Plyometric Training on Muscular Endurance of Football Players.

### Materials and Methods

#### Selection of Subjects

For this study, total 30 (Thirty) male football players were selected as subject from Government College of Physical Education, Gadoora Ganderbal, Jammu & Kashmir, India. The age of the subjects were ranged between 18-24 years.

#### Selection of Variables

To measure the Muscular Endurance of the football players, Bent Knee Sit-Ups was selected as the variables of the study.

#### Statistical Technique

To analyze the data descriptive statistics and paired t-test was employed to find out the effect of Plyometric Training on Muscular Endurance of football players.

#### Administration of Test

To improve the physical fitness of the football players, the subjects of Experimental Group was given 4-weeks of Plyometric Training and the Control Group was kept under practices only without giving any specific training. This test item was administered on the subjects

before administering the Plyometric Training exercises to obtain the data of pre-test and post-test score. Before conducting the test the method of execution was clearly explained and practically demonstrated to the subjects. To measure the Muscular Endurance, (Bent Knee Sit-Ups) was used for this study. There were total six (6) stations with different activities in Plyometric Training. The group performed their respective Plyometric Training for the period of 4-weeks (28) days, for three (3) days in a week alternatively on Monday, Wednesday and Friday. The training programme was consists of 10 minutes of warming up and cooling down exercises involving jogging, stretching and mobility exercises. The Experimental group performed Plyometric training exercises in the gym. The subjects performed different exercises for 30 seconds in

each station with a 30 seconds recovery. They performed 2 to 3 sets and 4 to 5 repetitions with a 2 to 3 minutes recovery between each set. The Plyometric Training exercises include Double Leg Hop, Explosive Step Up, Jumping Jacks, Jumping Squat, Lateral Jump, and Running in Spot (Michael G. M. et al. 2006, Ozbar, N. 2015 & Patir, K. & Singh, LS. (2021). The subjects underwent their respective training programme as per schedules with the researcher who provided motivation, advice and encouragement to the players. The final post test items was re-administer on Bent Knee Sit-Ups under similar conditions by the same tester after completion of 4-weeks (28 days) to the subjects of the Plyometric Training Group and the Control Group. The following plyometric training programme is presented in the table no. 1.

**Table no. 1:**  
**Training Programme for Plyometric Training Training Periods (min/motion)**

Weeks	Exercises	Repetition	Set	Volume of Contact	Total Number of Contact
I & II Weeks	Double Leg Hop Explosive Steps Ups Jumping Jacks	4	2	18	48
III & IV Weeks	Jumping Squat Lateral Jump Running in Spot	5	3	15	60

**Results and Discussion**

For the present study, the data obtained through different test were statistically analyzed. Mean, Standard Deviation and Paired

t-test test were employed to analyze the data. To know the significant mean difference on Bent Knee Sit-Ups of football players is presented in Table no.2.

**Table-2: Descriptive Analysis on Bent Knee Sit-Ups of Male Football Players**

Bent Knee Sit-Ups	Mean	N	Std. Deviation	Std. Error Mean	df	t-value
Experimental Group	39.2667	30	13.27672	2.42399	29	9.209
Control Group	27.3667	30	9.13683	1.66815		

\*Significant at 0.05 level of confidence Tabulated  $t(0.05)(29) = 2.045$

Table-2 represents the significance of mean difference of Experimental and Control Group for Bent Knee Sit-Ups of Football Players. The total number of Football Players is 30 and the mean and standard value of Bent Knee Sit-Ups for Experimental Group is  $39.2667 \pm 13.27672$  and for Control group was  $27.3667 \pm 9.13683$  respectively. The standard error for Experimental Group is also found out as 2.42399 and for Control Group is 1.66815.

And the ‘t’ ratio is calculated as 9.209, which is found significant at 0.05 level of confidence with the tabulated value of  $t(0.05)(29) = 2.045$  at 29 degree of freedom. It exhibits the significant difference in mean values among calculated and tabulated ‘t’ value of Experimental and Control Group on Bent Knee Sit-Ups of Football Players as shown in the figure below:

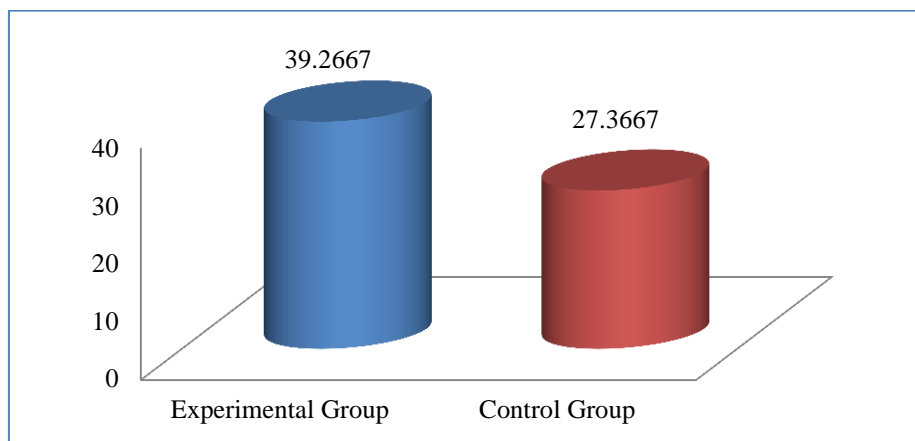


Fig.1: Graphical representation of Experimental Group and Control Group on Muscular Endurance of Football Players and significance at 0.05 level of confidence

### Discussion

The present study was designed to investigate the effect of Plyometric Training on Muscular Endurance of Football Players. From the result it was obtained that there was significant effect of Plyometric Training on Muscular Endurance of Football Players. The results were consistent with (Rimmer, E. et al., 2000, Sandeep, PH., 2017 & Shamshuddin, M.H.B., 2020). The result indicates that there is an overall difference among the variances tested on experimental and control group for Bent Knee Sit-Ups of Football Players. Further, it was confirmed that the experimental group's on Bent Knee Sit-Ups was improved after subjecting to plyometric training. This means that there was a significant effect of plyometric training on players' Bent Knee Sit-Ups. However, controlled group's Bent Knee Sit-Ups was also significantly improved.

### Conclusions

On the basis of the results and findings the researcher concluded that the four weeks of

plyometric training programme was effective in increasing the Muscular Endurance of the football players. The Plyometric Training programme brings positive effect on Bent Knee Sit-Ups of the Football Players. According to the results, it can be concluded that this type of training methods are suggested to football players and coaches for improving Bent Knee Sit-Ups and it can be more beneficial and effective only if the training programme are systematic, scientific and plan properly. The conclusions was consistent with (Slimani, M. et al., 2016, Taheri, E. et al., 2014 & Wang, C.Y. et al., 2016).

### Recommendation

Similar type of study can be conducted on female football players of Assam. It is recommended that similar type of study can be conducted on different age groups. And similar type of study can also be conducted on other sports disciplines such as Hockey, Handball, Basketball, Volleyball and Netball in order to enhance the performance of the players.

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