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EFFECT OF PLYOMETRIC TRAINING ON AGILITY, SPEED AND POWER PERFORMANCE OF THROWBALL PLAYERS IN SRI LANKA



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ABSTRACT

This study aimed to examine the effect of plyometric training on the Agility, Speed and Power performance of Throwball players in Sri Lanka. Twenty Eight male school throwball players (age 20.2±0.5) were selected as a study sample. These players were divided into a plyometric training group (14) and a control group (14). The intervention program was carried out three times a week over six weeks for the plyometric group, and a control group did not engage in any plyometric training. Agility was assessed using an Illinois Agility test, and power was measured by standing long jump and speed test from 30m sprint test. The test was carried out for both groups before and after the intervention. The results showed that the plyometric training group's post-test mean of Agility, speed, and power performance significantly improved from the control group. It is concluded that plyometric training is an effective technique to enhance male throwball players' Agility, speed and power.

Keywords: Agility, Speed, Power & Plyometric Training.

INTRODUCTION

A throwball game involves the ball catching and throwing with a quick change of direction with speed movements (Wijethunga, 2021). Plyometric training is a

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top-rated training program for improving speed, explosive power output, explosive reactivity and eccentric muscle control during dynamic movements (Kumar et al., 2016). Plyometric exercises aim to increase the force of movements after using both the natural elastic components of the muscles and tendons and the alternating ones (Fabricius, 2011). Plyometric combines eccentric and concentric muscle activity, allowing the muscles to produce greater force than normal core functions (Hasaloei et al., 2013). Plyometric drills usually involve stopping, starting, and explosively changing directions. These movements can assist in developing agility (Ramesh kannan & Chittibabu, 2014). *Agility* defines as rapid whole-body movements with the change of directional velocity in response to a stimulus (Asadi et al., 2016). Scholars stress that plyometric training effectively improves athletes' Power (Miller et al., 2006; Thomas et al. 2009; Heang et al., 2012). Power is described as "the ability to produce as much force or velocity in as short an amount of time as possible" (Kruck et al., 2018). Speed is the ability to move quickly across the ground or move limbs rapidly to grab or throw (Kruck et al., 2018). A limited study has been conducted based on the effect of plyometric training on Speed, Power and Agility performance in the Sri Lankan context. Therefore, this study aimed to examine the effect of plyometric training on the speed and agility performance of school-level male Throwball players in Sri Lanka.

OBJECTIVE OF THE STUDY

The main objective of the study was to examine the effect of plyometric training on the Agility, Speed and Power performance of Throwball players in Sri Lanka.

DESIGN OF THE STUDY

Subjects

The purpose of this study was to examine the effect of Ladder Training on the Agility and Speed performance of male Throwball Players in Sri Lanka. To attain the study's objective, Twenty Eight school-level male players were selected based on the

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purposive sampling technique, and participants participated in the national schools' western province throwball championship in 2022.

Procedures

Before starting the training, participants were randomly assigned to the control and experimental group. All the test procedures, risk factors, benefits, and exercises were explained before the start to conduct the pretest. Actual test protocols start after a few practice trials to familiarize participants with each test. Participants were allowed to perform three times, and the best time was considered. Team coaches agreed to include the plyometric training program before starting regular sessions. All participants were in good physical condition throughout the training program.

30m sprint test

30 m sprint test performed on the outdoor track and time recorded through the stopwatch. Instruct participants to start with standing start with the athlete's preferred foot forward, placed on the marked on the floor. With the command "Go", participants started to run, and the tester recorded the time while participants broke the finishing line. Measure the performance in seconds.

Illinois Agility test

Set up the test area with a length of 10m and width of 5m in the outdoor area, and five cones were placed down in the centre, spaced 3.3 m apart (Figure 1). The participants start in a lying position, face down on the floor. After the whilst of the tester, the participant stands up as fast as possible and sprints 10 m to a cone, completes a 180° turn at the cone and then sprints back 10 m to another cone and completes another 180° turn. Measure the performance in seconds.

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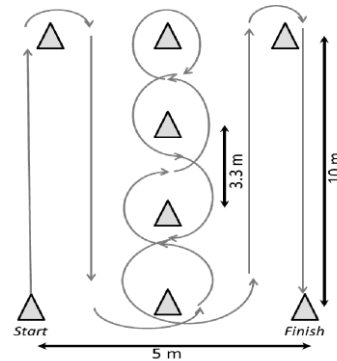


Figure 1: Illinois Agility test

Source: Adopted from Stephen Foulis, 2015

Standing Long Jump

Instruct participants to stand behind a line marked on the ground with feet slightly apart. After the whilst participants have taken, the two-foot take-off and landing are used, with the arms swinging and bending the knees to provide forward drive. The participants attempt to jump as far as possible, landing on both feet without falling backwards.

