

Investigation of Some Biomotoric Characteristics of Young German and Turkish Football Players

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Abstract

This research aimed to examine the biomotoric characteristics of Turkish and German young football players living in Germany. 32 football players participated in the research. Repetitive sprint test, agility test, vertical jump test and Standing long jump test were applied to the football players. The physical and performance characteristics of the research group were analyzed using descriptive statistics and Mann Whitney U test. The results showed that there was a significant difference between the total times of the repeated sprint test and the total times of the repeated sprint test. There was no significant difference between the biomotoric characteristics between the groups, except for repeated 3-4-5 sprints and total times. Turkish football players completed the repetitive sprint test in a shorter time than German football players, but there was no difference in their fatigue index. This result seems meaningful considering that Turkish football players live in Germany, grow up in Germany, have similar environmental conditions, train similarly and play in the same league.

Keywords: Football, Sprint, Vertical Jump, Agility

INTRODUCTION

Football is one of the most popular sports in the world. Football is an aerobic-based anaerobic sport where physical parameters directly affect performance, short and long-distance running at variable intensities, sudden direction changes and interventions occur (Uslu et al., 2022; Dolci et al. 2018; Sariakçali et al., 2020; Sariakçali et al., 2022). These physical and mental needs emerge as a product of the increase in exercise intensity and intensity, as well as the increase in total distances reached (Reilly et al., 2000; Uzun et al., 2021). Many factors affect the success and performance of football players, and a professional football player must be able to maintain a high level of exercise frequency in normal situations, at the time of the match (Hoff et al., 2002). While football requires movement dynamics, it is carried out in a dissimilar order and at irregular intervals, affecting the athletes' psychomotor properties as well as characteristics such as aerobic and anaerobic power. Therefore, along with technical and tactical training, capacities such as aerobic and anaerobic power, conditioning, endurance, speed, anthropometric characteristics, flexibility and cognitive skills can be considered features that affect the productivity levels of football players. These capacities will also be much more effective if they are trained considering competition needs (Hoff et al., 2002; Günay, 1998).

In a football game with a large number of participants and spectators; It seems that talent and skill are also very important in addition to psychomotor abilities and physical fitness. Anthropometric features are important in increasing the performance and skill capacities of athletes and in analyzing suitable and unsuitable athletes. Football is a sports branch where aerobic movements occur simultaneously and consequentially, where factors such as flexibility, coordination, strength, endurance, quickness, speed and balance are intertwined, and where tactical and technical integrity emerges (Günay, 1998).

Many of the movements made in football are violent and explosive (e.g. kicks, jumps and spins). The power efficiency during the performance of these movements is related to muscular strength, and it would be beneficial for players to have high muscle strength to minimize the risk of injury. Muscular strength; It is defined as the amount of tension or force produced by a muscle or muscle group against a certain intensity of resistance during a maximal voluntary contraction. Hip and leg muscles are needed to make a powerful shot, body and

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neck muscles are needed to head the ball, arm and shoulder muscles are needed for throw-ins, and body, hip and leg muscles are needed to fight to possess or win the ball. (Reilly et al., 2000).

Anthropometric and motoric characteristics are very important factors for optimal performance in football (Clark et al., 2008). Each athlete can show a different development process through training. This difference is caused by genes inherited from the family, muscle structure, training level, age, gender, training age, etc. may be related to. This study is important because it determines the differences between Turkish and German football players and there is no study in this field. This study aims to examine some biomotoric characteristics of young German and Turkish football players living in Germany.

METHOD

This study included 16 Turkish football players living in Germany (age: 16.31 ± 0.47 years; height: 177 ± 0.06 cm, weight: 68.8 ± 10.3 kg) and 16 German football players who compete in the German 1st Amateur Division. 32 football players (age: 16.25 ± 0.44 years; height: 173 ± 0.07 cm; weight: 61.8 ± 12.9 kg) participated voluntarily.

Height And Weight Measurements

Height and body weight measurements of athletes, 0.1 cm for height; Seca 769 brand electronic measuring device (Seca Joint Stock Company, Hamburg, Germany) with an accuracy of 0.01 kg was used for body weight. The body weights of the athletes were measured in kilograms (kg) without shoes and wearing only shorts and a t-shirt. Height was recorded in centimetres (cm) without shoes, with body weight evenly distributed on both feet.

