



DOI: <https://doi.org/10.20372/mwu.jessd.2026.1603>

Full Length Research Paper

Effects of Plyometric Training on Selected Physical Fitness and Football Skill Performance Variables among Butajira Football Club Players, Central Ethiopia

Tesfaye Boke Oyomo^{1*}, Dirshaye Weshebe Gelete¹

¹ Department of Sport Sciences, Wachemo University Hosanna, Ethiopia, PoBox. 667

Article Info

Article History

Received: 10/10/ 2025

Accepted: 09/03/ 2026

Keywords:

Control Group,
Experimental Group,
Football Club,
Plyometric training.

Abstract

The study finds out the effect of plyometric training on Agility, strength, power, accurate shoot, and accurate passing of Butajira male football club players. The total population of the study was taken twenty-six football players. The subjects were grouped randomly EG (N= 13), CG (N = 13). Then the plyometric training was given for experimental group for two days per a week in addition to regular football related activities for 12 weeks. Both groups underwent measurements of Illinois agility tests, squat tests and broad jump and accuracy shoot test, accuracy pass test before and after the training program and the scores were recorded. The collected data were analyzed by means, standard deviation and independent sample T- test using SPSS version 26. The mean value of Agility of the players between the EG and the CG of the team was statistically significant (since p-value = 0.019 and mean difference = -1.054). The mean value of accurate passing skills between the EG and the CG of the team was statistically significant (since p-value = 0.001 and mean difference = 3.231). The mean value of accurate shooting skills between the EG and the CG of the team was statistically significant (since p-value = 0.001 and mean difference = 0.94420). Thus, plyometric training is important to improve physical fitness and skill performance of the football players.

Licensed under a Creative Commons
Attribution-Non Commercial 4.0 International License.

* [Corresponding email: tesfay7boke@gmail.com](mailto:tesfay7boke@gmail.com)



1. Introduction

“Pleythyein”. Desiring to augment or to extend, or from the Greek root words “plio” means more and “metric”, about measure, and “Today plyometric training denotes exercises categorized by powerful muscular contractions in response to rapid, dynamic loading or stretching of the involved muscles” (Wang and Zhang, 2016). The explosive plyometric may be a key training method that may improve your game play skills, the maximum amount as much as or more than strength or other types of training Yessis (2009). Adolescent athletes’ power, speed and strength performance were significantly improved by adding a selected

plyometric exercise program, whereas other study findings show that 12-week plyometric training in addition to normal football training contributed to the development of speed, strength, and power among footballers in the study of Goitom (2018). Similarly, the findings of Mesfin (2014) showed that plyometric training had a positive effect on the specific physical fitness variables of agility, strength, explosive power, and soccer skill.

To improve explosive movements’ coaches can use different types of training methods; among those trainings plyometric training is the one which include different physical exercises that

improve Fitness components especially speed, agility, strength and power for football players Markovic (2007) Plyometric training is an effective mode of training as it enhances motor learning and neuromuscular efficiency promoting the excitability, sensitivity, and reactivity of the neuromuscular system to increase the rate of force production (power), motor-unit 3 recruitment and synchronization. Plyometric are training techniques used by players in all types of sports to increase strength and explosiveness Chu (1998).

Unlike other elements that contribute to team-sport performances, it is unusual for coaches to use methods other than observations to assess changes resulting from technical training Russell and Kingsley, 2011). In young soccer players, PT does provide such training stimuli

2. Materials and Methods

2.1. Research Design

The research design involved a quasi-experimental research approach, wherein participants were assigned to either a plyometric training group or a control group. Although the independent 20 variable is manipulated, participants are not randomly assigned to conditions or orders of conditions (Cook and Campbell, 1979). The effects of the plyometric training on some selected physical fitness variables and skill performance was assessed through pre- and post-training measurements, allowing for a comparison of the outcomes between the two groups. This experimental design has been developed to reduce biases of all kinds as much as possible. We reviewed the major sources of bias in the section on threats to internal and external validity between the plyometric training intervention and the observed changes in physical fitness and skill performance among players of Butajira Football Club in the Central Ethiopia region.

2.2. Study Population

3. Results and Discussion

3.1 Anthropometric Characteristics of the Participants

and has been shown to improve explosive actions in pubertal and prepubertal players (Diallo et al., 2001). Similarly, Wong et al. (2010), after 12 weeks of combined strength and PT that was performed twice a week in addition to soccer training.

