

A New Test for the Assessment of Agility and Dribbling Skill of Soccer Players Aged 14-15 Years Old

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Abstract

The aim of the study was the development of a new agility and dribbling skill test for young footballers. Twenty-one amateur soccer players aged 14.48 ± 0.11 years old participated in the study. Their overall mean height, weight and playing experience were 166.76 ± 2.06 cm, 58.03 ± 2.73 kg, 6.05 ± 0.51 years respectively. The anthropometric characteristics were examined by a portable Seca stadiometer, a calibrated Seca weight scale and a certified Harpenden skinfold caliper. Timing gates (Photocells; Microgate, RACETIME 2) were used for the assessment of sprint time, agility and dribbling skill. Descriptive statistics, t-test for dependent groups and Pearson correlation were executed by SPSS package (v. 17) in a statistical significance level of $p < .10$. The results showed that MM test with and without ball is a reliable and valid test for the assessment of dribbling skill and agility of young players. Furthermore, 10m speed, 20m speed, 30m speed and agility (Little and MM test) present a statistical significant correlation. However, 10m speed revealed higher correlation with 20m and 30m than MM and Little test without ball.

Keywords: Soccer, Speed, Agility, Skill, Little test

Introduction

Soccer is a physical game that demands high levels of strength, speed, balance, stability, flexibility, endurance, and agility (Bloomfield, Polman, O'Donoghue, & McNaughton., 2007; Gorostiaga et al., 2004; Helgerud, Engen, Wisloff & Hoff, 2001; Jovanovic, Sporis, Omrcen & Fiorentini, 2011; Krustup, Mohr, Ellingsgaard & Bangsbo, 2005). However, development and maintenance of high physical condition of players during the whole season is considered a multidimensional process. It has been found that several high speed activities affect individual and team performance (Little & Williams, 2006; Luhtanen, 1994). Although the high-speed movements contribute to the total covered distance only for 11%, they are the most crucial activities during the game as they influence scoring and passing to the teammates (Reilly, Bangsbo & Franks, 2000). Specifically, 80% of scored goals in soccer games are preceded after a sprint (Faude, Koch & Meyer, 2012). Although most of the goals are achieved after sprinting only 1.2 to 2.4% of the running distance in match play is covered with the ball (Di Salvo et al., 2007). Haugen and colleagues (2014) suggested that sprinting skill appearing during match games are categorized in straight line sprinting, repeated sprint ability, and agility (Haugen, Tønnessen, Hisdal & Seiler, 2014). Little and Williams (2005) also concluded that high speed movements during the game require acceleration, maximal speed and agility. Mero and colleagues (1992) further categorized straight line sprinting as acceleration, maximal running velocity and deceleration phase (Mero, Komi, & Gregor, 1992). The total straight line sprinting bouts players execute during a game, with or without a ball are between 20 to 60 sprints with a total sprinting distance of 700-1000m. Specifically, more than 90% of all sprints are shorter than 20m while 80-90% of maximal sprint velocity is achieved after 2-3sec (Chelly & Denis, 2001; Graubner & Nixdorf, 2011; Vigne, Gaudino, Rogowski, Alloatti, & Hautier, 2010). Specifically, acceleration is defined as the pace of speed change that allows to a player to reach the maximal speed on the minimum time. Maximal speed is defined as the maximum amount of the speed at which the player can execute sprints. During the game players cover 1.5-105m distances that require a developed acceleration and maximal speed capacity (Bangsbo, 1994). Although the mean sprint distance covered by the players is short (17m), the sprints they execute reach maximal speed because they have already a starting speed (Young & McDowell, 2001). However, sprinting is used not only on straight line but also to overpass an opponent or to receive a pass by changing direction continuously. Thus, agility is considered as an important parameter of soccer performance (Lloyd et al., 2015). Recently, Sheppard and Young (2006) defined agility as a rapid whole body change of direction and velocity in response to a stimulus. Several studies added the rapid stops and starts as a main characteristic of agility (BLOOMFIELD, ACKLAND, & ELLIOTT, 1994; Gambetta, 1996; Parsons & Jones, 1998; Quinn, 1990). Therefore, agility improvement consist a crucial factor for the execution of strength and coordination movements. In fact, some suggest that agility is what discriminates between higher and lower skilled young (15–16 years) players better than any other physical characteristic (Reilly, Williams, Nevill & Franks, 2000). Although the significance of agility for game performance (Fox & Methews, 1974; Harman, Rosenstein, Frykman & Rosenstein, 1990; Hoolahan, 1990; Semenick, 1984), Sporis and colleagues (2010) suggested that there is limited research concerning its characteristics (Sporis, Jukic, Milanovic & Vucetic, 2010). Withers and colleagues (1982), showed that players execute a mean of 50 direction changes during the game (Withers, Maricic, Wasilewski, & Kelly, 1982). Similar morphological and biochemical determinants of agility, acceleration and maximal speed contribute to the hypothesis that the already mentioned qualitative characteristics are highly correlated. Little and Williams (2005) concluded that acceleration, maximal speed and agility present low correlation level (Little &

