

The Effects of Plyometric Training Versus Agilitytraining to Improve Performance in Football Players – A Comparative Study

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Article History

Received: 15.05.2025

Revised: 04.06.2025

Accepted: 13.07.2025

Published: 04.08.2025

Abstract: Increased power output in the muscles leads to stronger contractions with less energy consumption, resulting in faster muscle contraction speed and overall movement. It also improves the ability to change directions quickly, a quality that fitness professionals often refer to as agility. Athletes need to rapidly change body position, react to environmental changes, and switch between skills as efficiently as possible. PT contributes to improvement in vertical jump performance, acceleration, leg strength, muscular power, increase of joint awareness and overall sport-specific skills. The increase in physical power make athletes run faster, jump higher and hit harder and develop specific skills such as injury protections relative to specific practiced sport (15). In addition, the forces involved and the quickness of execution induced the involvement of the central nervous system.

Keyword: Muscular Power, Agility, Athletic Performance, Neuromuscular Activation, Injury Prevention.

INTRODUCTION

The world of football is constantly looking for innovative training techniques that will improve players' abilities and provide them an advantage over their rivals. In the team sport of soccer, players' quickness, agility, balance, and coordination are crucial. In ninety minutes, the soccer players are supposed to execute high-intensity exercises like jumps, running at high speeds, and direction changes. Any exercise where muscles are rapidly and repeatedly stretched (also known as "loaded") and then contracted (for example, by jumping off a tall object or performing push-ups with a clap in between). Plyometric training aims to increase muscle power. Plyometric training, which combines the eccentric, amortization, and concentric phases, is one of the most widely used training techniques. Contractile structures store ATP during the eccentric contraction (tension) phase, which is then used to generate explosive energy during the concentric (acceleration) phase. Intramuscular and neuromuscular adaptations, such as increased muscle activation and musculotendinosis stiffness, occur during plyometric training. Plyometric training, then, consists of sports-specific exercises that improve soccer players' skill performance and prevent injuries.

The capacity to quickly and effectively change one's body position is known as agility, and it calls for the integration of distinct movement skills utilizing a variety of abilities, including balance, coordination, quick reflexes, strength, and endurance. It is the capacity to effectively and efficiently alter the body's direction. Historically, an athlete's ability to demonstrate rapid speed and direction changes has been linked to their agility. the capacity to quickly change directions without sacrificing balance or posture. The athlete needs to be able to quickly react to changes in the environment,

modify their body position accordingly, and switch between skills as quickly as possible.

The capacity to quickly change directions while keeping balance and posture under control.

PT has been shown to increase performance variables in many sports, little scientific information is currently available to determine whether PT actually enhances skill performance in soccer players, considering that soccer is an extremely demanding sport. Soccer players require dynamic muscular performance for fighting at all levels of training status, including rapid movements such as acceleration and deceleration of the body, change of direction, vertical and horizontal jumps, endurance, speed as well as power for kicking and tackling.

The athlete needs to be able to change their body position quickly, react to changes in the environment, and switch between skills as quickly as possible. PT contributes to improvement in vertical jump performance, acceleration, leg strength, muscular power, increase of joint awareness and overall sport-specific skills. Coaches frequently use the agility ladder to drill athletes' footwork in order to improve their agility and overall performance. Plyometric training is a technique used to increase strength and explosiveness. It consists of physical exercises in which muscles exert maximum force at short intervals to increase dynamic performances. In such a training, muscles undergo a rapid elongation followed by an immediate shortening (stretch-shortening contraction), utilizing the elastic energy stored during the stretching phase. The adaptability of PT has increased in popularity, thereby proven valuable for application to a range of sports as an effective tool in increasing lower body power (5), as measured in several studies. A very well-liked piece of equipment for coaches trying to

increase their players' quickness, coordination, balance, and agility is the agility ladder. There are numerous uses for ladders. The two most evident goals are improved coordination and foot speed.

The present study aims to compare the benefits of agility training and plyometric training in enhancing the performance of football players. Specifically, it seeks to examine the effects of plyometric training on players' ability to improve their performance, investigate how agility training contributes to overall performance, and evaluate the combined impact of both agility and plyometric training on football players' ability to perform at a higher level.

METHODOLOGY

Study design : Comparative study
Sampling method : Convenient sampling
Sampling size : 30 participants.
Study duration : 8 weeks
Study setting : Meenakshi College of physiotherapy.