Repetitive Sprint Test

A Newtest Powertimer brand portable electronic photocell (Model 300s, Oy, Finland) was used to measure the athletes' repetitive sprint test times. The repetitive sprinting characteristics of the athletes were determined using the repetitive sprint test developed by Bangsbo (1994). This test includes 7 sprint runs at maximal speed on a 34.2-meter test area. In addition, after each running lap, athletes were given a 25-second rest period to recover (Krustrup et al. 2006). Before the repeated sprint test, the athletes were asked to run at a low tempo for 10 minutes and then warm up for 5 minutes. Then, the athletes were made to do sprints with passive rest to get used to the test procedure. The athletes were given full rest to recover and were measured when they were ready for the test. The repeated sprint test was applied to the subjects twice and the best value was recorded for statistical analysis. During the measurement, each sprint value was determined with the help of photocells placed at the start and end points. Fatigue index values of athletes were obtained according to the formula below (Bangsbo, 1994).

Formula: $\% FI = (IT - IT) / IT \times 100$

According to this formula;

Ideal Time (IT): $S_{BT} \times 7$

Total Time (IT): $S_1 + S_2 + S_3 + S_4 + S_5 + S_6 + S_7$

S_{BT} : Best time

S: Sprint

T Test

The agility T test was applied to measure the agility ability of the athletes (Figure 1). In this test, the athlete starts the test with a desired foot at point A from a high starting position and sprints to point B. Touching the funnel at point B with his right hand, he moves with a side step towards the funnel at point C, facing forward. The athlete, who touches the funnel at point C with his left hand, then moves to the funnel at point D with a side run, and after touching this funnel with his right hand, he moves to the funnel at point B with a side run again. The athlete touches the funnel at point B with his left hand and finally completes the test by running

backwards towards the starting line at point A. When the athlete passes point A, the stopwatch is stopped (De Silvia et al. 2008). In this study, 2 repetitions were applied to the athlete with full rest and the best value was recorded. It is stated that during the test, the athlete must contact the funnels (with the hand closest to the funnel), do shuttle runs between the funnels without crossing over with his feet, and while doing side runs, his chest must point to the opposite side (the athlete's face is always in the same direction).

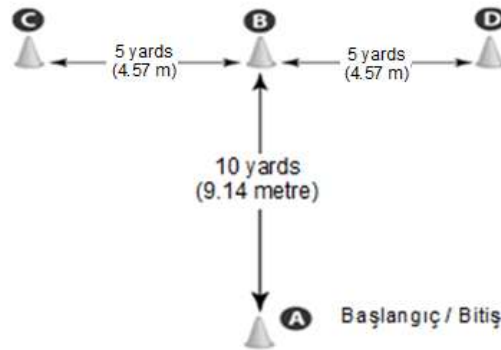


Figure 1. Agility T-test area

Vertical Jump Test

After a 10-minute general warm-up exercise, vertical jump tests were applied to the athletes. First, the standard arm lengths of the subjects were determined in front of the test platform and then they were asked to jump as high as possible. At the end of the test, the distance between the subjects' jumping distances and standard arm lengths was calculated and the vertical jumping distance was recorded in centimetres. The jump test was performed twice by giving sufficient rest time to the subjects and the best test values were recorded for statistical analysis.

Standing Long Jump Test

After a 10-minute general warm-up exercise, standing long jump tests were applied to the athletes. In this test, the subjects were asked to jump from behind the marked line to the farthest point they could reach with both feet, and the distance between the starting line and the trace left by the athlete closest to the line (the last contact of his body) was measured with a tape measure and recorded in centimetres. The jump test was performed twice by giving sufficient rest time to the subjects and the best value was recorded.

Statistical Analysis

SPSS 17.0 (The Statistical Packet for The Social Sciences) package program was used to analyze the data. The physical and performance characteristics of the research group were analyzed with descriptive statistics; Mann Whitney U test was applied for independent samples to compare the performance characteristics of the groups. In all statistical analyses, the significance level was accepted as $p < 0.05$.

RESULTS

The physical characteristics of the athletes are given in Table 1.