Williams, 2005). Haugen and colleagues (2014) reported that although soccer player Cristiano Ronaldo raced 0.3sec slower the 25m straight line sprint than Spanish track and field champion David Rodriguez, he passed him for 0.5sec when running the same distance in zig zag course. Furthermore, agility patterns may vary among soccer players as a function of playing role (Sporis et al., 2010). However, the literature is equivocal regarding agility performance across playing positions (Boone, Vaeyens, Steyaert, Bossche, & Bourgois, 2012; Sporis et al., 2010; Taskin, 2008). Literature review showed that there is a gap of research concerning specific agility (Semenick, 1984) as well as skill tests. According to Kollath and Quade (1993), footballers perform higher performance on agility and sprinting tests compared to the general population. Thus it is of great importance for sport scientists and coaching staff the use of specific tests and intervention methods for the improvement of physical parameters. The aim of the current study was to evaluate a new agility and skill test for soccer players aged 14-15 years old.

Materials and methods

Participants

Twenty one soccer players aged 14.48 ± 0.11 years old participated in the study. The overall mean values for height, weight and playing experience of players were 166.76 ± 2.06 cm, 58.03 ± 2.73 kg, 6.05 ± 0.51 years respectively. Players and their parents were informed about the aims, the ethics, the benefits and the risks of the study. Then they signed a written informed consent prior the first measurement. The researchers examined 10m sprint, 20m sprint, 30m sprint, as well as MM and Little test with and without ball.

Procedures

The five tests were administered outdoors on a soccer playing field and lasted for two days. Specifically the first day of the experiment the researchers evaluated the anthropometric characteristics (height/weight), as well as the 10m, 20m and 30m sprint. The second day of the experiment the researchers examined agility with and without ball with Little (figure 1) and MM test (figure 2). Before testing the players warmed-up for 12-15 minutes in the usual manner they use before a practice session (dynamic stretching/jogging with and without ball), and also actively recovered for 1 minute between each trial and 3 minutes between tests. The researchers recorded the better of the two trials for each player. The same testing procedures were applied a week later for the assessment of the validity and reliability of the tests.

Measurements

Anthropometric characteristics were evaluated with a portable Seca stadiometer, a calibrated Seca weight scale (Seca 880 Weight Scale, Leicester Height Measure, Seca Ltd, Vogel and Halke, Hamburg; Germany) and a certified Harpenden skinfold caliper (Harpenden, HSB-BI, faces 6×15 mm, constant pressure of 10 g/mm^2 ; UK). Sprint time was assessed with timing gates placed on the beginning line, as well as on the 10m, 20m and 30m distances (Photocells; Microgate, RACETIME 2). The participants started their sprint 40cm behind the first timing gate. Similarly, agility with and without ball was assessed by timing gates placed on the beginning and finish line of the distance. Specifically, during Little test participants started by standing position with their front leg placed 40cm distance behind the beginning line. The participants ran the 20m distance by changing 100° direction every 5m by passing from the outside part of the cone (figure 1).

Findings / Results

The following table presents the descriptive statistics of anthropometrical characteristics: Age, height, weight, and playing experience (table I).

Table 1. Descriptive statistics of anthropometrical characteristics

Anthropometrical characteristics	N	Descriptive statistics				
		M	SD	St. Error	Min	Max
Age		14.48	0.51	0.11	15	14
Playing experience		6.05	2.36	0.51	10	1
Height	21	166.76	9.43	2.06	181	148
Weight		58.03	12.51	2.73	81.7	38.3

The following table shows descriptive statistics of the examined variables as well as their differences between first and second measurements (Table II). Specifically, it was found that the difference between two measurements was not significant for 10m speed (1.88 ± 0.11 sec and 1.89 ± 0.13 sec respectively), 20m speed (3.35 ± 0.2 sec and 3.35 ± 0.22 sec respectively), and MM test with ball (13.73 ± 1.15 sec and 14.26 ± 1.21 sec respectively). On the other hand, the difference between the two measurements was statistically significant for 30m speed (4.7 ± 0.33 sec and 4.88 ± 0.38 sec respectively; $p < .01$), MM test without ball (10.5 ± 0.47 sec and 10.69 ± 0.47 sec respectively; $p < .10$), Little test without ball (5.69 ± 0.3 sec and 5.73 ± 0.27 sec, respectively; $p < .10$), and Little test with ball (7.00 ± 0.56 sec and 7.17 ± 0.56 sec respectively; $p < .10$).