Therefore, the main purpose of the study was focused on to examine the effects of an in-season, 12-week plyometric program supplemented with specific physical fitness (agility, power, strength) and specific football-related skills (such as shooting accuracy, passing precision. It was hypothesized that the proposed specific plyometric training program during a 12-week period enhances players' technical drills and physical fitness to a greater extent than soccer training alone.

The population of this study includes all players (26) of Butajira Football Club. These participants were randomly assigned to either the control group or the experimental group as part of the investigation into the effects of plyometric training on selected physical fitness and skill performance.

2.3. Sampling Techniques

From the total number of players in the club (26 players), $n = 13$ players were assigned to the control group, and $n = 13$ players were assigned to the experimental group. The selection of players for each group was conducted using the lottery method is simple random sampling technique. To create a sample using the lottery method, a researcher randomly picks numbers, with each corresponding to a subject, thereby enhancing the fairness and representativeness of the sample.

2.4. Method of Data Analysis

After data had been gathered from control and experimental groups, the data were analysed through descriptive and inferential statistics. The data were analysed using SPSS software (version 26).

To assess the anthropometric characteristics, participants' body height and weight were

measured then body mass index (BMI) was calculated by dividing weight (kg) by height (m²). The table shows that the body weight of the experimental group participants were $m = 69 \pm 4$ kg and control group participants were $m = 65 \pm 4$ kg; height 1.79 ± 0.07 m and 1.76 ± 0.07 m; and BMI $m = 21.42 \pm 0.77$ and 21.17 ± 1.94 the result was statistically significance for experimental and control groups respectively.

Table 1. Anthropometric characteristics of the participants

	Types of groups			
	Experimental		Control	
	Mean	Standard Deviation	Mean	Standard Deviation
Weight of the player	69	4	65	4
Height of the player	1.79	.07	1.76	.07
Body mass index (BMI) of the player	21.42	.77	21.17	1.94

3.2. The Effect of Plyometric Training on Strength

Examine the effect of plyometric training on leg muscle strength, a squat test was administered before and after the intervention for each participant (Table 2). The squat pre-test results actual total participants) mean value was

38.538 ± 3.992 ; while the experimental group participants' mean value was 39.307 ± 4.366 and the control group was 37.769 ± 3.585 . Whereas the squat post-test result for total participants was $m = 42.769 \pm 6.464$; while 48.076 ± 3.904 and 42.769 ± 6.464 for the experimental and control group respectively.

Table 2. Descriptive Statistics for leg strength per-test and Post-test Results

	Types of groups					
	Experimental		Control		Total	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Squat pre-test	39.307	4.366	37.769	3.585	38.538	3.992
Squat post-test	48.076	3.904	37.461	3.281	42.769	6.464

3.3. The effect of Plyometric Training on Leg Power

To examine the effect of plyometric training on leg power of football players standing long

jump tests were administered before and after the intervention for each participant (Table 3).

Table 3. Descriptive output of explosive power for per-test and Post-test Results.

	Types of groups				Total	
	Experimental		Control			
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Pre_ test	2.21	.12	2.20	.14	2.205	0.13
post_ test	2.38	.06	2.18	.14	2.28	0.1

3.4 The Effect of Plyometric Training on Agility

As shown in Table 4, the agility pre-test results (total participants) mean value was 17 ± 1 ; the

experimental group participants' mean value was 17 ± 1 , and the control group was 17 ± 1 .

Whereas the agility post-test result for total participants was $m = 16.5 \pm 1$; while 16 ± 1 and

17 ± 1 for experimental and control group respectively.

Table 4. Descriptive output of agility for per-test and Post-test Results.

	Types of groups				Total	
	Experimental		Control			
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Pre-test	17	1	17	1	17	1
Post-test	16	1	17	1	16.5	1

Table 5. The result of the Illinois agility run test

	Levine's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% CI of the Diff.	
								Lower	Upper
Equal variances	8.865	.007	-2.545	24	.018	-1.054	.414	-1.908	-.199
Not equal variances			-2.545	19.683	.019	-1.054	.414	-1.918	-.189

Since the p-value of Levene's test for equality of variance in Table 8 is less than 0.05 (i.e., $0.007 < 0.05$), we couldn't assume equal variance of the groups. Thus, as the result shown there is statistical evidence that there is a significant difference in the mean of Agility of the players between the experimental and the control group of the team (since p-value = 0.019). This implies that plyometric training can improve the Agility of the players (mean difference = -1.054).