Table 1. Demographic characteristics of Turkish and German football players

Değişkenler	Turkish Football Players (n = 16)			German Football Players (n = 16)			U	p
	Min.	Max.	Mean ± SD	Min.	Max.	Mean ± SD		
Age (yıl)	16	17	16,31 ± 0,47	16	17	16,25 ± 0,44	120	0,699
Height (cm)	1,68	1,85	177 ± 0,061	1,6	1,83	173 ± 0,07	95	0,212
Weight (kg)	50	85	68,80 ± 10,34	45	85	61,83 ± 12,92	87,5	0,126

Age of the groups according to Table 1 ($U=120.00$; 0.699 . $p>0.05$). It was determined that there was no significant difference between height ($U=95.00$; 0.212 . $p>0.05$) and weight ($U=87.50$; 0.126 . $p>0.05$) values.

Table 2. Difference between biomotoric characteristics of Turkish and German football players

	Turkish Football Players (n = 16)			German Football Players (n = 16)			U	p
	Min.	Max.	Mean±SD	Min.	Max.	Mean±SD		
RST1	6.63	7.2	6.96 ± 0.17	6.56	8.02	7.15 ± 0.33	76	0.050
RST 2	6.74	7.3	7.04 ± 0.16	6.6	7.52	7.15 ± 0.25	83	0.090
RST 3	6.75	7.34	7.07 ± 0.17	6.63	7.62	7.27 ± 0.30	65.5	0.018 *
RST 4	6.82	7.38	7.11 ± 0.15	6.71	7.64	7.30 ± 0.29	65.5	0.180 *
RST 5	6.9	7.42	7.17 ± 0.13	6.78	7.68	7.36 ± 0.30	71.5	0.033 *
RST 6	6.99	7.48	7.22 ± 0.13	6.85	7.75	7.40 ± 0.31	80	0.070
RST 7	7.05	7.45	7.26 ± 0.12	6.94	7.81	7.45 ± 0.29	77.5	0.057
Total Time (second)	47.94	51.46	49.86 ± 1.03	47.19	53.34	51.11 ± 2.98	65	0.018 *
Fatigue Index (%)	1.68	5.05	2.42 ± 0.88	0.9	5.78	3.42 ± 1.62	77.5	0.057
Agility (second)	10.24	11.86	10.89 ± 0.55	9.9	11.98	11.08 ± 0.59	97.5	0.250
Standing Long Jump Test (cm)	1.87	2.68	2.34 ± 0.24	1.81	2.69	2.11 ± 0.21	58.5	0.059
Vertical Jump Test (cm)	24	61	42.5 ± 11.7	25	57	36.5 ± 7.72	89	0.141

* $p<0.05$

In Table 2, the repeated sprint test of the group 3 ($U=65.50$; 0.018 . $p<0.05$). repeated sprint test 4 ($U=65.50$; 0.018 . $p<0.05$). It was observed that there was a significant difference between repeated sprint test 5 ($U=71.50$; 0.033 . $p<0.05$) and repeated sprint test total times ($U=65.50$; 0.018 . $p<0.05$). On the other hand, the agility of the groups ($U=97.50$; $.250$. $p>0.05$). standing long jump ($U=58.50$; 0.009 . $p<0.05$) and vertical jump ($U=89.00$; 0.141 . $p>0.05$) repeated sprint test 1 ($U=76.00$; 0.050 . $p>0.05$). repeated sprint test 2 ($U=83.00$; 0.090 . $p>0.05$). repeated sprint test 6 ($U=80.00$; 0.070 . $p>0.05$). It was determined that there was no significant difference between the repeated sprint test 7 ($U=77.50$; 0.057 . $p>0.05$) and repeated sprint test per cent fatigue index ($U=77.50$; 0.057 . $p>0.05$) values.

DISCUSSION

In this study, it was observed that there was no significant difference between the ages, heights and body weights of the football players of the two teams. Strudwick et al. (2002) found no difference in height and body weight measurements between the groups in their study of 19 professional football players and 33 amateur football players.

In this study, the average agility value of Turkish football players was determined as 10.89 ± 0.55 seconds, and that of German football players was 11.08 ± 0.59 seconds. When the agility performances of Turkish and German football players were compared, no significant difference was found between the test performances of the groups ($p>0.05$).

