

Investigation of agility levels according to different sport branches

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Abstract

The aim of this study is to examine the agility levels according to sports branches. A total of 50 male athletes, consisting of 10 wrestlers, 10 volleyball players, 10 boxers, 10 basketball players and 10 football players, whose average ages were 20.94 ± 1.64 , participated in the study voluntarily. Illinois Agility Test has been applied on the athletes. The agility levels of the participating athletes have been recorded in seconds. The level of agility have been determined in the Football players as 14.72 sec, in Wrestlers as 14.82 sec, in Basketball players as 16.15 sec, in Boxers as 14.64 sec and in Volleyball players as 15.93 sec. As a result, the agility level of boxers has been determined higher than other branches and the lowest level of agility has been observed in basketball players. It is thought that the differences in agility values are related to the sports branches.

Keywords: Wrestling, football, volleyball, basketball, boxing, agility.

INTRODUCTION

Agility can be expressed as changing suddenly the direction of the body or to move the direction of movement to a different direction quickly without losing balance. Agility is an important feature related to visual reaction, fast force, speed that a successful footballer should have Özdemir (7). Agility is the ability to change the direction of the body from one point to another as quickly as possible, in a fluid, easy and controlled manner and it is related to the speed of changing the position. Agility develops rapidly until puberty, 3 years after this period the agility performance decreases. After a period of rapid development, agility increases once more until maturity. Before puberty, there is a slight difference between the agility performances of boys and girls, while boys' agility performances after puberty is better than girls'. Shortly, agility increases with age Yapıcı (10). Until now, there is no clear consensus on the definition of agility in the sports science community, but agility is simply considered as the ability of fast-changing the direction Young et al. (12).

Agility is also defined as the ability to change direction quickly and precisely Young et al. (12). The definitions of agility may vary from different disciplines of sports science influenced by agility to the persons: A bio mechanist looks at agility in terms of mechanical changes that occur in body position, the motor learning specialist will look at the information processing period which takes place in the visual process, the direction change response to a warning, and at the same time will look at learning about appropriate motor skills and its training Sheppard and Young (8). Agility is an important feature in team sports to avoid an opponent during an attack or to apply pressure to the opponent during defense. The acceleration and slowing down of a football player in a straight line to avoid their opponents is an open skill arranged according to the opponent's movements (stimulus) and is unpredictable, so it is described as agility Sheppard and Young (8). The definition of agile performance in simple, temporal, spatial and universal forms was first made in the literature in 1976 by Sheppard & Young (8) has summarized agility as simple, temporal (temporal uncertainty)

spatial (spatial uncertainty) or universal (temporal and spatial uncertainty).

Athletes with good agility will often have other qualities such as dynamic balance, spatial awareness and ritual as well as visual processing (4). So, although agility can be described as fast stop and ability to resume motion, there is a high degree of complexity in this motor skill. Young et al. (12) have determined that agility is composed of two subcomponents such as "speed of change" and "cognitive factors". According to this definition, agility performance is influenced by features such as flat sprint speed, running technique, anthropometric features and leg muscle features. It has also begun to be noted recently that changes in direction and speed have generally occurred according to the movements of the opponent, so that the change in direction is related to drift, perceptual and decision-making components. Direction change speed is affected by factors which determine the quality of sub extremity of muscles, such as flat sprint, running technique and reactive (elastic) force, concentric muscle strength, and left-right leg force imbalances (11). However, in studies in the literature, the relationship between any of these components and agility performance has been examined and studies have been carried out on the understanding of training programs to develop agility (11). Within the scope of the study made in line with the information obtained from the literature, the examination of the agility levels according to sports branches has been aimed.

MATERIAL & METHOD

Subjects

The sample group of the study consisted of 50 healthy male athletes with age range of 18-25. The universe of the study is made up of the students who play sports in Kyrgyzstan - Turkey Manas University, football, volleyball, and basketball, wrestling and boxing branches school team. The study has been conducted between 25th November - 25th February 2015-2016 in the Sports Hall and Sports Field on the campus of Kyrgyzstan - Turkey Manas University. All the sportsmen participated in the study have been informed about the measurements and methods will be applied in the study and they voluntarily participated in the study.

Measures

The test track consists of three test lines arranged on a straight line with a width of 5 m, a length of 10 m and a width of 3.3 m in the middle section, has been established in a closed athletic hall with a synthetic floor. The test consists of a slalom run as 40 m straight, 20 m with cone such that 180° turns in every 10 m. After the test track was prepared, a two-port photocell electronic timekeeping system (Tümer Elektronik Ltd., Turkey) which measures the start and end with a precision of 0.01s was installed. Before starting the test, the athletes have been allowed to run 3-4 trials on the low temp after the introduction of the course and necessary explanations. After that, the athletes set 5-6 min warm up and stretching exercises in their own specified low tempo. The athletes started to run from the starting line of the test track, while the face was in the lying position and the hands were in contact with the ground at shoulder level. The track closing time is recorded in seconds. The test was done twice.