3.5. The Effects of Plyometric Training on the Accurate Passing Skill

As shown on the above Table 8 the passing accuracy skill pre-test results actual (total participants) mean value was 5 ± 1 ; the experimental group participants mean value was 5 ± 1 and control group were 5 ± 1 . Whereas, the passing accuracy skill post-test result for total participants was $m = 6.5 \pm 1$; while 8 ± 1 and 5 ± 1 for the experimental and control group, respectively.

Table 6. Descriptive output of passing accuracy skill for per-test and Post-test Results.

	Types of groups				Total	
	Experimental		Control			
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
pre-test	5	1	5	1	5	1
post-test	8	1	5	1	6.5	1

Table 7. T-test result of passing accuracy test

	Levine's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% CI of the Diff.	
								Lower	Upper
Equal variances	.058	.813	9.314	24	0.001	3.231	.347	2.515	3.947
Not equal variances			9.314	23.974	0.001	3.231	.347	2.515	3.947

Since the p-value of Levene's test for equality of variance in Table 9 is greater than 0.05 (i.e., $p = 0.813 > 0.05$), we can assume equal variance of the groups. Thus, as the result shown there is statistical evidence that there is a significant difference in the mean of accurate passing skills

3.6. The Effects of Plyometric Training on Accurate Shoot Skill

As shown in Table 10, the shooting accuracy skill pre-test results (total participants) mean value was 9.38 ± 2.50 ; the experimental group participants' mean value was also similar 9.38 ± 2.50 , and the control group was 9.38 ± 2.50 . Whereas the shooting accuracy skill post-test

between the experimental and the control group of the team ($p\text{-value} = 0.001$). This implies that plyometric training has a positive effect (mean difference = 3.231) on the accurate passing skills of the player.

result for total participants was $m = 12.23 \pm 2.245$; while 14.77 ± 3.11 and 9.69 ± 1.38 for the experimental and control group, respectively.

Table 8. Descriptive output of shooting accuracy skill for pre-test and Post-test Results

	Types of groups				Total	
	Experimental		Control		Mean	Standard Deviation
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre-test	9.38	2.50	9.38	2.50	9.38	2.50
Post-test	14.77	3.11	9.69	1.38	12.23	2.245

4. Discussion

The results of the present study show that there is a significant difference in the mean leg strength between the experimental and the control group of the groups ($p\text{-value} = 0.001$). Thus, plyometric training has a positive effect on the leg strength of the player. A study by (Hasan, 2023) were conducted randomized controlled trial for eight weeks plyometric training intervention, and they concluded that it can improve leg muscle strength of male soccer players (Shahnaz Hasan, 2023). As well as

Abass (2005), who also concluded that plyometric training is capable of improving leg muscle strength and power significantly (Ademola O & Abass, 2005). Also, several previous studies have demonstrated the beneficial effects of plyometric training on leg strength after programs ranging from 6 to 16 weeks (Ramirez *et al.*, 2018; Sohnlein *et al.*, 2014; Hammami *et al.*, 2016).

This study also shows that there is a significant difference in the mean of explosive power between the experimental and the control group

of the team ($p = 0.001$). Therefore, plyometric training can affect the explosive power of the players.

Consistent with the present findings' researchers concluded that after applying plyometric training, they find a significant improvement in standing long jump performance or leg power (Maciejczyk et al., 2021). The results on the present study showed that there is significant difference in mean agility of the players b/n the experimental and the control group of the team ($p = 0.019$). Therefore, plyometric training can affect the Agility of football players. Consistent with this study (Chandra *et al.*, 2023), concluded that agility was improved by 3 weeks of plyometric training (Chandra et al., 2023). Another study also stated that a plyometric training program is able to improve agility over duration of 6-weeks in players (Pooja, 2019). Miller et al. (2006) stated that the relationship between plyometric training and increased performance in agility tests may be high due to their similar patterns of movement to facilitate power and movement efficiency by the immediate change in direction upon landing (Miller et al., 2006).

The result shown there is a statistically significant difference in the mean of accurate passing skills between the experimental and the control group of the team ($p = 0.001$). Thus, plyometric training has a positive effect on accurate passing skills of the player. Consistent with the present study a systematic review and meta-analysis conducted by Zhang and his colleagues demonstrated that the plyometric training intervention could effectively enhance soccer players' passing performance (Zhang et al., 2019).

