RedFame

Journal of Education and Training Studies
Vol. 5, No. 13; December 2017
ISSN 2324-805X E-ISSN 2324-8068
Published by Redfame Publishing
URL: http://jets.redfame.com

Perceptual and Motor Components at Young Football Players

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Received: November 21, 2017 Accepted: December 12, 2017 Online Published: December 31, 2017

doi:10.11114/jets.v5i13.2906 URL: https://doi.org/10.11114/jets.v5i13.2906

Abstract

The purpose of this study was to determine some perceptual and motor components level of young football players and to investigate the relationships between perceptual and motor components. Thirty-eight (38) selected football players from different division of Turkey whose mean age was 13.50±.42 years, height 150.00±5.60 cm and body weight 40.00±4.75 kg were tested as voluntarily in this study. This study was conducted in the Riva Orhan Saka Facility of the Turkish Football Federation. The findings indicated that statistically significant relations were observed between visual reaction time and anticipation time and also between sit-ups and sprint time, reaction time and agility times. On the other hands, there is no significant relation was found in other parameters.

These findings may be useful for trainer and physical education teachers in the selection process and talent identification and preparing sport education programs.

Keywords: football, anticipation time, reaction time, perceptual skills, talent identification, agility, speed, motor skills

1. Introduction

In sport performance requires not only physical and motor capabilities but also perceptual-cognitive skills (Williams & Ericson, 2005). All sports require high perceptual abilities to perform motor skills proficiently (Mori, Ohtani & Imanaka, 2002). Reaction time and anticipation time are critical aspects of perceptual abilities in sports (Meng et al., 2015).

Reaction time is the elapsed time between the presentation of a sensory stimulus and the subsequent behavioral response. It represents the level of neuromuscular coordination in which the body through different physical, chemical and mechanical processes decodes visual or auditory stimuli which travel via afferent pathways and reach the brain as sensory stimuli (Shelton & Kumar, 2010).

Anticipation timing is mainly defined as the ability to predict when an object/image would arrive at a designated target point in time and space. Anticipatory skill plays an important role in successful decision-making (Vaeyens, Lenoir, Williams, & Philippaerts, 2007). Anticipation timing has been used as a perceptual and motor test in assessing the improvements of athletes and also for talent identification (Ripoll & Latiri, 1997)

The motor skills are gained and developed, such as agility depending on the development of the nervous system (Gallahue, 1982). Soccer is a highly demanding game in which the players are subjected to numerous actions that require such as speed, muscular strength, agility. Speed is the ability to overcome a distance in the shortest time possible. It is affected by reaction time as well as movement time (Spodek & Saracho, 2006). Agility is a key requirement for optimal performance in many sports and young football player (Singh, Sathe & Sandhu 2017; Oliver, Lloyd, & Rumpf, 2013). In fact, it has been reported that speed, agility and dribbling a ball were the best predictors of talented players in soccer and need to be developed from a young age (Reilly, Williams, Nevill, & Franks, 2000).

As far as we know there are few study on relationship between anticipation time, reaction time an motor parameters at young football players. Therefore, the purpose of this study was to determine some perceptual and motor components level of young football players and to investigate the relationships between perceptual and motor components.

2. Method

Thirty-eight (38) selected football players from different division of Turkey whose mean age was 13.50±.42 years, height 150.00±5.60 cm and body weight 40.00±4.75 kg were tested as voluntarily in this study. This study was conducted in the Riva Orhan Saka Facility of the Turkish Football Federation. Before measurements, the information was given to players about measurement protocols.

2.1 Reaction Time Test

For the measurement of reaction time, choice reaction times were measured by using the instrument called Lafayette (model 54035A, In USA). The participants were asked to stop the time by pushing to the button with same colour as the visual stimulus when the light stimulus with red, green, white or blue color was applied. The test was repeated five times. Excluding the one fastest and the one slowest values, others' arithmetic reaction time average was calculated and recorded in miliseconds (msec.)

