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Estrategias de presión defensiva y su impacto en el juego ofensivo en el fútbol femenino de élite

Defensive pressure strategies and their impact on offensive play in elite women's football

Estratégias de pressão defensiva e o seu impacto no jogo ofensivo no futebol feminino de elite

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RESUMEN

Estudios recientes han estudiado los comportamientos ofensivos en el fútbol femenino de élite, pero la relación entre las acciones defensivas y las transiciones ofensivas contrarias sigue estando poco explorada. Este estudio analizó cómo la presión defensiva durante las transiciones dinámicas afecta a los patrones ofensivos en la UEFA Women's Champions League 2023/2024. Se codificaron los datos de 13 partidos, 16 equipos y 1.324 transiciones utilizando la herramienta de observación "*Transfootb*", desarrollada por dos entrenadores UEFA PRO. El análisis, respaldado por una alta fiabilidad inter-observadores e intra-observadores (índices *kappa* de 0,9 y 0,85), incorporó 13 criterios técnico-tácticos y 4 contextuales. Los principales resultados indicaron que la presión defensiva condujo a ataques más directos por parte de los adversarios, menos pases, menor participación de los jugadores, posesiones más cortas y menor eficacia ofensiva. El análisis multivariante reveló que variables como el resultado final y parcial, el momento del partido, la ubicación del equipo, el posicionamiento defensivo, el tipo de recuperación del balón, la implicación de los jugadores atacantes y el periodo de tiempo determinaron las estrategias de presión defensiva. Los resultados ponen de relieve la capacidad de adaptación de los equipos para modificar los planteamientos defensivos en función de la interacción de factores técnico-tácticos y contextuales, así como la influencia de los comportamientos defensivos de un equipo sobre los ofensivos del rival. Estas conclusiones pueden servir de base para el entrenamiento y la planificación táctica con el fin de optimizar las fases defensiva y ofensiva del juego en el fútbol femenino de élite.

Palabras clave: presión defensiva, transiciones dinámicas, eficacia ofensiva, UEFA Women's Champions League.

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ABSTRACT

Recent studies have focused on offensive behaviours in elite women's football, but the relationship between defensive actions and opposing offensive transitions remains underexplored. This study analysed how defensive pressure during dynamic transitions affects offensive patterns in the UEFA Women's Champions League 2023/2024. Data from 13 matches involving 16 teams and 1,324 transitions were coded using the "*Transfootb*" observation tool, developed by two UEFA PRO coaches. The analysis, supported by high inter- and intra-observer reliability (*kappa* indices of 0.9 and 0.85), incorporated 13 technical-tactical and 4 contextual criteria. Main results indicate that defensive pressure leads to more direct attacks by opponents, fewer passes, reduced player involvement, shorter possessions, and diminished offensive efficiency. Multivariate analysis revealed that variables like match result, match status, game period, team location, defensive positioning, ball recovery type, attacking player involvement, and period time shaped defensive pressure strategies. The findings highlight the adaptability of teams in modifying defensive approaches based on the interplay of technical-tactical and contextual factors, as well as the influence of a team's defensive behaviour on its opponents' offensive behaviour. These insights can inform training and tactical planning to optimize both defensive and offensive phases of play in elite women's football.

Keywords: defensive pressure, dynamic transitions, offensive efficiency, UEFA Women's Champions League

RESUMO

Estudos recentes têm-se centrado nos comportamentos ofensivos no futebol feminino de elite, mas a relação entre as acções defensivas e as transições ofensivas adversárias continua pouco explorada. Este estudo analisou a forma como a pressão defensiva durante as transições dinâmicas afecta os padrões ofensivos na UEFA Women's Champions League 2023/2024. Dados de 13 jogos envolvendo 16 equipas e 1.324 transições foram codificados usando a ferramenta de observação "*Transfootb*" desenvolvida por dois treinadores do UEFA PRO. A análise, apoiada por uma elevada fiabilidade inter-observador e intra-observador (índices kappa de 0,9 e 0,85), incorporou 13 critérios técnico-tácticos e 4 critérios contextuais. Os principais resultados indicam que a pressão defensiva conduziu a mais ataques diretos dos adversários, menos passes, menos envolvimento dos jogadores, posses de bola mais curtas e menor eficácia ofensiva. A análise multivariada revelou que variáveis como o resultado final e parcial, o momento do jogo, a localização da equipa, o posicionamento defensivo, o tipo de recuperação de bola, o envolvimento do jogador atacante e o período de tempo determinaram as estratégias de pressão defensiva. Os resultados evidenciam a capacidade de adaptação das equipas para modificar as abordagens defensivas em função da interação de factores técnico-tácticos e contextuais, bem como a influência do comportamento defensivo de uma equipa no comportamento ofensivo do adversário. Estas conclusões podem servir de base ao treino e ao planeamento tático, a fim de otimizar as fases defensiva e ofensiva do jogo no futebol feminino de elite.

