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## Effect of plyometric exercises on Leg Strength of Inter collegiate Kho-Kho players of Kashmir Division

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### Abstract

The purpose of the study was to find out the “effect of plyometric exercises on Leg Strength of Kho-Kho players of Kashmir division”. For this study, the subjects were selected from Kashmir division; data was collected from the inter-collegiate Kho-Kho players. Forty (40) inter-collegiate subjects were selected from the Kashmir division for this study. The simple random sampling method was applied to select the subjects. The following criterion measures were chosen for testing the hypothesis. Strength was measured with the help of Standing Broad Jump. The best (Maximum distance) trial is used as the final score of the test. The data pertaining to the study were collected by administering the tests for the selected items. Before Collection of data, the subjects was given a chance to practice the prescribed test so that they should become familiar with the test and know exactly what is to be done to ensure uniform testing condition, the subjects was tested during morning and data was collected.

To test the hypothesis the level of significance was set at 0.05 level of confidence which was considered adequate and reliable for the purpose of this study. The data was collected before and after four week training programme on strength and was analyzed by comparing the means of controlled and experimental groups, and was again statistically analyzed by applying t-test to check the significant difference among selected items.

**Keywords:** Plyometric exercises, Strength, Kho-Kho players.

### Introduction

In 1975 Fred Wilt the American Track and Field coach coined the term plyometrics. The elements pl means “increase” and metric means “measure” derived from Latin thus the combined meaning „measurable increase” (Thomas, 1994). Plyometric rapidly got popular among the coaches and athletes as exercises aimed at linking strength with speed of movement to produce power. Plyometric training started became essential for athletes. The necessity for power development in sports needs no argument. Strength and conditioning specialists dedicate a great deal of time researching muscular power development techniques and implementing only those that produce significant results on athletes. Recent studies suggest that plyometric and resistance training exercises can increase vertical jump height, explosive power, and sprint speed by improving the production of peak muscle force and power. Presently many coaches and athletes have successfully used plyometric exercises as a method of training for performance enhancement.

Strength is the ability to overcome resistance or to act against resistance (Singh, 1991). Strength has been considered as the most important conditional ability. It has been the most significant factor to enhance sports techniques and performance. Development of strength also contributes to indirect development of other conditional abilities namely speed and endurance. Types of Strength

**a) Maximum Strength:** It is the ability of muscle to get over resistance of maximum intensity of stimulus in a single muscular contraction. The best examples are weight lifting and throwing events (shot, discus and hammer throws in track and field).

**b) Explosive Strength:** It is the ability of muscle to get over resistance of sub-maximum intensity of stimulus as fast as possible. The best examples are sprints, jumps, smashing in volleyball, hitting in hockey etc.

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**c) Strength Endurance:** It is the ability of muscle to get over resistance of medium intensity of stimulus for as long time as possible. The best examples are long distance races in track and field, swimming, distance cycling, wrestling, boxing etc. Kho-Kho

History of Kho-Kho in India goes back a long way, as it was first started in the state of Maharashtra. The game has been very popular in the Marathi speaking people. This game, for many years, was played in an informal ways! In order to make the game very popular, the Deccan Gymkhana club of Poona tried to formalize the game! The first edition of the rules, of Aryapatya Kho-Kho and Hu-Tu-Tu, was published in 1935, by the newly founded Akhil Maharashtra Shareerika Shikshan Mandal. In order to suite the playing condition some amendments have been made. One of the main points of a successful animal life is "Active Chase" which is a fundamental principle of the Indian game called Kho Kho, synonymous with the phrase "Game of Chase". It will not be a mistake to say that Kho Kho was a recognized sport in the ancient times even earlier to the oldest mythological writings of classics- Mahabharata. The game of chase was then also regarded as legend, as it used in phraseology as "putting Kho to someone's active chase meaning putting an effective block and stopping the progress". The current adaptation of the game was actually an adaptation about the time of World War I in 1914, but at the same time lacked exacting rules and regulation that govern the games in the modern times. There were neither any dimension to the playground nor the poles which demarcate the central line, and the factor was also missing!

The 1923-24 saw the foundation of Inter School Sports Organization and Kho Kho was introduced to promote at the grass roots and consequently popularize the sports. The certainly conveyed the results and the game of Kho Kho mainly owe it to the efforts taken by Deccan Gymkhana and Hind Vijay Gmykhana.

**Methodology**

**Source of Data:** The data pertaining to this study were

collected from the inter-collegiate Kho-Kho players of Kashmir Division.

**Selection of Subject:** The 40 inter-collegiate subjects were selected from the Kashmir Division.

**Sampling Method:** The simple random sampling method was applied to select the subjects for this study.

**Criterion Measures:** The following criterion measures were chosen for testing the hypothesis. Flexibility was measured with the help of Sit and reach test.

**Scoring:** Each subject is given three trials and the highest score nearest to an inch/centimeter was recorded from the recorded reading to obtain the flexibility score.

