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Effects of 10-Week Core Exercises Intervention on Agility Skills of U-15 Female Football Players

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Abstract

Introduction: *Core training effectively improves sports performance.****Objectives:*** *This study was conducted to determine the effect of 10-weeks core exercise intervention on the performance measures of two agility categories of U15female football players.* ***Methods:*** *Thirty under U-15 female football players were randomly assigned to an experimental group (EG, n=15) and control group (CG, n=15). Baseline and end measurements included the agility T-test and Illinois agility test. The 10-week intervention entailed 40 minutes of supervised core exercises (Jump Squat, Alternate Legs Jump, Squat, Crunches, Lying Twist Trunk, Lunge, Side Plank, and Mountain Climber), three days a week. Pretest measurements at the start of the study and post-test measurements afterten weeks were compared using mean, standard deviation, and analysis of varience (ANOVA) considering significant level of p<0.05. Second was used as the unit of measurement.* ***Results:*** *In the exeperimental group, there was an improvement in agility T-test and Illinious agility test with p<0.05.A statistically significant difference of Illinois agility test among EG in pretest and posttest between offensive and goalkeepers with a mean difference of (M=3.09), p<0.05; midfielders and goalkeepers (M=2.59), p<0.0; and between Defensives and Goalkeepers players (M=3.43), p<0.01. Also, significant variances of Agility T-Test among offensive players pretest (12.63 ± 0.59 sec) and the posttest values (10.39 ± 0.69 sec) (F=20.84; p=0.0001) was observed.****Conclusion:*** *The use of core training in combination with normal football training for ten weeks is shown to be effective in improving the quickness and agility of U15 female football players after ten weeks. So, it appears reasonable to include specific core training programs within football training.****Conclusion:*** *Core pieces of training that were applied additionally to soccer training can contribute positively to developing players' speed and agility skills.*

Keywords:1.*Agility skills, 2.Core training, 3.Female football, 4.10-weeksintervention, 5.Skill improvement*

1. Introduction

The effects of supervised exerecise has influenced the skills of different athletes including football players however, large number of football players are poorly engaged in supervised physical exerecise program. Supervised core exerecise are an indicpencible method of fitness development and skill improvement for many football players. For this reason, most high resourced countries around the worled established sport project specific skill development strategies employing supervised exerecise program to promote athletes skill improvement. The available evidence statets that tootballis an intermittent sport branded by high-intensity movements such as hurrying, altering direction, leaping, tackles, and kicks. Further evidence supports the infelunce of supeevised core exerecise training on the overall skills of football players including explosive

strength and performance(Hojka et al., 2016; Felipe et al., 2017; Adlof et al., 2018).Pieces of evidence show that core exercise training is an indispensable part of many sports training protocols including football(Andersen et al., 2014; Education & Goral, 2015; Cam et al., 2019). The Core of the body is the area including the abdominals in the front side of the body, and Core exercises training refers to the training of the abdominal and lumbar regions(Kartal, 2016; Slimani & Nikolaidis, 2017; Usher, 2019). There is a rapidly growing literature on the infelunce of strong central body area decreases risks of injury and provides explosive power in soccer players, improved higher rate anaerobic energy, and technical skills with and without a ball (Makhlouf et al., 2018; Afifi, 2019).

It has been demonstrated that core strength training is an effective means to enhance trunk muscle strength (TMS) and proxies of physical fitness in youth football players.Thus, core strength training may even produce larger performance gains. However, the results of studies on the effects of core strength training on agility skills of youth football players remain inconclusive(Granacher et al., 2014; Bernal-Orozco et al., 2020).Current research appears to witness the relationship of core stability with power production and dynamic stability of collegiate football players and whether core stability is more evident in these performance variables in either males or females (Greene et al., 2019;Sonesson et al., 2021).Training and competition in footballrequire constantly changing sprints such as 10m-30m, continuous high jumps to high-balls, and tackles which requires core muscles strength. This reveals the need for general aerobic endurance, which in turn demands the building of core body muscle strength with core exercises. Core practices include buttocks, back, and abdominal muscles. These muscles play important roles in transferring power between the lower and upper extremities so that maintaining balance while quickly changing direction is secured. Moreover, core exercises are indispensable training exercises in football that help in making the aimed move easier and strongly(Lesinski et al., 2017; Brull-Muria & Beltran-Garrido, 2021). However, there has been an inconclusive debate about whether core exercises training influence the agility skills of football players (Stepinski et al., 2020; Jr & Empleo, 2021).