2.2 Anticipation Time Test

Each participant was familiarised with the Bassin Anticipation Timer *(model 35575, Lafayette, USA)* given 5 attempts at each of stimulus speeds used in the test (1, 5 and 10 mph). 15 attempts' arithmetic average was calculated and recorded in miliseconds *(msec.)*

None of the lights on the runway were blanked and the target light was light # 10 of apparatus' second block. The sequentially lighted LED lamps illuminate in a linear pattern with movement occuring from left to right. For each trial, the signal was initiated by the experimenter, with the participant being asked to press a trigger button, with their dominant hand, as close to the arrival time of the stimulus at the target location as possible (Rudisill, 1992; Bozkurt, 2004; Akpınar, Devrilmez & Kirazcı, 2012).

2.3 Sit-ups Test

For sit-ups measurements, the participants were asked to repeat as quick as possible at 30 seconds.

2.4 Sprint Test

Distance of 30-meter was selected to evaluate running performance. The participants performed two maximal sprint efforts over the distance of 30 m. on a grass tracks 3-minute interval between trials. Participants begun with their preferred foot placed forward on a line merked on the pitch. Sprint times recorded in miliseconds (msec.) accuracy by photoelectric cells. The best time was used statistical analysis.

2.5 Agility (with the Ball) Tests

Agility was defined as the ability to change direction rapidly without loss of speed (Brughelli, Cronin, Levin, Chaouachi, 2008). Start and finish lines were marked by two pairs of photocells 2 m. apart. The test consisted of a maximal slalom sprint of 30 m. (Açıkada, Hazır, Aşçı, Turnagöl & Özkara, 1998)

2.6 Statistical Analysis

Descriptive statistics are presented as arithmetic means, standart deviations, minimum and maximums. The relationships between the perceptual and motor components were tested for significance by using multiple correlations. The level of significance taken into account was ($p<0.05$).

3. Results

Table 1. Descriptive Statistics for Perceptural and Motor Components

Variable	N	Min.	Max.	Mean	St.Dev.
Age (years)	38	12.11	13.90	13.50	.42
Height (cm)	38	138.00	160.00	150.00	5.60
Body weight (kg)	38	32.00	50.00	40.00	4.75
Visual Choice Reaction (msec)	38	303.33	633.00	456.07	70.41
Anticipation (msec)	38	31.33	89.67	53.89	13.00
30 m.Sprint (sec)	38	4.07	5.55	4.96	.25
Agility (sec)	37	9.32	12.13	10.15	.60
Agility with the ball (sec)	37	11.86	16.63	13.64	1.12
Sit-ups (rep)	38	14	31	24.52	3.02

Descriptive statistics of the participants were presented in Table 1. Applied tests and mean value of results for the players were La Fayette Instrument Visual Choice Reaction Test 456.07±11,42 msec), 30 m. Sprint Test (4.96±0.04 msec), Bassin Anticipation Timer Test (53.89±2.10 msec), Agility Test (10.15±0.09 sec), Agility Test with the Ball (13.64±0.18 sec) and 30 sec. Sit-ups Test (24.52±0.49 rep.)

Table 2. Correlation test results between visual choice reaction time and anticipation time in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Visual Choice Reaction	38	456.07	70.41	0.350	0.031
Anticipation	38	53.89	13.00		p<0.05

Table 3. Correlation test results between visual choice reaction time and 30 m. sprint in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Visual Choice Reaction	38	456.07	70.41	0.130	0.438
30 m. Sprint	38	4.96	0.25		p>0.05

Table 4. Correlation test results between visual choice reaction time and agility in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Visual Choice Reaction	38	456.07	70.41	0.168	0.319
Agility	37	10.15	0.60		p>0.05

Table 5. Correlation test results between visual choice reaction time and agility with the ball in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Visual Choice Reaction	38	456.07	70.41	0.068	0.303
Agility with the ball	37	13.64	1.12		p>0.05

Table 6. Correlation test results between anticipation time and 30 m. sprint in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Anticipation	38	53.89	13.00	-0.025	0.883
30 m. Sprint	38	4.96	0.25		p>0.05

