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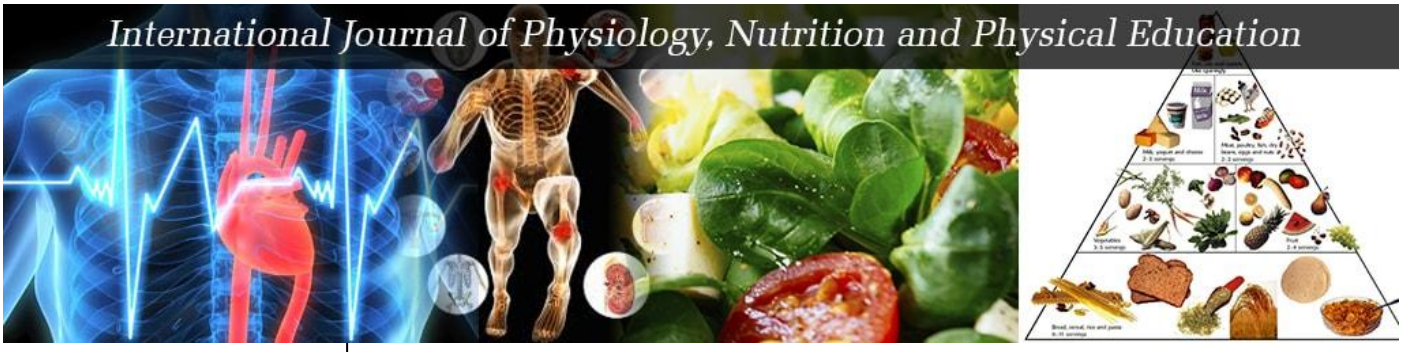

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Effect of plyometric exercises on broad jump of kabaddi players

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Abstract
The purpose of the study was to find out the effects of plyometric training on broad jump of kabaddi players. To achieve this purpose of the study, Fourty (40) samples for this research will be randomly selected from Jammu. The age of subjects will be ranged from 16 years to 24 years. The selected subjects were divided in to two equal groups of twenty subjects each. The Experimental group was given Plyometric training for nine weeks where as Control group was not given any type of training, but was permitted to join regular classes. The Mean value and Standard Deviation of pre-test and post-test of Experimental group were 1.841, 2.111 and 0.146, 0.220 respectively. When statistical comparison of pre-test and post-test of Experimental group was compared, the post-test was better than pre-test of this group („t" 9.077). The findings regarding Mean value and Standard Deviation of pre and post-test of Control group were 1.874, 1.868 and 0.161, 0.163 respectively. The statistical comparison of the pre and post-test of Control group showed statistically non-significant difference („t"=1.813). The Mean value and Standard Deviation of post-test of Experiment group and Control group were 2.111, 1.868 and 0.220, 0.163.The statistical comparison of post-test of these two groups predict that the Experimental group was more better than the Control group i.e.; the difference was statistically found significant at 0.05 level of confidence („t" = 4.076). There was non-significant difference in pre-test and post-test of Control group. There existed significant difference in pre-test and post-test of Experimental group.

Keywords: Plyometric, kabaddi and training.

Introduction
Plyometrics, also known as "jump training" or "plyos", are exercises in which muscles exert maximum force in short intervals of time, with the goal of increasing power (speed-strength). This training focuses on learning to move from a muscle extension to a contraction in a rapid or "explosive" manner, such as in specialized repeated jumping. Plyometric are primarily used by athletes, especially martial artists, sprinters and high jumpers, to improve performance, and are used in the fitness field to a much lesser degree.

Plyometric includes explosive powerful training exercises that are trained to activate the quick response and elastic properties of the major muscles in the body. It was initially made famous by Soviet Olympians in the 1970s, providing the core element in the strength programs of elite sporting athletes worldwide. Sports using Plyometric include basketball, tennis, badminton, squash and volleyball as well as the various codes of football.

The term "plyometrics" was coined by Fred Wilt after watching Soviet athletes prepare for their events in track and field; he felt this was a key to their success. He began a collaboration with Soviet (Russian) trainer Michael Yessis to promote plyometrics.

Review: Faigenbaum, *et al*., (2007) compared the effects of a six week training period of combined plyometric and resistance training (PRT, n = 13) or resistance training alone (RT, n = 14) on fitness performance in boys (12-15 yr). The RT group performed static stretching exercises followed by resistance training whereas the PRT group performed plyometric exercises followed by the same resistance training program. The training duration per session for both the groups was 90 min. At baseline and after training all participants were tested on the vertical jump, long jump, medicine ball toss, 9.1 m sprint, pro agility shuttle run and flexibility. The PRT group made significantly ($p < 0.05$) greater improvements than RT in long jump (10.8 cm vs. 2.2 cm), medicine ball toss (39.1 cm vs. 17.7 cm) and pro agility

shuttle run time (-0.23 sec vs. -0.02 sec) following training. They suggested that the addition of plyometric training to a resistance training program may be more beneficial than resistance training and static stretching for enhancing selected measures of upper and lower body power in boys.

