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Examination of Agility and Speed Performance Parameters in Male Football Players Aged 17-21*

İsmail Taha KARLIKLI[1], Selin YILDIRIM TUNCER[1†]
[1] Lokman Hekim University, Faculty of Sport Sciences, Ankara, Türkiye

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Abstract

This study is to conduct a comparative assessment of agility and speed performance levels among male football players aged 17 to 21. A total of 78 participants were included, comprising professional players from Gençlerbirliği Sports Club (n=28) and amateur players from the Faculty of Sports Sciences at Lokman Hekim University (n=50). Anthropometric measurements, including height and body weight, were documented, and physical performance was evaluated by the 30-meter sprint and Arrowhead agility assessments. Independent sample t-tests were employed to compare the groups, and Pearson correlation analysis was performed to investigate correlations among variables. The results indicated that professional players surpassed amateur players in both tests, with statistically significant differences ($p<0.05$). Furthermore, reduced standard deviations in the professional group signified greater consistency in physical performance. These disparities are ascribed to systematic training regimens, enhanced nutritional methods, and talent acquisition methodologies prioritized at the elite level.
Keywords: Physical performance, Agility, Speed, Football

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† **Corresponding Author:** Asst. Prof. Selin YILDIRIM TUNCER, **E-mail:** selin.yildirim@lokmanhekim.edu.tr

INTRODUCTION

Football is a globally celebrated sport that demands a combination of technical, tactical, physical, and motor skills (Yüksel & Koçak, 2024). The game is characterized by intermittent periods of high- and low-intensity activity, including acceleration, deceleration, jumping, and rapid changes of direction (Ersöz, 2016; Mohr et al., 2005). Key physical attributes essential for successful football performance include strength, balance, speed, and agility (Gökhan et al., 2015; Little & Williams, 2005). These attributes directly influence on-field performance, facilitating the execution of tactical manoeuvres and offering a competitive advantage during matches.

Among these attributes, speed and agility are widely recognized as critical performance components in football. Speed enables players to move swiftly and implement tactical decisions effectively, while agility supports rapid directional changes and adaptive responses during gameplay (Forster et al., 2023; Sheppard & Young, 2006). Speed refers to the capacity to perform movements in the shortest possible time, which aids players in outmanoeuvring opponents and creating scoring opportunities (Solak, 2021; Özdemir, 2009). During a typical match, players may cover over 10,000 meters, alternating between walking, jogging, and sprinting, which underscores the importance of speed (Şahbaz, 2003). Agility, in contrast, is a multifaceted ability that integrates both biomechanical and cognitive components. It involves rapid changes in direction in response to external stimuli and is enhanced through training programs that target both physical and perceptual skills (Forster et al., 2023; Komarudin et al., 2022).

Regular assessment of speed and agility is essential for monitoring the progress of young athletes, identifying individual strengths and weaknesses, and informing training interventions. Numerous studies have investigated the impact of these parameters on the performance of young football players. For example, Little and Williams (2005) reported a strong relationship between speed and agility, particularly at the elite level. Similarly, Pojskic et al. (2018) identified speed and agility as key predictors of football-specific performance in elite youth players. Within the national context, Köklü et al. (2015) found significant associations between 10- and 30-meter sprint times and agility test results in young footballers. These findings suggest a close interrelationship between speed and agility, both of which can be enhanced through structured training.

Anthropometric characteristics, particularly height, body weight, and body mass index (BMI), also play a role in physical performance. However, findings in the literature regarding their influence are inconsistent. Gil et al. (2007) reported no significant relationship between BMI and performance indicators, emphasizing the need to consider more specific parameters such as body composition and muscle mass. Similarly, Reilly et al. (2000) advocated for the inclusion of detailed physiological assessments beyond basic anthropometric data. Nationally, Hazır et al. (2010) examined the associations between agility, body composition, and anaerobic power in young footballers, underlining their relevance to performance. Internationally, Sedeaud et al. (2014) noted that a BMI range of 20–22 kg/m² is associated with better speed and agility outcomes. These results highlight the importance of optimal body composition in supporting physical performance.

Identifying differences in physical performance between elite and amateur players is crucial for developing training programs and refining talent identification strategies. Professional footballers generally display more consistent and higher-level performance due to systematic training, optimized nutrition, and structured talent development pathways (Boone et al., 2012; Izzo et al., 2018). In contrast, amateur players often rely more on innate abilities, leading to greater variability in performance (Kaplan et al., 2009). Accordingly, comparative analyses of speed and agility in young footballers provide valuable insights into individual development needs and support the creation of evidence-based coaching methods.