Palavras chave: pressão defensiva, transições dinâmicas, eficácia ofensiva, UEFA Women's Champions League

INTRODUCTION

Publications on technical-tactical performance in women's football have increased significantly since 2020, coinciding with a growth in social interest and a rise in the number of practitioners (FIFA, 2019, 2023). Additionally, most studies have focused on high-level football, partly due to easier access to matches (Casal et al., 2024; Dipple et al., 2022; Feist et al., 2024; Harkness-Armstrong et al., 2023; Iván-Baragaño et al., 2022; López-Araya et al., 2025; Maneiro et al., 2021; Narayanan & Pifer, 2023; Shen et al., 2024). Early research on technical-tactical performance in women's football employed a narrative approach to identify potential performance indicators (Kirkendall, 2007). Subsequent investigations sought to establish associations between contextual and technical-tactical variables (Hewitt et al., 2014; Mara et al., 2012; Stuart & Leite, 2013). Thus, in the past decade, research on set pieces in women's football has revealed differences in outcomes based on match status and

execution variables, such as the number of players involved in offensive actions (Beare & Stone, 2019; Lee & Mills, 2021; Maneiro et al., 2019).

Recent years have seen detailed analysis of technical-tactical offensive behaviour in elite women's football. For instance, researchers have explored the goalkeeper's role in individual and collective team success (Casal et al., 2024; Sainz de Baranda et al., 2019). Other studies have employed statistical models to identify variables that characterise top-performing teams. Dipple et al. (2022) found that winning teams exhibited greater forward-passing efficiency, especially in areas near the final third of the field, aligning with findings of De Jong et al. (2023) that top teams displayed less reliance on individual players and greater collective performance. Studies of offensive success indicators have linked ball possession to individual actions and short, fast possessions originating near the opponent's goal (Iván-Baragaño et al., 2021; Maneiro et al., 2022; Martínez-Hernández et al., 2024; O'Donoghue & Beckley, 2023; Scanlan et al., 2020).

In contrast, defensive dynamic transitions -a crucial component of football- have been less frequently examined in women's football, despite related research in men's football (Casal et al., 2016; Casal et al., 2021; Forcher et al., 2024; Freitas et al., 2023; Vogelbein et al., 2014). Studies in men's football consistently identify defensive pressure following ball loss as the most effective strategy for regaining possession. In women's football, there remains insufficient understanding of how defensive transitions influence both the team's success and the opponent's outcomes. An example of this is the Spanish National Team, champion of the FIFA Women's World Cup 2023, which excelled in recovering the ball quickly through effective pressure following loss (FIFA, 2023).

Another under-researched area is how a team's defensive transition strategy affects the offensive model of the opposing team. In football, every action tends to prompt a reaction, so examining whether defensive transition approaches influence the opponent's offensive structure and efficiency would provide valuable insights. Existing research in men's football highlights the relationship between the ball recovery zones and attacking strategies. For instance, Martínez-Hernández et al. (2024) and O'Donoghue and Beckley (2023) observed that effective attacking outcomes are linked to ball recovery in central defensive zones, with collective balance and increased central pressure proving essential.

Few studies have explored the relationship between a team's defensive phase and the opponent's offensive phase. Casal et al. (2015) examined the link between a team's offensive transitions and the opposing team's defensive organisation but reported no significant results. Armatas et al. (2022), however, found significant associations between counterattack success and defensive factors such as player positioning, defender numbers, and initial pressure.

To the authors' knowledge, no prior research has investigated elite women's football from this perspective. Such an analysis could be highly valuable for teams, coaches, and analysts, offering actionable insights that could determine success or failure in crucial match scenarios.

To the authors´ knowledge, no prior research has investigated the relationship between a team's defensive dynamic transition execution models and the offensive dynamic transition models/outcomes of opposing teams in elite women´s football. Such an analysis could be highly valuable for teams, coaches, and analysts, offering actionable insights that could determine success or failure in these key match scenarios.

In this study two objectives were proposed; firstly, to analyse the relationship between a team's general defensive approach following ball loss and the development of the opposing team's offensive dynamic transitions in elite women's football; and secondly, to establish a multivariate explanatory model based on the technical-tactical and contextual criteria studied.

METHODS

Study design

This research was conducted within the framework of observational methodology (Anguera, 1979). The specific design for this systematic observation was nomothetic/punctual/multidimensional (Anguera et al., 2011). Additionally, the recording employed an intra-sessional follow-up observation. The design is considered nomothetic as it involves observing various matches and teams. It is punctual because no match featured repeated matchups. Furthermore, it is classified as intra-sessional follow-up due to the diachronic recording of behaviours. Lastly, it is multidimensional as it examines various behavioural dimensions (proxemics and gestures), which are incorporated into the observational instrument.

Sample

This research examined every sequence initiated during an offensive dynamic transition, conducted by teams participating in the final phases (quarter-finals, semi-finals and final) of the UEFA Women´s Champions League 2023/2024. A total of 16 teams, 13 matches, and 1,324 dynamic transitions were analysed, with 57 transitions excluded due to unobservability (Table 1). Match recordings were obtained from WyScout (*www.hudl.com*, n.d.) and analysed *post-event*. The unit of analysis comprised the period from the moment the observer team regained ball possession until the opposing team ended its defensive phase, using the definition of ball possession provided by Casal (2011). Observations were limited to the regular period (i.e. 90 minutes, excluding extra time). Data recording was performed in a manner that preserved the spontaneity of the players' behaviour and their natural environment. In line with the Belmont Report (1978), the use of publicly available images for research purposes does not require informed consent or ethical approval from a committee.

Table 1

Match sample characteristics.

