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EFFECTIVENESS OF LOWER AND UPPER BODY PLYOMETICS ON PERFORMANCE OF DRIBBLING SKILL AMONG FEMALE SOCCER PLAYERS

Theresa Nkiru Uzor & Nonye Ann Ujuagu,
Department of Human Kinetics, Faculty of Education,
Nnamdi Azikiwe University, Awka.
Email: tn.uzor@unizik.edu.ng

ABSTRACT

The study aim examined the effectiveness of lower and upper body plyometrics on performance of dribbling skill among female soccer players. This study adopted a quasi-experimental research design, pre-test, post-test and control group. To facilitate the study, three research questions and three null hypotheses guided the study. The population of the study comprised of thirty-two female soccer players in Nnamdi Azikiwe University, Awka, who have participated in outside competition and belong to the school soccer team. Twenty-one female students aged 14-18years volunteered to participate in the study. No sample was used since the population was small. Data collected were analyzed using arithmetic mean and standard deviation, while t-test inferential statistics was used for testing the hypothesis at 0.05 level of significant. The findings revealed that lower and upper body plyometrics have positive effect on dribbling skill among female soccer players in the game soccer. The study concluded that using lower and upper body plyometrics have great effect on performance of dribbling skill among female soccer players in the game of soccer. Based on the findings, it was recommended that coaches and athletes should include lower and upper body plyometrics using squat jumps and plyo push-ups in their training schedule order to improve dribbling skill in the game of soccer, push-ups in their training schedule order to improve dribbling skill in the game of soccer.

Keywords: Lower body plyometric, upper body plyometric, leg speed, agility, dribbling skill.

Introduction

Soccer is a highly competitive sport in which players must possess a combination of skill, speed, and physical fitness to succeed in the game. Motor fitness variables are the key aspect to perform during the match. Soccer being most competitive sport, a player who is fit does not only enjoy more but he is also capable of using all the skills attained and mastered by him throughout, right from the start to the finish. A player who lacks one of these qualities will not be able to accomplish much in soccer, especially when it comes to playing efficiently.

Training is an essential part of preparing for sports competition. If training for soccer is to be effective, it must be related to the demands of the game. Fitness for the sport assumes that the player is capable of meeting these demands; otherwise, he or she may not be able to cope with the physiological stress of match-play. In this instance the player has to raise fitness levels or risk not being selected. Soccer is the world most popular game and countless

research has been conducted on various aspect of this sports. Among the fundamental skills in soccer, dribbling plays a crucial role in passing, shooting and controlling the ball. The ability to execute accurate and powerful dribble is essential for players to contribute effectively to their team's performance. According to Uzor, Ujuagu and Offodile (2023), for anybody to excel in soccer there is need to master such basic skills as kicking, trapping, heading, passing, goal-keeping, dribbling, shooting to mention but few. It is the combination of these basic skills that produces the attractive display in the field and also helps the players to win laurels in the game.

Plyometric exercises are a type of resistance exercise that involve quick, powerful movements that require generating maximum force in your muscles in the shortest period of time possible (William, 2024). Plyometric training has therefore gained popularity as a means of enhancing dynamic athletic performance, including the capacity for vertical jump (Glendinning, 2014; Uzor, 2016; Markovic, Dizdar & Javic, 2016; King, 2012; Ramirez-Campillo, Morgan, Oliver, Pedley & Lioyd, 2022), speed (Uzor, 2016), agility, and lower extremity muscle activation.

Plyometrics are those exercises in which the muscles are stretched right before sudden contractions. This combined action is known as a stretch-shortening cycle (SSC) (Uzor, 2021). These fast, explosive movements help athletes and fitness enthusiasts build strength, speed, agility. Plyometric exercise is classified into two types: lower and upper body plyometric training. Lower-body plyometric exercise includes jumps, hops, bounds, and lunges, while upper-body plyometric training includes medicine ball tosses and plyometric push-ups (Kons et al., 2023).

