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The Effect of Using Agility Drills on Developing Some Speed Abilities of Junior Soccer Players

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Abstract
This research aims to design a program for agility drills as an attempt to see its impact on agility and some speed abilities of junior soccer player. The researcher used the experimental method by design "pre-measurement - post-measurement" to one experimental set. And research sample was selected by intended way from juniors under 17 years of National Bank Club in Cairo and they were 23 players (8 defenders, 7 Midfielders, 8 attackers), and the place of applying the research experiment and pre and post-measurements was specified at the fields of National Bank Club in Giza district of soccer. The temporal scale of the program in the period from 07.24 to 09.29 / 2010 during (10) weeks of the preparation period, starting with the third week of 2010/2011 season. And the most important results were that the training program has a positive impact in the development speed and agility abilities under study in the play's (defense, midfield, offensive) lines, and the volume of variability in the post-measurement ranged between (6.269 -15.792). There is also a correlation statistically significant between the play's lines and the variables of starting speed from stability, and zig-zag running with the ball, speed movement (in the direction of the midfield and offensive), and an inverse significant relation in the direction (midfield and defense) in sprint variables, speed endurance, rebound running , and a correlation is not significant in the starting speed from movement, and running with the ball 30 meters, running with the ball between 10 cones.

Introduction:

Agility is considered one of the most important elements of fitness for soccer field as it overlaps and linked with other elements such as speed, strength, flexibility and coordination, in addition to its close relation with dynamic performance and have an impact in variable situations during the game, as in the speed of the variation from one performance to another, and changing the player his direction or stop suddenly, or shooting after dribbling , or running to escape from a competitor to receive the ball. (1: 158) (2: 169) (3: 434)

And agility drills in soccer are necessary to make the player dynamically faster, and increase muscle strength and improve the performance of the players and to maintain a balance when starting and stopping, as well as neuromuscular coordination in dynamic performances. (4: 18).

And Bangsbo (2009) adds that the speed and agility drills of great importance in the fitness program for soccer player, as the speed of play in modern soccer has increased than ever before, and when the endurance and strength are important in improving performance, the fastest player is the separator limit in the competition, and whatever you have endurance the ability to access to the ball faster remain the most important in performance. (5: 15).

According to soccer experts the speed factor is one of the most important variables of developing modern soccer, as it forms the basis for this development, and is considered an important determinant of the outcome of many games Speed is also linked to all other physical elements affects and is affected by, physical and skillful and tactical performance in soccer as a whole or in any part of it became not dispensed

with speed through the reactions of the external and internal stimulus and very quickly

(6:285) (1: 120) (7: 95)

Moreover Devries (1997),Frank dick (2007) mention that the speed can be developed with difficulty and in a lesser degree than other physical abilities as it is characterized with its confidentiality that linked to the nature of performance and flexibility of joints and stretching muscles, genetic factor that controls the formation of the number of fast and slow muscle fibers ratio and what follows that of the formation of the number of dynamic units, and by reducing the negative resistance and improve the degree of neuromuscular coordination. (8:37) (9: 451)

Therefore Tumilty (1998), Strudwick (2002), confirm on the importance of developing the rates of speed with its different types of the players in all positions of play in soccer, due to the increasing need for them during the many changes happening in the duties of the players and their roles in the field, as well as the rapid changes in tactical sides whether it is innovative or recognized. (10: 239-242) (11: 16)

And also Hanafy Mukhtar (1989), Mufti Ibrahim (1990) and Hassan Abuabdh (2001), and Hernsuk (2003) refer to the importance of player's speed and the need to Perform movements of the play quickly as soon as possible under the available circumstances, and the tactical requirements and individual potential, especially the sprint by quick running to specific distances, as well as the speed of the starting, and the speed of motor performance of skills in various forms as the speed of running with the ball, passing and receiving and shooting. (12: 37) (14: 284) (14:60) (15:284)

In the light of the previous display and through the nature and the diversity of speed in soccer activity, and the researcher's experience in the field of training and analysis of the games has been found that there are several reasons appear and crystallize research problem as follows:

- The researcher noticed during follow-ups to some competitions at the level of clubs and national teams North African players exceed the Egyptian players in short speeds, especially in offensive areas of the field

- The researcher noticed that a lot of Egyptian coaches are interested in developing speed endurance and neglect other speed abilities as (starting speed, sprint, and motor speed).