Stage	Match	Result	Transitions
Quarter-finals	Ajax – Chelsea	0 - 3	105
	Sport Lisboa e Benfica – Olimpique Lion	1 - 2	104
	BK Häcken – Paris Saint Germain Football Club	1 - 2	89
	SK Brann Kvinner – Barcelona	1 - 2	102
	Chelsea– Ajax	1 - 1	134
	Olympique Lion – Sport Lisboa e Benfica	4 - 1	94
	Paris Saint Germain Football Club – BK Häcken	3 - 0	145
	Barcelona – SK Brann Kvinner	3 - 1	110
Semi-finals	Barcelona – Chelsea	0 - 1	96
	Olympique Lion – Paris Saint Germain Football Club	3 - 2	96
	Chelsea – Barcelona	0 - 2	82
	Paris Saint Germain Football Club – Olympique Lion	1 - 2	108
Final	Barcelona – Olympique Lion	2 - 0	59

Observation Instrument

An *ad hoc* observation instrument, named *Transfootb*, was developed for this study (Table II). It combines a field format with category systems based on the methodology of Anguera et al. (2007) and was created through a dynamic process of proposing dimensions and an initial formulation of tentative category systems for each. This

process was led by two researchers and UEFA PRO coaches, each with over ten years of experience in applying observational methodology to match analysis, following an exhaustive theoretical review of the works of Armatas et al. (2022), Casal et al. (2015, 2023) and Tenga et al. (2010). Subsequently modified in accordance with an empirical-inductive strategy, and then again, according to a theoretical-deductive strategy. After recording 30 dynamic transitions that do not form part of the observational sample of this research, without detecting new behaviours in any of the criteria, the precautionary test was passed, with catalogue type lists being assumed as repertory type lists (Anguera & Izquierdo, 2006), counting on the presumption of exhaustivity.

Table 2

Macrocriteria, Criteria, Categories and Codes to Observation Instrument.

Macrocriteria	Criteria	Category	Code
Match context	**Location**	**Home**: the observer team plays at home	HM
		Away: the observer team plays away from home	AW
	Period	**0-15 Minutes:** 0-15 minutes of the match time	0-15
		16-30 Minutes: 16-30 minutes of the match time	16-30
		31-45 Minutes: 31 minutes –half time	31-45
		46-60 Minutes: 46-60 minutesof the match time	46-60
		61-75 Minutes: 61-75 minutesof the match time	61-75
		76-90 Minutes: 76 minutes –full time	76-90
	Match Status	**Winning:** The opposing team has scored more goal than the observed team at the moment of regaining possession of the ball	W
		Drawing: The opposing team has scored equal goals to the observed team, or no goals had been scored	D
		Lossing: The opposing team has scored less goal than the observed team at the moment of regaining possession of the ball	L
	Final Result	**Win:** The opposing team has scored more goals than observed and won the match	FW
		Draw: The opposing team has scored equal goals to observed and draw the match	FD
		Loss: The opposing team has scored fewer goals than observed and lost the match	FL
Offensive transition opposing team	**Ball Recovery**	**Steal:** A defending player prevents the ball passed by an opponent from reaching its intended receiver by contacting the ball and maintaining his team's possession of the ball	ST
		Duel: A defending player dispossesses an opponent of the ball through a physical challenge or defensive pressure	DL
		Turnover: A defending player collects the ball lost (via clearance or a missed pass) by the opposing team	TR
		Goalkeeper Action: The goalkeeper recovers the ball after an opponent's shot, cross, turnover, etc.	GK
	Recovery Zone	**Defensive zone**	DF
		Middle defensive zone	MD
		Middle offensive zone	MO
		Offensive zone	OF
	Start Interaction Context (CEI)	The goalkeeper regains possession of the ball with the opposing team's forward line ahead	PA
		The defensive line regains possession of the ball with the forward line ahead	RA
		The defensive line regains possession of the ball with the midfield line ahead	RM
		The midfield line regains possession of the ball against the rearmost line	MR

	The midfield line regains possession of the ball against the midfield line	MM
	The midfield line regains possession of the ball with the forward line ahead	MA
	The forward line regains possession of the ball against the rearmost line	AR
	The forward line regains possession of the ball against the midfield line	AM
	The forward line regains possession of the ball against the goalkeeper	AØ
Type of Initial Attack	**Positional:** Possession starts by gaining the ball in play; the first or second player makes short, horizontal, and non-penetrating passes in an attempt to destabilize the organized defensive system of the opposing team	PT
	Direct: Possession starts by gaining the ball in play; the first or second player in action uses long vertical penetrating passes. This type of possession aims to quickly reach the opponent's goal, challenging the organized defensive system of the opposing team	DT
	Counterattack: Possession starts by gaining the ball in play; the first or second player in action uses penetrating passes or dribbles to penetrate; the progression towards the opposing goal involves a high percentage of quick penetration passes (evaluated qualitatively). This type of possession aims to deny the opponent the opportunity to minimize surprise, reorganize their system, and be defensively prepared. It cannot begin with a goalkeeper pass if the goalkeeper controls the ball for more than 4 seconds	CT
Passes	**0:** The attacking team fails to make any passes	0
	1-2: The attacking team makes between 1 and 2 passes	1-2
	3-4: The attacking team makes between 3 and 4 passes	3-4
	≥5: The attacking team makes 5 or more passes	≥5
Penetrate Passes	**0:** The team does not make any passes towards the opposing goal, failing to surpass any player or defensive line of the opposing team	0
	1-2: The team makes between 1 or 2 passes towards the opposing goal, successfully surpassing some player or defensive lines of the opposing team	1-2
	≥3: The team makes more than 2 passes towards the opposing goal, successfully surpassing some players or defensive lines of the opposing team	≥3
Attack Player	**1-2:** During the team's possession, between 1 and 2 players voluntarily contact the ball If a player contacts the ball more than once, it is counted only once	1-2
	3-4: During the team's possession, between 3 and 4 players voluntarily contact the ball	3-4
	≥5: During the team's possession, 5 or more players voluntarily contact the ball	≥5
Duration	**1-5:** Possession lasts between 1 and 5 seconds	1-5
	6-10: Possession lasts between 6 and 10 seconds	6-10
	≥11: Possession lasts more than 10 seconds	≥11
End Zone	**Defensive zone**	DFF
	Middle defensive zone	MDF
	Middle offensive zone	MOF
	Offensive zone	OFF
Type of Possession	**Short possession:** one or two passes per team possession	SH
	Medium possession: three or four passes per team possession	MP