Analysis of Data

The measurements were analyzed by statistical package program (SPSS 15) and the results were interpreted. Then descriptive statistics including standard deviation, arithmetic mean, frequency and percent distributions have been made.

RESULTS

The demographic characteristics of the athletes participating in the study and the comparison of Illinois agility levels according to the branches are given in the following tables.

According to the data of Table 1, it was found that the average level of agility of boxing branch athletes was significantly lower than volleyball and basketball players ($p<0.05$), while they were statistically similar to football players and wrestlers.

As shown in Table 2, the agility average of the volleyball players was significantly higher than football, wrestling and boxing athletes ($p < 0.05$) and was at similar level in comparison with basketball athletes.

Table 3 shows the agility levels of football branch athletes significantly lower than basketball and volleyball athletes ($p < 0.05$). No statistically significant difference was found in comparison of wrestling and basketball athlete averages.

According to the results of Table 4 the agility averages obtained from basketball players were significantly higher than wrestling, boxing and

football players ($p < 0.05$) and were statistically similar to volleyball players.

Table 2. Demographic characteristics of the study group by branches.

Branch	Demographic Features	N	Min	Max	Mean	SD
Boxing	Age		19	24	21.20	1.476
	Height	10	1.68	1.82	1.74	0.05
	Body Weight		49	90	65.30	10.96
Volleyball	Age		19	24	20.50	1.90
	Height	10	1.68	1.88	1.80	0.07
	Body Weight		60	80	71.00	6.96
Football	Age		18	23	20.30	1.42
	Height	10	1.67	1.85	1.77	0.06
	Body Weight		57	75	63.80	5.03
Basketball	Age		21	25	22.10	1.20
	Height	10	1.76	1.92	1.85	0.05
	Body Weight		69	120	85.60	14.44
Wrestling	Age		19	25	20.60	1.78
	Height	10	1.67	1.86	1.74	0.06
	Body Weight		65	90	72.30	7.95

Table 1. Comparison of agility values by boxers and other branches.

Group	Mean \pm SD	Group	Mean \pm SD	Z	p
Boxing (n=10)	14.64 \pm .734	Volleyball	15.93 \pm .573	-3.175	0.00*
		Football	14.72 \pm .560	-.189	0.85
		Basketball	16.15 \pm 1.260	-2.306	0.01*
		Wrestling	14.82 \pm .543	-.756	0.48

* $p < 0.05$

Table 2. Comparison of agility values by volleyball players and other branches.

Group	Mean \pm SD	Group	n	Mean \pm SD	Z	p
Volleyball	15.93 \pm .573	Football	10	14.72 \pm 0.56	-3.326	0.00*
		Basketball	10	16.15 \pm 1.26	-.567	0.57
		Wrestling	10	14.82 \pm 0.54	-3.402	0.00*
		Boxing	10	14.64 \pm 0.73	-3.175	0.00*

* $p < 0.05$

Table 3. Comparison of agility values by footballers and other branches.

Group	Mean \pm SD	Group	Mean \pm SD	Z	p
Football	14.72 \pm .560	Basketball	16.15 \pm 1.26	-2.495	0.01*
		Wrestling	14.82 \pm 0.54	-.681	0.52
		Boxing	14.64 \pm 0.73	-.189	0.85
		Volleyball	15.93 \pm 0.57	-3.326	0.00*

* $p < 0.05$

Table 4. Comparison of agility values by basketball players and other branches.

Group	Mean \pm SD	Group	Mean \pm SD	Z	p
Basketball	16.15 \pm 1.260	Wrestling	14.82 \pm 0.54	-1.965	0.05*
		Boxing	14.64 \pm 0.73	-2.306	0.01*
		Volleyball	15.93 \pm 0.57	-.567	0.57
		Football	14.72 \pm 0.56	-2.495	0.00*

* $p < 0.05$

Table 5. Comparison of agility values by wrestlers and other branches.