In this study, the result shown there is a statistically significant difference in the mean of accurate shooting skills between the

experimental and the control group of the team ($p = 0.001$). Thus, the result illustrates that plyometric training can affect the shooting skills of the players. Inconsistent with these findings, a study by Memarzadeh and his teams showed that although 8 weeks plyometric training increases accuracy of shooting but did not achieve statistical significance (Memarzadeh et al., 2014). Accordingly, a study by Haghighi and his colleagues also reported that plyometric training had no significant effect on accuracy of shooting in young soccer players Haghighi et al. (2012). This means the target practice is right and still shows the right shooting accuracy. Targeted practice needs to be achieved through consistent and continuous movements (Sintoko & Suharjana, 2018).

5. Conclusions

In the present investigation, the researcher hypothesized that 12 weeks of plyometric training, comprising football training, would produce improvements in Agility, strength, power, shooting accuracy, and passing accuracy of soccer players. Based on the major findings and with the possible limitations of the study, the following points were stated as a conclusion. Plyometric training programs can improve leg strength performance. In this study, there is a significant difference in the mean of leg strength between the experimental and the control group of the groups (p -value = 0.001). Thus, plyometric training has a positive effect on the leg strength of the players. The study also concluded, plyometric training program can improve the leg explosive power of the players. This data shows that there was a significant mean difference between the experimental and the control group of the players. As well as, a plyometric training program can improve the Agility level of football players.

Competing interests

The authors declare no competing interests.

References

Abigail A. Bedoya, Matthew R. Miltenberger, Rebecca M. Lopez. (2015). Plyometric training effects on athletic Performance in youth soccer athletes: a systematic review.

The Journal of Strength & Conditioning Research, 29(8), 2351-2360.
Andrade Andrade, David Cristóbal, Beltrán, Ana Rosa, Labarca Valenzuela, Cristian, Manzo Botarelli, Oscar, Trujillo, Erwin, Otero Farias, Patricio, Álvarez, Cristian, Garcia Hermoso, Antonio, Toledo, Camilo, Del Río, Rodrigo Silva Urrea, Juan, Ramírez Campillo, Rodrigo. (2018). Effects of

- plyometric training on explosive and endurance performance at sea level And at high altitude. *Frontiers in Physiology*, 9, 1415.
- Asghar Haghighi, Mehrzad Moghadasi, Asghar Nikseresht, Ahmad Torkfar, Mostafa Haghighi. (2012). Effects of plyometric versus resistance training on sprint and skill performance in young soccer players. *European Journal of Experimental Biology*, 2012, 2 (6):2348-2351.
- Chu (1998). *The Basics of plyometric training*. Second edition, 100 exercises for power & strength.
- Chu Donald A. and Gregory D. Myer. (2013). *Plyometric*, first edition. Champaign, IL, USA: 2- 6.
- Cook & Campbell (1979). *Quasi-experimentation: design & analysis issues for field settings*.
- Diallo, O., Dore, E., Duche, P., & Van Praagh, E (2001). The Effects of plyometric training followed by a reduced training programme on physical performance in prepubescent soccer players. *Journal of Sports Medicine and Physical Fitness*, 41, 342-348.
- Effects of plyometric training on leg Muscles strength, endurance and Power characteristics of Nigerian University undergraduates. Vol. IV, No. 1, Jan 2005.
- Getasew, G. (2018) Effect of Plyometric training on speed, strength and power of male football Players in case of Gohatsion football team players, in north Showa Zone Oromia Regional State, Ethiopia.
- Goitom (2018). Effect of selected plyometric exercises on power, strength, and speed of short distance Athletics project Female athletes.
- Hassan (2023). Effects of plyometric vs. strength training on strength, sprint, and functional performance in soccer players:
- Lanlan Zhang, Fanghui Qiu, Hua Zhu, Mingqiang Xiang4 and Liangjun Zhou. (2019). Neural Efficiency and Acquired Motor Skills: An fMRI Study of Expert Athletes. December 2019. Volume 10.
- Makaruk, H., Starzak, M., Suchecki, B., Czaplicki, M., & Stojiljković, N. (2020). The effects of Assisted and resisted plyometric training programs on vertical jump performance in Adults: a systematic review and meta-analysis. *Journal of sports science & Medicine*, 19(2), 347.
- Marcin Maciejczyk, Renata Błyszczuk, Aleksander Drwal, Beata Nowak, and Marek Strzała. (2021). Effects of Short-Term Plyometric Training on Agility, Jump and Repeated Sprint Performance in Female Soccer Players. *International Journal of Environmental Research and Public Health*.
- Markovic G. (2007). Does Plyometric training improve vertical jump height? A Meta analytical review. *Br J Sport Med*, 41:349-355.
- Markovic, G., & Mikulic, P. (2010). Neuromusculoskeletal and performance adaptations to Lower-extremity plyometric training. *Sports Medicine*, 40, 859-895.
- Mehrez Hammami, Yassine Negra, Ridha Aouadi, Roy J Shephard, Mohamed Souhaïel Chelly. (2016). Effects of an In-season Plyometric Training Program on Repeated Change of Direction and Sprint Performance in the Junior Soccer Player. *Journal of Strength and Conditioning Research*.
- Mengesh, M., Sangeeta, R., & Deyou, M. (2015). Effects of plyometric training on soccer related Physical fitness variables of intercollegiate female soccer players. *Turkish Journal of Kinesiology*, 1(1), 20-24.
- Mesfin (2014). Effect of plyometric trianing on lower limb strength, power, agility, and body composition in athletically trained adults.
- Michael G. Miller, Jeremy J. Herniman, Mark D. Ricard, Christopher C. Cheatham, Timothy J. Michael. (2006). The effects of a 6-week plyometric training program on agility. *J Sports Sci Med* 2006 Sep 1; 5 (3):459-65.
- Ozbar, N. (2015). Effects of plyometric training on explosive strength, speed and kicking speed in Female soccer players. *The Anthropologist*, 19(2), 333-339.
- Peacock, J. C., & Ball, K. (2018). Strategies to improve impact efficiency in football kicking. *Sports Biomechanics*.
- Quirin Söhnlein, Erich Müller, Thomas L. Stöggel. (2014). The Effect of 16-Week Plyometric Training on Explosive Actions in Early to Mid-Puberty Elite Soccer Players. *Journal of Strength and Conditioning Research* 28(8): p 2105-2114, August 2014.

