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DIFFERENCES IN AGILITY PERFORMANCE BETWEEN FUTSAL AND SOCCER PLAYERS

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Abstract
The purpose of this study was to determine differences in agility performance between futsal and soccer players. The research was conducted on a sample of 82 subjects divided in two groups: 40 futsal players (body mass 70.39 ± 5.33 kg; body height 176.26 ± 6.85 cm) and 42 soccer players (body mass 70.86 ± 5.65 kg; body height 175.42 ± 5.95 cm). The subjects were tested in the following variables: Slalom test (SL); Slalom test with ball (SLB); Sprint with 90° turns (S90°); Sprint with 90° turns with ball (SB90°); Sprint 9-3-6-3-9 m with 180° turns (S180°); Sprint 9-3-6-3-9 m with backward and forward running (SBF). The values for the Slalom test with and without the ball are very similar for soccer and futsal players and without statistically significant difference (slalom test p = 0674; slalom test with ball p = 0830). The same results are in the sprint test 9-3-6-3-9 whether it was done by turning for 180° or with running back and forth. For the agility performance of players, in the tests SL and SLB there was no statistically significant difference between futsal and soccer players. The futsal and soccer players differ in the intensity exertion during the game, but not in the motor activities such as agility. Agility is a very important component of both, futsal and soccer and it represents a common characteristic. Based on that fact we can conclude that the players in these two sports are very similar in agility performance.

Key words: *field test, futsal, comparison, team sport*

Introduction

Despite the fact that soccer is one of the most popular sports today, interest in futsal slowly starts to grow (Roxburg, 2008) and therefore its popularity too. Compared to soccer, futsal has very similar game structure. Nevertheless, it has been much less the object of scientific research. Up to date, much more researches have been conducted in soccer than in futsal. It is particularly interesting that only a few studies exist which deals with the comparison of players in soccer and futsal, despite the fact that they are very related.

What the soccer and futsal have in common is that they represent an intermittent high-intensity activity which is based not only of aerobic but also of anaerobic capacity of players (Barbero-Alvarez et al., 2008; Bangsbo et al., 1991; Ben Abdelkrim et al., 2007). However, the intensity during the futsal match was almost 90% of the maximum Heart rate (Barbaro-Alvarez et al., 2008) compared to match intensity in soccer that was lower and ranged from 80 to 90% of maximum Heart rate (Reilly, 1994). In futsal the total distance covered during the match consists of 13.7% high intensity running and 8.9% sprinting (Barbaro-Alvarez et al., 2008). In soccer, those high intensity activities account about 11% (Baron et al., 2007, Reilly et al., 2000). In addition, Dragomaci & Watsford (2006) has pointed out that futsal players spend 26% of time during the match in high intensity level, which is direct consequence of futsal rules that allow players more frequent changes than in soccer.

The technical proficiency of futsal players is influenced by the smaller ball, which forces the players to technically more quickly and accurately respond in control and keeping the ball (Burns, 2003; Goncalves, 1998). Besides this, the reduced size of the field will cause a constant pressure from the opposite players, so the futsal players are found under constant markings and in situations 1vs1 (Vaeyens et al., 2007). Such reduced pitch dimensions and the frequent turnovers during futsal match requires from players fast decision-making and high sprint capabilities under pressure during attacking and defending phases of the game (Vaeyens et al., 2007). The question is whether they need better agility performance in order to help them to come to a better position to receive the ball and threaten the opponent's goal.

The ability of athletes to make a quick movement of the entire body with a change of direction and speed of movement, known as agility (Sheppard and Young, 2006) may represent a basic component in team sports such as futsal and football. During a soccer match and the player frequently performs activities that require rapid development of force, such as sprinting or changing direction quickly (Bangsbo, 1996). High-speed actions in soccer and futsal can be categorized into actions requiring acceleration, maximal speed, or agility (Gambetta, 1996). Concerning that fact, SAQ (speed, agility and quickness) method has become dominant in training (Pearson, 2001).