- The researcher noticed that the international and local commitments in soccer competitions and convergence and overlapping of training seasons helps to reduce the time of preparation, as well as pressure of matches in the local competition, with a break up to three days between the game and the next, Which works to compress physical training inclusions, and implementing it in a compound way may reach to omit some of its elements.

Based on the foregoing, it highlight the importance of this study in developing a new method for developing and improving speed abilities in soccer, and provide who works in the field of training a standardized training program aims at the development of speed and agility, in the light of one program for agility drills, which is considered a compound physical ability in which speed is a key element to soccer players.

The aim of this research:

The research aims to identify the effect of agility drills program on some speed abilities on junior soccer players under 17 years old.

Materials and Methods:

Research approach:

The researcher used the experimental method by designing (pre-measurement, post-measurement) for one experimental group because of its appropriateness to the nature of this search.

Research sample:

Study sample was selected and made up of (26) junior representing original population of NBE team under 17 years old, registered at the junior phase in Giza district for soccer sports season 2010/2011, (3) players were excluded due to injury, making the number of main sample members (23) player (8 players at defense line, 7 at the center line, 8 at offensive line)

The coefficient of skewness in the variables under study has been calculated, and ranged between (0.019 -2.527) that is, it was limited between ± 3, Indicating the homogeneity of

research sample and its location under the normal curve.

Variables of speed abilities and Agility:

-The test of starting speed from stability (10 m) to the nearest 1/10 S (16: 203)

-The test of starting speed from movement (10). (16: 203)

-Speed endurance in the last (40 yards) of running (120 yards) (16: 203)

-The test of sprint and acceleration from stability (30). (17: 125)

-The test of motor speed (wall pass). (1 : 254)

-The test of running speed and ball control (30 m). (17: 126)

-The test of shuttle running (4 x 10 m). (17: 127)

-The test of zig-zag running (25 m) with the ball between (5) cones. (1 : 259)

-The test of running speed and control the ball between (10) cones. (18 : 19)

Equipment and tools used in the research:

The researcher used the following equipment and tools to help do the tests, and the proposed program, a (Ristameter) (cm), Medical Balance (Kg), Measuring tape (50 meters), (3) Stopwatch to the nearest 1/10 Sec, cones different sizes - hoops, barriers, training ladders - soccer balls - a whistle

instruments and devices used in drills and measurements, and directing assistants in the program.

-Scientific transactions of tests:

Studies conducted on similar samples (5) (16) (19) (18), agreed that these tests have high (validity - reliability) coefficients, the "z" value of validity coefficient to the current research sample between distinctive group and another non-distinctive was limited between (2.193 - 2.619), and the reliability coefficient between (.949 - .999) by test-retest, and it is statistically significant value at the level of 0.05 and so these tests can be used in the proposed program.

The proposed training program:

-The time of the daily training unit in the preparation program of the team between (70:120) minutes, and by (5) weekly training units.

-The allocated time for the development and refinement of the special agility in training unit in between (25 - 35) minutes during the period of the proposed program. (1: 162)

-Applying the proposed program of agility training from the beginning of the third week of the preparation period for (10) weeks, by (3) training units weekly with time interval not less than (48) hours between the unit and the next, where the player has in the first and the second weeks the constitutive section through endurance, strength, and flexibility drills.

-The section of agility drills begins after the warm-up period, and in the beginning of the main part of the training unit, since it puts a great burden on the central nervous system (1: 385)

-The basic components of agility drills in the program: Agility by running in curves and zig-zag with and without the ball, Agility with flexibility, Agility with the ability, Agility with balance, Agility with coordination, Agility with skill in soccer.

-Researcher used the controlling of the load degree in legalization of the training load for the development of agility and some speed abilities, and that through fixing the intensity load, and relief, and the change in the amount of load (performance time) according to energy production systems.(13:385) (20:128) .

