



EFFECT OF PLYOMETRIC EXERCISES ON FLEXIBILITY AND LEG STRENGTH OF BADMINTON PLAYERS

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ABSTRACT: - The study assesses the variables, flexibility and leg strength of Badminton players of District Ganderbal. The study is limited to the inter-colligate Badminton players of district Ganderbal, wherein primary data has been collected from 40 participants, who understudied in different schools of district Ganderbal during the session 2018-19. The players were tested by Sit and reach test and Standing broad jump in order to measure their flexibility and leg strength. From the data analysis, it emerged that there was significant effect of plyometric exercises on flexibility and leg strength of badminton players through the statistical analysis after six weeks training program.

KEYWORDS: - Plyometric exercises, flexibility, leg strength, Badminton Players.

Introduction: Plyometrics otherwise called jump training or plyos are practices in which muscles apply most extreme power in short time frames, with the objective of expanding power. The training centers around figuring out how to move from a muscle expansion to a compression in a fast or unstable way, for example, in particular repeating jumping. Plyometrics are principally utilized by competitors, particularly Martial craftsmen, runners and high jumpers to improve execution.

For quite time the coaches and sportspersons have been trying to design training methods, which would enable them to run faster, jump higher, and throw an object farther. To accomplish such objectives, power is fundamental. Strength gains can be changed into power exclusively by applying explicit force training. Maybe perhaps the best strategies are training that utilizes plyometric works out. Plyometric is known as the stretch shortening cycle, or mitotic stretch reflex, in which the muscle is loaded in an eccentric (lengthening) contraction, followed immediately by a concentric (shortening contraction Research has demonstrated that a muscle stretched before a contraction will contract more forcefully and rapidly (Bosco & Komi, 1980; Schmidt bleicher, 1984). For example, by lowering the center of gravity to perform a takeoff, the athlete stretches the muscle, resulting in more forceful contraction.

The stretch-shortening cycle comprises of the following three phases:

Phase-1 is the eccentric phase, which involves preloading of agonist muscle(s).

Phase-2 is the time gap between eccentric and concentric phases. This phase is called the phase of amortization. It begins at the end of eccentric phase and continues up to initiation of the concentric muscle action.

Phase-3 is the body's response to eccentric and amortization phases. During this phase the agonist muscle contracts and at the same time the energy stored in the series elastic component (SEC) during the eccentric phase is used to increase the force of subsequent movement.

The term Plyometric has been derived from the Greek word pleythein, meaning, "to increase" and the shorter Greek words plio "more" and plyo "to move ". Metrics means "length". The word plyometrics

originally appeared in Russian sports literature in 1966 in the work completed by V. M. Zaciorskij. Plyometric action relies on the stretch reflex found the degree of muscle stretch and prevents overstretching. At the point when a competitor jumps, a lot of power is needed to drive the body upward. The body should have the option to flex and stretch out rapidly to leave the ground. A plyometric exercise depends on this brisk body activity to achieve the force needed for the development.

Flexibility: The range of movement in a joint or sequence of joints is known as flexibility. For example, touching of fingers to toes while sitting or standing without bending knees.

Strength is maybe the main engine capacity in games since all developments in games are brought about by muscle constriction. Thusly, strength is an integral part of every single engine capacity, specialized abilities and strategic activities. The development of strength has almost certainly been the greatest factor to enhance performance in sports but it is not a new concern.

Strength alone will not assure success in any sport. It is usable strength that is the key, the strength which can be applied to the body to make it more lasted, change speed, change the direction of body movement, put a greater speed into a cricket bat or racket head, or make the pull on an oar faster and longer. Hence, while strength is a dominant factor one must also call upon skill, mobility and speed. Development of strength also contributes to indirect development of other conditional abilities namely speed and endurance.

STATEMENT OF THE PROBLEM:

The statement of the problem was to find the “EFFECT OF PLYOMETRIC EXERCISES ON FLEXIBILITY AND LEG STRENGTH OF BADMINTON PLAYERS”.

PURPOSE OF THE STUDY:

The main purpose of this study was to determine the effect of plyometric exercises on Badminton players.

SIGNIFICANCE OF THE STUDY:

The significance of the study was justified on the basis of the following grounds.

1. The finding of the study would help to know the Effect of plyometric exercises on flexibility and leg strength of Badminton players.
2. The study would serve as a reference data for physical education teachers and coaches for the selection of eligible athletes.
3. The result would help to understand the relationship of variables with each other.

HYPOTHESIS:

On the basis of literature searched and by expert advice of the supervisor, it was hypothesized that there would be a significant effect of plyometric exercises on flexibility and leg strength of badminton players of District Ganderbal.