Miller, *et al*., (2006) studied the impact of Plyometric training for six weeks on agility. Subjects were divided into two groups, a plyometric training and a control group. The plyometric training group performed in a six week Plyometric training program and the control group did not perform any plyometric training techniques. All subjects participated in two agility tests: T-test and Illinois Agility Test, and a force plate test for ground reaction times both pre and post testing. Univariate ANCOVAs were conducted to analyze the change scores (post –pre) in the independent variables by group (training or control) with pre scores as covariates. The Univariate ANCOVA revealed a significant group effect F2, 26 = 25.42, p=0.0000 for the T-test agility measure. For the Illinois Agility test, a significant group effect F2, 26 = 27.24, p = 0.000 was also found. The Plyometric training group had quicker posttest times compared to the control group for the agility tests. A significant group effect F2, 26 = 7.81, p = 0.002 was found for the Force Plate test. The plyometric training group reduced time on the ground on the posttest compared to the control group. They found that plyometric training can be an effective training technique to improve an athlete's agility.

Robinson and Owens (2004) conducted a study to evaluate the increase in agility during preparatory phase for which their program that targets fundamental techniques and skills required for straight ahead speed, directional changes, and lower body power development to be used during a collegiate athlete's non-traditional season. The goal of their program is to teach generalized movement patterns and build a solid foundation that can be used by individual sport coaches during their traditional season.

Young, McDowell and Scarlett (2001) tried to identify whether straight sprint training transferred to agility performance tests that involved various change-of-direction complexities and if agility training transferred to straight sprinting speed. Thirty-six males were tested on a 30-m straight sprint and 6 agility tests with 2-5 changes of direction at various angles. The subjects participated in 2 training sessions per week for 6 weeks using 20-40-m straight sprints (speed) or 20-40-m change-of-direction sprints (3-5 changes of 100 [degrees]) (agility). After the training period, the subjects were retested, and the speed training resulted in significant improvements ($p < 0.05$) in straight sprinting speed but limited gains in the agility tests. Generally the more complex the agility task, the less the transfer from the speed training to the agility task. Conversely, the agility training resulted in significant improvements in the change-of direction tests ($p < 0.05$) but no significant improvement ($p > 0.05$) in straight sprint performance. They concluded that straight speed and agility training methods are specific and produce limited transfer to the other. Their findings have implications for the design of speed and agility training and testing protocols.

Significance: Strength is the basis of high-level performance in most sports. Speed, endurance, power, agility and quickness are some of the most significant, and visible, components that required for kabaddi players to excel in competition. This study would reveal the importance of carefully designed combined strength and plyometric training programs in improving overall performance of male kabaddi players. The finding of the study may add to the quantum of knowledge in the area of training methods and results of the study may be of great value for designing suitable training program for the movement of performance abilities.

Hypothesis: In the light of the objective of the present study, it was hypothesized that Plyometric exercises would help to improve the ability of broad jump and explosive power of legs.

Selection of the Subjects

Fourty (40) samples for this research will be randomly selected from Jammu. The age of subjects will be ranged from 16 years to 24 years.

Tool to be used

To find out the effect of Plyometric exercises on horizontal jump, Experimental Group will be given training for the nine weeks. Pre and post-test of standing broad jump will taken for both the Experimental and Control group. 'T' test method of statistics will applied to test the hypothesis taken for present study. The data of this study will collected by the use of AAHPER Youth Fitness Test (1976) on the students.

Results and Discussion

The collected data was tabulated and computerized to draw meaningful conclusion. Mean, standard deviation and mean difference of pre and post-test of standing broad jump has been presented in the tables 1 and depicted in graph as well.

Table 1: Mean, Mean Differences, Standard Deviation and 'T'-Value Between Pre and Post- Test of Experimental Group

Group	Mean	Mean Difference	Std. Deviation	"t"
Experimental Group	1.841 2.111	0.270	0.146 0.220	9.077*

Significant at 0.05 level t .05(20) = 2.09

The above table shows the results of Mean, Standard Deviation and Mean differences between pre and post-test values of standing broad jump of Experimental group were 1.841&2.111, 0.146&0.220 and 0.270 respectively. It indicated that there exists significant mean difference between pre and post-test of Experimental group that was recorded 0.270. When the, t" ratio was applied to find out the statistical difference between pre and post-test, the computed „t" value 9.077 was greater than the table value of 2.09 and thus scores of post-test was highly significant at 0.05 level of confidence.

Conclusions

1. There was non-significant difference in pre-test and post-test of Control group.
2. There existed significant difference in pre-test and post-test of Experimental group.
3. There existed significant difference in post-test of Experimental group and post-test of Control group.

Recommendations

From the results of the present study, it is clear that the Plyometric exercises are the most essential part of sports that needs jumping abilities.

1. The study may be conducted on both males as well as female players at difference level of sports participation.
2. It may be meaningful to compare on large number of the sample.
3. The Plyometric exercise should be the necessarily part of

the training schedule for all levels of the competitions.

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