This study aims to conduct a comparative analysis of speed and agility performance among male football players aged 17 to 21. By examining professional athletes from Gençlerbirliği Sports Club and amateur players from Lokman Hekim University Faculty of Sports Sciences, the study seeks to identify performance differences and explore the relationship between these attributes and anthropometric characteristics. The findings aim to inform evidence-based training and coaching strategies, drawing on both national and international research, to optimize agility and speed development in young footballers.

METHOD

Research Model

This research follows a comparative design approach, blending descriptive, correlational, and causal-comparative designs within a quantitative design. The primary objective is to assess the physical performance levels of male footballers aged 17 to 21, focusing on agility and speed metrics, while also determining the association between these attributes and anthropometric factors including height, weight, and body mass index. The descriptive aspect aims to establish the prevailing physical performance characteristics of the participants by measuring variables like height, weight, agility (assessed by the Arrowhead agility test), and speed (assessed using the 30-meter sprint test). Concurrently, a correlational analysis examines the interaction between these variables for the purpose of establishing their interdependence. A causal-comparative design is employed to compare the performance outcomes of two groups—football players from Gençlerbirligi Sports Club (GSC) and Lokman Hekim University Faculty of Sports Sciences (FSS)—to identify potential group differences that may influence agility and speed performance. The comprehensive design of this study facilitates a thorough analysis of general performance trends and unique distinguishing features among groups, aligning with the study's objective to provide specialized training methodologies (Creswell and Clark, 2007). All participants received essential information regarding the study, and consent was sought prior to data collection through completion and signing of an "Informed Consent Form."

Research Groups

Purposive sampling was used in the selection of the participants for this study. As a non-probability sampling method, purposive sampling entails the selective choice of participants who share characteristics or experiences that are useful to the aims of the study. In this study, a total of 78 volunteer footballers were selected, comprising 28 professional players from Gençlerbirliği Sports Club and 50 amateur players from the Lokman Hekim University Faculty of Sports Sciences. Gençlerbirliği Sports Club, being a professional football club, was selected because of its established reputation and status as a major stakeholder that actively engages in scientific research activities, thus being consistent with the aims of the study. Additionally, the inclusion of amateur players from the Faculty of Sports Sciences, representing diverse regional teams, broadened the sample to encompass a wide range of athletic groups. The sample was established based on certain inclusion criteria, namely being an active footballer and falling within the 17–21 age category, aligning with the research questions and objectives of the study.

Data Collection Tools

The study involved measuring the height and body weight of 78 volunteer football players. The volunteers had a typical 10-minute warm-up comprising low-intensity acceleration runs and other staggered running exercises to assess their physical performance development levels, followed by the Arrowhead agility drill test and 30-meter sprint testing. The tests were performed at 72-hour intervals.

Height Measurement

The height of the volunteers involved in the study was assessed using a tape measure affixed to the wall, with the zero-mark positioned at ground level. Athletes engaged in the measurement without footwear. The acquired values are documented in "cm" (Santos et al., 2014).

Body Weight Measurement

The body weights of the participants were assessed using a digital indicator scale. Volunteers engaged in the measure wearing only shorts and t-shirts. The acquired values are documented in "kg" (Santos et al., 2014).

Arrowhead Agility Test

In the Arrowhead Agility Test, the participants commence by positioning themselves behind a clearly designated starting line. At the commencement of the test, they must run at top speed for 10 meters to get to the center of a cone-course. At this decision point, the participant executes a pivoting action in the shape of a 90-degree turn about its rear tip, moving towards a cone positioned laterally at a 5-meter distance, either to the right or left, depending on which trial. Following this first turn, the participant moves another 5 meters towards a cone positioned at a farther distance, necessitating a further 90-degree change in direction. Upon arriving at the farthest cone, the subject makes a 180-degree turn and runs about 10 meters back to the starting line, hence having covered one trial of a total distance of around 35-37 meters (Rago et al., 2020). The time for each trial, from initiation to completion, is measured systematically with accurate timing devices. To consider the test valid, participants are required to complete a total of four trials, two with right turns and two with left turns—to allow proper assessment of agility in both directional axes. The subjects' best performance times, that is, their fastest recorded scores from these tests, are then recorded for analysis and evaluation purposes in the field of sport science research or training.