Table (1) Training load of agility drills distribution in the proposed program for the sample under study

week number	intensity of load	Training number	Amount(time/ seconds)					Recovery		Agility time by unit
			Set 1	Set 2	Set 3	Set 4	Set 5	For exercise	Between sets	
1,2	Maximum	(1,2,3,4,5,6) a, b, c	30	45	45	60	45	from 60-120 sec	5 Minute	30 Minute
3,4		(7,8,9,10,11,12) a, b, c	30	60	60	45	60	from 60-120 sec	5 Minute	35 Minute
5		(13,14,15) a, b, c	30	30	60	30	45	from 60-120 sec	5 Minute	35 Minute
6,7		(16,17,18,19,20,21) a, b, c	15	20	20	30	20	from 30-60 sec	4 Minute	30 Minute
8,9		(22,23,24,25,26,27) a, b, c	15	30	30	20	30	from 30-60 sec	4 Minute	35 Minute
10		(28,29,30) a, b, c	15	15	30	15	20	from 30-60 sec	4 Minute	25 Minute

Table (1) shows the intensity of load and amount and recovery of the training unit according to the time of energy production systems in the research to develop agility over (10) weeks duration of the program:

-Maximum amount: 3 set 100%, 1 set 75%, 1 set 50% - sub-maximum: 3 set 75%, 1 set 100%, 1 set 50% - average: 3 set 50%, 1 set 100%, program 75 % - recovery is up to twice the performance time of the exercise, and 4 - 5 minute for set.

Pre-measurement was conducted on sample members on Thursday, Friday 22, 23/7/2010 on the fields of the National Bank Club of Giza in all research variables

Program application:

The researcher applied the proposed program of agility drills in the period from Saturday 24/7/2010 to Wednesday 29/9/2010 by (3) weekly training units

Post-measurements:

Post-measurements conducted on Thursday, Friday 30/9, 1/10/2010 according to their ranking in the same conditions of their pre-measurements for all research variables.

Statistical treatments

To achieve the objectives of the research researcher used the following statistical treatments:

arithmetic mean, standerd deviation, skweness coefficient, "Z" test, probabilities, correlation coefficient (person), volum of variability.

Results and Discussion:

Table (2) differences significance between the pre-measurement and post-measurement in variables under study n = 23

Variables	The whole sample	n=23	defense	n=8	midfield	n=7	Offensive	n=8
	"Z" value	P	"Z" value	P	"Z" value	P	"Z" value	P
Starting speed from stability	*4.201	.000	2.524 *	.012	2.366 *	.018	2.533 *	.011
Starting speed from movement	*4.203	.000	2.536 *	.011	2.375 *	.018	2.524 *	.012
sprint	*4.203	.000	2.524 *	.012	2.379 *	.017	2.527 *	.012
Speed endurance	*3.51	.000	2.539 *	.011	2.375 *	.018	2.409	.012
Running 30 m with ball	*4.2	.000	2.527 *	.012	2.366 *	.018	2.521 *	.012
Running with ball between cones	*4.199	.000	2.524 *	.012	2.371 *	.018	2.533 *	.011
Zig-zag with ball	*4.199	.000	2.521 *	.012	2.366 *	.018	2.521 *	.012
Shuttle running	*4.199	.000	2.524 *	.012	2.375 *	.018	2.524 *	.012
Speed movement	*4.2	.000	2.521 *	.012	2.366 *	.018	2.533 *	.011

"z" value at the level of 0.05=1.96

Table (3) Volume of variability of the post-measurement from pre-measurement in variables under study