Based on the determination model of agility, Young & Farrow (2006) emphasize the ability of perception and decision-making as a key skill of agility athletes in team sports, to which futsal and soccer belong too. As it is already mentioned above, there are few studies related to futsal with the objectives mostly based on physiological response of players (Castagna et al., 2007; Barbero-Alvarez et al., 2008) or aerobic fitness (Barbero-Alvarez et al., 2009). Also, to our knowledge, there are no studies that compare men's futsal and soccer players in agility performance. Although agility is one of the motor skills that are still unexplored in Futsal, still it represents a very important component regard to the amount of high intensity movements during the match. Knowing all that, the purpose of this study was to determine the differences in agility performance between futsal and soccer players.

Methods

Subjects

The research was conducted on a sample of 82 subjects divided in two groups: 40 futsal players (body mass = 70.39 ± 5.33 kg; body height = 176.26 ± 6.85 cm) and 42 soccer players (body mass = 70.86 ± 5.65 kg; body height = 175.42 ± 5.95 cm). Soccer and futsal players in this research were taken from the first Croatian football and futsal league. All players were fully informed and they signed a consent form. The study protocol was held for every subject. Beside the results, the basic anthropometric parameters (body height and body weight) were registered in the study protocol. The tests were performed on the same day in the morning for all the subjects. The study was approved by the Ethics Committee of the Faculty of Kinesiology, University of Zagreb. Subjects were admitted in the study if they had a minimum training age of 3yr, engaged in strenuous training at least 10 h per week and were currently active in competition. The characteristics of the sample are presented in Table 1.

Table 1. Descriptive statistics parameters

	Futsal	Soccer
	N=40 (Mean±SD)	N=42 (Mean±SD)
Body height (cm)	176.26±6.85	175.42±5.95
Body mass (kg)	70.39±5.33	70.86±5.65
S180° (s)	7.49±0.45	7.48±0.37
SBF (s)	7.93±0.45	7.73±0.44
SL (s)	3.66±0.81	3.74±0.73
SLB (s)	7.96±0.94	7.91±1.12
SB90° (s)	9.91±0.63	9.71±0.67
S90° (s)	7.75±0.61	7.45±0.69

SL-Slalom Test; SLB-Slalom Test with ball; S90°-Sprint With 90° Turns; SB90°-Sprint With 90° Turns with ball; S180°-Sprint 9-3-6-3-9 m with 180° Turns; SBF-Sprint 9-3-6-3-9 m with Backward and Forward Running.

Procedure

Body height and body weight were measured according to the instructions of the International Biological Program–IBP (Weiner & Lourie, 1969). The body height was measured with a GPM anthropometer (Siber & Hegner, Zurich, Switzerland) to the nearest 0.1 cm. Body weight was obtained by Tanita BC 540 (Tanita Corp., Arlington Heights, IL) to the nearest 0.1 kg. Tests: 1) *Slalom Test (SL):* They all started with both feet behind starting point. Six cones were set up 2 m apart, the first cone 1 m away from the starting line. Every player stood still facing the starting line, with his feet apart and the cone between his legs. He started after the signal and ran from point to point. The player at second point had to be passed on his right-hand side. The player continued to run as fast as possible constantly changing the direction from right to left, until he reached the player standing at last point. After last point, the player made an 180° turn and went on running the slalom to the starting line. 2) *Slalom Test with ball (SLB):* The test is by the structure the same to the SL test, but it differs only in that sense that it was performed with the ball. 3) *Sprint With 90° Turns (S90°):* The players began with both of their feet behind starting point. They started from first point after the signal, ran as fast as possible to second point, and made a 90° turn to the right. After reaching second point, they continued to run to third point where they made a 90° turn to the left. At fourth point, they made another 90° turn to the left and ran on to point five, where they made a 90° to the right. Point six had the same direction and turning angle (90° turn to the right). At point seven, they made a turn to the left and ran on to the finish line-point. The track was 15 m long, the distance between the start line and the first flag was 3 m, the second and the third 2 m, the third and the fourth 2 m, the fourth and the fifth 5 m, the fifth and the sixth 3 m, the sixth and the seventh 3 m, the seventh and the eight 2 m, and nine 2 m. 4) *Sprint With 90° Turns with ball (SB90°):* The test is by the structure the same to the S90° test, but it differs only in that sense that it was performed with the ball. 5) *Sprint 9-3-6-3-9 m with 180° Turns (S180°):* The players started after the signal and ran 9 m from starting line A to line B (the lines were white, 3 m long and 5 cm wide). Having touched line B with one foot, they made either a 180° left or right turn. All the following turns had to be made in the same direction. The players then ran 3 m to line C, made another 180° turn, and ran 6 m forward. Then, they made another 180° turn (line D) and ran another 3 m forward (line E), before making the final turn and running the final 9 m to the finish line (line F). 6) *Sprint 9-3-6-3-9 m with Backward and Forward Running (SBF):* The distance that the players had to cover was the same as in the previous test (S180°). The only difference was that instead of making a turn, the players shifted from forward to backward running. After the starting signal, they ran 9 m from starting line A to line B (the lines were white, 3 m long and 5 cm wide).