The average vertical jump value of Turkish football players was 42.5 ± 11.7 cm, and that of German football players was 36.5 ± 7.72 cm. When the vertical jump performances of Turkish and German football players were compared, no significant difference was found between the test performances of the groups ($p>0.05$). In the study conducted by Karanfilci (2014); When Ankaragücü and Çayyolu Sports Clubs football players were examined in terms of vertical jump averages; It can be seen that there is a statistically significant difference between the teams, with Ankaragücü U-17 football players having an average of 53.81 ± 1.36 cm and Çayyolu Spor football players having an average of 51.95 ± 1.32 cm. In his study, Danacı (2008) found differences in the average vertical jump of athletes (49.50 ± 1.32 cm) and sedentary people (45.38 ± 1.43 cm). Strudwick et al. (2002), in their study on 19 professional football players with an average age of 22 years and 33 amateur football players with an average age of 23 years, revealed that the vertical jump distance created a positive difference in professional football players. Data obtained from other studies support the result of this study

and show that vertical jump characteristics can be considered important criteria in football. (Matavulj et al. 2001; Brown et al. 1986).

Considering the average values of football players in the standing long jump test, the average value of Turkish football players in the Tanding long jump test was determined as 2.34 ± 0.24 cm. On the other hand, the average value of German football players in the Tanding long jump test was determined as 2.11 ± 0.21 cm. When the Tanding long jump performances of Turkish and German football players were compared, a significant difference was found between the test performances of the groups ($p < 0.05$). In the study conducted by Karanfilci (2014), he compared the Standing long jump values of Ankaragücü and Çayyolu U-17 team football players and no significant difference was detected between the football players of the two teams. Rauf Onur et al. (2007) in their study, examined 26 football players competing in the amateur league in Aydın province and determined the average value of Sanding long jump distance as 2.24 ± 0.04 m.

Ek et al. (2007) on 26 amateur football players, it was determined that there was a significant correlation between 30 m and 60 m sprint performances, as well as a significant correlation between vertical jump performance and sprint performance, and between shuttle running performance and vertical jump and standing long jump performance. In his study, Gülak (2000) found that the standing long jump of 34 athletes aged 17 years was 2.21m on the first test, 2.30m on the last test, and 1.95m on the first test and 1.97m on the last test of the control group. While we detected a significant difference in the study group, no significant difference was found in the control group. Aybek et al. (2004) in their study to determine the repetitive sprint test fatigue and recovery levels of 19 amateur football players competing in the Samsun amateur league, found the average value of 7 runs to be 6.23. They also stated that the number of sprints and the positions of the players affected the running times. In the 34.2 m speed test applied by Bangsbo (1996) to senior Danish players, the best time was found to be 6.80 s and the average time was 7.10 s. In his study, Bangsbo (1996) found the fatigue rate to be 0.64 seconds in Danish football players. Can et al. (2015) in the study conducted by 18 football players (age: 17.8 ± 0.70 years; height: 175.8 ± 5.53 cm; weight: 66.7 ± 5.51 kg) playing in the youth category of the Super League team Trabzonspor football team, the total time average of repeated sprint test was 47.4 seconds. The average test fatigue index was found to be 3.64 seconds.

When studies in the literature are examined, recovery times in repeated sprint ability tests differ from each other. Ratel et al. (2004) used 15-second rest intervals in the 10x10-second sprint test in their study, while Hill-Hass et al. (2007) conducted repeated sprinting with 20-second and 80-second rest intervals in their study. Besides these, Edge et al. (2006) applied a rest interval of 30 seconds in the 5 x 6-second repetitive sprint test in their study, while Oliver et al. (2007) used a 20-second rest interval in the 7x5-second sprint test. When all these studies are examined, it is seen that rest intervals vary between 15 seconds and 80 seconds and different results are obtained in repeated sprint performance. Soydan et al. (2010) conducted a 12x20 m repetitive sprint test without interruption, with active recovery intervals of 15, 30 and 45 seconds, and it was observed that the lowest values in terms of best sprint time and total sprint time were obtained in sprints with rest periods of 30 seconds and 45 seconds.

CONCLUSION

As a result, in this study, there was no significant difference between the height, body weight, agility, Sanding long jump and vertical jump and fatigue index between Turkish and German football players; It was observed that there was a difference between the repeated sprint test 3-4-5 and the total repetitive sprint times. Except for repetitive sprint times, no difference was seen in other biomotoric features in the two groups. Considering that Turkish football players live in Germany, grow up in Germany, and have similar environmental conditions and similar training, this result can be considered meaningful.

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