variable	The whole sample n=23			Defense line n =8			Midfield n =7			Offensive line n=8		
	pre	post	Volume of variability %	pre	post	Volume of variability %	pre	post	Volume of variability %	pre	post	Volume of variability %
Starting speed from stability	5.298	4.613	12.926	5.338	4.700	11.944	5.357	4.657	13.067	5.206	4.488	13.806
Starting speed from movement	1.681	1.461	13.085	1.730	1.506	12.934	1.733	1.524	12.036	1.588	1.361	14.252
sprint	5.095	4.627	9.191	5.079	4.581	9.796	5.060	4.639	8.329	5.141	4.661	9.336
Speed endurance	5.567	5.218	6.269	5.530	5.193	4.295	5.449	5.041	7.487	5.721	5.421	5.244
Running 30 m with ball	13.574	12.031	11.365	13.315	11.813	11.284	13.656	12.196	10.691	13.761	12.106	12.027
Running with ball between cones	14.030	12.916	7.937	13.994	13.049	6.753	13.966	12.703	9.043	14.121	12.970	8.153
Zig-zag with ball	13.926	11.727	15.792	14.105	11.964	15.181	13.837	11.614	16.064	13.824	11.588	16.177
Shuttle running	10.325	9.624	6.784	10.325	9.595	7.070	10.206	9.443	7.475	10.429	9.813	5.909
Speed movement	13.795	12.058	12.594	13.850	12.150	12.274	13.741	12.063	12.217	13.794	11.947	13.391

The results of tables (2), (3) illustrate that there are statistically significant differences - for post-measurement in all speed and agility variables under study, and the new in this study is the development of speed through agility drills, while researchers adopted in previous studies on the speed exercises for developing speed abilities. Where the "Z" values of the sample as a whole ranged between (3.51 -4.203), and in the defense line between (2.521 - 2.539) the midfield (2,366-2.379), offensive line (2.521 - 2.533), all of it is statistically significant at the level of 0.05.

Researcher attributed these differences to the effect of the proposed training program for the development of agility, which was applied to research sample through the special two stages of preparation, and before competitions, Where it was characterized by precision in agility drills design and selection, and pay attention to the balanced development of agility components, and the proper succession in line with the objective targets for the program, and content in this age stage.

And this is consistent with the results of Mohammed Batal, Ibrahim Hegab study (1989) (21), Taha Ismail et al (1989) (1), Ali Albeack (1992) (22) and what Aboulela Abdel-Fattah refers to (1997) (23), that there is a correlation relation between agility and each of general speed, coordination, and strength characterized by speed, and to upgrade and improve the abilities of speed standardized scientific programs of agility should be used by

improving the ability of the central nervous system and coordination within the muscle.

The researcher also attributed these differences to the legalization of agility drills in the proposed program in defense line, midfield, offensive line according to the performance nature in soccer and energy production systems (the glycogenolysis – ATP-PC) and using the high intensity interval training method, which suit the development of agility with its essential components such as speed, capacity, flexibility, coordination and balance. And what proves that is the volume of variability and improvement in post-measurement, ranging in defense line between (5.909 - 12.934) and midfield (4.903 - 13.391) and offensive line (2.715 - 14.617), and the sample as a whole between (3,928 - 15.792).

And this is consistent with the study results of, Hanafy Mukhtar (1988) (20), Ismail Ashour (1989) (6), Mohammed Ibrahim (1990) (24) , Ehab Hussein (1996) (25), Hassan Abu Abda (2001) (14), Bangsbo (2009) (5).

Table (4) differences significance between the play's "defense, midfield, offensive" post- lines in the measurement in variables under study

Variables	positions	number	Mean rank	D F	"z" value	probability
Starting speed from stability	defense	8	15.31	2	4.488	.106
	midfield	7	12.57			
	offensive	8	8.19			
Starting speed from movement	defense	8	15.38	2	3.197	.202
	midfield	7	10.93			
	offensive	8	9.56			
sprint	defense	8	13.81	2	.882	.643
	midfield	7	11.07			
	offensive	8	11.00			
Speed endurance	defense	8	12.06	2	1.739	.419
	midfield	7	9.50			
	offensive	8	14.13			
Running 30 m with ball	defense	8	8.75	2	2.955	.228
	midfield	7	14.43			
	offensive	8	13.13			
Running with ball between cones	defense	8	13.88	2	2.428	.297
	midfield	7	8.71			
	offensive	8	13.00			
Zig-zag with ball	defense	8	15.00	2	2.446	.294
	midfield	7	10.00			
	offensive	8	10.75			
Shuttle running	defense	8	15.56	2	4.326	.115
	midfield	7	8.29			
	offensive	8	11.69			
Speed movement	defense	8	12.50	2	.406	.816
	midfield	7	10.64			
	offensive	8	12.69			

"z" value at the level of 0.05=1.96

As table (4) shows that there are differences not statistically significant in post-measurement between the play lines "defense, the midfield, the offensive " in the research variables, and the researcher attributed that to the importance of these abilities to all the players as it is considered the most crucial factors in superiority over the opponent in modern soccer. The agility drills has played a key role in the convergence of the results of the players of defense, midfield and offensive lines in these variables.

