



ISSN: 2456-0057

IJPNPE 2023; 8(1): 391-394

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www.journalofsports.com

Received: 04-01-2023

Accepted: 03-02-2023

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Effect of plyometric training on agility of tribal footballers

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Abstract

The purpose of the study was to access the effectiveness of plyometric exercise in developing agility of tribal footballers. Forty six tribal footballers (age 19.17 ± 1.23 years; height 165.14 ± 3.46 cm and weight 58.38 ± 4.32 kg) voluntarily took part in the experiment as subjects. They were randomly divided into two groups - Experimental and Control. Experimental group practiced plyometric training for 6 weeks with 2-day sessions per week along with their regular football practice. Control group carried out only their regular football practice. For measuring agility 4×10m shuttle run test was conducted prior to and after 6 weeks intervention period. Pair T-Test was used to calculate the acquired data on agility. Level of significance was fixed at 0.05 level. Result revealed that experimental group significantly improved their agility after 6 weeks plyometric intervention but the improvement of control group was not significant.

Keywords: Plyometric training, agility, tribal footballers

1. Introduction

Plyometric is a type of exercise that enables a muscle to reach maximum strength in the shortest possible time (Chu, 1998) [2]. Plyometric training is also known as stretch shortening cycle. In plyometric exercise the action is completed by stretch of muscle followed by rapid contraction of muscle. It is a well-known exercise to develop explosiveness of muscle.

The playing pattern of football has been changed very rapidly. Now it is the era of total football or all round football. Every player needs to have the ability to play in every position. Repeated short sprints, reactive agility, speed endurance and jumps are the basic elements of motor and fitness preparations of football players (Datson et al., 2014) [3]. Agility is one of the important motor ability for playing all round football specially during scoring a goal and saving a goal. Agility is the ability of an individual to change direction with speed. Explosive power of muscle can play an important role in developing agility of an individual.

Tribal youth of 'Jungle Mahal' are fond of football. Most of the children in 'Jungle Mahal' regularly play football. Now a days lots of tournaments are being organized in tribal area of 'Jungle Mahal' due to rapidly increasing interest of football among the tribal people of those areas. Many tribal boys are playing fast division, super division football in Kolkata, West Bengal. Some of them are even playing ISL.

Plyometric exercise can be practiced with minimum equipments or without equipments which is very suitable method of exercise to the financially backward tribal boys. Purpose of the study was to access the effectiveness of plyometric exercise in developing agility of tribal footballers. So that, with minimum equipments they can practice this exercise and acquire the required motor ability to play football with the maximum efficiency.

2. Methodology

2.1 Participants

Forty six male tribal footballers from Manikpara, Jhargram, and West Bengal, India voluntarily took part in this study. The mean age, height and weight of the subjects were respectively 19.17 ± 1.23 years, 165.14 ± 3.46 cm and 58.38 ± 4.32 Kg. While selecting subjects, each subject was checked up by a physician and certified 'fit' to undergo rigorous training program.

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Written consent from each subject was obtained prior to the commencement of the experiment.

2.2. Experimental Design

Pre-test post-test randomised group design was employed for the study. Forty six male tribal footballers were randomly and equally divided into two groups, namely 'Experimental group' and 'Control'. An initial test on agility was conducted prior to the commencement of the training for both the groups. Experimental group carried out plyometric training on the football ground along with their regular football practice, whereas Control group did their regular football practice only. The final data for both the groups were collected after six weeks intervention period.

2.3. Test and Data Collection

Agility was tested by 4x10m shuttle run test. Two lines 10 meters apart were marked. Two blocks were placed on the line opposite of starting line. Subjects got ready placing their front foot behind the starting line. On the signal, "go!" the subjects started sprint to the blocks, picked up one, then run back and placed it beyond the starting line. Then turning without a rest, repeated the process with the second block and carried it back across the finish line. Some rest is allowed between two trials. Time to complete 4x10m shuttle run was taken in seconds to the nearest one decimal place. Time of the best trial is recorded (Johnson & Nelson 1988) [6].

2.4. Treatment Protocol

Plyometric training programme was conducted for 6 weeks with 2-day sessions per week (Chimera et al., 2004; Martel,

2005; Vossen et al., 2000) [1, 9, 16]. The training was based on the recommendations of intensity and volume from previous literature (Miller et al., 2007; Piper & Erdmann, 1998) [10, 11]. The intensity of the exercise increased throughout the course of the training. All the subjects were under the direct supervision of the researcher.