According to studies, plyometric training is frequently used by athletes who need to generate a quick burst of maximal effort, which is required in most popular sports such as soccer, basketball, track and field events, racket games, rugby, and martial arts in a short period of time (Uzor and Ujuagu, 2020a, 2020b). Most recently however, Yeqin, Danyang, Danel, & Miguel (2023) studied efffects of plyometric training on kicking performance in soccer players. The study pointed out that plyometric training is a generally effective method to improve soccer players kicking performance, which plays a crucial role in passing and shooting actions during games. Similarly, for efficient performance in kicking skill, studies by Liviu and Oravitan (2021)

Ateş (2018) investigated the age-related effects of power and running speed on the agility of young soccer players. The findings suggested that speed and lower extremity power should not be regarded as key determinants of agility performance in young athletes. Bartolomei et al. (2021) compared male vs. female athletes in strength and power performance relative to body mass (BM) and lean body mass (LBM) and to investigate the relationships between muscle architecture and strength in both genders. The results revealed that significant differences in strength and power relative to body mass, lean body mass, and muscle thickness exist between

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male and female strength and power athletes.

Uzor and Ujuagu (2020a, 2020b) evaluated how lower and upper body plyometric training affected electrocardiogram (ECG) characteristics in university athletes. After 10 weeks of training, athletes who received both lower and upper body plyometric exercise exhibited no significant difference from the control group. Uzor and Emeahara (2020) also studied the effects of lower and upper body plyometric training on cardiovascular variables of athletes. The results revealed that athletes who were trained using LBPT and UBPT had reduced HR, SBP, DBP, MAP and RPP better than the control group. The findings also showed that athletes who were trained using LBPT and UBPT indicated no significant differences following ten weeks plyometric training and those in the control group in all the cardiovascular variables.

Although plyometric training has been a useful training technique for developing optimal sports performance by coaches, yet it is relatively not clear whether lower and upper body plyometric training improves the performance of female university soccer players on performance of dribbling skill. Therefore, more information is necessary, since it has not been well established. Base on that, the researcher wants to carry out research on the effect of lower and upper body plyometrics using squat jumps and plyo push-ups on dribbling skill among female soccer players in Nnamdi Azikiwe University, Awka.

Research Questions

The following research questions were formulated to guide the study:

1. How effective is lower body plyometrics in improving performance on dribbling skill among female soccer players?
2. How effective is upper body plyometric in improving performance on dribbling skill among female soccer players?
3. How effective is the combined effect of lower and upper body plyometric in improving performance on dribbling skill among female soccer players?

Hypotheses

The following null hypotheses were stated and tested at 0.05 level of significance.

1. There will be no significant difference in the pre-test post-test mean scores of female students on performance of dribbling skill in the game of soccer using lower body plyometric training and control group.
2. There will be no significant difference in the pre-test post-test mean scores of female students on performance of dribbling skill in game of soccer using upper body plyometric training and control group.
3. There will be no significant difference in the pre-test post-test mean scores of female students in dribbling skill in the game of soccer using the combination of vertical jump and isometric-strength training and control group.

Methods and Material

The Quasi-experimental research design was utilised for the study. It was pre test post test non-randomised control group design. It is a design where the observations are made in the study groups before and

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after interventions and subjects are assigned to groups but without proper randomisation. This design was also considered appropriate because it was not possible to place subjects in groups by random assignment without disrupting the athletes in their team groups and the training venues. Also, the subjects in both the treatment and control groups differ by number and they were not equal at baseline.

Population

The population of this study is made up of all female soccer players in Nnamdi Azikiwe university, Awka were used to carry out this research. The population is made up of thirty-two female players, but twenty-one volunteered to participate in the study. The volunteered athletes are those who have participated within the school soccer competitions, were used for the study. No sample was used for the study because the population was small.

Instrumentation

The instrument used to collect data for this study included:

Standard Stadiometer: Standard Stadiometer was used to obtain the height of the participants in centimeters. The height scale is calibrated in centimeters from 60-200 centimeters. Body height was measured to an accuracy of 1cm, with the subject in an upright position with a Standard Stadiometre.

The Calibrated Bathroom Weighing Scale: The Calibrated Bathroom Weighing Scale Model: BR9011 was used to measure the total body weight of the participants. The Weighing scale is calibrated in kilograms from 0-180kg. Body weight was measured to the nearest 0.1kg, with subjects lightly dressed and in stocking feet

Experimental Procedure

All the 32 participants were who volunteer to participate for the study was gathered for grouping at the soccer pitch. The subjects were purposively assigned into one of the four groups: three experimental groups and Control group.

They were assigned into two experimental groups namely Group A (8) Lower Body Plyometric (LBP), Group B (8) Upper Body Plyometric (UBP), and Group C (8) Combination of Lower Body Plyometric and Upper Body Plyometric (LBP/UBP) and (8) Control Group (C).