		Long possession: five or more passes per team possession	LG
	Outcome	**Goal:** When the whole of the ball crosses over the line, between the goal posts and under the crossbar, provided no offence has been committed by the scoring team. The referee awarded a goal	GO
		Attempt ON Target: An attempt on goal by the attacking team that were heading towards the goal which was saved by the goalkeeper or blocked by a defensive player of the opposing team	AO
		Attempt OFF Target: An attempt by the attacking team which was not directed between the dimensions of the goal including hitting the crossbar or goal posts	AF
		Set-play: A set piece was awarded to the attacking team in the form of a free kick, penalty kick or throw-in	SP
		Corner kick: The attacking team wins a corner kick	CK
		Enter offensive zone: advance the ball into the offensive zone, free kicks, and throw-ins in the offensive zone.	OZ
		Loss of Possession: The attacking team lost possession of the ball through the ball going out of the dimensions of the pitch or an opposing team player regaining possession of the ball, with enough control to have a deliberate influence over the ball's subsequent direction	LP
Defensive transitions observed team	**Number of Defenders**	**1-3:** At the moment of losing possession, the defending team has between 1 and 3 players positioned between the ball and their own goal, excluding the goalkeeper.	1-3
		4-6: At the moment of losing possession, the defending team has between 4 and 6 players positioned between the ball and their own goal, excluding goalkeeper.	4-6
		≥7: At the moment of losing possession, the defending team has 7 or more players positioned between the ball and their own goal, excluding goalkeeper.	≥7
	Defensive Position	**High:** The furthest-back defender is in the opposing half	HG
		Medium: The furthest-back defender is closer to the midline than to their own goal (Middle defensive zone)	ME
		Low: The furthest-back defender is closer to their own goal than the midline (Defensive zone)	LW
	General Defensive Approach (GDA)	**Persistent (pressure):** Several opposing players press the attackers during the first 3 seconds of possession. The defenders position themselves near the ball possessor, trying to hinder their actions, and close to the attackers closest to the ball, attempting to prevent passes. Pressing defensive model.	PR
		Expectant (no pressure): A player pressures the ball possessor, or no player pressures the attackers during the first 3 seconds of possession. Containment defensive model.	EP

Procedure and Reliability

Data were coded by one observer. To minimise intra-observer variability, eight training sessions of two hours each were conducted in accordance with the Losada and Manolov (2015) criteria and applying the criterion of consensual agreement (Anguera, 1990) among the observer and the principal investigator. A total of 110 offensive transitions were analysed during the training sessions. An intra- and inter-observer reliability test was performed by reassessing 132 transitions (10% of the total sample) (Tabachnick & Fidell, 2021), which were randomly selected and analysed four weeks after the initial assessment (Losada & Manolov, 2015). Cohen's *Kappa coefficient* (Cohen, 1960) was used to measure the reliability of the data collected, yielding values of 0.9 for intra-observer

reliability and 0.85 for inter-observer reliability. Both coefficients indicate *almost perfect* agreement (Landis & Koch, 1977).

Data Analysis

Initially, a descriptive and comparative analysis of absolute frequencies was conducted based on the expectant (no pressure) and persistent (pressure) categories of the general defensive approach criterion. The existence of statistically significant differences between the two criteria was examined using the Pearson's Chi-Square statistic, and the results were quantified using the contingency coefficient. Effect sizes were classified as small (ES=.10), medium (ES=.30), and large (ES=.50) (Gravetter & Wallnau, 2007). Statistically significant deviations from expected values were identified using standardised residuals for each cell, with a significance level $p < .05$ ($z > 1.96$; $z < -1.96$).

Subsequently, to explore the interaction of variables associated with defensive tactical intent, a multivariate decision tree model was proposed (Shannom, 1948). The model's dependent variable was the general defensive approach criterion, while all other criteria were included as independent variables. To optimise the model's performance and mitigate risks of underfitting or overfitting on the test set, various hyperparameters combinations and growth algorithms were evaluated; i) training sample percentage, ii) model depth, iii) minimum observations per node, and iv) the model growth method. The final model utilised the CHAID (Chi-Square Automatic Detection Interaction) growth method, with 70% of the sample designated as training data and the remaining 30% used as a validation set. The maximum tree depth was limited to three levels, with a minimum of 80 observations for parent nodes and 40 for terminal nodes.