METHODS AND PROCEDURE

SOURCE OF DATA:

The data pertaining to this study were collected from the Badminton players of district Ganderbal.

SELECTION OF SUBJECT:

The 40 subjects were selected from the district Ganderbal.

SAMPLING METHOD:

After the consideration of all the points, the simple random sampling method was applied to select the subjects for the present investigation.

CRITERION MEASURES:

The following criterion measures were chosen for testing the hypothesis.

1. Flexibility: - Flexibility was measured with the help of Sit and reach test.
2. Standing broad jump: Leg strength was measured with the help of standing broad jump.

DESCRIPTION OF THE TESTS:

1. Sit and reach test:

Purpose: -To measure the flexibility.

Equipments: - Sit and reach box/table.

Procedure: The subject was asked to remove the shoes and place his feet against the testing box while sitting on the floor with straight knees. Then the subject was asked to place one hand on the top of the other so that the middle finger of both hands kept together at the same length. The subject was instructed to lean forwards and places his hands over the measuring scale lying on the top of the box near its mark, coinciding with the front edge of the testing box. Then, the subject was asked to slide his hands along the measuring scale as far as possible without bouncing and to hold the farthest position for at least one second.

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

2. Standing Broad Jump:

Purpose: -Measure the explosive leg strength.

Equipment: - Floor, long jump pit, measuring tape, marking tape.

Test Administration:

A demonstration of standing broad jump is given to a group of subject to be tested the subject is then asked to stand behind the starting line with the feet parallel to each other. The subject is instructed to jump as faster as possible by bending the knees and swing arms only 3 trails were given to each subject.

Scoring: The distance between the starting line and the nearest point of landing provide the score of the test. The best (Maximum distance) trial is used as the finale score of the test.

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 was 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 ware tested during morning and data was collected.

Plyometric Training Schedule of six weeks

Exercises	1-2 Week	3-4 Week	5-6 Week	Repetitions
Single Or Double Hops	10 Jumps	15 Jumps	20 jumps	4
Ankle Jumps	10 Jumps	15 Jumps	20 jumps	3
Side Jumps	15 Jumps	20 Jumps	25 jumps	4
Vertical depth jumps	10 jumps	15 jumps	20 jumps	3
Side Jumps Over The Bench	10 Jumps	15 Jumps	20 jumps	3
Zig- Zag Jumps	15 Jumps	20 jumps	25 jumps	4
Double Leg Jump	15 Jumps	20 Jumps	25 jumps	3
Box Jumps	10 Jumps	15 Jumps	20 jumps	3

Note: 5-7 seconds rest after each repetition.

STATISTICAL ANALYSIS AN INTERPRETATION OF DATA

The gathered data from pre-test and post-test of control group and Experimental group are presented in tables, graphs. The purpose of this study was to find out the effect of six week (42 days) Plyometric exercises on various Badminton players of district Ganderbal.

For the statistical analysis and interpretation of data the control group (N=20), and experimental groups (N=20) were analyzed by using the 't' test and means of both groups to find out the significant difference among the selected components. The subjects were selected by using Random sampling method.

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 subjects before and after four week training programmers on flexibility and leg strength was analyzed by comparing the means of pre and post-test 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

Group	Test	Mean	S.D	S.E comb.	M.D	D.F	Obtained “t”	Tabulated “t”
Controlled	Pre test	71.75	5.65	1.58	0.20	38	0.12 [#]	2.021
	Post test	71.95	4.33					
Experimental	Pre test	73.25	4.76	1.53	8.35		5.45 [@]	
	Post test	81.60	4.95					

Table showing leg strength comparison between Pre and Post Test Of controlled and Experimental Group

*Level of Significance = 0.05

Insignificant at 0.05 level of confidence

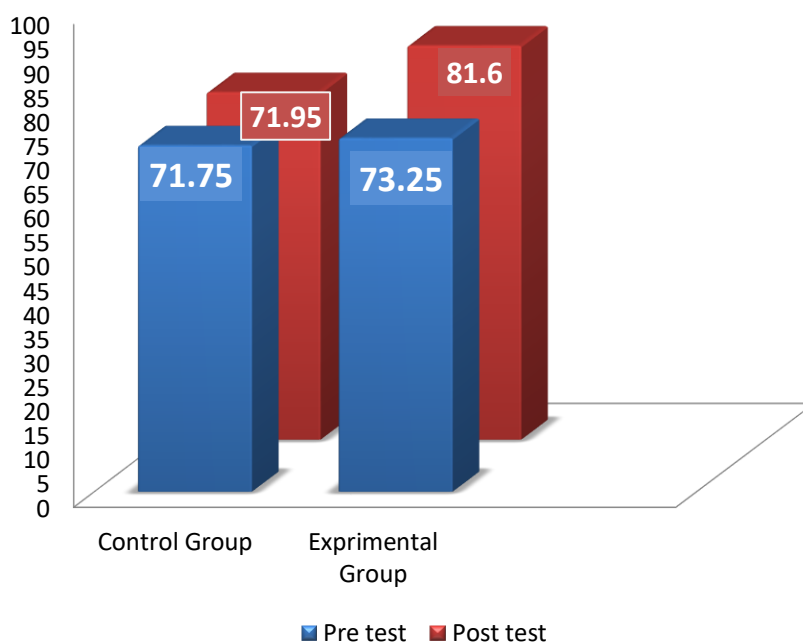
@ Significant at 0.05 level of confidence