The cones are placed as per the diagram. A 4m square is placed 9m from the goaline. For the start a ball is placed between the cones at gate (B).

Players start in the box (A), facing the goal without the ball. When the coach calls "GO" the timing starts and the player turns and runs to the ball at gate (B), dribbles through the gate and turns right towards gate (C). The player dribbles around the first cone at gate (C), in between both cones and turns right around the second cone and runs towards gate (D). The player dribbles between the cones and turns left around the second cone. The last turn is back through gate (B). The player continues into the box (A) and shoots at goal. One practice turn is allowed, followed by one timed attempt.

The researcher demonstrated the accurate training tests: Lower Body Plyometric-Squat Jumps and upper body plyometric-plyo push-ups for each group after which she appointed a group leader from those who performed best. The training lasted for

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(8) weeks. The days used for the training session in a week were Mondays, Wednesdays, and Fridays. The training lasted for 45mintes with 15 minutes warm up exercises, 20minutes plyometric-vertical jump, isometric- strength training and combination of the two and then 10 minutes of cooling down. The researcher appointed a group leader of each from the subject that performs best. During treatment sessions, the researchers exposed the subjects to accurate training sessions on plyometric squat jumps and plyo push-ups and those in the control group were placed on practices for the period. The consent of the participants, their parents and that of the school authority were sought and obtained.

A pretest was administered on all the experimental and control groups to establish baseline dribbling ability of all the participants. At the end of 8weeks treatment period, post tests were administered on all the groups using the same instrument as in pre test. Three trails were given to each subject from each group and best scores were taken as the subjects score. The score was estimated to the nearest meter and any dribbling outside the boundaries of the alley was discarded.

Data collected were analysed using statistical mean to answer the research questions while t-test was used in testing hypotheses.

Table 1: Training programme for Lower Body Plyometric, Upper Body Plyometrics and Combined

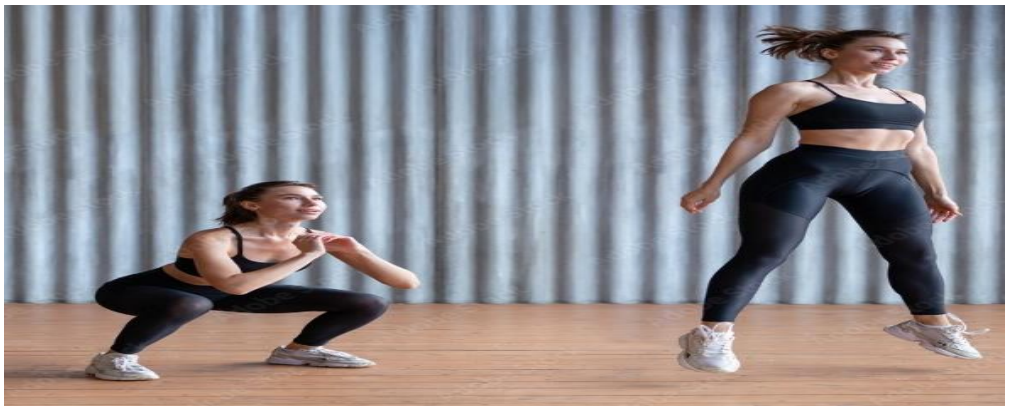
Mode 1 X sets X reps Squats	Mode 2 X sets X reps Toe Raises	Mode 3 X sets X reps Combined
Wk 1 Squat jumps X 3 X 8	plyo push-ups 3 X 3 X 8	Combined 3 X 3 X 8
Wk 2 Squat jumps 3 X 5 X 8	plyo push-ups 3 X 5 X 8	Combined 3 X5 X 8
Wk 3 Squat jumps 3 X 5 X 10	plyo push-ups 3 X 5 X 10	Combined 3X 7 X10
Wk 4 Squat jumps 3 X 8 X 10	plyo push-ups 3 X 8 X 10	Combined 3 X8 X 10
Wk 5 Squat jumps 3 X 8 X 10	plyo push-ups 3 X 8X 10	Combined 3 X 8 X 10
Wk 6 Squat jumps 3 X 8 X 10	plyo push-ups 3 X 8 X 10	Combined 3 X 8 X 10
Wk7 Squat jumps 3 X 10 X 10	plyo push-ups 3 X 10 X 10	Combined 3 X 10 X 10