Although the statistical differences are not significant between the play's "defense, midfield and offensive" lines but it refers to the superiority of "offensive line" where it achieved the best averages in the times of tests of starting speed from stability (4.488) and from movement (1.361), and zig-zag running with the ball between (5) cones (11.588), and motor speed (12.15).

Researcher attributes these results to the nature of the performance in this position which requires that the striker has the ability to get rid of the defender by movement and quick starting surprisingly, in addition to the deception and zig-zag running with the ball in areas crowded with players, and this is consistent with what mentioned by and Ali Albeack (1992) (22), DEVRIES (1997) (8), and Adel Alfady (2004) (26), and Little & William (2005) (4) that agility drills (ability agility using barriers) works on improving starting speed and acceleration for short distances, and help to improve the explosive movements of the two legs .

And the "midfield" achieved best averages of times of the test of : speed endurance reached (5.041), shuttle run (9.443), running with the ball between (10) cones (12.703), and these results are attributed to the nature of the performance of midfielders, which requires the ability to repeat running with or without the ball under opponent's pressure, this may be done beginning with the preparation stage for the attack and to the construction stage and finishing, which leads the player to reach the state of adaptation in performance .

And this is consistent with what each of Taha Ismail et al (1989) (1), Mohammed Ibrahim Shehata (1997) (24), Ghazi Youssef, and Ibrahim Saleh (1998) (27), a study by Mohamed keshk and Amralla Bosatti (2002) (16), Adel Alfady (2004) (26), William & Little (2005) (4) referred to which shows that the midfielders have achieved the better rates of speed endurance and they justified it that the player needs to keep at high speed rate and performance timing like speed endurance, performance endurance, and these speeds are the basis for the implementation of play's plans and create opportunities of shooting, and this appears in the agility drills (shuttle run) as it in addition to improving the speed and balance is working on the development of speed endurance.

-"defense line" also achieved the best average time in (running with the ball 30 m) test, was (11.813), the sprint (4.581).

Researcher attributes the superiority of the defense line in these two variables to the player moving with the ball in a straight line in areas relatively empty, which is always repeated in defense area and on the edge of the field in wings area, Adel Alfady (2004) (26). Rifai Mustafa (2009) (28), supported that.

Table (5) the correlation coefficient between play's "defense, midfield, offensive" lines and variables under study in the post-measurement

Study variables	Play's lines
Starting speed from stability	0.415
Starting speed from movement	*0.227
sprint	* 0.464 -
Speed endurance	*0.626 -
Running 30 m with ball	0.059
Running with ball between cones	0.354

Zig-zag with ball	*0.532
Shuttle running	*0.492-
Speed movement	*0.479

"cor…" value at the level of 0.05=0.413

Table (5) shows the results of correlation coefficients between the three play lines "defense, the midfield, offensive ", and speed and agility variables in the proposed program, where the aspects of benefit between the play lines varied according to the requirements of each line in the activity of soccer. Through a review of the post-measurement results, there is a statistically significant correlation in the direction of "midfield and offensive" lines where the correlation coefficient values of the variables of: the starting speed from stability (0.405),zigzag running with the ball (.532), motor speed (0.479) and all of them statistically significant values at the level of 0.05 .

Researcher attributes these correlations to the importance of these abilities to the players in midfield and offensive lines, which commensurate with the nature of their performance, in which agility plays a major role that appears in getting rid of defender pressure during running short distances by starting speed, dribbling and control by zigzag running, to complete purposefully planned work.

And this is consistent with what Abo elela Abd ElFattah, Ibrahim Shaalan (1994) (29), Amr Allah Bosatti (1995) (2), and Hassan Saud's study (2002) (30) and Adel Alfady (2004) (26) referred to that the strikers achieved the highest averages in the short running tests (15,30 m), and the nature of the offensive player duties requires high-intensity effort for a short period of time.