Pieces of evidence show that core exercise training has asignificant effect on the improvement of body fat percentage parameters, sprint, and standing long jump of youth male soccer players. Moreover, core training improves significantly vertical jump, back and leg strength, right and left-handgrip strength, flexibility, balance parameters of football players(Trecroci et al., 2018; Genc et al., 2019). More results reveal that 8-week core training may improve static balance, core endurance, and running economy in college athletes (Oyón et al., 2016; Hung et al., 2019).However, non of the established studies revealed the effects of core exercise training on the agility skills of female football players.

According to (Mendes, 2016),core exercise training aid in coordinating upper and lower body muscle's synchronous movement. This is important when football players move with the ball and even simply make the ball go where the player is intending. Core stability and strength exercises are a common practice in the men football world(Sermaxhaj, 2017; Zemková & Hamar, 2018)but, there is paucity of scientificevidence on the effect of core exerecise on the agility skills in the female football world. However, despite the widely recognized importance of core strength in Sports performance, less is known about its relationship with the agility of female football players. Up-to-date, the effectiveness of core exercise training on the agility skills of under-15 female football players has not been evaluated. Therefore, this study is an attempt to investigate the effects of 10-weeks of core exercise training proto-cols on two agility skills of Under-15 (U-15) female soccer players inJimma, Ethiopia.

2.Materials and Methods

2.1. Study Design and Setting

An experimental pretest-posttest 10-week intervention study was conducted at Jimma University in Jimma town, Ethiopia, located 353 km southwest of Addis Ababa among U-15female football players.

2.2 Participants and Sampling

The study population comprised 30 Jimma University U-15 female football players training at the expense of Jimma University and the Ethiopian football federation. All the available 30 footballers currently partaking in the training program were enrolled. Participants were randomly assigned to an experimental group (EG; n=15) and a control group (CG; n=15). CG and EG participants continued with their 90-105minutes strength and conditioning program two days a week, while the EG performed an additional 40minutes of core exercises on non-consecutive days for two day a week for 10 weeks.

2.3 Data collection process

After informed consent was obtained from the participant's parents/guardians and assent from the 30 footballers, participants completed the Physical activity readiness questionnaire to ensure eligibility for inclusion into the study.

The participants were orientated on the two agility tests, and after ten minutes of warming up, the agility T-test and Illinois agility test were measured. Then, the core exercise intervention program was demonstrated and provided in print to the EG to perform two non-consecutive days per week for 10-weeks. Ten weeks post-intervention, the agility T-test and Illinois agility test were measured.

The study was conducted between Aprile 2022 to June 2022 on acomparable two-group, longitudinal (pre, post) design was used with physical and two category of agility tests performed before (pre-intervention) and after (post-intervention) the ten-week intervention period. To investigate the effect of a 10-week core exercise intervention program on U15 female football players, those from the CG were asked to maintain their training routines, while those from the EG pereformed a 40 minutes core exerecisetraining as additional on their regular training program.

2.2. Participants

The participants were trained two-fold a week (90-105 min per session) and the training sessions were based on technical and tactical content development (65% of training time), technical skill improvements (20% of training time), and general improvements in physical condition (15% of training time), covered a warm-up, main part, and cooldown.

The participants' parents obtained information about the main aims of the investigation and signed informed consent forms. All the football players in this study were treated according to the 1964 Helesinki declaration of research ethical principles containing human elements and was approved by the Research Ethics Review Board (RERB) of JimmaUniveresity Sport Academy.