INCLUSION CRITERIA:

- Competitive athletes
- Age group: 17-23 years
- Sex: male

EXCLUSION CRITERIA:

- Football players who have recently sustained an injury.
- Football players who recently suffered a fracture.
- Ankle, knee, hip, and back pathology in the three months prior to the study.
- Unresolved musculoskeletal disorders or any lower extremity reconstruction surgery performed within the last 24 months.
- The athletes who were using had previously used growth hormone, anabolic steroids, or other similar performance-enhancing medications.

OUTCOME MEASURES:

T TEST: FOR MOVEMENT AND SPEED

The T test is a basic running assessment of agility that involves backward, sideways, and forward motions and suitable for a variety of sports.

ILLINOIS AGILITY TEST: FOR BALANCE AND COORDINATION.

The purpose of the Illinois Agility Test is to measure a person's sport agility. It's an easy test that is simple to use and needs minimal equipment. It assesses one's capacity to change directions and from various perspectives.

TOOLS USED:

- Cones
- Stopwatch
- Inch tapes
- Ladders
- Markers
- Training hurdles

PROCEDURE:

After obtaining informed consent, the samples are chosen based on inclusion and exclusion criteria. 30 samples total, split into two groups for this study. Every group has 15 samples

GROUP –A: PLYOMETRIC TRAINING IN GROUP A.

In order to perform plyometric exercises, which involve the right and left extremities as well as the feet, 15 samples are taken from this group. These consist of 5 repetitions of the following exercises:

1. straight forward jump
2. lateral jump (right)
3. lateral jump (left) from a 20-cm height jump barrier. For four weeks, a training session should take place three times a week for about 40 minutes.

GROUP: A (PLYOMETRIC TRAINING)

WEEKS	BODY PART	EXERCISE	REPETITIONS
WEEK 1	BOTH FEET	Straightforward jump starting at a height of 20 cm	5 Repetitions
	RIGHT EXTREMITY	Lateral jump over a 20-cm vertical jump (RIGHT)	
	LEFT EXTREMITY	Lateral jump over a 20-cm vertical jump (LEFT)	
WEEK 2	BOTH FEET	Straightforward jump starting at a height of 20 cm	5 Repetitions
	RIGHT EXTREMITY	Lateral jump over a 20-cm vertical jump (RIGHT)	
	LEFT EXTREMITY	Lateral jump over a 20-cm vertical jump (LEFT)	

WEEK 3	BOTH FEET RIGHT EXTREMITY LEFT EXTREMITY	Straightforward jump starting at a height of 20 cm Lateral jump over a 20-cm vertical jump (RIGHT) Lateral jump over a 20-cm vertical jump (LEFT)	5 Repetitions
WEEK 4	BOTH FEET RIGHT EXTREMITY LEFT EXTREMITY	Straightforward jump starting at a height of 20 cm Lateral jump over a 20-cm vertical jump (RIGHT) Lateral jump over a 20-cm vertical jump (LEFT)	5 Repetitions

FIGURE1.1STRAIGHT FORWARD JUMP (BOTH FEET)



STRAIGHT FORWARD JUMP (RIGHT EXTREMITY)



FIGURE2.1

FIGURE2.2

LATERAL FOOT (BOTH EXTREMITY)



FIGURE3.1



FIGURE3.2

LATERAL JUMP(RIGHT EXTREMITY)

LATERAL JUMP (LEFT EXTREMITY)



FIGURE4.1



FIGURE4.2

GROUP –B: AGILITY TRAINING

In this group, 15 samples are used for an agility drill involving the ladder. The ladder drills training program lasted for four weeks, with three sessions held on Mondays, Wednesdays, and Fridays. Each session lasted for 40 minutes, for a total of eighteen ladder drills training sessions.

