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Effect of Eight Weeks Plyometric Training on Agility of University Level Handball Players

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Abstract – The purpose of the present study was to determine the effect of 8-week plyometric training on agility of university level handball players. 32 male university level handball players of LNIPE,NERC Guwahati (Assam), aged 18 to 23 years were selected as subjects. For the study the pretest- posttest randomized groups Experimental design was adopted. The experimental treatment was given to the subjects through the plyometric exercises i.e. Squat Jump, Split Jump (lounges), Vertical Depth Jump, Jump up, Box Jump March, Lateral Jump (Single leg), Lateral Jump over the cone (Double leg), three days a week for 8 weeks of 45 minutes per session from 5 p.m. to 5:45 p.m. The pre-test and post-test data were collected before administering the training and immediately after the completion of the training programme by using AAHPERD shuttle run test to measure the Agility. To analyze the collected data ANCOVA statistical technique was employed and the level of significant was observed at 0.05 level. On the basis of the statistical technique it was conclude that there was significant improvement of agility due to the training of selected plyotmetric exercises.

Keywords: Plyometric, Exercise, Agility, Handball

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INTRODUCTION

Modern handball requires for player a good physical endurance, parallel it is very important to develop speed and explosive power and force endurance. Handball is also a social game, where next to the good coordination and cleverness comes up to the important place team players good rapprochement and cooperation (Järvekülg, 2002).The plyometric method is ranked among the most frequently used methods for conditioning in handball (Lehnert et al., 2009). It is worth indicating that some important and extremely common activities in handball include: jumping and shooting over the head of the opponent into the goal (Shahdadi, 1999), the player's shooting at a speed of more than 70 miles per hour (Amirtash, 2006), rapid redirecting (briskness), and passing the opponent around 6 and 9 meter lines of the handball court and 30 meter speed, which are effective features for elite handball players to execute counterattacks (Agha and Ghahremanloo, 2007). All of these abilities have a considerable impact on the final result of a match and they are proper predictors of successful performance in handball which will determine the winner and the loser. Plyometric training has been an effective method for the improvement of agility, sprinting, and jumping ability. (Crowther et.al.,2007; De Villarreal et.al.,2012; Impellizzeri et.al.,2008). and it has also been reported to improve running economy, joint stability, increased joint awareness and overall proprioception and decrease the severity of knee injuries(Chimera et.al.,2004; Miller et.al.,2002).

Plyometric drills usually involve stopping, starting, and changing directions in an explosive manner. These movements are components that can assist in developing agility (Craig, 2004; Miller et al., 2001; Parsons et al., 1998; Yap et al., 2000; Young et al., 2001). Agility is the ability to maintain or control body position while quickly changing direction during a series of movements (Twist and Benickly, 1995). Agility training is thought to be a re- enforcement of motor programming through neuromuscular conditioning and neural adaptation of muscle spindles, golgi-tendon organs, and joint proprioceptors (Barnes and Attaway, 1996; Craig, 2004, Potteiger et al., 1999). By enhancing balance and control of body positions during movement, agility theoretically should improve. Jump performances appears to be contingent on the quantity and efficiency in which force is produced at the hip, knee and ankle joints, explosive strength of the legs and hips should result in a higher vertical jump. Plyometrics are training techniques used by athletes in all types of sports to increase strength and explosiveness (Chu, 1998). Plyometrics consists of a rapid stretching of a muscle (eccentricaction) immediately followed by a concentric or shortening

action of the same muscle and connective tissue (Baechle and Earle, 2000).

Therefore, the purpose of this study was to evaluate the effect of plyometric training on agility of university level handball players.

METHODS

Study design and subjects

A Pretest- Posttest randomized groups experimental design was used. For the present study the data was collected from university level Handball Players of LNIPE (NERC), Guwahati (Assam). The study was delimited to 32 male university level Handball players. Age of the handball players was ranging from 18 to 23 years. The researcher divided the Handball players into two equal groups on the basis of the mean performance of pre-test score. The groups were randomly selected distributed into two homogeneous groups namely, Experimental Group and Control Group.

All the subjects were informed about the nature, purpose, and possible risk involved in the study and an informed written consent was taken from them prior to participation. All subjects were familiarized with all testing procedures and plyometrics training prior to the commencement of the study.

The experimental treatment was given to the subjects through the selected plyometric exercises i.e. Squat Jump, Split Jump (lounges), Vertical Depth Jump, Jump up, Box Jump March, Lateral Jump (Single leg), Lateral Jump over the cone (Double leg), three days a week for 8 weeks of 45 minutes per session from 5 p.m. to 5:45 p.m. The pre-test and post-test data were collected before administering the training and immediately after the completion of the training programme by using AAHPERD shuttle run test to measure the Agility. The test was conducted in the evening between 5 p.m. to 5:45 p.m. To analyze the collected data ANCOVA statistical technique was employed and the level of significant was observed at 0.05 level.