2.3. Procedure

2.3.1. Pre-intervention

First, we invited all the team managers and families to a meeting in which we presented the objectives of the project and asked them to sign an informed consent form. Parents, team managers, and coaches were informed that they could revoke the participation agreement at any time. Every young soccer player was verbally informed and asked to provide consent before the completion of each test and intervention..

Secondly, the football players performed the tests following the same order, and with a minimum of 5 min of rest between tests. The physical measurements were performed in a dressing room with a stable temperature of $18C^0$ and relative humidity of 49%. The Illinois Agility Test (IAT) and Agility T-test was performed in indoor gymnasium. In addition, no rainy conditions occurred in the two moments of assessment, and the tests were performed at the same time of day (9:00-11:00 a.m.). Successively, the CG group were tutored to sustain their training practices and the EG was taught about the core exereciseintervention program as additional to their regular training program. Each training session and test was supervised by one main researcher and

was pereformedby the physical training coaches liable for the teams, who were expresslyqualified for truthful and consistent data recording.

2.3.2. Intervention

The young football players accomplished a ten-week core exereciseintervention program, which was plannedseparately for the EG and supervised by the main researcher and physical coach liable for this group, in view of the competences that they worked on for each training session.

The core exercise intervention program was performed two-non-consecutive days per week for 10 weeks. A 10-week core exercise training program included eight core areas improving activities such as (Power Shiver, Alternate Legs Jump, Squat, Chunch, Lying Twist trunk, Lunge, Alternate plank, Mountain Climber), duration and repetition. The training program is applied for 40 minutes in three days additionally to the usual soccer training program. Core exercises chosen for the training program are arranged from easy to complex and distributed to the weeks by applying fluctuating method **(Table 1)**. On the other hand, the Control group attended, all necessary football training skills as they were in match season.

Table 1:10-Week Core Training Program

Core activities	**Week 1-4**	**Week 5-8**	**Week 9-10**
	Period & frequency	Period and frequency	Period and frequency
Jump Squat	*15 sec x 3 repetition*	*20 sec x 3 repetition*	*20 sec x 3 repetition*
Alternate Legs Jump	*10 repetition*	*15 repetition*	*15 repetition*
Squat	*10 repetition*	*15 repetition*	*20 repetition*
Crunch	15 *repetition*	20 *repetition*	20 *repetition*
Lying Twist Trunk	*15 sec x 2 repetition*	*15 sec x 3 repetition*	*20 sec x 3 repetition*
Power Shiver	*15 sec x 3 repetition*	*20 sec x 2 repetition*	*20 sec x 3 repetition*
Side Plank	*15 sec x 2 repetition*	*20 sec x 2 repetition*	*20 sec x 3 repetition*
Mountain Climber	*15 sec x 2 repetition*	*20 sec x 2 repetition*	*20 sec x 3 repetition*

The training has consisted of 10 minutes of warm-up exercise before the main training, 40 minutes for the main training session, and within 1-minute rest between each exercise. The training program has consisted of 2 to 3 sets of the upper body, lower body, and abdominal muscle exercises. Exercises like Jump Squat, Alternate Legs Jump, Squat, Crunch, Lying Twist Trunk, Lunge, Side Plank, and Mountain Climber were performed during the training program. At the end of the training session, 5 minutes of cooling down and stretching exercises were performed. To control training load, intensity, and volume, the researcher was properly and progressively supervised throughout the training session.

2.3.3 Post-intervention

After ten weeks, the CG and EG were assessed at the same time of day as in the preinterventionperiod (9:00-11:00 a.m.), in a similar space and at a similar time with the same humidity conditions. The football players in the CG were also allowed to perform the same program as the experimental group after the study ended.