GROUP-B: (AGILITY TRAINING)

WEEKS	EXERCISE	REPETITIONS
WEEK 1	Single foot run Two foot run Lateral single hop Single leg forward hop Two foot lateral run	2 REPETITIONS
	Single foot run Two foot run	

WEEK 2	Lateral single hop Single leg forward hop Two foot lateral run	2REPETITIONS
WEEK 3	Single foot run Two foot run Lateral single hop Single leg forward hop Two foot lateral run	2REPETITIONS
WEEK 4	Single foot run Two foot run Lateral single hop Single leg forward hop Two foot lateral run	2REPETITIONS

FIGURE:5.1 SINGLE FOOT RUN



FIGURE :6.1 TWO FOOTRUN



FIGURE:7.1 LATERAL SINGLE LEG HOP



FIGURE:8.1 SINGLE LEG FORWARD HOP



DATA ANALYSIS AND INTERPRETATION:

ANALYSIS WITHIN THE GROUP:

Table1: Represents The Pre And Post Values Of Group A– (T –Test And Illinois Agility Test)

TABULAR REPRESENTATION:

	MEAN	MEAN	STANDARD DEVIATION	STANDARD DEVIATION	t-VALUE	p-VALUE
	PRETEST	POSTTEST	PRETEST	POSTTEST		
T-TEST	11.92	10.57	0.360	0.509	8.3865	0.0001
ILLINOIS TEST	16.58	15.47	0.747	0.844	3.8142	0.0001

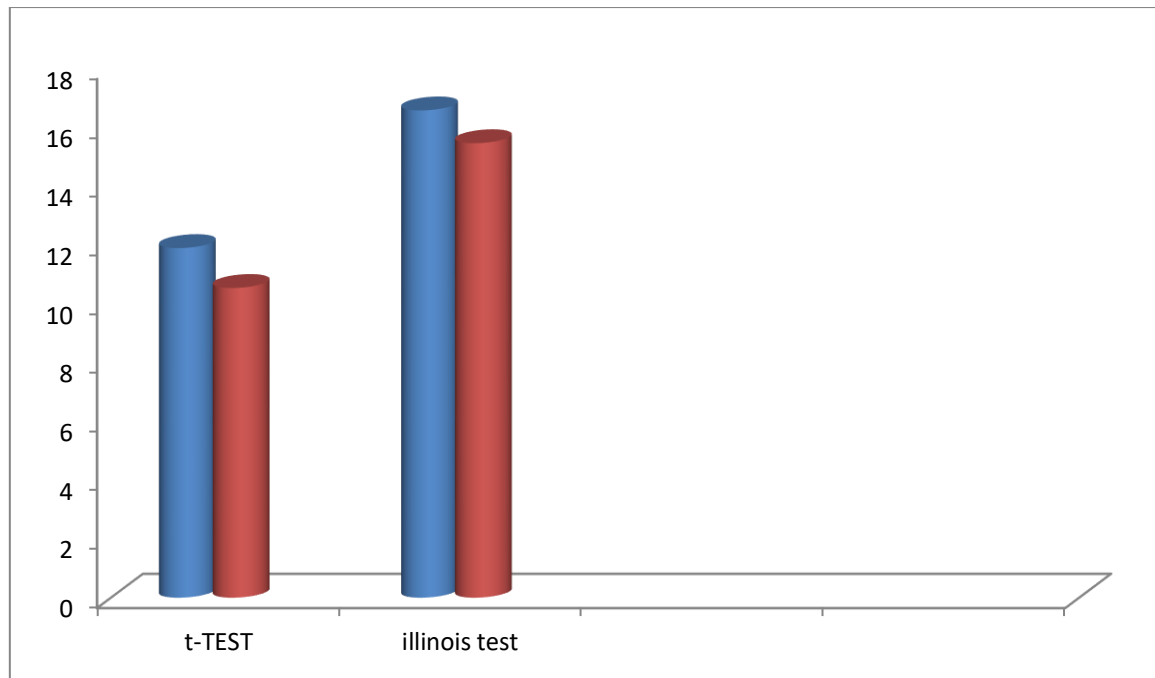
RESULT:

Using the paired t test as shown in graphs 1 and 2, the descriptive statistics, mean, standard deviation, and post mean value of group A T test = 10.57 and Illinois agility test = 15.47 were determined from the above table.

ANALYSIS WITHIN THE GROUP:

GRAPH 1 : REPRESENTS THE PRE AND POST MEAN VALUES OF GROUP A T- TEST AND ILLINOIS AGILITY TEST

GRAPHICAL REPRESENTATION:



ANALYSIS WITHIN THE GROUP:

Table 2: Represents The Pre And Post Mean Values Of Group B T Test And Illinois Agility Test

TABULAR REPRESENTATION:

	MEAN	MEAN	STANDARD DEVIATION	STANDARD DEVIATION	t-VALUE	P-VALUE
t-test	11.81	10.41	0.455	0.818	5.7927	0.0001
Illinois test	16.52	15.40	0.602	0.653	4.8840	0.0001