All analyses were conducted using SPSS 26.0 statistical software (IBM Corp., Released 2017. IBM SPSS Statistics for Windows, Version 26, IBM Corp., Armonk, NY, USA).

The model's validation was assessed through the area under the curve (AUC), yielding a result of .652 [95% CI = .620-.684]. Sensitivity, specificity, and percentage of correct classifications for the training and validation models are detailed in the confusion matrix in Table III. The correct classification rate of the decision tree model on the training dataset was 69.4%, compared to 61.1% observed on the test dataset. In both cases, the model showed greater sensitivity in detecting true positives (i.e., Pressure), with 80.3% and 74.8% respectively. Lastly, the model demonstrated a lower ability to detect true negatives, with a specificity of 50.9% and 45.1% in both datasets.

Table 3

Decision Tree Classification Model confusion matrix.

Sample		Predicted		
		No Pressure (0)	**Pressure (1)**	**Correct Percentage**
Training	No Pressure (0)	174	168	50.9%
	Pressure (1)	115	469	80.3%
	Overall Percentage	31.2%	68.8%	**69.4%**
Test	No Pressure (0)	83	101	45.1%
	Pressure (1)	54	160	74.8%
	Overall Percentage	34.4%	65.6%	**61.1%**

RESULTS

Table IV presents the descriptive and bivariate results comparing the categories of pressure and no pressure within the general defensive approach criterion. Among the 17 criteria analysed, statistically significant associations were identified in 12, with effects sizes ranging from small to medium (.075 - .252).

Table 4

Descriptive and bivariate results based on the General Defensive Approach criterion.

Criteria	Category	No Pressure (n=526 - 39.7%)	Pressure (n=798 - 60.3%)	*p* Overall (ES)
Location	AW	256 (37.6%)	425 (62.4%)	.102 [-]
	HM	270 (42.0%)	373 (58.0%)	
Period	0-15	107 (45.0%)	131 (55.0%)	<.05 [.108]
	16-30	77 (40.7%)	112 (59.3%)	
	31-45	80 (40.6%)	117 (59.4%)	
	46-60	79 (36.6%)	137 (63.4%)	
	61-75	84 (47.5%)	93 (52.5%)	
	76-90	99 (32.2%)**	208 (67.8%)*	
Match Status	W	172 (48.6%)*	182 (51.4%)**	<.001 [.115]
	D	212 (34.9%)**	395 (65.1%)*	
	L	142 (39.1%)	221 (60.9%)	
Final Result	FW	203 (41.7%)	284 (58.3%)	<.001 [.252]
	FD	47 (16.8%)**	232 (83.2%)*	
	FL	276 (49.5%)*	282 (50.5%)**	
Ball Recovery	ST	150 (36.4%)	262 (63.6%)	<.001 [.213]
	DL	91 (39.1%)	142 (60.9%)	
	TR	191 (35.0%)**	355 (65.0%)*	
	GK	94 (70.7%)*	39 (29.3%)**	
Recovery Zone	DFF	204 (41.7%)	285 (58.3%)	.403 [-]
	MD	182 (39.4%)	280 (60.6%)	
	MO	126 (38.7%)	200 (61.3%)	
	OFF	14 (29.8%)	33 (70.2%)	
Start Interaction Context (CEI)	AM	6 (54.5%)	5 (45.5%)	<.001 [.251]
	A0	1 (50.0%)	1 (50.0%)	
	AR	15 (37.5%)	25 (62.5%)	
	MA	16 (80.0%)*	4 (20.0%)**	
	MM	158 (30.7%)**	356 (69.3%)*	
	MR	4 (50.0%)	4 (50.0%)	
	PA	94 (69.1%)*	42 (30.9%)**	
	RA	227 (38.8%)	358 (61.2%)	
	RM	5 (62.5%)	3 (37.5%)	
Type of initial attack	PT	224 (40.1%)	334 (59.9%)	<.05 [.075]
	DT	210 (36.6%)**	363 (62.4%)*	
	CT	92 (47.7%)*	101 (52.3%)**	