Group	Mean \pm SD	Group	Mean \pm SD	Z	p
Wrestling	14.82 \pm .543	Boxing	14.64 \pm .734	-.756	0.48
		Volleyball	15.93 \pm .573	-3.402	0.00*
		Football	14.72 \pm .560	-.681	0.52
		Basketball	16.15 \pm 1.26	-1.965	0.05*

* p<0.05

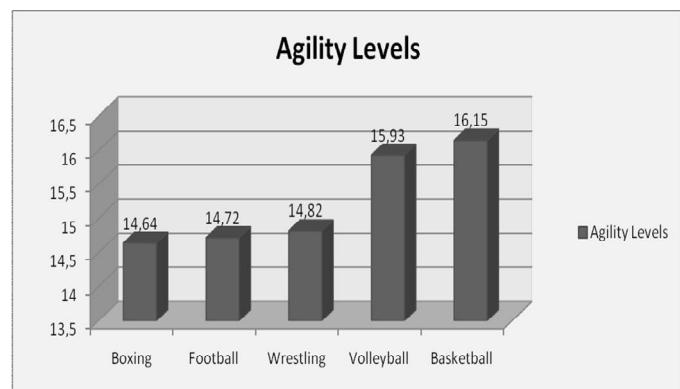


Figure 1. Agility level of branches.

It was found that the agility levels of wrestlers were significantly lower than volleyball and basketball players ($p <0.05$) and were statistically similar to boxing and football averages.

DISCUSSION

Agility can be defined as changing suddenly the direction of the body or to move the direction of movement to a different direction quickly without losing equilibrium. Agility is an important feature related to visual reaction, fast force, speed that a successful footballer should have (7). Agility is the ability to change the direction of the body from one point to another as quickly as possible, in a fluid, easy and controlled manner and it is related to the speed of changing the position. Agility develops rapidly until puberty, 3 years after this period the agility performance decreases. After a period of rapid development, agility increases once more until maturity. Before puberty, there is a slight difference between the agility performances of boys and girls, while boys' agility performances after puberty is better than girls'. Shortly, agility increases with age (10). Until now, there is no clear consensus on the definition of agility in the sports science community, but agility is simply considered as the ability of fast-changing the direction (12).

The features of the athletes who participated in the study have been determined as mean age 20.94 ± 1.64 years, mean height of 177.98 ± 0.69 cm and mean body weight 71.60 ± 12.09 kg. This group

consists of athletes from football, volleyball, basketball, wrestling and boxing branches. The data have been examined; the agility scores (15.93s) detected in the volleyball players were significantly higher than the averages in the football (14.72s), wrestling (14.82s) and boxing (14.64s) branches ($p <0.05$) while statistically similar averages ($p > 0.05$) has been recorded in basketball athletes (16.15 sec). (Table 5, figure) The agility data of the football branch athletes obtained in the study as (14.72sn) has been found significantly lower than the basketball (16.15s) and volleyball (15.93sn) athletes ($p <0.05$). No statistically significant difference was found between the agility averages of the footballers and averages of wrestling (14.82s) and basketball (16.15s) athletes ($p >0.05$) (table 3). According to our study findings, the average agility levels obtained from basketball branch athletes as (16.15s) was significantly higher than wrestling (14.82s), boxing (14.64s) and footballers (14.72sn) scores ($p <0.05$), while the results of volleyball players (15.93 sec) were statistically similar ($p > 0.05$) (Table 4). The agility averages obtained from the wrestling athletes who were examined in our study as (14.82s) have been found significantly lower than volleyball (15.93s) and basketball players (16.15s) ($p <0.05$) while the agility averages of footballers as (14.72 s) have been found statistically similar ($p > 0.05$; table 5, figure 1).

In a study conducted by Atacan (1), on 14-15 age group tennis players, Illinois agility values of

experiment group have been determined as pretest; 17.13 ± 0.48 sec and final test; 15.95 ± 0.50 sec and the results of control group have been determined as pretest; 17.43 ± 0.50 sec and final test; 17.08 ± 0.47 sec. Besler et al. (3) have carried out a study in which they have compared some physical and motoric features of football players whose team could come out in Professional and Amateur Leagues and have determined the average agility measurement values of Tavsanlı Linyit Spor's footballers as 14.63 ± 0.22 sec, and the agility measurement values of Dumlupınar University Sport's footballers as 14.93 ± 0.45 sec ($p < 0.05$). In a study examining the effects of different strength training on the basketball player's ability such as jump and quickness, two groups of athletes have been examined as with and without ball and Illinois agility test has been applied on the group without ball and the results have been specified as pre-test average 17.97 ± 1.01 sec and final test average 17.95 ± 0.92 sec (5).

As a result of the study has been carried out by Suna et al. (9), The athletes' pre-training agility values have been found as 19.62 ± 1.01 sec and their agility values after training have been found as 19.53 ± 0.98 sec. There was a significant difference between the averages of agility values before and after training ($p < 0.01$).