2.4 Measurements

2.4.1. *Anthropometry*

Height and body weight were collected at the two moments of assessment, at the same hour and on the same day of the week. Height was measured using a stadiometer (SECA 213, Birmingham, UK) to the nearest 0.1 cm, and players were asked to remove their shoes and other accessories that could influence the assessment. Players also had to be in a vertical and immobile position, with arms extended along the body, and look straight ahead in an upright position. For each measure, only one measurement was collected.

2.4.2. Illinois Agility Test

The length of the field was 10 m, while the width (distance between the start andfinish points) was 5 m. Four cones were placed in the centre of the testing area at a distance of 3.3 m from one another. Four cones were used to mark the start, finish, and two turning points. The subjects started the test lying face down, with their hands at shoulder level. The trial started on the "go" command, and the subjects began to run as fast as possible. The time was recorded using photocell timing gates (Microgate wireless Training Timer, Bolzano, Germany, v1.6) with the resolution of 1 thousandth of a second. The typical error of the photocells was between 0.04 and 0.06 s, while the smallest worthwhile change was between 0.11 and 0.17 s. The trial was completed when the players crossed the finish line without having knocked any cones over. Two attempts were performed by every football player, timed so that the last participant undergoing the test had the same amount ofrest as the first person. The best score was considered as the outcome and used for analysis.

2.4.3Agility T-test

As illustrated in Figure 1, the Agility t-test was administered by setting up four cones in a T-shape. Cone "A" and "B" were set up 10 meters (m) apart from each other, cones "B" and "C" 5m apart, and finally cones "B" and "D" were set up 5m apart from each other. To prepare the track, four cones were placed on the track. On the start command, the participant starts at cone "A" and runs to cone "B" as fast as possible, touching the cone with their right hand. Then the participant runs to the cone "C" side-stepping and touches the cone with the left hand. After that, the participant side-steps to cone "D" and touches it with their right hand. Then, the participant runs to cone "A" side-stepping and touches it with the left hand, and the chronometer is immediately stopped as soon as the participant reaches cone "A". The test is repeated a maximum of three times after five minutes of resting and the best score is recorded.

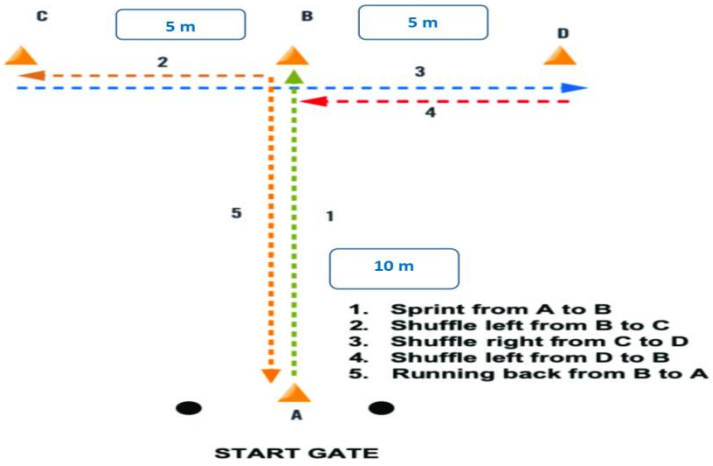

Figure 1. Agility T-test

2.4.5 Data Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS, version 27.0, Chicago. IL, USA). The primary analysis was "intention-to-treat" and included all participants that were allocated to the control

or intervention groups. Descriptive statistics were performed to describe the participants at baseline by reporting the frequencies for categorical data and means and standard deviations for continuous variables. Differences between participants from different groups were examined by One-way Analysis of Variance (ANOVA). The Tukey HSD test was used to determine where differences existed. The significance level was set at a threshold of $p<0.05$ and a 95% confidence interval.

1. Results

Illustrated in (**Table 2**), (n=15, EG) age=14.86±0.42 years of age; body weight=36.87±1.73, height=1.37±0.02cm); BMI= 19.01±0.77kg/m2 and (n=15, CG) age=15.13±0.50 years of age; body weight =35.49±1.41kg; height =1.40±0.018cm; BMI= 19.38 ±0.23kg/m2, totally 30 U15 female football players were participated in the study.