Description for Treatment Tests:

Lower Body Plyometric: Squat Jumps

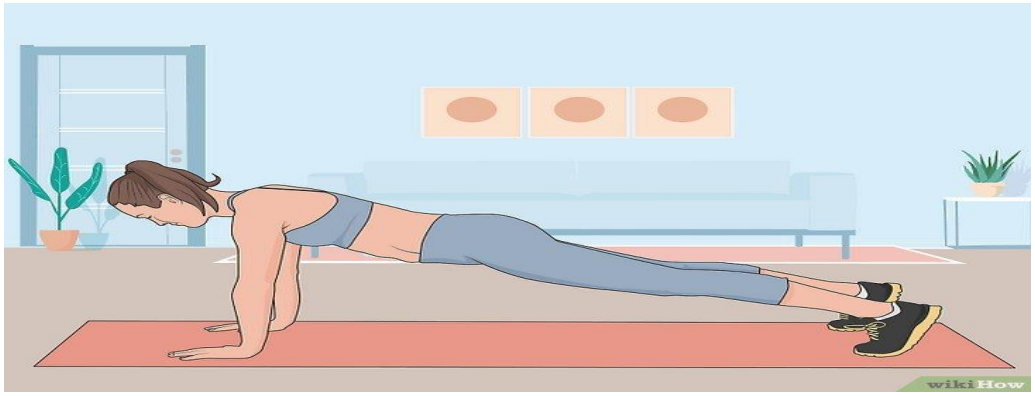
1. Stand with your feet shoulder-width apart and the toes pointing slightly outward.
2. Bend your knees pressing your hips back as if you were going to sit back on a chair.
3. Pushing through the heels, jump straight up.
4. Land with your knees slightly bent and go back into the squat position.
5. Repeat until the set is complete.

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Upper Body Plyometric: Plyo push-ups

1. Move into a prone position on the floor, supporting your weight on your hands and toes.
2. Your arms should be fully extended with the hands around shoulder width. Keep your body straight throughout the movement. This will be your starting position.
3. Descend by flexing at the elbow, lowering your chest towards the ground.
4. At the bottom, reverse the motion by pushing yourself up through elbow extension as quickly as possible. Attempt to push your upper body up until your hands leave the ground.
5. Return to the starting position and repeat the exercise.
6. For added difficulty, add claps into the movement while you are air borne.



Method for Data Collection

The data were collected through a pre-test and post-test on Warner Soccer Skill Test. Therefore, for this study, qualitative data collection method was used. The field test was Warner Soccer Skill Test. Test was administered in proper sequence on the same time for each day in a way they can be accomplished comfortably. Standardized equipment's were used for the tests. The data was collected and recorded by the researcher with one assistant.

The Ronaldo speed test assesses the ability to dribble the ball at pace and with control.

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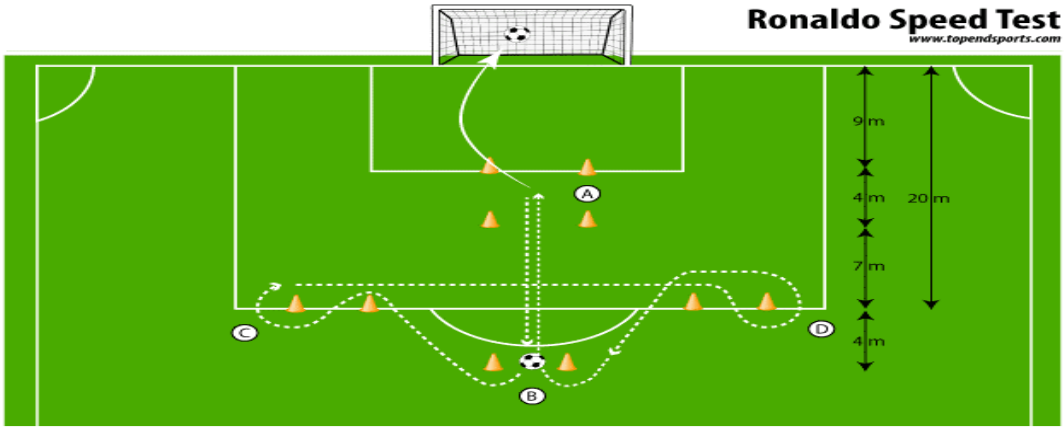
This is a timed drill - players can be retested to monitor improvements over time. The focus for the players should be on maintaining control of the ball with close touches - not big touches and chasing the ball.

