Analysis of goal-scoring in an elite European women's football teams

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ABSTRACT

Football is one of the sports with more audience and women's football has undergone a notable evolution at all levels. Scoring goals is the most relevant indicator of success in football. The aims of this study were to analyse, looking for patterns and/or differences in how goals are obtained through European elite women's teams. The goals were analysed through: way of obtaining the goal, type of finishing, type of assistance, time interval in which the goal was scored, assistance zone and finishing zone. A frequency analyses was performed through total number of actions of 174 goals from French and English teams in the respective national championships. The highest percentage of goals was obtained through offensive organization, also giving importance to the number of goals through tactical schemes (set balls). The zone where most goal submissions occur was in the penalty area, and the time interval of the games where the most goals were scored was defined between the 31 and 61 minutes. Differently from men's, elite women's football teams obtain the highest percentage of goals through the offensive organization, with a substantial number of goals also being scored through tactical schemes.
Keywords: Technology, Innovation, Notational analysis, Game analysis, Soccer, Goal analysis, Women's soccer.

INTRODUCTION

Football is undoubtedly the sport that attracts the most public attention (Pollard & Reep, 1997). It is characterized by a complex system that is in constant change, by which the behaviour and actions of teams must be the subject of several studies seeking to analyse and interpret what occurs during football matches (Clemente et al., 2014). As part of the general evolution of football, women's football has undergone changes and a notable evolution at all levels.

In recent years, there has been a large increase in the amount of scientific research conducted in various areas of football, such as game observation, game analysis, and notational analysis (Garganta, 2001). This is because coaches look for information through this type of analysis, as it can improve the quality of the performance of their teams, either collectively or individually.

Because scoring goals is the most relevant indicator of success in football, it is extremely important to implement training methods and game strategies that increase the percentage of goals scored by a team and to hiring and/or development of players who have a remarkable ability to score goals (Rodenas et al., 2020).

Researchers have tried to establish a relationship between the adopted offensive game methods—such as counterattacks, quick attacks, or positional attacks—and success in scoring goals (Santos et al., 2016). However, it is also necessary to consider the evolution of the effectiveness of shots themselves and the way goals are scored, as well as players' abilities to score goals in different game and training contexts, as these variables are fundamental to a more in-depth study of the tactical components of football (Rodenas et al., 2019).

According to recent literature reviews of football game analyses (Pratas et al., 2018; Sarmento et al., 2018), few scientific studies have analysed what a goal itself is and how it is obtained. Such an analysis would be valuable, as the number of goals scored throughout a season decreases disproportionately to the number of scoring opportunities and many other variables that occur in greater numbers in a football game (Tenga et al., 2010).

Analysing other offensive variables is useful when assessing the offensive playing style of a team. However, creating more scoring opportunities, having more shots on goal, and entering the opponent's area more often do not guarantee that a team will score more goals. In fact, some studies have observed that the shot/goal ratio is a critical aspect that differentiates successful teams from unsuccessful ones (Castellano et al., 2012; Delgado-Bordonau et al., 2013; Dufour et al., 2017).

Therefore, studying the number of goals scored and understanding how they occur should be prioritized when analysing any football game, as it is the main objective of all teams. Studying this parameter is advised in different contexts and environments, as well as among different teams from different leagues (Santos et al., 2016). The sample of the present study comprises players from European elite women's teams, which are currently evolving rapidly and attracting increasing attention.

Based on the above discussion, this study aims to analyse the goals scored by three European elite women's teams and understand how they are obtained by looking for shared patterns and/or divergences between them.

MATERIAL AND METHODS

In this observational study, the goals scored by three European elite women's teams were observed and analysed according to video analysis using a specific instrument and several predefined variables.

The observational sample consists of 174 goals scored by three elite women's teams from French leagues (Olympique Lyonnais F – 67 goals; Paris Saint Germain F – 60 goals) and an English league (Chelsea Football Club F – 47 goals) during their respective national championships from the 2019/2020 season.

This study analysed different events (including events that culminated in goals) using an observational method with a previously validated instrument (Santos et al., 2016; Sarmento et al., 2016) and support field scheme (Figures 1) considering several variables.
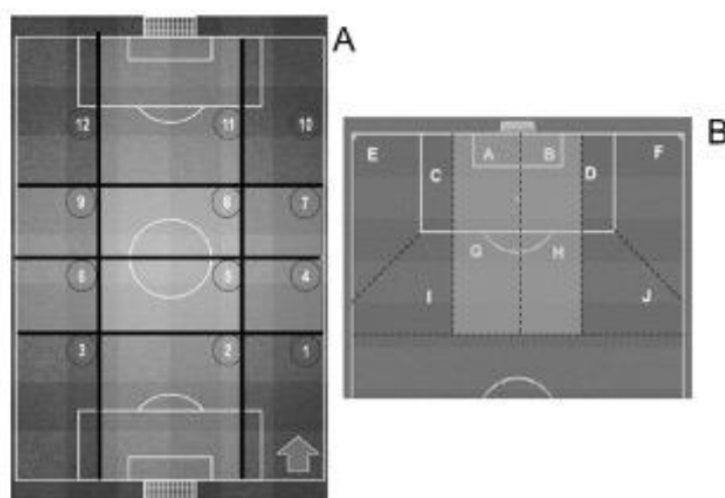

Figure 1. Field scheme (A – submission zone; B – finishing zone).