Tabulated ‘t’ 0.05 (38) = 2.021

Table-1 shows that there is no significant difference between means of pre and post test of control group, because mean of pre test is 71.75 is slightly less than mean of post test 71.95, and there mean difference is 0.20. To check the significant difference between pre and post test of control group the data was again analyzed by applying ‘t’ test. Before applying ‘t’ test, standard deviation was calculated between pre-test where S.D. = 5.65 and Post test where S.D. = 4.33 and their Combine standard error = 1.58. So, There was no significant difference between pre and post test of control group because value of calculated ‘t’ = 0.12 which is less than tabulated ‘t’ = 2.021 at 0.05 level of confidence, which shows no improvement in control group because no training was given to the subjects of controlled group.

But there is significant difference between means of pre and post test of experimental group, because mean of pre test is 73.25 is less than mean of post test which is 81.60, There was significant difference between pre and post test of control group because value of calculated ‘t’ = 5.45 which is greater than tabulated “t” = 2.021 at 0.05 level of confidence, which shows good improvement in experimental group after four weeks plyometric training.

Graph – 1



Graph showing leg strength comparison between Pre and Post Test Of controlled and Experimental Group

Table - 2

Table showing flexibility comparison between Pre and Post Test Of controlled and Experimental Group

Group	Test	Mean	S.D	S.E comb	M.D	D.F	Obtained "t"	Tabulated "t"
Controlled	Pre test	11.25	2.12	0.66	0.15	38	0.227 [#]	2.021
	Post test	11.40	2.11					
Experimental	Pre test	11.55	2.37	0.707	10.15	14.35 [@]		
	Post test	21.7	2.12					