Table 2.Demographic characteristics of the participants

Variables	**Control Group (n=15)**		**Experimental Group (n=15)**	
	Pre-test	Post-test	Pre-test	Post-test
Age (year)	15.13±0.50	15.13±0.51	14.86±0.42	14.87±0.43
Weight (kg)	35.48±1.41	37.22 ±0.89	36.87±1.73	34.87 ±0.44
Height (m)	1.398 ±0.018	1.40 ±0.015	1.371±0.02	1.425±0.022
BMI (kg/m²)	19.38 ±0.23	19.247 ±0.22	19.013±0.78	18.37±0.29

Note: All results are illustrated using the mean value score (M) and standard deviations (SD).

The findings show that there is a statistically significant disparity of Agility T-test and Illinois agility test scores of U15 female football players based on their playing positions (Table 3). Statistically high Agility T-test score was observed among offensive players with a pretest score of (M±SD=12.63±0.59, F=7.164, P<.0012) and posttest scores of (M±SD=10.392±0.63, F=20.824, p<=00001). Statistically high variation of Illinois agility test was observed among defensive players with pretest score of (M±SD=20.01±2.15, F=0.09, P=.96) and post scores of (M±SD =17.89±0.38, F=13.68, P=.00002) respectively.

Table 3. Agility T-test and Illinois agility test scores of U15 female football players based on their playing positions

Pre-test	**Positions**	**Mean±SD**	**F**	***P***	***Post-test***	**Positions**	**Mean±SD**	**F**	***P***
Agility T-test (Seconds)	Offensive	12.63±0.59	7.164	.0012	Agility T-test (Seconds)	Offensive	10.39±0.63	20.825	.00001
	Midfielders	12.49±0.38				Midfielders	11.48±0.55		

	Defensives	12.78±0.43				Defensives	11.8856±0.38		
	Goalkee-pers	13.66±0.53				Goalkee-pers	12.68±0.40		
Illinois agility test (seconds)	Offensive	19.54±1.13	0.086	.96	Illinois agility test (seconds)	Offensive	18.22±1.08	13.68	.00002
	Midfielders	19.99±2.18				Midfielders	18.73±1.12		
	Defensives	20.01±2.15				Defensives	17.89±0.94		
	Goalkee-pers	21.316±0.71				Goalkee-pers	20.00±2.15		

Agility T-test and Illinois agility test scores were significant at p < .05 for posttest.

The results of ANOVA Tukey HSD **(Table 4)** shows statistically significant Agility T-test difference between offensive with Midfielders (M=1.09), Defensives (M=1.49), Goalkeepers (M=2.29), p<0.01 respectively. However, there is no statistically significant difference in Agility T-test mean score (M=0.41) for Midfielders and Defensives players of U15 football players.

Table 4. Agility T-test Tukey HSD scores (Seconds) of U15 female football players based on their playing positions

Experimental Group

Test duration	Positions (I)	Positions (J)	Difference (I-J)	Test duration	Positions (I)	Positions (J)	Difference (I-J)
Pre-test	Offensive	Midfielders	0.15	**Post-test**	Offensive	Midfielders	1.09**
		Defensives	0.17			Defensives	1.49**
		Goalkeepers	0.22			Goalkeepers	2.29**
	Midfielders	Defensives	0.12		Midfielders	Defensives	0.41
		Goalkeepers	0.21			Goalkeepers	1.20**
	Defensives	Goalkeepers	0.18		Defensives	Goalkeepers	0.80*

**p: p-value is significant at p<0.05; **p: p-value is significant at p<0.01*

The results of ANOVA Tukey HSD **(Table 5)** for CG show no statistically significant difference of Illinois agility test in pre and post-test scores of U15 female football players based on their playing positions. However, a statistically significant difference of Illinois agility test was observed among EG in pretest and posttest between offensive and goalkeepers with a mean score of (M=3.09, p<0.05); midfielders and goalkeepers (M=2.59, p<0.0); and between Defensives and Goalkeepers players (M=3.43, p<0.01).