The following (dependent) variables were used to obtain a complete and detailed analysis of the goals: method of obtaining the goal (offensive organization, which presupposes a positional attack, quick attack, offensive transition, or tactical scheme), type of goal (right foot, left foot, head, and other), type of assistance (individual action, pass, cross, rebound) and submission zone (Figure 1A). The independent variable was the time interval of the game in which the goal was scored in the respective game.

The goals were observed and analysed using the WyScout platform (Chiavari, Italy), which provided access to all the goals that were intended to be analysed (Martín-González et al., 2017).

A Microsoft Excel spreadsheet was created to gather all the variables that were initially defined and analyse all the goals, discriminating throughout the document for further statistical analysis.

The teams' goals were described in each sample point for analysis, as were their positions in the field scheme (which represent the real areas of the field - Figure 1). The events were then analysed concerning how the goal was scored, the area where the shot was taken from (completion zone), the area where assistance was given for the goal, the time interval in which it was scored, and the type of finish.

Frequencies and percentages were calculated for all variables. Microsoft Excel was used to simplify the data analysis.

RESULTS

The most common way to score goals among the analysed female teams was the offensive organization (OO), with about 79 of the 174 analysed goals being scored during this action. In other words, 45.4% of the goals were scored through quick attacks or positional attacks (offensive organization). Also, 97 (55.7%) goals were scored with the right foot (n = 97) (Table 1).

Table 1. Goals score distributions according to way, type finishing and type of assistant.

	Frequency (N)	Percentage (%)
Way of obtaining the goal		
Tactical Scheme (set ball)	54	31
Offensive Organization	79	45.4
Offensive Transition	41	23.6
Type of finish		
Right Foot	97	55.7
Left Foot	39	22.4
Head	38	21.8
Type of assist		
Pass	77	44.3
Crossing	55	31.6
Rebound	21	12.1
Individual Action	7	4
Without assistance*	14	8

Note. * Tactical Scheme (set balls): penalty and free kicks.

The remaining goals were distributed evenly between the other two variables (n = 39 for the left foot and n = 38 for the head). It was found that passing was the most prominent type of assistance. Of the 174 total goals, 77 (44.3%) were obtained after a pass. Crosses were the second most common type of assist (n = 55; 31.6%). Only seven goals (4%) were scored using an individual action, such as a series of dribbles after regaining possession of the ball. Goals resulting from shots taken either at the penalty mark or through an offensive freekick were considered unassisted and, thus, were not included in the individual action. Fourteen goals (8%) were obtained in these two ways.

Table 2. Time interval where the goal was scored.

	Frequency (N)	Percentage (%)
[0-15] minutes	28	16.1
[15-30] minutes	14	8.1
[30-45] minutes	34	19.5
[+45] minutes	5	2.9
[45-60] minutes	30	17.2
[60-75] minutes	29	16.7
[75-90] minutes	27	15.5
[+90] minutes	7	4

There was no single time interval in which goals were scored more frequently, as goals were divided quite evenly among the various moments of the game (Table 2).

The most goals (n = 34; 19.5%) were scored in the time interval [30-45], near the half time. The start of the second half, (i.e., the [45-60] interval) contained the next-most goals (n = 30; 17.2%). The time intervals of [60-75], [0-15], and [75-90] were very similar, with 29, 28, and 27 goals scored, respectively.

Fourteen of the 174 goals (8.1%) were scored in the [15-30] interval. Few goals were scored in the compensation periods (discounts) of the first and second halves here, in the [+45] interval, only five goals (2.9%) were scored; seven goals (4%) occurred in the [+90] interval.

Zone B was the area from which the most goals (n = 81; 46.6%) were scored. Another 64 goals (36.8%) were scored from zone A, making it the second-most prevalent goal-scoring area. Therefore, we can verify that the goals were predominantly achieved from the zones within the penalty kick area (Figure 2).
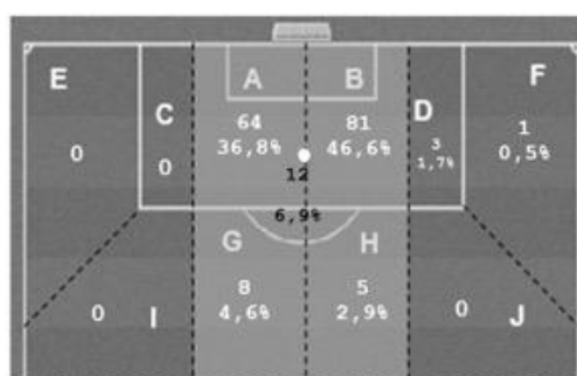

Figure 2. Goals finishing zone frequencies.

Relatively few goals were scored from the penalty mark (12 goals; 6.9%); zone G (8 goals; 4.6%); zone H (5 goals; 2.9%) and zone F (1 goal; 0.5%).