*Level of Significance = 0.05

Insignificant at 0.05 level of confidence

@ Significant at 0.05 level of confidence

Tabulated 't' 0.05 (38) = 2.021

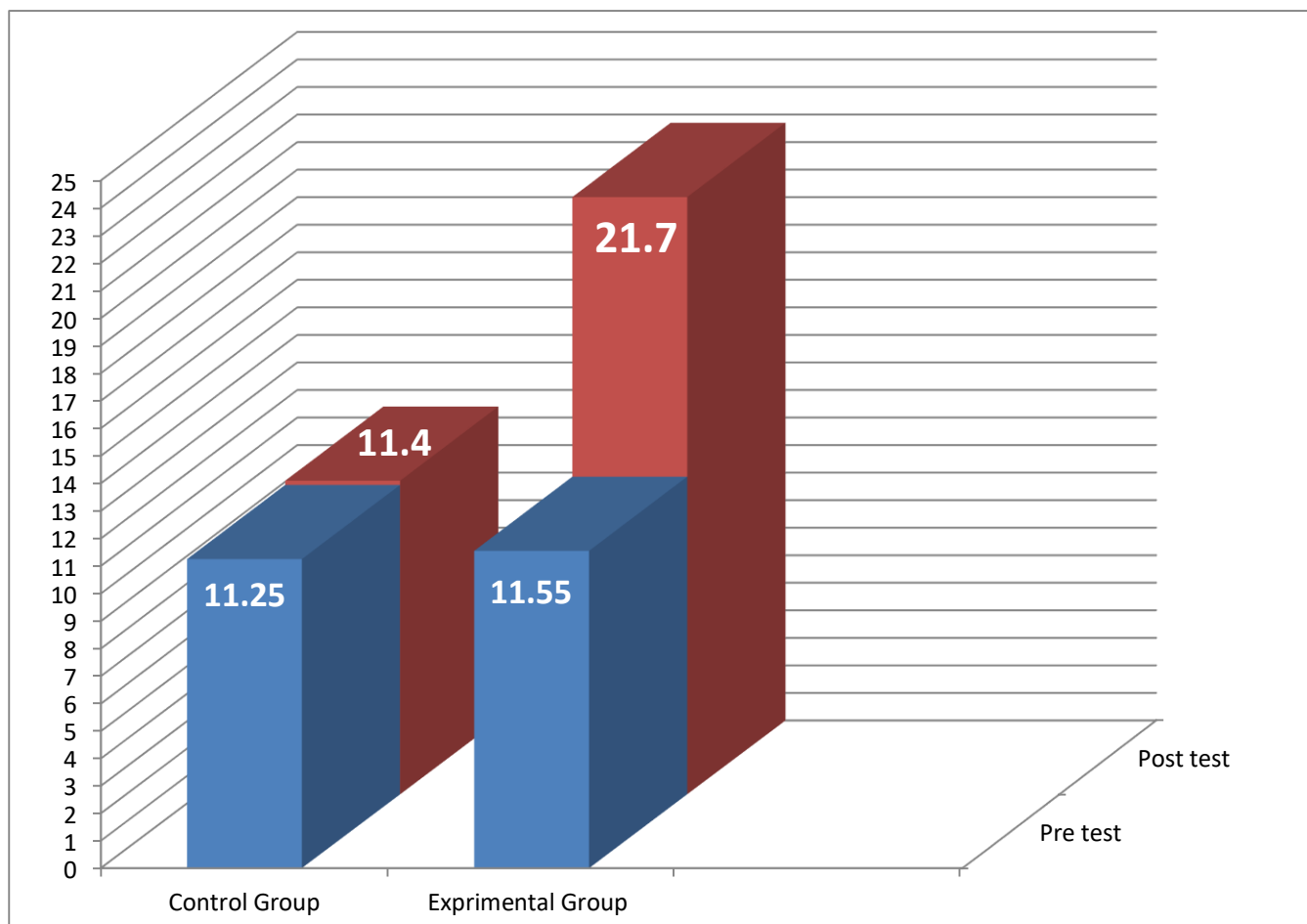
Table-2 reveals that there is no significant difference between means of pre and post test of control group, because mean of pre test is 11.25 is slightly less than mean of post test 11.40, and there mean difference is 0.15. To check the significant difference between pre and post test of control group the data

was again analyzed by applying 't' test. Before applying 't' test, standard deviation was calculated between pre-test where S.D. = 2.12 and Post test where S.D. = 2.11 and their Combine standard error = 0.66. There was no significant difference between pre and post test of control group because value of calculated 't' = 0.227 which is less than tabulated 't' = 2.021 at 0.05 level of confidence, which shows no improvement in control group because no training was given to the subjects of control group.

But there is significant difference between means of pre and post test of experimental group, because mean of pre test is 11.55 is less than mean of post test which is 21.7, There was significant difference between pre and post test of control group because value of calculated 't' = 14.35 which is greater than tabulated 't' = 2.021 at 0.05 level of confidence, which shows expected improvement in experimental group after four weeks plyometric training.

Graph - 2

Graph showing flexibility comparison between Pre and Post Test Of controlled and Experimental Group



Discussion on findings: It has been observed from the analysis of data that there was significant difference between the same components among the groups after the administration of training program. And there was great improvement mostly in both the selected components of the leg strength and flexibility of the Badminton players.

Mostly the effect of six weeks training program of Plyometric exercises showed a great improvement as well as the positive effects in the components like leg strength and flexibility of the Badminton players.

Justification of Hypothesis: In Beginning of this study it was hypothesized that there would be positive effect of Plyometric exercises on leg strength and flexibility of the Badminton players. And the effect of six week training program of Plyometric exercises showed a great improvement in the leg strength and flexibility of the Badminton players. So, the hypothesis was partially accepted at the level of 0.05 level of confidence and null hypothesis was rejected.

FINDINGS AND CONCLUSIONS

Within the limitations of the study and from statistical analysis the following conclusion was drawn. There was significant effect on flexibility and leg strength of Badminton players through the statistical analysis after six weeks training program.

It was also ensured that for quite time the coaches and sportspersons have been trying to design training methods, which would enable them to run faster, jump higher, and throw an object farther. To achieve such goals, power is essential. Strength gains can be transformed into power only by applying specific power training. Perhaps one of the most successful methods is training that employs plyometric exercises.

RECOMMENDATION:

In the light of results obtained and conclusions drawn the following recommendation were made for future investigations and for practical applications:

1. The study may be repeated to other physical fitness components on the same subjects.
2. The same study may be constructed with longer duration of training program.
3. The similar study may be repeated on the female subjects.
4. Coaches and physical education teachers are recommended to undertake this type of studies for selecting and planning the training programs for the players and athletes.
5. The similar study can be carried out on the total physiological variables as well.

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