30-Meter Speed Test

In the 30-meter speed test, the photocell and reflectors are positioned approximately 2 meters from the starting line and 30 meters apart, facing each other. Participants received the requisite information to complete the 30-meter distance in the minimal time and at maximum velocity prior to the test. We performed the assessment using an electronic stopwatch apparatus. The timing commenced when the volunteers activated the initial sensor, and the elapsed time between the 0 and 30-meter sensors was recorded in the system with an accuracy of 0.01 seconds (Kumar, 2006). The sprint commenced when the volunteer activated the photocell at the starting line by moving forward, without any backward motion, at the instant chosen by the participant within the designated area 1 meter behind the starting point and concluded upon the completion of the run. Participants completed the test twice, with a 3-minute interval, and their best times were recorded in seconds for assessment.

Ethics Approval

The study was conducted in accordance with ethical standards outlined in the Declaration of Helsinki and approved by the Lokman Hekim University Scientific Research Ethics Committee with decision number 2024-11/1.

Data Analysis

The data analysis in this research was done using the IBM Statistics 26.0 statistical package at a significant level of $p<0.05$. The analysis started with the use of descriptive statistics to summarize the central tendency, variability, and distributional properties of the variables under measurement, which were height, body weight, 30-meter speed test results, and Arrowhead agility test scores (right and left foot). Then, normality tests were conducted through the examination of kurtosis and skewness values to establish if the data was normally distributed, hence guiding the selection between parametric and nonparametric statistical methods. As prescribed by George and Mallery (2019), measures of skewness and kurtosis between -2.00 and +2.00 indicate normality; this criterion was met for the right and left foot measurements in the Arrowhead agility test and the 30-meter speed test, and thus parametric analysis was justified. To analyze the difference between the groups of participants—Gençlerbirligi Sports Club (GSC) and Lokman Hekim University Faculty of Sports Sciences (FSS)—independent samples t-tests were conducted on the 30-meter sprint test and the Arrowhead agility test (right foot and left foot measurements) as part of relational analysis. They were conducted to determine whether there were statistically significant differences in the performance results of the two groups. Besides, for analyzing the correlation between the parameters, i.e., speed, agility, height, body weight, and body mass index, Pearson Product-Moment Coefficient analysis, or Pearson's correlation, was employed. This parametric correlation technique was chosen due to the proven normality of the data, which allowed for both the direction and strength of linear relations between variables to be ascertained. All analyses followed the prescribed significance level ($p<0.05$), thereby providing strong statistical inference within the context of the study (George and Mallery, 2019).

FINDINGS

The descriptive statistical findings of the measured characteristics of the participants are given in Table 1.

Table 1. Descriptive statistical results of the assessed attributes of the subjects

Variables	Mean		SD		Min.-Max.	
	FSS	GSC	FSS	GSC	FSS	GSC
Height (cm)	177.44	176.78	8.533	5.965	160-203	167-190
Body weight (kg)	73.00	65.37	12.445	8.567	48-104	54-99
BMI (kg/m²)	23.08	20.88	2.880	2.116	16,61-28,40	17.90-27.45
30-meter speed test (s)	5.48	4.34	0.565	0.193	4.27-6.78	4.07-4.87
Arrowhead agility test-right foot (s)	9.68	8.77	0.669	0.267	8.71-11.25	8.32-9.20
Arrowhead agility test -left foot (s)	9.61	8.93	0.703	0.335	8.73-11.36	8.26-9.50

Note: FSS = Faculty of Sports Sciences; GSC = Gençlerbirligi Sports Club; BMI: Body Mass Index
S: second; cm: centimeter

Table 1 indicates that the mean height of GSC (professional) and FSS (amateur) players in the study was virtually same; however, the height variability among amateur players was greater, whereas professionals demonstrated a more consistent height distribution. The data revealed that amateur performers were 7.63 kg heavier than their professional counterparts in terms of body weight. Simultaneously, for similar reasons, it can be elucidated that FSS participants (23.08) have a higher average BMI than GSC participants (20.88), and that professional football players demonstrate a more delicate and agile physical profile than amateur athletes. According to the averages of 30-meter speed test results, professional football players demonstrate enhanced speed, and the standard deviation values (GSC 0.193 vs. FSS 0.565) indicate that the performances of professional players are more consistent. The GSC group exhibited enhanced performance in the right foot Arrowhead agility test, achieving an average time of 8.77 seconds (SD: 0.27; Min–Max: 8.32–9.20), in contrast to the FSS group's average of 9.68 seconds (SD: 0.67; Min–Max: 8.71–11.25). Likewise, the GSC group attained superior outcomes in the left foot agility assessment. The GSC group had an average time of 8.93 seconds (SD: 0.33; Min–Max: 8.26–9.50), whereas the FSS group had an average of 9.61 seconds (SD: 0.70; Min–Max: 8.73–11.36).