Having touched line B with one foot, the players shifted from running forward to running backward. Then, they ran 3 m to line C and changed from backward running to forward running. After 6 m, the players made another change (line D) and ran another 3 m backward (line E) and then made the final change and ran the final 9 m forward to the finish line (line F). All tests used in this study were reliable and had good metric characteristics (Sporis et al., 2010). The tests were performed from a standing start and measured by means of infrared photocells (RS Sport, Zagreb, Croatia).

Data analysis

The statistical Package for Social Sciences SPSS (v18.0, SPSS Inc., Chicago, IL) was used for the statistical analysis. Descriptive statistics were calculated for all experimental data. Kolmogorov-Smirnov test was used to test if data were normally distributed. Statistical power was calculated using G-power software. The significance of differences between soccer and futsal players was determined by the Independent-Samples T test. We used the Bonferrony correction for the level of significance, so the level was $p < 0.0083$.

Results

The Kolmogorov-Smirnov test showed that data was normally distributed. Statistical power was 0.95 and effect size was from r = 0.024 to r = 0.45. The greatest effect size was found in the tests $S90^0$ (r = 0.46) and SBF (r = 0.45) and the lowest for the test $S180^0$ r = 0.02. Basic statistical parameters has shown that players have similar values of body height and body mass (Table 1). The average body height of soccer players was 175.42 ± 5.95 cm and of futsal players 176.26 ± 6.85 cm. The average body mass among soccer players was 70.86 ± 5.65 kg, while among futsal players 70.39 ± 5.33 kg. Other descriptive parameters have shown that the soccer players achieved better results in all tested variables for agility except for the slalom test, where the average values for futsal player was 3.66 ± 0.81 seconds and for soccer players 3.74 ± 0.73 sec.

Table 2. Differences - futsal and soccer players

	t	df	Sig. (2-tailed)
S180°	0.12	80	.903
SBF	1.99	80	.051
SL	-0.42	80	.674
SLB	0.22	80	.830
SB90°	1.34	80	.183
S90°	2.06	80	.043

SL-Slalom Test; SLB-Slalom Test with ball; S90°-Sprint With 90° Turns; SB90°-Sprint With 90° Turns with ball; S180°-Sprint 9-3-6-3-9 m with 180° Turns; SBF-Sprint 9-3-6-3-9 m with Backward and Forward Running.

The values for the Slalom test with and without the ball are very similar for soccer and futsal players and without statistically significant difference (slalom test p = 0674; slalom test with ball p = 0830).

Thus, the same results are in sprint test 9-3-6-3-9 whether it was done by turning for 180 ° or with running back and forth. For the agility performance of players, in the test change of direction for 90 ° there was no statistically significant difference between futsal and soccer players (p = 0.043). In addition, no statistically significant difference has been found to the one (SB90°) done with the ball (p = 0,183).

Discussion

Average values of players' body height and body mass are similar or slightly higher than the values of the national team players' of Singapore and the first League players' of Iceland and Hong Kong (Arnason et al., 2004; Aziz & Chin, 2000; Chin et al., 1994). Body height of futsal players is similar to the one found in the study conducted among Spanish professional futsal players. The study has also shown that Spanish players were slightly heavier (76.9 kg) (Esteban et al., 2009). It is interesting that specific agility tests have shown no significant difference between futsal and soccer players, despite the fact that the size of the ball used in futsal significantly differs to one used in soccer (Burns, 2003; Goncalves, 1998). This leads us to the conclusion that in both, the elite soccer and futsal, it is necessary to have very skilful players. That was indicated by STB test of dribbling the ball with the inside of the foot as well as by SB90° test in which all the leading skills of controlling the ball have been examined (dribbling the ball with inner and outer side of the foot and etc.).