Table 5. Illinois agility test Tukey HSD scores of U15 female football players based on their playing positions (seconds)

Experimental Group							
Test duration	Positions (I)	Positions (J)	Difference (I-J)	Test duration	Positions (I)	Positions (J)	Difference (I-J)
Pretest	Offensive	Midfielders	0.46	**Post-test**	Offensive	Midfielders	0.50
		Defensives	0.47			Defensives	0.33
		Goalkeepers	0.47			Goalkeepers	3.09*
	Midfielders	Defensives	0.43		Midfielders	Defensives	0.84
		Goalkeepers	0.42			Goalkeepers	2.59*
	Defensives	Goalkeepers	0.45		Defensives	Goalkeepers	3.43**

**p: p-value is significant at p<0.05; **p: p-value is significant at p<0.01*

Discussion

The objective of the present study was to reveal the effects of 10-Week Core Exercises intervention on Agility Skills of U-15 Fe-male Football Players. In football, players need to change direction more quickly to react to a moving ball or opponent and these changes in directed movement are commonly referred to as agility (Owen et al., 2020). Therefore, we decided to discuss the results of our study inrelation to other studies that analyzed the effects of general core exerecisetraining interventions on sport-specific actions in football. The athletes with good postural stability were better core muscle endurance and agility. It is important to apply exercise programs that enhance postural stability and increase core muscle endurance to improve sportive success(Cengizhan et al., 2019). According to the results of this study, core trainings which were applied additionally to soccer trainings can contribute positively to the development of players' speed and agility skills(Afyon et al., 2017). The comparison of posttests indicated that experimen- tal treatment (core stability training) has not signifi cant effect on the balance, agility and self-confidence of girl roller skaters. It is, therefore, could be concluded that more intensity and duration of exercises are needed if the experimental treatment effect to increase the self-confidence, balance and agility of participants in the study(Dizajdizi et al., 2016). The result showed the correlation of core strength and agility. The result showed that there is a perfect negative correlation between core strength and agility in relation to time as the r values of ventral core strength test, left and right lateral core strength test and dorsal core strength test with agility are -0.64, -0.67, -0.67, and -0.58 respectively. Conclusion: This study suggests that there is a correlation seen between the core strength and agility in badminton players(Savla, Sangaonkar, & Palekar, 2020).

The findings of our study show that there is a statistically significant high Agility T-test score was observed among offensive players with a pretest score of (M±SD=12.63±0.59, F=7.164, P<.0012) and posttest scores of (M±SD=10.392±0.63, F=20.824, p<=00001). Statistically high variation of Illinois agility test was observed among defensive players with pretest score of (M±SD=20.01±2.15, F=0.09, P=.96) and post scores of (M±SD =17.89±0.38, F=13.68, P=.00002) respectively.

The study concluded that 6-week program of Core stabilization training and Balance training is equally effective in improving agility in young soccer players(Arslan et al., 2021). It was observed that core trainings implemented on junior level players brought about significant improvements on parameters of standing long jump, shuttle, balance, speed, plank, and vertical jump (p<0.05)(Afyon, 2014). Core exercises were improved speed, acceleration, vertical jump, and standing long jump in 18-19 years-old female soccer players. Therefore, it is believed core training is necessary for optimal sport performance and should not be dismissed for all sport branches(Taskin, 2016). It was observed that 8-week core training in addition to football trainings contributed to the strength and speed development among footballers. Accordingly, core trainings can be advised for football trainers, who work for youth teams of football clubs(Afyon & Boyacı, 2016). These results reveal that 8-week core training may improve static balance, core endurance, and running economy in college athletes(Hung et al., 2019). the 6-week core training program that was applied to football players improved the performance of vertical jump, 30-m speed, agility, and flexibility(Atlı, 2021). The 8-week core strength training intervention showed no effect on athletes' balance but a positive effect on long jump and agility were observed(Dinç & Ergin, 2019).core trainings which were applied additionally to soccer trainings can contribute positively to the development of players' speed and agility skills (Afyon et al., 2017).