Passes	0	35 (22.2%)**	123 (77.8%)*	<.001 [.142]
	1-2	218 (39.7%)	331 (60.3%)	
	3-4	116 (42.2%)	159 (57.8%)	
	>4	157 (45.9%)	185 (54.1%)	
Penetrate passes	0	140 (35.1%)**	259 (64.9%)*	.076 [-]
	1-2	309 (41.6%)	433 (58.4%)	
	>2	77 (42.1%)	106 (57.9%)	
Attack player	1-2	164 (33.0%)**	333 (67.0%)*	<.001 [.112]
	3-4	209 (42.1%)	288 (57.9%)	
	>4	153 (46.4%)*	177 (53.6%)**	
Duration	1-5	112 (33.2%)**	225 (66.8%)*	<.005 [.092]
	6-10	129 (38.1%)	210 (61.9%)	
	>10	285 (44.0%)*	363 (56.0%)**	
End Zone	DFF	16 (25.0%)**	48 (75.0%)*	<.005 [.100]
	MDF	114 (34.4%)**	217 (65.6%)*	
	MOF	212 (41.7%)	296 (58.3%)	
	OFF	184 (43.7%)*	237 (56.3%)**	
Type of possession	SH	116 (34.0%)**	225 (66.0%)*	<.05 [.077]
	MP	130 (38.9%)	204 (61.1%)	
	LG	280 (43.1%)*	369 (56.9%)**	
Outcome	GO	6 (30.0%)	14 (70.0%)	<.001 [.135]
	AO	31 (38.3%)	50 (61.7%)	
	AF	34 (54.0%)*	29 (46.0%)**	
	SP	64 (27.8%)**	166 (72.2%)*	
	CK	7 (63.6%)	4 (36.4%)	
	OZ	106 (42.6%)	143 (57.4%)	
	LP	278 (41.5%)	392 (58.5%)	
Number of defenders	1-3	22 (34.9%)	41 (65.1%)	.591 [-]
	4-6	88 (38.1%)	143 (61.9%)	
	>6	416 (40.4%)	614 (59.6%)	
Defensive positioning	HG	209 (38.4%)	335 (61.6%)	.605 [-]
	ME	148 (41.6%)	226 (58.4%)	
	LW	169 (39.6%)	237 (60.4%)	

*Notes: AW away; HM home; W wining; D drawing; L losing; FW final result win; FD final result draw; FL final result loss; ST steal; DL duel; TR turnover; GK Goalkeeper action; DF defensive zone; MD middle defensive zone; MO middle offensive zone; OF offensive zone; PA/RA/RM/MR/MM/MA/AR/AM/AØ types of Start Interaction Context; PT positional attack; DT direct attack; CT counterattack; DFF defensive zone; MDF middle defensive zone; MOF middle offensive zone; OFF offensive zone; SH short possession; MP medium possession; LG long possession; GO goal; AO attempt on target; AF attempt off target; SP set-play; CK corner kick; OZ enter offensive zone; LP Loss of possession; HG high defensive position; ME medium defensive position; LW low defensive position. * More observed than expected values; ** Fewer observed than expected values; ES effect size.*

Elite Women's Football: Defense-Offense Dynamics

The decision tree model (training sample) is presented in Figure 1, with the most significant results summarised below. The independent criteria included in the model were final result, location, defensive position, ball recovery, attack player, and period time.

At node 0 (n=926), the probability of observing pressure was 63.1%, compared to 36.9% for no pressure. A higher relative frequency of pressure was observed when the variable *final* result was a draw (node 3; no pressure = 17.7%, pressure = 82.3%). Beyond node 3, the criterion *ball recovery* ($\chi 2 = 8.814$; df = 1, $p < .001$) was introduced, with a significant increase in pressure when possession was initiated via a steal (node 8; no pressure = 5.2%, pressure = 94.8%).

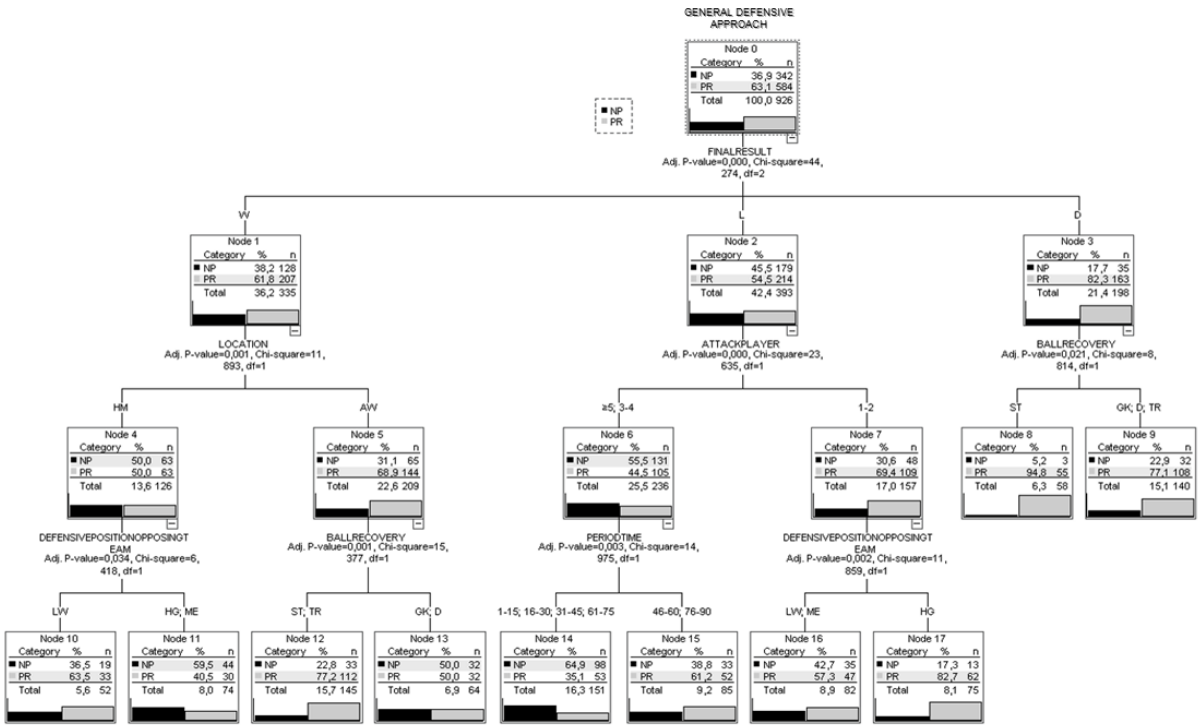
From node 2 (*final result* = lose), the variable *number of attackers* ($\chi 2 = 23.635$; df = 1, $p < .001$) emerged as a predictor. At nodes 6 and 7, a higher frequency of pressure was noted at node 7 (69.4%) when 1-2 players were involved, compared to node 6 (44.5%) when more than two players participated.