While Table (5) shows that there is correlations not statistically significant between the play's lines "defense, midfield, offensive line" and the variables of: starting speed from movement (10 m) in which the value of the coefficient of correlation reached (0.427), and running with the ball (30 m) was (.059), and running with the ball between (10) cones (0.354), and all of them are values not statistically significant at the level of 0.05.

Researcher attributes this to the nature of the modern soccer activity that requires from the player the ability to perform in any of the different play positions as necessary during the match and the play's plan, especially performing running and controlling the ball skills, which are considered one of the fundamental skills that must be mastered by all the players in all the play's lines, or quick navigation without the ball from one place to another from stability, or from movement to take appropriate positions on the field, or rapid shift from defense to attack and the contrary throughout the game time, and what proves that is the volume of variability and improvement of these variables in post-measurement.

The results of table (5) also show that there is an inverse correlation statistically significant relation between the play's lines "defense, midfield, offensive line" in the direction of "midfield, defense" lines of sprint variables with coefficient of correlation (.464), speed endurance (0.626), shuttle running (0.492).

Researcher attributes this inverse correlation relation to the impact of some agility drills of the proposed program such as shuttle running, and bounces in some parts of the exercise whether above the cones or using barriers that contribute to the development of sprint, and speed endurance, and shuttle running, in addition to the nature of the performance of midfield and defense players which use long and short running spaces, and repeat it during the game which commensurate with the nature of the play's modern systems in which the number of defenders reduced to provide an opportunity for offensive work with a large number of players who should have high level of speed for proper and appropriate positioning, and inverse coverage and take defensive positions as quickly as possible, and the shift from defense to attack and vice versa. .And this is consistent with what Ryder jj (2004) (31), Arnason (2004) (32) see that the midfielders are the most soccer players in covering field's areas, and certainly for small distances and the speeds that exceed (10 m) and used it in defense and attack to open the loopholes. And what Adel

Alfady's study indicates that defense players have achieved the highest rate in the averages of running test 30 meters with the midfielders.

Conclusions:

In the light of the objectives and within the research sample and procedures researcher was able to reach to the following conclusions:

1 - Agility Training Program has a positive effect on the development of the selected speed and agility abilities to the juniors U-17 research sample with statistically significant differences.

2 - Agility training program have a positive impact on the development of speed and agility to play's lines "defense, midfield, offensive" the research sample with statistically significant differences in the post-measurement of every one.

3 - Benefit degrees varied between play's lines "defense, midfield, offensive" despite there is no statistically significance of the results of speed and agility abilities in the post-measurement, so the best averages came to offensive line in starting speed from stability and movement, zigzag running with the ball, motor speed, and the midfield in speed endurance, shuttle running, and defense line in running with the ball in a straight line.

4 - That the volumes of variability and improvement in the speed and agility variables came in favor of the post-measurement as a result of applying the proposed program on research sample and it ranged between (4.295-16.177) in the three play's lines.

5 – There is a correlation statistically significant relation in the direction of "midfield and offensive" lines in the variables (starting speed from stability, zig-zag running with the ball, motor speed), and an inverse relation in the direction of midfield and defense lines in the variables (speed endurance, sprint "30 m", shuttle running), and correlation not statistically significant relation in the variables: starting speed from movement, running with the ball between (10) cones, running with the ball in a straight line (30 m).

Recommendations:

By displaying and interpretation of the results, and within the research sample the researcher recommends the following:

1 - Directing the results of this research and agility proposed program and its implementation steps to workers in the field of soccer training to take advantage of them.

2 - Paying attention to agility drills with its various components, especially in the private preparation stage, and pre-competitions stage because of its positive impact on the development of speed and agility abilities in soccer.

3-The use of agility proposed program, especially in short preparation periods in training seasons overlapping and crowded with championships.

4- Paying attention to the planning of agility drills programs in soccer according to energy production systems which takes into account individual differences among individuals.

5 - Conduct such a study in other sport activities and link it to basic skills.

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