Ölçücü et al. (6) have assessed the factors affecting the development of tennis ability and have specified the values of agility measurement test as 1. group were 17.90 ± 0.74 sec at the beginning, 13.54 ± 0.68 sec after 3 weeks, 14.51 ± 0.45 after 6 weeks and 2. group at the beginning were 15.31 ± 0.82 sec, 14.66 ± 0.85 sec after 3 weeks, 14.46 ± 0.45 sec after 6 weeks. A significant difference was found in favor of 1. Group agility parameter between the first and second groups in the second measure ($p < 0.01$). Akdeniz et al. (2), have carried out a study in which they have examined the effects of muscle damage related to exercise and have found the measurement values of pre and postiliions is agility test as baseline 16.78 ± 1.56 sec, after 1 hour 18.50 ± 1.83 sec, 19.68 ± 1.63 sec after 24 hours, 19.13 ± 1.18 sec after 48 hours, 17.74 ± 1.42 after 72 hours and 17.34 ± 1.70 after 96 hours. They have found significant difference between pre- and post-test measurement values ($p < 0.05$).

In the light of information obtained from the literature, it can be said that the Illinois test values we have are similar to the values in other studies.

We think that this data is important for supporting our findings.

As a result, when the study has been evaluated in general, it has been found that boxers have the best value of agility level, while the lowest values were related to basketball players. Agility, which is a necessary feature for successful athletes and a great majority of sports branches, has been found as a feature which has different values in different sports branches depending on the characteristics required by the branch.

- Athletes should have quickness and agility training in every branches.
- The agility values of the athletes should be tested frequently and the situation should be analyzed.
- Athletes should be trained for agility and quickness from the background and substructure.

Preparing training programs for basketball players whose agility level was low and arranging agility exercises and activities in order to eliminate these deficiencies have been aimed.

REFERENCES

1. Atacan B. Özel Düzenlenmiş 8 Haftalık Pliometrik Antrenmanın Genç Erkek Futbolcularda Güce ve Çevikliğine Etkisi. Yüksek Lisans Tezi, Kırıkkale Üniversitesi Sağlık Bilimleri Enstitüsü. 2010.
2. Akdeniz Ş, Karlı Ü, Daşdemir T, Yarar H, Yılmaz B. Egzersize bağlı kas hasarının sürat ve çeviklik performansına etkisi, Niğde Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 2012; 2(6): 152-160.
3. Besler, M., Acet M., Koç H., Akköyunlu, Y. Profesyonel ve Amatör Liglerde Dereceye Giren Takımlardaki Futbolcuların Bazi Fiziksel ve Motorik Özelliklerinin Karşılaştırılması. Selçuk Üniversitesi Beden Eğitimi ve Spor Bilim Dergisi, 2010; 12(2): 150-156.
4. Ellis L, Gastin S, Lawrence B, Savage A, Buckeridge A, Stoff D, Tumilty A, Quinn S, Young W. Protocols for the physiological assessment of team sports players. In physiological tests for elite athletes. CJ Gore ed. Champaign. Human Kinetics, 2000; 128-144.
5. Kızılet A, Atılan O, Erdemir İ. 12-14 yaş grubu basketbol oyuncularının çabukluk ve sıçrama yetilerine farklı kuvvet antrenmanlarının etkisi. ATABESBD, 2010; 12(2): 44-57.
6. Ölçücü B, Canıklı A, Ağaoğlu YS, Erzurumluoğlu A. 10-14 yaş çocuklarda tenis becerisinin gelişimine etki eden faktörlerin değerlendirilmesi. 4. Raket Sporları Sempozyumu, Kocaeli, 2009.
7. Özdemir S. 14-16 Yaş grubu erkek futbolcularda kompleks antrenman programının patlayıcı güç, kuvvet, sürat ve çeviklik gelişimine etkisi. Marmara Üniversitesi Sağlık Bilimleri Enstitüsü, Yüksek Lisans Tezi, 2009.

8. Sheppard JM, Young WB. Agility literature review: Classifications, training and testing. *Journal of Sports Sciences*, 2006; 24(9): 919-932.
9. Suna G, Beyleroğlu M, Alp M, Yalçın S. Investigating the effects of coordination trainings on velocity, balance and agility features of tennis kids. *International Refereed Academic Journal of Sports, Health and Medical Sciences*, 2016; 20: 13-23.
10. Yaprıcı H. Profesyonel ve amatör futbolcularınan aerobic güç, çeviklik ve vücut kompozisyonu parametrelerinin karşılaştırılması, Kırıkkale Üniversitesi, Sağlık Bilimleri Enstitüsü, Yüksek LisansTezi, 2009.
11. Young W, Farrow DA. Review of agility: practical applications for strength and conditioning. *Strength and conditioning journal*, 2006; 28(5): 24-29.
12. Young WB, James R, Montgomery I. Is muscle power related to running speed with changes of directions? *Journal of Sports Medicine and Physical Fitness*, 2002; 42(3): 282-288.