Training intervention

After the pretest, only the treatment group started the 6-week plyometric training with regular training and the control group engaged only with the regular training schedules. The duration of regular throwball training was 2hour in three days per week. The intervention programme consisted of six weeks, as shown in Table 1 (Adopted from Miller et al., 2006). The researcher supervises all the training sessions to confirm that all the exercises are performed with the correct technique.

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Table No I: 6 weeks of Plyometric training

Weeks	Training V	Plyometric drills	Sets*Reps	T. Inten.
1	90	Side-to-side ankle hops	2 x 15	Low
		Standing Jump and reach	2 x 15	Low
		Front cone hops	5 x 6	Low
2	120	Side-to-side ankle hops	2 x 15	Low
		Standing long Jump	5 x 6	Low
		Lateral Jump over barrier	2 x 15	Medium
		Double leg hops	5 x 6	Medium
3	120	Side-to-side ankle hops	2 x 12	Low
		Standing long Jump	4 x 6	Low
		Lateral Jump over barrier	2 x 12	Medium
		Double leg hops	3 x 8	Medium
		Lateral cone hops	2 x 12	Medium
4	140	Diagonal cone hops	4 x 8	Low
		Standing long Jump with lateral sprint	4 x 8	Medium
		Lateral Jump over barrier	2 x 12	Medium
		Single leg bounding	4 x 7	High
		Lateral jump single leg	4 x 6	High
5	140	Diagonal cone hops	2 x 7	Low
		Standing long Jump with lateral sprint	4 x 7	Medium
		Lateral cone hops	4 x 7	Medium
		Cone hops with 180-degree turn	4 x 7	Medium
		Single leg bounding	4 x 7	High
		Lateral jump single leg	2 x 7	High

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6	120	Diagonal cone hops	2 x 12	Low
		Hexagon drills	2 x 12	Low
		Cone hops with change of direction	4 x 6	Medium
		sprint	3 x 8	Medium
		Double leg hops	4 x 6	High
		Lateral jump single leg		

Source: Adopted from Miller et al., 2006

STATISTICAL ANALYSIS & INTERPRETATIONS OF THE DATA

Pre and Post-test data were collected from the control and treatment groups before and after the six weeks of plyometric training. All the analysis was completed using SPSS at 5%. The normality test result showed that the data were not normally distributed. Therefore, the non-parametric test was used to determine the pre and post-test differences.

RESULTS AND DISCUSSION

Speed, Agility, and Power post-test scores significantly improved from pre-test scores, as shown in Table 2. The control group scored 20.64 seconds in Speed, 21.29 in Agility and 17.12m in Power in the pre-test. While treatment group showed a mean score of 20.46 seconds in Speed, 18.80 seconds in Agility and 15.97m in Power in the pre-test. The treatment group showed a more significant improvement ($p < 0.001$) in the post-test than the control group.

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Table No II: Mean and standard deviation and P values of pre and post-tests of Control and Treatment Group

Variable	Group	Mean ± SD		P-Value
		Pre	Post	
Speed	Control Group	20.64 ± 2.91	21.99±2.66*	0.001**
	Treatment Group	20.46±2.92	22.86±2.58*	
Agility	Control Group	21.29 ± 1.70	21.73 ± 1.62	0.022**
	Treatment Group	18.80 ± 1.22	20.05 ± 1.22*	
Power	Control Group	17.12 ± 4.76	18.93 ± 3.96*	0.007**
	Treatment Group	15.97 ± 2.75	20.19 ± 3.62*	

*Significant difference from Pre-test ** Significant difference from Control group

Source: author 2020

DISCUSSION

This study indicates that 6-week plyometric training significantly influences the development of speed, power and agility performance of school-level male Throwball players. Again, this finding is consistent with Heang et al., 2012; Ozmen & Aydogmus, 2017; Ramesh Kannan & Chittibabu 2014; who found that plyometric training helps to improve speed, power and agility performance.

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CONCLUSION

According to the revealed results of the data analysis and discussion above, plyometric training affects the speed, power and agility performance of male Throwball players. Hence it is expected that Throwball coaches can implement plyometric training in their training sessions.

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