Table 2 displays the results of the independent sample t-test performed between the groups for the 30-meter speed and arrowhead agility evaluations.

Table 2. Results of intergroup independent sample t-test for 30-meter speed and Arrowhead agility assessments

Variables	Groups	N	$\bar{X}$	s	t	p
30-meter speed test (s)	FSS	50	5.488	0.565	10.311	0.001
	GSC	28	4.348	0.193		
Arrowhead agility test-right foot (s)	FSS	50	9.682	0.669	6.836	0.001*
	GSC	28	8.778	0.267		
Arrowhead agility test-left foot (s)	FSS	50	9.615	0.703	4.829	0.001*
	GSC	28	8.932	0.336		

***p<0.05**

All test results in Table 2 indicate that professional players (GSC) surpass amateur footballers (FSS) in speed and agility. All three tests produced p-values of 0.001 ($p < 0.05$), indicating statistically significant differences across the groups. The 30-meter sprint test unequivocally indicated that GSC athletes had superior speed, finishing the test in markedly reduced times relative to the FSS group ($p < 0.05$). Likewise, the outcomes of the Arrowhead agility assessments demonstrated the preeminence of the GSC group. In the right foot agility test, the GSC group reported an average time of 8.78 seconds, but the FSS group averaged 9.68 seconds—a statistically significant difference ($p < 0.05$). A comparable trend was noted in the left foot agility assessment, wherein GSC players exhibited superior speed (8.93 seconds) relative to the FSS group (9.62 seconds), with a statistically significant difference ($p < 0.05$). Furthermore, the GSC group demonstrated reduced standard deviation scores across all assessments, signifying greater uniformity and consistency in performance among professional athletes.

Table 3. The results of the correlation analysis about measurements of GSC players

Variables		1	2	3	4	5
1- 30-meter speed test (s)	r	1	-			
2- Arrowhead agility test right foot (s)	r	0.380^{**}	1			
3- Arrowhead agility test left foot (s)	r	0.292^{*}	0.682^{**}	1		
4- Height (cm)	r	-0.095	0.364	0.297	1	
5- BMI (kg/m²)	r	0.027	-0.040	-0.027	0.052	1

***p<0.05, **p<0.01**

The correlation analysis in Table 3 indicates a moderate positive and statistically significant correlation between the 30-meter sprint test and the Arrowhead agility test executed with the right foot ($r = 0.380$; $p < 0.01$). A small positive and statistically significant correlation was observed between the 30-meter sprint test and the Arrowhead agility test executed with the left foot ($r = 0.292$; $p < 0.05$). A small negative but statistically non-significant correlation was found between the 30-meter sprint test and height ($r = -0.095$; $p > 0.05$). The correlation between body mass index (BMI) and the 30-meter sprint test was negligible and statistically non-significant ($r = 0.027$; $p > 0.05$).

Table 4. The results of the correlation analysis of the measurements performed by FSS players

Variables		1	2	3	4	5
1- 30-meter speed test (s)	r	1	-			
2- Arrowhead agility test right foot (s)	r	0.472^{**}	1			
3- Arrowhead agility test left foot (s)	r	0.549^{**}	0.957^{**}	1		
4- Height (cm)	r	-0.488^{**}	-0.576^{**}	-0.588^{**}	1	
5- BMI (kg/m²)	r	0.078	-0.353^{**}	-0.337^{*}	0.194	1

***p<0.05, **p<0.01**

The results shown in Table 4 demonstrate a positive and moderate association ($r = 0.472$) between the 30-meter speed test and the Arrowhead right foot agility test. The association is statistically significant ($p<0.05$). A strong and positive correlation ($r = 0.549$) found between the speed and Arrowhead left foot agility evaluations. The speed test and height demonstrate a moderately negative and statistically significant connection ($r = -0.488$). Taller athletes need additional time to complete the 30-meter speed test. The speed test and BMI exhibit a negligible and statistically insignificant correlation ($r = 0.078$; $p > 0.05$). Nonetheless, because of the low r value, the impact of BMI on speed performance appears to be considerably constrained in practice. The Arrowhead right and left foot agility tests demonstrate a robust positive connection ($r = 0.957$). Significant inverse correlations were seen between BMI and agility evaluations (right foot: $r = -0.353$; $p < 0.01$; left foot: $r = -0.337$; $p < 0.01$). This suggests that an increase in BMI is associated with a decrease in agility.

