



Differences in the physical components of speed, agility, and muscle endurance based on playing position in Indonesian amateur women soccer athletes

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Abstract

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Scientific interest in women's soccer has increased over the past few years. There are several factors that can affect the performance of female soccer athletes, including the composition that supports running performance (speed, agility, and muscular endurance). This is to identify players who may be considered important for the successful execution of tactical roles and reference norms for developing future soccer playing talent. The purpose of this study was to identify differences in speed, agility, and muscular endurance based on playing position in amateur female athletes. The population and sample in this study were 24 amateur female soccer players. This research method uses an analytical approach with data description. Furthermore, it was analyzed using SPSS software version 26. The results showed significant differences between the variables tested according to the player's position in the team could not be determined with the significance results for the speed variable of $0.001 < 0.05$, then for the agility value of $0.001 < 0.05$, and for the muscle endurance variable of $0.000 < 0.05$. The conclusion of this study is that there are significant differences in speed, agility, and muscle endurance in amateur female soccer players based on playing position. However, players must maintain and improve their level of physical fitness to support tactical performance during matches or seasons.

PENDAHULUAN

Soccer players play many games during a season, which lasts approximately nine months. The period of a season usually consists of pre-season, early, middle and late season. To improve the training performance of football players during matches, it is necessary to implement a scientific and systematic training program. Various studies have been conducted to develop effective training programs (Kent et al., 2022; Kotzamanidis et al., 2005; Noyes et al., 2013).

Although the popularity of women's soccer is lower than that of men's soccer, it has increased considerably compared to before. The number of studies on women's soccer is increasing as the popularity of women's soccer increases (Castellano et al., 2011; Loturco et al., 2015; Ramirez-Campillo et al., 2016). The performance ratio of each intensity exercise, such as standing, walking, jogging, high-intensity running, and sprinting in women's soccer matches is the same as that of men's soccer players.

Soccer is a sport that requires key physical demands such as speed, agility, and muscular endurance to support performance on the field. Therefore, based on a comparison of the amount of high-intensity training during matches, national team players do more high-intensity running and sprinting than professional league players (Griffin et al., 2021). This also greatly affects the benchmark of the lower level players as a study in making training programs to improve the quality from amateur to professional players.

The movements of soccer players vary depending on their playing position (Bloomfield et al., 2007). Depending on the tactical characteristics practiced by the team, the movement patterns in each position may differ, but the performance ratio based on training intensity by position is similar in most national soccer leagues. , the purpose of this study is to analyze the differences in the physical conditions of Indonesian female amateur soccer players, namely speed, agility, and muscle endurance based on playing position.

METODE

This study involved 24 amateur female soccer players of Batu City, with an average age of 19.4 to 0.7 years. Each of the samples was willing to participate in this study and fulfill research criteria. The data from these tests were collected outside of the competitive season. to measure agility and speed the tests used instruments that already met the valid criteria. However, to measure leg muscle endurance, the wall sit test was used.

Performance Test

The selected tests are the Illinois Agility (IA) test, as well as the 30 m Sprint (S), and Wall Sit (WS) to evaluate physical performance in athletes. The IA was performed on a 10x5 m rectangular track. The players started in a prone position, ran towards the barrier at a distance of 10 m maximum speed, returned, and performed a zigzag run around four barriers, each 3.3 m apart.

m. The test ends with another straight run to the end of the rectangle. For S, players ran the length of the track 30 m after the start signal. And for WS, it is done with a squat movement where the player's back position touches the wall and is done with as long as and how resistant the player is in doing it. For the IA and S tests, each subject performed the test 2 times and the best time recorded through to be considered in the analysis.

Data Analysis

For the performance parameters, *Shapiro-wilk* and *Levene* tests were applied to verify the normality of the data and homogeneity of the data variance. *One-Way Anova* analysis was used to determine differences in the variables of speed, agility, and muscular endurance based on playing position. The corresponding effect size was determined by calculating the analyzed data using SPSS software version 26, and the level of significance for all variables was set at p 0.05.

RESULTS

In accordance with the objectives in this study, namely to find out the difference in speed, agility, and speed. muscular endurance of amateur female soccer players. Data normality and homogeneity of data variance have been tested with the results of the data can be continued with the *One Way Anova* test. Description of research or test results can be seen in table 1.