RESULT:

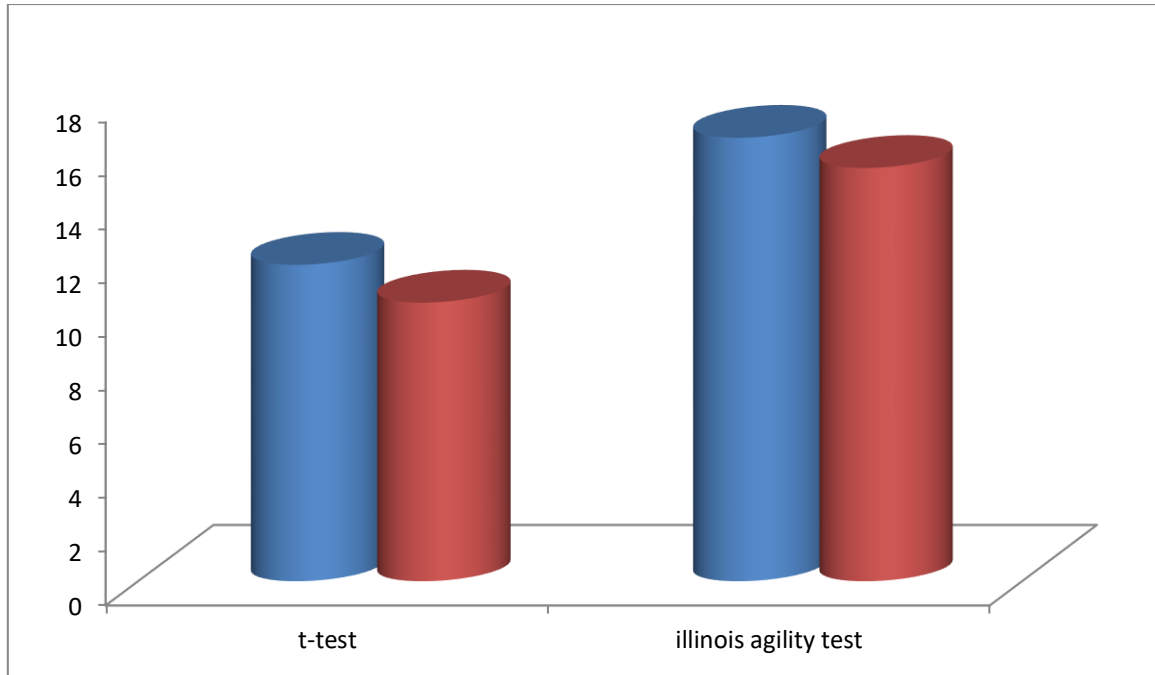
Using the paired t test as shown in graphs 1 and 2, the descriptive statistics, mean, standard deviation, and post mean value of group A T test = 10.41 and Illinois agility test = 15.40 were determined from the above table.

GRAPH 2:

Shows The Data Representation Of Pre And Post Test Meanvalues Of T Test And Illinois Agility Test For