DISCUSSION

This study aimed to identify the specific distinctions between professional (GSC) and amateur (FSS) football players aged 17 to 21 by analysing their physical attributes and performance indicators. Anthropometric variables, including body weight, height, and body mass index (BMI), as well as measurements of performance such as speed (30-meter sprint) and agility (Arrowhead Agility Test), were examined to evaluate inter-group differences and the correlations among these characteristics.

In this context, the mean heights of GSC (professional) and FSS (amateur) players were found to be quite similar; however, the height distribution was more extensive among amateur players, whereas professional players displayed a more uniform height range. The FSS group exhibited a greater mean body weight than the GSC group. Consequently, FSS participants exhibited a higher average BMI (23.08) than GSC participants (20.88), thus indicating the thinner and more agile physiques of professional athletes as contrast to amateurs. This study indicates that amateur players may have increased fluctuation in muscle mass or body fat percentage, whereas the physical consistency of professionals is likely shaped by systematic training, elevated match intensity, and performance maintenance requirements. According to the average outcomes of the 30-meter sprint test, professional athletes exhibited enhanced speed performance. Furthermore, the comparison of standard deviation numbers (GSC: 0.193 vs. FSS: 0.565) indicates that professional players exhibit greater consistency in performance. The GSC group surpassed the FSS group in both right and left foot agility assessments, evidenced by reduced average times and diminished variability. This consistent performance presumably indicates the impact of higher training levels. FSS participants seemed to depend more on physical attributes such height and BMI for their performance results, whereas similar criteria had no influence on GSC participants. This disparity may be ascribed to the differing training intensity or player characteristics between the two cohorts (Table 1).

Numerous studies in the literature corroborate the conclusions of the current research. Gil et al. (2007) found no significant relationship between BMI levels and performance indicators, highlighting that BMI alone is inadequate as a performance predictor for youth football players. They suggested evaluating more specific parameters, including body composition and muscle mass. Likewise, Reilly et al. (2000) emphasized the necessity of assessing specific physiological indicators in addition to basic anthropometric indices. De Giorgio et al. (2018) discovered no significant correlation between BMI and agility, indicating that agility is predominantly affected by motor abilities and training level rather than body composition. A study by Sedeaud et al. (2014) corroborated our findings, indicating that top runners with BMI values between around 20–22 kg/m² exhibited enhanced speed and agility performance. This further emphasizes that BMI may enhance physical performance alone within an appropriate range and in conjunction with advantageous body composition. Table 2 illustrates that the GSC group, comprising professional athletes, considerably surpassed the FSS group, comprised of amateur players, across all assessed parameters, including the 30-meter sprint and both right and left foot Arrowhead agility tests ($p < 0.05$). Additionally, in the FSS group, a moderate correlation ($r = 0.57$) was noted between right and left foot agility performance, suggesting a level of bilateral consistency, albeit lacking full symmetry. Conversely, GSC players demonstrated a robust and statistically significant association ($r = 0.682$, $p < 0.05$), indicating a more symmetrical and consistent bilateral agility performance.

The data indicate that GSC athletes, due to their consistent and systematic training and professional expertise, have enhanced physical performance in speed and agility. Conversely, the FSS group demonstrated a wider range of performance scores, reflecting a more varied composition among amateur players. The results distinctly highlight the impact of consistent training, physical conditioning, and maybe superior technical abilities on athletic performance. Our findings are corroborated by the research by Little and Williams (2005), who highlighted the integral relationship between speed and agility in football play, observing that this association is particularly evident at the highest level. Pojskic et al. (2018) emphasized the substantial correlation between speed and agility in their study of elite youth football players, finding these characteristics as key predictors of football-specific performance. Pereira et al. (2018) revealed a robust and statistically significant correlation between sprint and agility performance in top footballers ($r = 0.76$, $p < 0.01$), hence further substantiating our findings. These data substantiate the idea that bilateral coordination in professional football players is likely improved through specific training treatments, such as bilateral limb exercises. Negra et al. (2017) observed that although speed and agility are separate skills in young athletes, bilateral performance can be enhanced with structured and professional training methods.