Results show that there are important position differences in humanities such as weight and height. In particular, the defensive players (38.45 kg, 1.42 m) was the heaviest and tallest while offensive players were (35.76 kg, 1.37 m) was light and short players (p> .05). In previous similar studies (Tom et al., 2021)goalkeepers were heavier and taller than defenders, forwards and midfielders.

Our study results shows that there is statistically significant Agility T-test difference between offensive with Midfielders (M=1.09), Defensives (M=1.49), Goalkeepers (M=2.29), p<0.01 respectively. However, there is no statistically significant difference in Agility T-test mean score (M=0.41) for Midfielders and Defensives players.

A study by (Cam et al., 2019)among football team inclusive of offensive and defensive players reveal that the agility T-test for defensive players is 8.18 ± 0.62 seconds, and for offensive players, it is 8.33 ± 0.69 seconds. A study by (Dinç & Ergin, 2019)makes use of a comparable test and agility T-test findings show 8.89 ± 0.059 seconds for offensive players. A study (Atlı, 2021)among players aged 14 to 16 gave pre and post-test results of 11.07 ± .046 and 10.39 seconds, respectively. A study by reveal that Agility T-test effects had been visible after a 12-week core exercise program with pretest (9.51 ± 0.17 seconds) and posttest (8.11 ± 1.20 seconds).

A survey of players by (Dinç & Ergin, 2019)Core exercise training and Illinois agility test results reveal pretest 4.73 ± 0.18 and follow-up test 4.49 ± 0.14 seconds. (Sonesson et al., 2021)performed an eight-week core exercise training study and the Illinois agility test results were 3.00 ± 0.19 seconds for the pretest and 2.80 ± 0.14 seconds for the follow-up test. (Tom et al., 2021)conducted a 10-week core exercise training study of young football players and the Illinois agility test results were 3.5 ± 0.33 before the test and 3.41 ± 0.09 after the test. (Credico et al., 2020)conducted a study on an elite player and reveal the Illinois agility test results 4.0 ± 0.2 before the test and 3.89 ± 0.21 after the test. (Hailu et al., 2018) performed a 12-week core exercise training study on young football players, and the Illinois agility test showed an improvement.

The results of our study depicts a statistically significant difference of Illinois agility test was observed among EG in pretest and posttest between offensive and goalkeepers with a mean score of (M=3.09, p<0.05); midfielders and goalkeepers (M=2.59, p<0.0); and between Defensives and Goalkeepers players (M=3.43, p<0.01).

Like many previous studies, the Illinois and AgilityT-tests were used to measure the agility performance of soccer players in this study. A study by (Padrón-Cabo et al., 2020; Young et al., 2021)showed that midfielders

have the highest value for agility. According to (Negra et al., 2017), attackers are significantly faster than goalkeepers, defenders and midfielders. Another study found that (Šišková et al., 2021)attackers were the fastest group and goalkeepers were the slowest. (Lee et al., 2021)suggested that two agility tests identified a significant difference between attackers and defenders. (Sonesson et al., 2021; Kurz et al., 2021).

Conclusions

This study aimed to examine Effects of 10-Week Core Exercises Intervention on Agility Skills of U-15 Fe-male Football Players. The results of this study showed that core exerecisetraining producedimprovements in il-liious agility test and agility T-test scores of U15 female football layers. Therefore, young female football coaches can use core exerecisetrainijng as part of their training plan to improve the agility of football players therby their strength, fitness, and pereformance can be enhanced. Core pieces of training that were applied additionally to soccer training can contribute positively to developing agility skills, physical fitness, speed, and reaction time of young female football players.

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