2.5. Statistical Analysis

The collected data from both the groups at Pre and Post training condition on agility were statistically analysed by Paired t-test using SPSS. The level of confidence was fixed at 95%.

3. Results

Table 1: Descriptive statistics of agility of Experimental group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre Test	11.075	23	.616	.128
	Post Test	11.020	23	.609	.127

In Table-1, the mean, standard deviation and standard error of mean of agility of experimental group at pre and post training conditions have been presented. The mean, standard deviation and standard error of mean of agility of experimental group in pre-experimental condition were 11.075, 0.616 and 0.128 respectively. The mean, standard deviation and standard error of mean of agility of experimental group in post-experimental condition were 11.020, 0.609 and 0.127 respectively.

Table 2: Comparison of agility of Experimental group at pre and post training conditions

	Paired differences			95% confidence interval of the difference		T	DF	Sig. (2-tailed)
	Mean	SD	SE(M)	Lower	Upper			
Pair 1 Pre Test Post Test	.05522	.06302	.01314	.02797	.08247	4.202	22	.001**

** $p < 0.05$

Table-2 shows that the value of t is 4.202 and p value is 0.001. This t value is significant at 0.05 level as the obtained p value 0.001 is less than 0.05. So, there is significant

difference between pre and post-test means of agility performance of Experimental group.

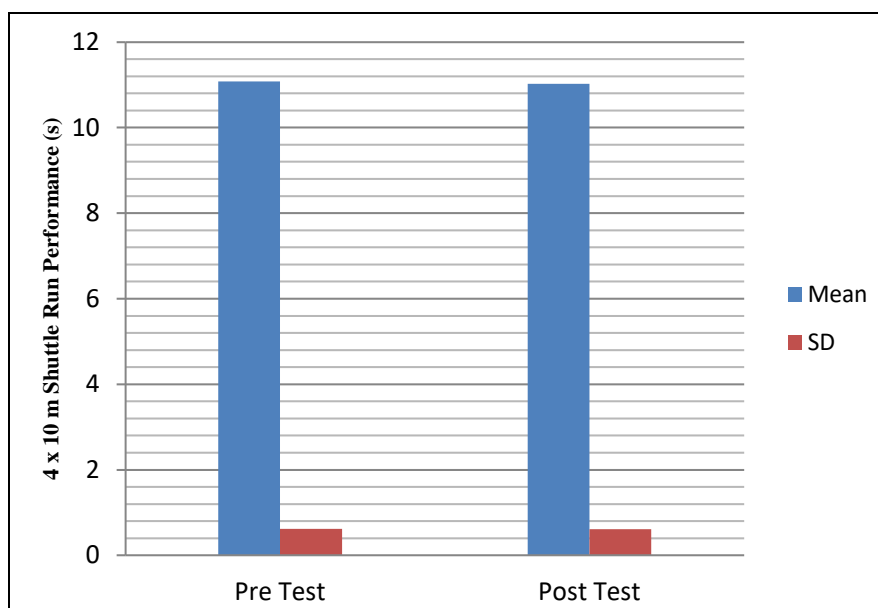


Fig 1: Comparison of agility of experimental group at pre and post training conditions

Table 3: Descriptive statistics of agility of Control group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 2	Pre Test	11.066	23	.603	.126
	Post Test	11.050	23	.594	.124

Table-3 shows the mean, standard deviation and standard error of mean of agility of control group at pre and post