The reduced and more uniform agility test timings observed in GSC players (8.77–8.93 s) may indicate superior bilateral coordination, highlighting the impact of elite-level technical and physical preparation. Little and Williams (2005) similarly showed a robust correlation between speed and agility in football, underscoring the notion that these skills are intricately connected. In contrast to these findings, our study identified a diminished correlation between speed and agility in GSC players relative to FSS players, while a more pronounced bilateral consistency was observed in right and left foot agility performance among professionals (as noted by Negra et al., 2017). This indicates that the two groups may vary in training intensity or playing style. Similar studies in the literature corroborate these findings and provide valuable insights for enhancing the physical performance of young athletes. Köklü et al. (2015) identified significant relationships between 10- and 30-meter sprint timings and agility evaluations in adolescent football players. Buchheit et al. (2010) underscored the strong correlation between agility and sprint speed in young footballers, asserting that agility training is crucial for improving overall player performance. A separate study including 24 football athletes aged 19 to 24 ($n = 12$ football, $n = 12$ futsal) evaluated the combined effects of speed, agility, anaerobic power, and anthropometric parameters. The findings indicated statistically significant disparities favoring futsal players in the 30-meter sprint and agility assessments; however, no significant variations in agility scores were noted between the two groups (Kartal, 2016). The research conducted by Milanović et al. (2011) and Göral (2015) indicated no significant disparity in agility performance between football and futsal players, implying that both activities may provide comparable agility abilities despite their distinct physical requirements.

Sheppard and Young (2006) indicated that agility performance is affected by both physical capacities and the integration of cognitive processes, such as decision-making ability. Çatalo et al. (2024) highlighted that agility performance, especially in young athletes, is closely associated with multiple physical attributes including strength, speed, and flexibility, and that enhancing these traits through targeted training interventions can markedly improve performance. Brughelli et al. (2008) contended that agility is a complex skill, and that athletes' performance in agility activities may fluctuate based on several physical and technical aspects. Jones and Wilson (2009) emphasized the significance of recognizing the relationship between speed and agility in the formulation of performance enhancement programs, proposing that agility training is essential for augmenting total athletic performance. Kapidžić et al. (2011) corroborated our findings by identifying statistically significant correlations between a 20-meter sprint test and 3- and 7-meter sprint-agility tests in amateur football players, illustrating the interrelation of these abilities. A similar study consistent with our findings was performed by Kaplan et al. (2009), who evaluated running speed and agility performance (utilizing the 10 × 5 m shuttle run) in a cohort of 187 male subjects (108 professional and 79 amateur footballers). Their findings demonstrated statistically significant differences between the two groups, so reinforcing the idea that performance capacity in sprinting and agility activities is affected by competition level and training exposure. Izzo et al. (2018) indicated that professional football players attained greater maximum running speeds (31 km/h) than amateur players (28 km/h), attributing this disparity to specialized speed and agility training at the elite level. Boone et al. (2012) highlighted that the sprint performance of professional athletes is improved through consistent high-intensity interval training (HIIT) and position-specific drills, emphasizing the importance of planned and targeted training in augmenting speed. The limited correlation identified between speed and BMI in the FSS group indicates that amateur players may depend more on innate physical attributes due to the lack of organized and systematic training regimens. The findings substantiate the idea that the physical and performance discrepancies between professional and amateur football players can be attributed to variations in training methodologies, talent identification and selection procedures, and the extent of physical optimization attained through elite-level development systems.