DISCUSSION

In elite women's football, most goals are scored through the offensive organization, which involves positional attacks and quick attacks. Similar findings were obtained in a study that analysed the goals scored by a Sporting CP senior women's team (Santos et al., 2018). It was concluded that goals were obtained most often through quick attacks, while the least goals were scored during offensive transitions (i.e., the transition from defence to attack), as only 23.6% of goals were scored in this way. Meanwhile, 31% of the goals were scored through tactical schemes (set balls), making this the second-most effective method in this study.

These results do not support the vast majority of goal analysis studies (Lago et al., 2012; Liu et al., 2015; Santos et al., 2016; Tenga & Sigmundstad, 2011). Most studies have found that counterattacks (offensive transitions) are the most effective scoring method. This fact demonstrates the difference between men's and women's football in terms of the most effective goal-scoring method. These findings are partially supported by the physiological and anatomical differences between men and women football players (McFadden et al., 2020). For example, male central midfielders covered more total distance during a match than female central

midfielders, male full-backs and wide midfielders covered a greater distance than female players in the same positions at higher speed thresholds (Bradley et al., 2014). Thorough, the distance covered in the higher speed zones across practices and games are superior in men than women, with the differences most pronounced at the highest speed zones with male players accumulated a greater number of sprints during games than female players (McFadden et al., 2020). However, there are no gender differences for technical events between men and women in the number of ball touches, time in possession of the ball or total duels won during both halves and the entire match, but female players lost the ball more often and displayed lower pass completion rates than male players during match periods (Bradley et al., 2014).

The greater number of goals scored from an offensive organization indicates that the opponents are limited to defensive organization because of some debilities in attacking capabilities as reported among so-called inferior men's teams (Bradley et al., 2013).

As expected, most of the scored goals were achieved with the right foot. Similar results were observed in a study that analysed the goals scored by the Club Atlético de Madrid team in the Spanish League during the 2013-2014 season (Santos et al., 2017) and in a study on other elite teams in the 2013-2014 season (Santos et al., 2016b.

The most common type of assist was passing, followed by crossing. These results are expected considering that the greatest number of goals were obtained during offensive organizations as discussed in previous studies (Garratt et al., 2017). Of the 174 goals scored, 21 (12%) resulted from rebounds, which may indicate a lack of pressure from the opponent, as suggested in a study of the 2008 Brazilian Championship (De Andrade et al., 2015). This finding indirectly indicates lower levels of competitiveness and tactical organization.

In the same study, many goals were scored through individual actions, which does not align with our results—we found that only 4% of goals resulted from individual actions. This difference may be because males generally have better-developed technical skills than females. These findings also highlight the differences between male and female football players, considering the acceptability and feasibility of experiencing the same training conditions, which is currently evolving as increasingly talented female athletes are emerging in football on a global stage.

No time interval was associated with a greater number of goals than the others. Goals were not distributed evenly over time in several games. However, there are a pattern during the end of the first half and the beginning of the second half. These results are in line with findings from elite football teams from Italian, English, and Spanish Leagues (Palomino et al., 2000), where the highest frequency of goals was associated with the interval between the 31st and 61st minutes.

Our results demonstrate that the greatest number of goals were scored from the penalty area (mostly zones A and B), which is in line with the findings of several other researchers (Clemente et al., 2014; De Andrade et al., 2015; Palomino et al., 2000; Rodenas et al., 2020; Santos et al., 2016, 2017; Santos et al., 2015; Tenga et al., 2010). However, there is moderate disparity between zones A and B, with more goals being scored from zone B. This makes sense, as more goals are scored with the right foot than the left foot, and zone B is located in the right zone of the penalty area.

This study has some limitations. Most notably, the sample size was limited to three teams and did not include each team's representative from all elite female leagues, thus making it impossible to generalize the findings.

However, this was one of the most relevant women's football teams from the European football league during the 2019/2020 championship. Analysing the goals and the way they were scored—as well as the areas where more goals were scored—are of great importance, as they improve our understanding of the game and why certain events and actions occur, as a database to better understand the game and try to find patterns in women's football. Due to the current lack of information about female football players, further studies on this group of athletes are needed.

CONCLUSION

Differently from men's, elite women's football teams obtain the highest percentage of goals through the offensive organization, with a substantial number of goals also being scored through tactical schemes (set balls). Moreover, similar to elite male players, elite female players score goals most often with the right foot from the penalty area (zones A and B) 31-61 minutes into the game.

AUTHOR CONTRIBUTIONS

Study design, PM, FMC, MC and RL; PM data collection; PM, BS, MR, NM results analysis; PM, BS, MR, NM, FMC, MC and RL statistical analysis; PM, BS, MR, NM, data interpretation; PM, BS and RL literature search; PM, BS manuscript preparation; FMC, MC and RL supervision. All authors read and approved the final version of the manuscript.

SUPPORTING AGENCIES

DISCLOSURE STATEMENT

No potential conflict of interest were reported by the authors.

ACKNOWLEDGMENTS

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