ANALYSIS OF THE STUDY

The mean and standard deviation of both groups during post testing have been shown in table 1:-

Table 1-Descriptive statistics of post-test of agility

Treatment Groups	Mean	SD	N
Experimental Group	10.29	.257	16
Control Group	10.56	.213	16
Total	10.43	.270	32

The mean and standard deviation of different post testing groups after adjustment have been shown in table 2:-

Table 2- Adjusted mean and standard error of experimental and control group in post testing

Treatment Groups	Mean	Std. Error
Experimental Group	10.263	.019
Control Group	10.598	.019

Further, adjusted means and standard deviation for data on agility of both the groups during post testing is shown in table 2. These values are different from that of unadjusted values shown in table 1.

The final results of ANCOVA have been shown in table 3:-

Table 3 – ANCOVA table for the post test data on agility

Source	Type I Sum of squares	df	Mean Square	F	Sig.
Pre test on agility	1.507	1	1.507	258.335	.000
Treatment group	.878	1	0.878	150.477	.000
Error	.169	29	.006		
Total	3483.799	31			

Table 3 shows the f- value for comparing the adjusted means of the two groups (treatment and control) during post testing. Since p-value for f statistics is 0.00 which is less than 0.05, it is significant. Thus the null hypothesis of no difference among the adjusted post means for the data on agility in both the groups may be rejected at 5% level.

Since f- statistics is significant, post hoc comparison has been made for adjusted means of two groups which is shown in table 4:-

Table 4- Post hoc comparison of adjusted means of the data on agility obtained in post hoc measurement

(I) Treatment Groups	(J) Treatment Groups	Mean Difference (I-J)	Std. Error	Sig.
Experimental Group	Control Group	-.335	.027	.000

The p- value for mean difference between experimental and control group is 0.00. Since p-value is less than 0.05 and hence they are significant at 5% level.

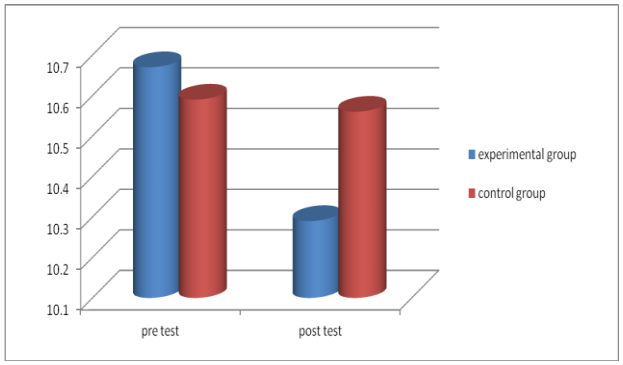

Fig 1: Graphical representation of difference of means among experimental and control group from pre testing and post testing

DISCUSSION

The aim of this study was to see the effect of 8 week plyometric training on agility university level handball players. In this study a 8-weeks of plyometrics training programmed was done and functional test was performed for both the group. The study showed that there is significant improvement in agility of experimental group. So present study indicated that 8 weeks of plyometrics training was able to increase agility significantly.

Agility training is thought to be a reinforcement of motor programming through neuromuscular conditioning and neural adaptation of muscle spindles, Golgitendon organs, and joint proprioceptors. (Craig, 2004). Plyometrics drills usually involve stopping, starting and changing direction in an explosive manner and these components can assist in developing agility. (Miller et.al., 2001; Craig, 2004; Miller et.al., 1998; Yap et.al., 2000; Parsons et.al., 1998; Yap et.al.,2000) and plyometrics help in improving agility (Miller et.al., 1998). Plyometrics training exhibit a marked improvement in all speed tests and vertical jump tests, leg strength and agility. (Michailidis et.al., 2013) . plyometric training can be an effective training technique to improve an athlete's agility. (Miller et.al., 1998). He said the plyometric training group reduced time on the ground on the post test compared to the control group (Miller et.al., 1998). Both drop jump and counter moment jump plyometrics are worthwhile training activities that for improving power and agility. (Thomas et.al., 2009). The use of plyometrics training program is not only to break the monotony of training, but they can also improve the agility and strength of players. (Bal et.al., 2011).

CONCLUSION

The results of this study indicate that there is significant difference in the effect of 8 week plyometric training on agility of university level handball players. On the basis of above findings we can say that 8 week plyometric training is effective in improving agility.

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