Table 3 indicates a considerable positive and statistically significant association between the 30-meter sprint test and the Arrowhead agility test conducted with the right foot ($r = 0.380$, $p < 0.01$). This research indicates that people with inferior sprint performance typically exhibit constrained agility capabilities as well. A small although statistically significant correlation was identified between the 30-meter sprint and the left foot agility test ($r = 0.292$, $p < 0.05$). The results indicate that speed and agility are complementary motor skills that may collectively impact total sports performance. Sheppard and Young (2006) contended that agility encompasses not just the capacity to alter direction but is also intricately linked to sprint speed and reaction time. Similarly, Lockie et al. (2014) identified substantial connections between speed and agility in sprinters and team sport players. The present findings are consistent with prior literature. Conversely, while a weak negative correlation was observed between height and sprint performance in this investigation, it lacked statistical significance ($r = -0.095$, $p > 0.05$). A negligible correlation was seen between BMI and sprint performance ($r = 0.027$, $p > 0.05$). The results suggest that sprint performance cannot be sufficiently elucidated by anthropometric measurements alone; rather, factors such as muscle strength, response time, and technical proficiency may exert a more significant influence. In this context, the results of Silva et al. (2013) indicated a negligible influence of height and BMI on sprint performance. The meta-analysis by Nygaard Falch et al. (2019) corroborated an inverse correlation between height and agility performance. The authors noted that taller athletes encounter increased challenges in managing their center of gravity, especially during directional shifts. Mathisen and Pettersen (2015) similarly reported a positive association between height and sprint performance in youth football players ($r = 0.30–0.50$) but observed that this impact tends to decline at the elite level. The data indicate that although greater height may confer a benefit in sprinting throughout an athlete's formative years, its significance diminishes when training and performance variables take precedence in professional settings. De Giorgio et al. (2018) also suggested that increases in height may correlate with diminished agility performance in both right and left foot assessments. Taller athletes may encounter increased challenges in sustaining agility, primarily due to biomechanical constraints associated with balance and center of mass regulation. In contrast, shorter athletes with a lower center of gravity had superior performance in agility testing, highlighting the biomechanical benefits of compact body proportions in activities necessitating swift directional shifts.

The correlation analysis results in Table 4 indicate statistically significant positive associations between the 30-meter sprint test and both the right and left foot Arrowhead agility tests among FSS players ($r = 0.472$ and $r = 0.549$, respectively). This suggests that those with diminished sprint performance typically demonstrate reduced agility performance as well. The significant association identified between the left foot agility test and the sprint test ($r = 0.957$, $p < 0.01$) indicates that both evaluations may depend on analogous neuromuscular elements. This data suggests that agility performance may be sustained at a similar level using the non-dominant foot, underscoring its correlation with overall motor control capability. The favorable connections observed in this study reinforce the concept that agility is a motor ability that evolves concurrently with speed. Consistent with our findings, Lockie et al. (2014) revealed substantial relationships between speed and agility performance in athletes. Additionally, negative and statistically significant correlations were identified between height and both the 30-meter sprint and agility tests (e.g., $r = -0.488$ for height and sprint performance), suggesting that taller individuals may experience disadvantages in acceleration and change-of-direction abilities. Moreover, negative and significant correlations were identified between BMI and agility performance ($r = -0.353$ and $r = -0.337$), highlighting the influence of body composition on agility-related tasks. The lack of a substantial correlation between BMI and sprint performance ($r = 0.078$, $p > 0.05$) indicates that BMI alone may not adequately account for speed capability, necessitating the consideration of extra specific factors such as muscle power or limb strength for precise evaluation.

CONCLUSION

The disparities in physical attributes and performance between amateur and professional footballers can be ascribed to variations in training quality, selection criteria, and physical optimization. The amateur group seems to depend more on inherent physical attributes, whereas professional players gain from honed technical abilities and a well-rounded physical profile developed through elite training regimens. This study finds that professional football players aged 17–21 have enhanced and more consistent agility and speed performance relative to their amateur counterparts. The disparities mostly originate from organized training protocols, enhanced nutritional approaches, and methodical talent identification and development systems utilized in professional settings. The results underscore the necessity of creating personalized training programs that align with athletes' physical ability and developmental requirements. Prioritizing the concurrent enhancement of speed and agility is essential for optimizing performance outcomes in youth athletes.

Recommendations

Training regimens must incorporate bilateral agility drills and speed enhancement exercises according to the athlete's skill level.

Regular performance evaluations must be conducted to monitor progress and enable adaptive training modifications.

The methods of player selection and development must include considerations beyond anthropometric dimensions, such as technical skill, psychological resilience, and motor coordination.

Future study should build upon these findings by examining position-specific performance criteria, broader age demographics, and cross-sport comparisons.

Conflicts of Interest: The authors declare that they have no conflict of interest in relation to this manuscript.

Authors' Contribution: Study Design- SYT, ITK; Data Collection- ITK, Statistical Analysis and Manuscript Preparation- ITK; SYT. All authors read and approved of the final manuscript.

Ethical Approval
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