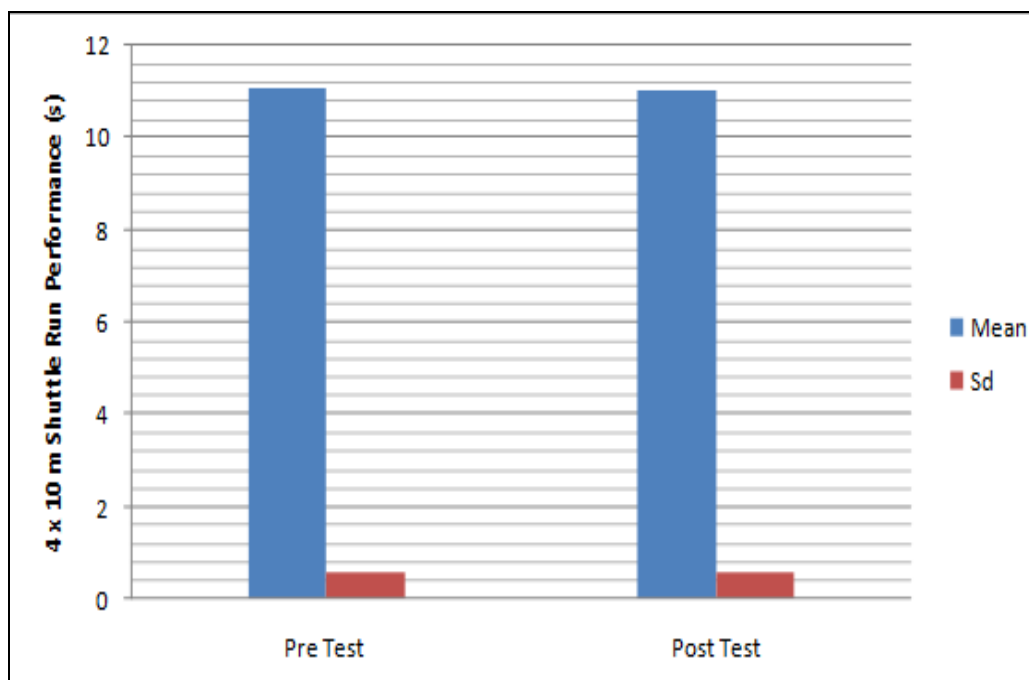
Table 4: Comparison of agility of Control group at pre and post training condition

	Paired differences			95% confidence interval of the difference				
	Mean	SD	SEM	Lower	Upper	T	DF	Sig. (2-tailed)
Pair 1 Pre Test Post Test	.01609	.04580	.00955	-.00372	.03589	1.685	22	.106

Table-4 shows that the value of t is 1.685 and p value is 0.106. The t value is not significant at 0.05 level as the obtained p value 0.106 is more than 0.05. So, there is no

training conditions. The mean, standard deviation and standard error of mean of agility of control group in pre-experimental condition were 11.066, 0.603 and 0.126 respectively. The mean, standard deviation and standard error of mean of agility of control group in post-experimental condition were 11.050, 0.594 and 0.124 respectively.

significant difference between pre and post-test means of agility performance of Control group.

**Fig 2:** Comparison of agility of Control group at pre and post training conditions

4. Discussion

According to Table-2 and 4, 4×10m shuttle run performance of Experimental group significantly ($p = 0.001$) decreased after six weeks but the decrement of shuttle run performance of Control group was not statistically significant ($p = 0.106$). So, it appears that six weeks plyometric training is sufficient enough to improve the agility of tribal footballers. Similar result have been observed by Heang et al. (2012) [5], Tendulkar et al. (2018) [14], Shamshuddin et al. (2020) [13], Maciejczyk et al. (2021) [8]. Martin and Lue-Chin (2010) found three weeks of plyometric training sufficient to improve agility of Jamaican national netball players. Heang et al. (2012) [5] reported six weeks plyometric training significantly effective to improve agility of college badminton players. Tendulkar et al. (2018) [14] saw the effect of plyometric training on football players and found it significantly effective. Shamshuddin et al. (2020) [13] assessed the effect of six weeks plyometric training on recreational football players and found significant improvement. Maciejczyk et al. (2021) [8] observed the effect of short term plyometric training on female soccer players and they found only 4 weeks

plyometric training is effective instead of typical 6–12 weeks plyometric training.

Plyometric exercise is consisting of repeated eccentric followed by concentric muscular action. The minimal time delay between eccentric and concentric phase is called Amortization phase. Concentric contraction store elastic potential energy (Potash & Chu, 2008) [12]. Stretch in the muscle stimulates muscle spindles and cause a reflexive muscular action (Voight & Tippett, 2004) [15]. If amortization phase is kept as short as possible in eccentric followed by concentric muscular action, elastic potential energy and reflexive muscular energy are added to concentric muscular contraction and produce maximal force explosive force (Kobak et al., 2015) [7]. Thus, it may be said that plyometric exercise is conducive for increasing agility of tribal footballers.

5. Conclusions

On the basis of results of the study it is concluded that

- Plyometric training improves agility of tribal footballers.
- Six weeks duration of plyometric training with 2-day

sessions per week is sufficient enough to improve agility.

6. References

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