Table 1. Results of speed, agility, and muscular endurance performance tests

| Playing Position | Sprint 30 m (sec) | Agility (sec) | Muscle Endurance (sec) |
|------------------|-------------------|---------------|------------------------|
| Goalkeeper | 5.5± 0.4 | 20.1 ± 1.0 | 71.3 ± 1.6 |
| Defender | 5.1± 0.4 | 18.6± 0.7 | 74.4 + 2.2 |

The highest average speed of female players in the 30 m sprint test is in the front position with a value of 4.4 ± 0.5 seconds. The highest average value of agility is also found in the front players with 17.2 ± 0.6 seconds. The muscular endurance of players in the forward position is the highest among all playing positions. Furthermore, the t-test values between the variables showed significant differences which can be seen in (Table 2).

Table 2. Results of the difference test between variables along with the Post hoc test

| Variables | Sig. | Post Hoc |
|------------------------|--------|-----------------|
| Sprint (sec) | 0.001* | F > D, M, & GK |
| Agility (sec) | 0.001* | F > D, F&M > GK |
| Muscle Endurance (sec) | 0.000* | F > D, F&M > GK |

Description: GK (Goalkeeper), D (Defender), M (Midfielder), F Forward)

*Significance different P Value < 0.05

Striker or Forward has higher speed characteristics than other positions with a significance value of 0.001 < 0.05. Similarly, in the agility component, the F position still has high characteristics compared to other positions with a significance value of 0.001 < 0.05. The position with a high amount of muscle endurance also seems to be achieved by position F (0.000 < 0.05), while position M together with F outperforms position GK. And a clear difference was seen between the F and D positions.

DISCUSSION

This study was conducted to analyze the performance of female soccer players based on playing position. Soccer players are required to have specific physical demands on each position due to the characteristics of the style of play and tactics performed by the team (Abbott et al., 2018). In the current study, the position that took the fastest time among all positions was F, and vice versa for the GK position.

High-intensity exercise was most prevalent among FW, including sprinting. This is inconsistent with previous studies, as it was reported that FW players completed the longest distances when running (Dellal et al., 2010, 2011). Many players from different teams participating in European men's soccer leagues were targeted in previous studies, however this study looked at the performance of FW players in a team based on playing position. Maximal acceleration and deceleration are considered "high-intensity" efforts that impose the greatest physiological and mechanical load on players in terms of any running metric (Dalen et al., 2016; Osgnach et al., 2010). Therefore, the pattern of player exercise performance by position in this study may differ from previous studies due to the tactical characteristics practiced by the team. For example, the team's attacking tactics may have been configured such that the players in F actively attacked from both sides of the field. Such an explanation is supported by the observation that maximum velocity was also highest in the F position.

In official matches, the number of players in acceleration and deceleration that show the degree of sudden movement changes during the game varies depending on the position. Although explosive exercise performance capacity differs with differences in body composition between male and female soccer players,

the movement patterns during matches are similar (Davis & Brewer, 1993; Thomas et al., 2002). The highest acceleration and deceleration values occurred for F and M, respectively. These results indicate the performance pattern characteristic of positional training. In other words, F had to accelerate more because it was required to perform many explosive movements to cover a wide space when switching from defense to attack or vice versa. In addition, M is considered to complete a greater amount of deceleration because the player must make many changes in direction of movement in a compact situation with other players in a narrow space in the center area.

It has been demonstrated that the physical demands of women's soccer increase linearly as the standard of play progresses from youth to college and beyond college to professional and international levels (Andersson Helena Åand Randers et al., 2010; Krstrup et al., 2005; Mohr et al., 2008; Vescovi & Favero, 2014). The need to improve football-specific fitness components as for improvised players across the board is evident. As intermittent endurance training and repetitive sprinting ability are highly correlated with match performance, especially with the ability to perform high-intensity work, frequent assessment of players using field tests and implementation of training strategies aimed at improving these fitness components (e.g., prescribing high-intensity interval training) is highly recommended. If intensity management is not balanced, players may experience increased risk of injury, decreased aerobic capacity, and reduced performance (Silva et al., 2016).

Important limitations of the current study can be noted. Player performance was analyzed for only one of several women's amateur football teams in the study. Players' physical performance patterns during a match are influenced by the tactical characteristics of the team. Therefore, there are limitations to generalizing the athletic performance characteristics of a team throughout the season as characteristics of a professional football league.

CONCLUSION

Current research results show that female amateur soccer players cover long distances and perform high-intensity training like male players, and there are differences in physical performance for each position. , to improve the performance of female players and prevent injuries, it is necessary to build a training program that considers the characteristics of each player and playing position, in addition to the overall training program in a team.

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