In node 1 (*final result* = win), defensive pressure was observed in 61.8% of actions, increasing to 68.9% at node 5 under the influence of *location* criterion, specifically the category away ($\chi 2 = 11.893$; df = 1, $p < .001$).

Further distinctions were observed in nodes 12 and 13 (*final result* = win, *location* = away, *ball recovery* = steal or turnover versus goalkeeper action or duel). At node 12, 145 records indicated a pressure frequency of 77.2%, while in node 13, this decreased to 50% across 64 observations. Similarly, nodes 14 and 15 revealed a difference of approximately 24% in pressure frequency. At node 15 (*final result* = lose, *attack player* > 2, *period time* = 46-60 or 76-90), defensive pressure was recorded in 61.2% of actions during the first and final 15 minutes of the second half. By contrast, node 14 (n = 151) showed a reduced pressure frequency of 35.1%, with no pressure accounting for 64.9% during other periods of the match.

Figure 1

Decision Tree Model based on the General Defensive Approach criterion.



DISCUSSION

This study had two primary aims. Firstly, to analyse the association between pressing or not pressing after losing possession during dynamic defensive transitions -referred to as the *general defensive approach*- and the development of the opposing team's dynamic offensive transitions in elite women's football. Secondly, to establish a multivariate explanatory model of the *general defensive approach* based on technical-tactical and contextual criteria.

Across the 13 matches analysed, 1,381 dynamic transitions were recorded, with 57 excluded due to observability issues, resulting in an average of 106 transitions per match. This aligns with findings by Casal et al. (2015) and Casal et al. (2021), who reported 106 and 100 transitions per match in men's football, respectively. Of the transitions analysed, 50% resulted in loss of possession, 10.9% culminated in a shot, and only 1.5% led to a goal. The most frequent pattern involved 1-2 passes (37.5%) with an average duration of 11 seconds (48.9%).

Transitions predominantly occurred during the final stages of matches, between minutes 76-90, often coinciding with a partial draw result (45.8%) or a final defeat result (42.1%).

Bivariate analysis has demonstrated an association between the criterion *general defensive approach* and various offensive tactical behaviours of the opposing team. Specifically, defensive pressure following a turnover was linked to a higher frequency of direct attacks by the opposing team ($p < .05$; ES = .07). Additionally, attackers tended to make fewer passes during their offensive actions ($p < .001$; ES = .14), with the number of possessions involving no completed passes exceeding expectations when the general defensive approach was categorised as pressure.

The participation of opposing players in attacks was also restricted ($p < .001$; ES = .11), with a higher number of attacks involving just 1-2 players. Furthermore, multivariate analysis revealed that the likelihood of the team employing a pressing strategy was greater in cases where 1-2 players participated in the action (node 7: 69.4% pressure). This finding highlights the multivariate influence of the *general defensive approach* on the number of players involved in the opponent´s offensive transition.

A statistically significant association was observed between the overall defensive approach and the duration of opposing team’s attacks. Attacks were shorter in duration ($p < .005$; ES = .09), and the types of attacks were also shorter ($p < .05$; ES = .07) when defensive pressure was applied immediately after losing possession. Defensive pressure prevented the opposing team from advancing the ball beyond the defensive midzone ($p < .005$; ES = .01) and often resulted in their attacks concluding with either a set play or an outside shot ($p < .005$; ES = .13), both of which are among the least effective offensive outcomes.

These findings, consistent with previous research (Bauer & Anzer, 2021; Casal et al., 2016; Casal et al., 2021; Forcher et al., 2024; Freitas et al., 2023; Vogelbein et al., 2014), suggest that applying defensive pressure immediately after losing the ball and restricting the opposing team’s playing space is a highly effective strategy. This approach helps regain possession quickly and limits the offensive effectiveness of the opposing team, as demonstrated by the most successful teams.

The strongest association was observed between how the opposing team regained possession of the ball and initiated their offensive phase (*ball recovery*, $p < .001$; ES = .21) and with CEI ($p < .001$; ES = .25). Defensive pressure increased when possession was regained by the opposing team through a turnover, whereas it was lower when possession began with the goalkeeper, who benefits from the ability to hold the ball with their hands.

This variable also featured in the multivariate model, showing greater pressure when recovery occurred through a steal (node 8: 54 observations, 94.8% pressure) during matches that ended in a draw. This is particular significant as Hughes and Lovell (2019) identified turnover as the most effective recovery type for creating goal-scoring

opportunities. Therefore, applying strong defensive pressure when the opponent regains possession through a turnover is crucial to limiting their offensive effectiveness.