Table 7. Correlation test results between anticipation time and agility in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Anticipation	38	53.89	13.00	0.180	0.285
Agility	37	10.15	0.60		p>0.05

Table 8. Correlation test results between anticipation time and agility with the ball in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Anticipation	38	53.89	13.00	0.134	0.430
Agility with the ball	37	13.64	1.12		p>0.05

Table 9. Correlation test results between anticipation time and sit-ups in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Anticipation	38	53.89	13.00	-0.032	0.847
Sit - ups	38	24.52	3.02		p>0.05

Table 10. Correlation test results between agility with the ball and 30 m. sprint in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Agility with the ball	37	13.64	1.12	0.122	0.472
30 m. Sprint	38	4.96	0.25		p>0.05

Table 11. Correlation test results between agility with the ball and agility in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Agility with the ball	37	13.64	1.12	0.399	0.015
Agility	37	10.15	0.60		p<0.05

Table 12. Correlation test results between sit-ups and 30 m. Sprint in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Sit - ups	38	24.52	3.02	-0.484	0.002
30 m. Sprint	38	4.96	0.25		p<0.01

Table 13. Correlation test results between sit-ups and agility in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Sit - ups	38	24.52	3.02	-0.343	0.038
Agility	37	10.15	0.60		p<0.01

Table 14. Correlation test results between sit-ups and agility with the ball in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Sit - ups	38	24.52	3.02	-0.350	0.034
Agility with the ball	37	13.64	1.12		p<0.01

Table 15. Correlation test results between sit-ups and Visual Choice Reaction in the study group

Variable	N	Mean	Standart deviation	Correlation (r)	Significance Level (P)
Sit - ups	38	24.52	3.02	-0.366	0.024
Visual Choice Reaction	38	456.07	70.41		p<0.01

The correlations between the perceptual and motor components were shown in between Table 2. with Table 15. The was a significant correlation between anticipation time and visual choice reaction time scores (p= 0.031; r= -0.350) Sit-ups scores correlated with sprint scores (p= 0.002; r= -0.484), agility scores (p= 0.038; r= -0.343), agility with the ball scores (p= 0.034; r= -0.350), visual choice reaction time scores (p= 0.024; r= -0.366).The was a significant correlation between agility and agility with the ball time scores (p= 0.015; r= -0.399)

There were not statistically significant difference between other parameters (p>0.05).

4. Discussion

It is observed that while there are sports studies in which perceptual components and motor components such as speed, agility, strength are addressed in the literature, there are limited number of studies examining the relationship between perceptual componenets such as reaction and anticipation times and motor components.

In this study, in which we tried to o determine some perceptual and motor components level of young football players and to investigate the relationships between perceptual and motor components.

In our study, a significant relationship was found between anticipation time and visual reaction time (p<0.05). Bozkurt, Erkut & Akkoç (2017) found a significant relationship between anticipation time and reaction time in the study conducted with school students at the average age of 11.06 years (p<0.05). These perceptual motor skills affect each other as seen above. The result of this study is parallel with our study.

Strength, speed and agility are abilities that make an important contribution to efficient movement with and without the ball (Fortomme, Croisier, Ciccarone, Crielaard & Cloes, 2005). It is also possible to conclude that the core strength training may contribute to the speed performance. According to our results of statistically, significant relations were observed between sit-ups and sprint time, agility and agility with the ball, and reaction time, also between agility and agility with the ball (p<0.05).

We found that there was no significant relation between sprint time and agility in our study (p<0.05). In a study by Šimonek, Horička and Hianik (2017) although negative relationship was observed between speed and agility performances in football players Little and Williams (2005) study who found a weak correlation between speed and agility in male soccer players. This result is similar to our study.

On the other hands, there is no significant relation was found in other parameters.

These findings may be useful for trainer and physical education teachers in the selection process and talent identification and preparing sport education programs.

Acknowledgements

The author thanks Football Development Department of Turkish Football Federation and Nuri Topsakal for their assistance in this study.

Note: This study was presented as poster announcement at the 1st Scientific Conference on Motor Skill Acquisition. Kisakallio, Finland, on November 2015.

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