- Rodrigo Ramirez-Campillo, Felipe García-Pinillos , Amador García-Ramos Javier Yanci , Paulo Gentil , Helmi Chaabene, and Urs Granacher. (2018). Effects of Different Plyometric Training Frequencies on Components of Physical Fitness in Amateur Female Soccer Players. June 2018. Volume 9.
- Russell and Kingsley (2011). The Effects of Fatigue on Soccer Skills Performed During a Soccer Match Simulation. *International Journal of sports physiology and performance*, volume 6, Issue 2.
- Sintoko & Suharyana (2018). Effects of Training Methods and Power on Shooting Accuracy in Football. *Advances in Social Science, Education and Humanities Research*, volume 278.
- Slimani, M., Chamari, K., Miarka, B., Del Vecchio, F. B., & Chéour, F. (2016). Effects of Plyometric training on physical fitness in team sport athletes: a systematic review. *Journal of human kinetics*, 53, 231.
- Suresh Chandra, Ankita Sharma, Nitesh Malhotra*, Moattar Raza Rizvi, Sunita Kumari. (2023). Effects of Plyometric Training on the Agility, Speed, and Explosive Power of Male Collegiate Badminton Players. *Journal of Lifestyle Medicine*, 01 Feb 2023, 13(1):52-58.
- Vijavalakshmi & jayabal, (2013). Effect of Plyometric Training with Yogic Practices on Selected Physical and Physiological Variables among Adolescent Boys International. *Journal of Sport and plyometric exercise Science*, Vol. 5.
- Vincent A. Parnabas, Yahaya Mamahood, Julinamary Parnabas, Nagoor Meera Abdullah. (2014). The Relationship between Relaxation Techniques and Sport Performance.
- Wang, Y.-C., & Zhang, N. (2016). Effects of plyometric training on soccer players. *Experimental And therapeutic medicine*, 12(2), 550-554.
- Wong, P. L., Chamari, K., & Wisløff, U. (2010). Effects of 12-week on-field combined strength and power training on physical performance among U-14 young soccer players. *J Strength Cond Res*, 24(3), 644-652.
<https://doi.org/10.1519/JSC.0b013e3181ad3349>.
- Yessis (2009). The principles and application of explosive plyometric, a form of

explosive training used to increase speed and power, are essential for performance in most competitive sport.