In relation to the CEI, greater pressure was observed when the defensive transition began with the middle and defensive lines positioned behind the ball, facing the opposing team's middle and defensive lines (MM). Surprisingly, pressure was lower when the defensive transition started with the entire team positioned behind the ball, facing the opposing team's midline (MA). In the latter situation, it could be expected that teams would exert more pressure due to the presence of more players behind the ball, providing greater defensive security in case the pressure was ineffective (Casal et al., 2015; Freitas et al., 2021).

However, the results suggest that because the number of players in the forward line is always fewer than in other lines, the defending team is consistently outnumbered in the central area of play during the initiation of the defensive transition (Freitas et al., 2021), thereby reducing the chances of regaining possession. Further analysis of the relationship between the number of players from both teams in the central area of play is necessary to test this hypothesis.

Additionally, it is worth noting that this variable was not significant in the decision tree model. This may be due to the minimum number of observations required for each node, which likely prevented the inclusion of this variable due to the high number of categories associated with it.

Similarly, it is surprising that neither of the two variables related to defensive transition (number of defenders and defensive position) showed a significant association with defensive pressure. Contrary to expectations, the data do not support the hypothesis that a larger number of defenders positioned behind the ball during the initiation of the defensive transition intensifies pressure. Likewise, no evidence was found to suggest that a more advanced defensive line, and therefore a shorter distance between defensive lines, generates greater pressure. This finding contrasts with previous studies, which argue for the greater effectiveness of high pressure applied closer to the opponent's goal (Casal et al., 2021; Cooper & Pulling, 2020; González-Ródenas et al., 20216; Hughes & Lovell, 2019).

Finally, defensive pressure also demonstrated a significant association with certain situational variables. A stronger association was observed with the final result ($p < .001$; ES = .25), with more pressure applied in matches that ended in a draw and less in those that were won. Notably, the final result was the first independent variable introduced in the decision tree model. At node 3, defensive pressure was predominant in matches that ended in a draw (node 3: $n = 198$; 82.3% pressure). Regarding match status, a significant relationship was also identified ($p < .001$; ES = .11), with fewer transitions involving pressure when teams were winning, and more when the scoreline was level. This may be explained by two factors; firstly, the higher frequency of a draw during the early stages of matches, when players experience less physical fatigue; secondly teams leading in the scoreline may exert less pressure after losing possession to mitigate the risks associated with an unsuccessful press, instead focusing on protecting their goal.

In the final quarter of matches, there was an increase in defensive pressure compared to other periods ($p < .05$; ES = .1), likely due to the urgency for teams that were losing or drawing to regain possession quickly. Further analysis is needed to investigate the relationship between the timing of the match, pressure, and the partial scoreline to confirm this hypothesis.

Interestingly, match location was also associated with defensive pressure in the multivariate analysis. Contrary to expectations, teams applied more pressure when playing as visitors (68.9%). At node 5, the proportion of pressure was nearly 20 percentage points higher for teams winning away compared to teams winning at home (node 4: 50% pressure). This could be attributed to disparity in team quality, with visiting teams often dominating the scoreline and maintaining greater pressure after losing possession, despite being away from home.

Some limitations of our work must be recognised. Although 12 of the 17 criteria that make up the observation instrument showed an association with the *general defensive approach* criterion, the effect sizes remained in a medium-low range, suggesting a margin for improving instrument accuracy. In addition, criterion outcome of the opponent´s offensive transition was not included in the multivariate model, indicating the need for a methodological review for possible integration into future research. Contradictory results with previous work, such as the lower pressure observed when all players were behind the ball, suggest the inclusion of new criteria in the observation instrument. Adding the number of players from both teams in the centre of the game could offer a more detailed perspective of the defensive and offensive dynamics during transitions.

Despite the limitations identified, this study represents a pioneering approach to analysing how a team's defensive transitions influence and are affected by the opposing team's offensive transitions. Our findings provide valuable insights into the dynamic interplay between the competing teams' strategies. This information is of paramount importance for coaches, as it provides them with a scientific basis for designing more effective strategies during these critical phases of the game.

CONCLUSIONS

The main findings of this study indicate that the type of defensive transition of a team is intrinsically related to the offensive transition model of the opposing team and certain situational variables. The application of immediate defensive pressure after the loss of possession of the ball has been shown to be an effective strategy to regain possession of the ball and decrease the offensive effectiveness of the opponent. The technical-tactical action of turnover and the interaction context of starting MM showed a strong positive association with the application of defensive pressure. Situational variables such as the final result, the partial result, the period of the match and location also showed a significant relationship with defensive pressure.

PRACTICAL APPLICATIONS

The study on the impact of defensive pressure after losing possession in the UEFA Women's Champions League reveals several practical applications for teams. Emphasizing immediate defensive pressure and improving players' ability to recover the ball through turnovers can significantly disrupt opponents' offensive transitions. Training sessions should simulate scenarios where players press quickly and make rapid decisions to start offensive plays under high pressure situations.

Analysing opponent behaviour and customising training to counteract specific patterns can provide a tactical edge. Enhanced coordination among defenders and maintaining defensive balance while pressing are essential to prevent opponents from exploiting gaps and creating scoring opportunities. Integrating these insights into training and strategic planning can help teams optimize their defensive and offensive effectiveness.

STATEMENTS AND DECLARATIONS

Ethical considerations: Not applicable. According to the Belmont Report (1978), the use of public images for research purposes does not require informed consent or approval by an ethics committee.

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