Table 2. Descriptive statistics of the variables and differences between measurements

Tests	Descriptive statistics				T-test
	1 st measurement		2 nd measurement		
	M	SD	M	SD	
10m speed	1.88	0.11	1.89	0.13	-1.183
20m speed	3.35	0.2	3.35	0.22	-0.975
30m speed	4.77	0.33	4.88	0.38	-5.058***
MM without ball	10.5	0.47	10.69	0.47	-1.692*
MM with ball	13.73	1.15	14.26	1.21	-1.269
Little without ball	5.69	0.3	5.73	0.27	-1.861*
Little with ball	7.00	0.56	7.17	0.56	-2.007*

*** $p < .01$; ** $p < .05$; * $p < .10$

The following table shows the correlations among the tested variables (table III). Specifically, it was found that 10m speed presented a significant strong correlation with 20m speed ($r = .957$; $p < .001$), 30m speed ($r = .953$; $p < .001$), MM test without ball ($r = .589$; $p < .001$), MM test with ball ($r = .741$; $p < .001$), Little test without ball ($r = .793$; $p < .001$), and Little test with ball ($r = .833$; $p < .001$). Concerning 20m speed it was found a significant strong correlation with 30m speed ($r = .966$; $p < .001$), MM test without ball ($r = .504$; $p < .05$), MM test with ball ($r = .632$; $p < .01$), Little test without ball ($r = .707$; $p < .001$), Little test with ball ($r = .746$; $p < .001$). Furthermore, 30m speed presented a significant strong correlation with MM test without ball ($r = .508$; $p < .05$), MM test with ball ($r = .614$; $p < .01$), Little test without ball ($r = .725$; $p < .001$), and Little test with ball ($r = .785$; $p < .001$). Regarding agility tests, it was found that MM test without ball significantly strong correlated with MM test with ball ($r = .477$; $p < .05$), Little test without ball ($r = .682$; $p < .001$). However, it was moderately correlated with Little test with ball ($r = .391$; $p < .10$). Moreover, MM test with ball significantly strong correlated with Little test without ball ($r = .501$; $p < .05$), and Little test with ball ($r = .592$; $p < .01$). Finally, Little test without ball was significantly strong correlated with Little test with ball ($r = .778$; $p < .001$).

Table 3. Pearson r correlations among variables

Variables (N= 21)	10m speed	20m speed	30m speed	MM without ball	MM with ball	Little without ball	Little with ball
10m speed	-	-	-	-	-	-	-
20m speed	$r = .957$ $p = .000$	-	-	-	-	-	-
30m speed	$r = .953$ $p = .000$	$r = .966$ $p = .000$	-	-	-	-	-
MM test without ball	$r = .589$ $p = .005$	$r = .504$ $p = .020$	$r = .508$ $p = .019$	-	-	-	-
MM test with ball	$r = .741$ $p = .000$	$r = .632$ $p = .002$	$r = .614$ $p = .003$	$r = .477$ $p = .029$	-	-	-
Little test without ball	$r = .793$ $p = .000$	$r = .707$ $p = .000$	$r = .725$ $p = .000$	$r = .682$ $p = .001$	$r = .501$ $p = .021$	-	-
Little with ball	$r = .833$ $p = .000$	$r = .746$ $p = .000$	$r = .785$ $p = .000$	$r = .391$ $p = .080$	$r = .592$ $p = .005$	$r = .778$ $p = .000$	-

Discussions and Conclusions

The current study showed that 10m speed, 20m speed, 30m speed and agility (Little and MM test) present strong correlation, finding that is confirmed by Little and Williams (2003, 2005). Furthermore, it was found that MM test without ball significantly correlated with Little test without ball. Thus, MM test is a reliable method to evaluate agility of young players. Similarly, MM test with ball significantly correlated with Little test with ball which could be used for skills assessment. Furthermore, 10m speed revealed higher correlation with 20m and

30m than MM and Little test without ball. This finding confirms that straight line sprinting and agility require different physiological and biomechanical characteristics which contribute to successful performance in each speed discipline (Little & Williams, 2003). Although agility is considered as a sprinting skill its locomotor characteristics are different than straight line sprinting (Little & Williams, 2005; Vescovi & McGuigan, 2008).

In conclusion, the study showed that MM test with and without ball is a reliable and valid test for the assessment of dribbling skill and agility of young players. Dribbling skill and agility which consist specific abilities affecting performance of high intensity activities, may be trained with MM tests with or without ball. In addition, MM tests probably improve players' strength of lower limbs as it contains continuous accelerations, decelerations and direction changes which affect their muscular system (Lockie, Schultz, Callaghan, Jeffries, & Simon, 2013). The findings of the current study suggest that dribbling skill and agility training through MM test with and without ball could be part of training session for the multidimensional improvement of young players' performance in high intensity activities. Furthermore, when training staff use agility and dribbling skill assessment could design more effectively their training sessions. The researchers also suggest that MM test for different age ranges and playing positions merits consideration in future research.

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Conflict of Interest

The authors have not declared any conflicts of interest.

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