Description of Instrument for Data Collection

Aim: To test football players ability to dribble the ball at pace and with control

Test Set-Up: The cones are placed as per the diagram. A 4m square is placed 9m from the goaline. For the start a ball is placed between the cones at gate (B). The original test description did not indicate the distance to place the cones at (c) and (d) from the midline.

Description: Players start in the box (A), facing the goal without the ball. When the coach calls "GO" the timing starts and the player turns and runs to the ball at gate (B), dribbles through the gate and turns right towards gate (C). The player dribbles around the first cone at gate (C), in between both cones and turns right around the second cone and runs towards gate (D). The player dribbles between the cones and turns left around the second cone. The last turn is back through gate (B). The player continues into the box (A) and shoots at goal. One practice turn is allowed, followed by one timed attempt.



Ronaldo Speed Test." Retrieved from https://www.topendsports.com/sport/soccer/skill-ronaldo-speed-test.htm, Accessed 19 September 2024

Results

Table 1: Summary of pre-test post-test mean scores of Female Students on performance of dribbling skill in the game of soccer using lower body Plyometric- squat jumps and Control group.

LBP	Training Status	N	Df	Mean	SD	Remarks
	Pre-Test	7	6	24.17	2.691	**Highly Effective**
	Post Test	7		44.29	4.329	

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Table 1: Showed that the calculated arithmetic mean scores and standard deviation of female soccer players on performance dribbling skill using squat jumps were 24.17 and 44.29 for pre-test and post-test respectively with 7 subjects each with a standard deviation of 2.691 and 4.329 respectively. The post-test mean score were greater than pre-test mean score, which shows that the treatment has effect on performance of dribbling skill in the game of soccer. This implied that lower body plyometric using squat jumps training has positive effect on performance of dribbling skill among female soccer players.

Research Question 2: How effective is upper body plyometric in improving performance on dribbling skill among female soccer players?

Table 2: Summary of the calculated arithmetic mean scores and standard deviation of female university soccer players using upper body plyometric - plyo push-ups.

UBP Training	N	Df	Mean	SD	Remarks
Pre-Test	7	6	26.43	2.730	**Highly Effective**
Post Test	7		39.21	4.348	

Table 2: Showed that the calculated arithmetic mean scores and standard deviation of female soccer players on performance dribbling skill using upper body plyometric-plyo push-ups were 26.43and 39.21 for pre-test and post-test respectively with 7 subjects each with a standard deviation of 2.730 and 4.348 respectively. The post-test mean score were greater than pre-test mean score, which shows that the treatment has effect on performance of dribbling skill in the game of soccer. This implied that upper body plyometric training using plyo push-ups has positive effect on performance of dribbling skill among female soccer players.

Research Question 3: How effective is the combined lower body and upper body plyometric in improving performance on dribbling skill among female soccer players?

Table 2: Summary of the calculated arithmetic mean scores and standard deviation of female university soccer players using combined lower body plyometric- squat jumps and upper body plyometric- plyo push-ups.

Table 3: Summary of the calculated arithmetic mean scores and standard deviation of female university soccer players using combined squat jumps and plyo push-ups.

LBP & UBP Training	N	Df	Mean	SD	Remarks
Pre Test	14	13	25.30	2.855	**Highly Effective**
Post Test	14		41.75	4.929	

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Showed that the calculated arithmetic mean scores and standard deviation of female soccer players performance on Leg Speed and Agility using combined squat jumps and plyo push-ups were 25.30 and 41.75 for pre-test and post-test respectively with 7 subjects each with a standard deviation of 2.855 and 4.929 respectively. The post-test mean score were greater than pre-test mean score, which shows that the treatment has effect on performance. This implied that both lower and upper body plyometric training has positive effect on performance of dribbling skill among the female soccer players.

Hypothesis One: There will be no significant difference in the pre-test post-test mean scores of female students on performance of dribbling skill in the game of soccer using lower body plyometric training and control group.