GROUP B:T- TEST AND ILLINOIS AGILITY TEST

GRAPHICAL REPRESENTATION



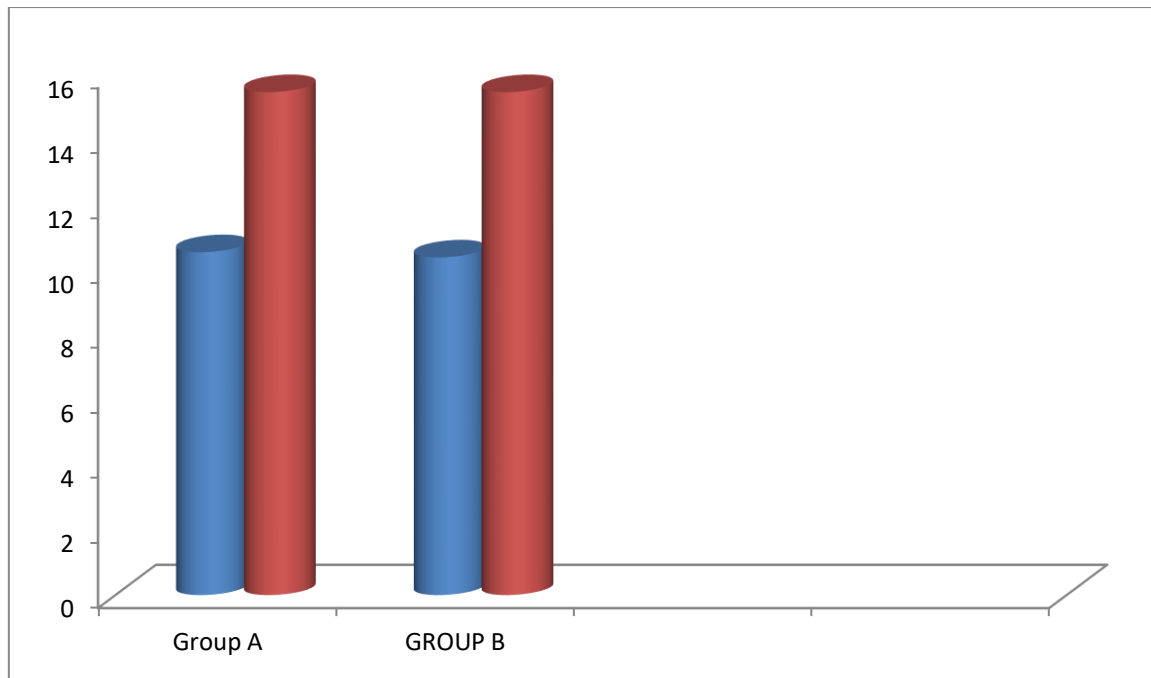
ANALYSIS BETWEEN THE GROUPS:

TABLE 3: REPRESENTS THE POST MEAN VALUES OF T TEST AND ILLINOIS AGILITY TEST OF GROUP A AND GROUP B

	t-TEST		ILLINOIS AGILITY TEST		t-value		P value	
GROUP A	10.57	0.509	15.47	0.844	8.3865	3.8142	0.0001	0.0001
GROUP B	10.41	0.818	15.40	0.653	5.7927	4.8840	0.0001	0.0001

GRAPH 3: SHOWS THE DATA REPRESENTATION OF POST TEST MEANVALUES OF T TEST AND ILLINOIS AGILITY TEST FOR

GROUP A AND GROUP B.



RESULTS

The present results show by statistics analysis of paired t test done on the mean and standard deviation, which is been converted into the post test. The post mean value of Group A (15.47) and Group B (15.40), it is calculated with paired t test. We also arrived highly significant difference ($p < 0.0001$) Group A, who received plyometric training. Both the groups were statistically significant but the value of Group B who received Agility training are less as compared to Group A, for evaluating T test and Illinois agility test. That present study shows that significant improvement in Group A compare to Group B with the (value of p less than 0.0001).

DISCUSSION

The study's primary conclusions were that both groups' T-test and Illinois Agility Test scores improved after applying two distinct programs for four weeks. Agility training, however, did not result in any further improvements in any outcome metrics.

The present study's findings add to the body of literature by examining modifications in the T-test and Illinois Agility Test and designing a 4-week training program. Prior research has elucidated the possible significance of core strength for sportspeople. For the purpose of athletic performance, the core produces the proper amount of strength, transfers power between the upper and lower extremities, and protects against injuries. Several pieces of evidence have been reported in the literature to bolster the beneficial effects of plyometric training on neuromuscular kinematic properties and performance. The isometric maximum voluntary torque, rate of torque development, impulse overtime, and maximum voluntary contraction were all shown to be enhanced by plyometric practice.

This study looked at how training with ladder drills for four weeks affected players' agility performance. The main discovery of this study was that the experimental group's agility performance significantly changed after a 4-week program of ladder drills. These results showed that the training program using ladder drills could enhance agility performance. When compared to the post-test, the experimental group's mean agility performance score increased significantly. The results showed that training with ladder drills could improve the trained individuals' agility performance.

These results corroborated a thorough meta-analysis that found athletes can be thought of as progressing in agility training in a similar way—that is, by mastering simpler drills before moving on to more difficult ones. As a result, after four weeks of training, the results showed that plyometric training was substantially higher than agility training.

The T-test and the Illinois Agility Test showed improvements in both groups in this study. However, after four weeks of training, plyometric training has significantly outperformed agility training.

CONCLUSION

The study found that football players' performance can be enhanced by both plyometric and agility training. When compared to Group B participants who underwent agility training, those in Group A who underwent plyometric training demonstrated a noticeably greater improvement in performance.

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