**Collection of Data**

The data pertaining to the study was collected by administering the tests for the selected items. Before Collection of data, the subjects were given a chance to practice the prescribed tests so that they should become familiar with the tests and know exactly what is to be done to ensure uniform testing condition, the subjects was tested during morning and data was collected.

**Level of Significance**

To test the hypothesis the level of significance was set at 0.05 level of confidence which was considered adequate and reliable for the purpose of this study.

**Findings**

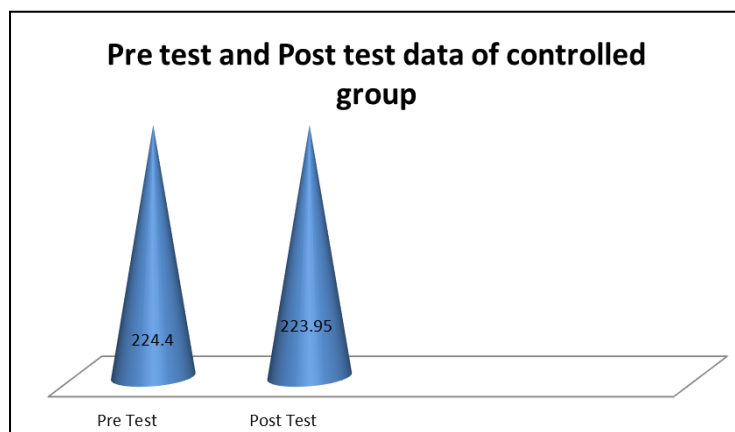
The data collected on 40 male inter-collegiate subjects before and after four week training programmes and strength was analyzed by comparing the means of control and experimental groups and was again statistically analyzed by applying t-test to check the significant difference among selected items. Therefore separate tables and graphs have been presented for each item as follows.

**Table 1:** shows the comparison of mean between the pre-test and post-test in leg strength of the controlled group of kho-kho players

Variable	Pre-test		Post-test		Mean	Sd. error	D.F	Obt."t"	Tabulated 't'	Significance
	Mean	S.D	Mean	S.d						
Leg Strength Of controled group	224.400	10.61974	223.9500	9.70336	-55000	.47281	38	-1.163	2.021	.007 p<0.05

The table 1 shows the analyzed data in leg strength of kho-kho players. The pretest means of strength were 224.400 and 223.9500 in post-test of controlled groups. The obtained 't' is

-1.163 which is less than the tabulated value of 2.021; hence the pretest was not significant at 0.05 level of confidence 38.

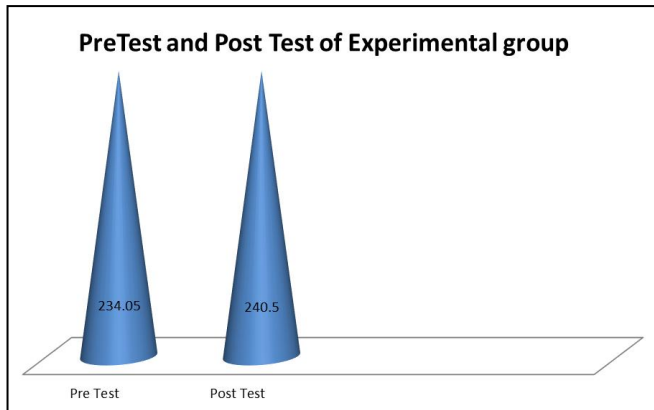


**Graph 1:** shows the comparison of mean between the pre-test and post-test in leg strength of the controlled group of kho-kho players.

**Table 2:** shows the comparison of mean between the pre-test and post-test in leg strength of the experimental group of kho-kho players.

Variable	Pre-test		Post-test		Mean	Sd. error	D.F	Obt"t"	Tabulated 't'	Significance
	Mean	S.D	Mean	S.d						
Leg strength of experimental group	234.0500	12.48778	240.500	2.29416	11.23189	-6.5000	38	-4.739	2.021	.000p<0.05

Similarly in above table 2 the pretest means of leg strength of experimental group is 234.0500 and in post-test it is 240.500 and the obtained 't' -4.739 which is less than tabulated value. Hence it is not significant at 0.05 level of confidence 38



**Graph 2:** shows the comparison of mean between the pre-test and post-test in leg strength of the experimental group of kho-kho players.

### Discussion on findings

It has been observed from the means of pre-test (224.40) and post-test (223.95) that it is not increased in controlled group.

It has also been observed from the means of pre-test (234.0500) and post-test (240.500) of experimental group that it is increased by 17.45 after given a proper 4 weeks training, hence there was great improvement in the leg strength of the Kho-Kho players.

Mostly the effect of four week training programme of Plyometric exercises showed a great improvement as well as the positive effects in the component like strength of the Kho-Kho players.

### Conclusion

Within the limitations of the study and from statistical analysis the following conclusion was drawn. There was no significant difference in pre-test and post-test of Control group.

There existed significant difference in pre-test and post-test of Experimental group.

Plyometric exercise shows positive effect on leg strength of the players.

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