There was no statistically significant difference in the test $S90^0$ in which the change of direction for the 90° dominated. The soccer players have shown better results than the futsal players in that test, but it was not statistically significant. The explanation could be found in the fact that this type of turn (0-90°) during the match is the most common structure which makes 85% of all the turns during the match (Bloomfield et al., 2007). Bloomfield et al. (2007) stated that during the soccer match each player performs approximately 305 turns of 0-90° to the right side and 303 turns of 0-90° to the left side. Since the test S90° includes change of direction at angle greater than 90° in practical terms, there was no difference between futsal and soccer players. On the other hand, the difference is obvious because during the soccer match there are 45 turns on the right and 49 turns on the left side when the angle for the change of direction is 0-180°, which represents about 10% of all turns. The research results demonstrate that both futsal and soccer players have quite a similar motor characteristics of agility type. The results obtained by this research could be explained by the fact that in Croatia does not exist a school of futsal that would start from the beginning with the futsal practice. The majority of futsal players at first goes through the soccer schools and after that they are exposed to the to the futsal training.

The second explanation could be found in the fact that in the modern soccer practice the small-sided games, which represent one sort of futsal, are often used. Such activities are all performed on the shortened space where the ratio of players is 4 vs 4, 5 vs 5, 5 vs 4, which insist on the strict surrounding of players. With this type of training soccer and futsal players are approaching the movement structure, so that the results obtained in this study could substantiate that fact. On the other side SAQ method (Pearson, 2001) become very familiar for both, futsal and soccer players, and more often represented in training methodology. The players have become familiar with the movement in which is present not only the acceleration but also the deceleration in combination with the quick change of direction and body control (Pearson, 2001). The statement is enclosed by the research which implies that better athletes have quicker and more precise reactions due to their ability to choose anticipated information (Abernethy, Wann & Parks, 1998) which extremely important in the course of the agility test performance. The possession of good agility performance reduces the injury risk, enhance sports performance and neutralizes the opponent or avoids the opponent by using the body feints (Foran, 2001), that are very frequent in futsal and soccer. Specifically, it plays an important role in dribbling in a position where players are in a situation 1vs1. Agility also contributes to the ability of successful manipulation of the external object such as the ball (Foran, 2001).

Conclusion

Based on our results, we can conclude that the futsal and soccer players differ in the intensity exertion during the game, but not in motor activities such as agility. Agility is a very important component of futsal and soccer and it represents a common characteristic. Based on that fact it can be said that the players in this two sports are very similar in agility performance.

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RAZLIKE U IZVEDBI AGILNOSTI IZMEĐU IGRAČA FUTSALA I NOGOMETAŠA

Sažetak

Svrha ovog istraživanja bila je utvrđivanje razlika u sposobnosti agilnosti između igrača futsala i nogometa. Istraživanje je provedeno na uzorku od 82 ispitanika podijeljenih u dvije grupe: 40 futsal igrača (tjelesne mase 70.39 ± 5.33 kg; visine 176.26 ± 6.85 cm) i 42 nogometaša (tjelesne mase 70.86 ± 5.65 kg; visine 175.42 ± 5.95 cm). Ispitanici su mjereni u slijedećim varijablama: Slalom test (SL), slalom test s loptom (SLB), Sprint sa 90° promjene pravca (S90°), Sprint sa 90° promjene pravca s loptom (SB90°); Sprint 9-3-6-3-9 m sa 180° promjene pravca (S180°), Sprint 9-3-6-3-9 m s trčanjem naprijed i natrag (SBF). Vrijednosti SL i SLB bile su jako slične kod oba uzorka i bez statistički značajne razlike (p > 0.05). Isti rezultati su bili i u testovima SBF. Za iskazivanje agilnosti također nije bilo razlika. Igrači futsala i nogometa razlikuju se u intenzitetu opterećenja za vrijeme utakmice, ali ne i u motoričkoj aktivnosti kao što je agilnost. Agilnost je jako važna za obje vrste sporta i predstavlja zajedničko svojstvo. Temeljeno na toj činjenici može se zaključiti kako su igrači ovih dvaju sportova vrlo slični u iskazivanju agilnosti.

Ključne riječi: *terenski test, futsal, usporedba, momčadski sport*

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