Groups	N	Df	Mean	SD	T	Sig
LBP Treatment	7	12	20.11	5.254	9.583	0.000
Control Group (no treatment)	7		-1.50	2.828		

Conclusion: The independent sample T-test carried out for pre- and post-training data yielded a significant result (T = 9.583, p>0.05). This indicates that lower body plyometric training using squat jumps does affects the dribbling skill of those in treatment group than those in control group. Thus, the first null hypothesis is therefore rejected. The researchers conclude that the post test mean scores of those who were trained using lower body plyometric- squat jumps differ significantly with that of those in the control group.

Hypothesis Two: There will be no significant difference in the pre-test post-test mean scores of female students on performance of dribbling skill in the game of soccer using upper body plyometric training- plyo push -ups and control group.

Groups	N	Df	Mean	SD	T	Sig
UBP Treatment Group	7	12	12.79	2.856	9.404	0.000
Control Group (no Treatment)	7		-1.50	2.828		

Conclusion: Independent sample T-test was carried out for pre- and post-training data and result was statistically significant (T = 9.404, p>0.05). So, the second hypothesis. The first null hypothesis is therefore rejected. The researchers conclude that the post test mean scores of those who were trained using upper body plyometrics - plyo push-ups differ significantly with that of those in the control group.

Hypothesis Three: There will be no significant difference in the pre-test post-test mean scores of female students on performance of dribbling skill in the game of soccer using the combined lower body and upper body plyometric training (squat jumps/plyo push -ups) and control group.

Groups	N	Df	Mean	SD	T	Sig
LBP/UBP Treatment Group	14	18.946	16.45	5.565	9.800	0.000
Control Group (no treatment)	7		-1.50	2.828		

Conclusion: Independent T-test was carried out for pre-test and post-test training data and result was statistically significant (T = 9.800, p>0.05). As such, the result revealed that both lower and upper body plyometric training affect dribbling skill of female soccer players than the control group. Therefore, the null hypothesis is rejected.

Discussion

Analysis of data in tables 1-3 showed that with the mean scores of 44.29 (LBP), 39.21 (UBP) and 41.75 (LBP & UBP) against consistent -1.50 for the control group, lower body plyometric squat jump, upper body plyometric training and in their combined group highly improved performance in dribbling skill by the treatment group. Also, when these treatment modules were subjected to t-test analysis to determine their significant effects, tables 4-6 showed marked significant effects in the post test mean scores of lower body plyometric - squat jump, upper body plyometric training and their combination over that of the control group. These findings therefore agreed with the finding of (Uzor, Ujuagu & Offodile, 2023) that studied effects of lower-limb plyometric training on body composition, explosive strength, and kicking speed in female soccer players.

Yeqin, Danyang, Danel, & Miguel (2023) studied efffects of plyometric training on kicking performance in soccer players. The study pointed out that plyometric training is a generally effective method to improve soccer players kicking performance, which plays a crucial role in passing and shooting actions during games. Similarly, for efficient performance in kicking skill, studies by Liviu and Oravitan (2021) recommended that for that maximum performance, strength training must be included in the training progamme for athletes including soccer.

The finding on t-test revealed that lower body plyometric, upper body plyometric training and the combined had a positive marked effect on performance of dribbling skill. Since the null hypothesis was rejected at 0.05 level of significance, Teshome, 2023) examine agility, coordination and speed as a predictor of dribbling &kicking performance Ethiopian youths sports academy. The finding revealed that dribbling had significant moderate relationship with agility and coordination. More importantly dribbling had significant high relationship with speed. Jointly, speed and agility were significantly affected both dribbling and kicking performance of football players. Ojo (2021) added that that soccer is a complex sport activity, whose success depends on various variables and factors, including physiological abilities and technical skill and among them, one of the most important is the kicking.

Conclusion

The following conclusions were made on this study. Lower body plyometric, upper body plyometric and combined lower and upper body plyometric training had significant effect on performance of dribbling skill in the game of soccer among female soccer players.

Recommendation

Based on the findings on the effectiveness of lower body plyometric and upper body plyometric on performance of dribbling

skill among female soccer players, the following recommendations can be made: Soccer players should focus on training their athletes using both lower and upper body plyometric training to improve their performance. This could include lower limb exercises like races and drills that involve changing direction quickly, such as squat jumps, plyo push-ups, shuttle runs and ladder drills. Soccer players should also focus on strengthening their core and hip muscles, which will help them generate more power when sprinting and kicking and dribbling the ball.

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