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INFLUENCE OF TEAM PRESSING ON MATCH PERFORMANCE IN HIGHEST-LEVEL SOCCER; PRELIMINARY REPORT

VPLIV EKIPNEGA PRESINGA NA USPEŠNOST TEKME V NOGOMETU NA NAJVIŠJI RAVNI; PREDHODNO POROČILO

ABSTRACT

Considering lack of studies which investigated pressing behaviour in soccer, this study aimed to preliminary examine the influence of successful team pressing on team running performance (TRP) and team technical-tactical performance (TTP). All data were obtained from UEFA Champions League (UCL) matches (n=20) using optical system InStat Fitness. The TRP variables included total distance covered, low-intensity running (<4 m/s), running (4–5.5 m/s), high speed running (5.5–7 m/s) and sprinting (>7 m/s). The TTP variables included total actions shots on target, passes, key passes, crosses, dribbles, final third entries and penalty area entries. Results from linear mixed model indicated that (i) TRP was similar irrespective to number of successful pressings (t=-0.13 to 0.67, all p>0.05, all trivial to small effects sizes), (ii) TTP tend to increase when higher rate of successful team pressings was utilized (t=2.33 to 5.18, all p<0.05, all large effects sizes). These results show significant influence of team pressing on TTP and no influence of team pressing on TRP, suggesting that cooperative and well-organised interaction between players is more important factor of team pressing than pure physical performance. This study may help soccer coaches to better understand physical and technical-tactical profiles of teams that utilize pressing style of play.

Keywords: pressing behaviour, running performance, technical-tactical performance, UEFA Champions League, match analysis

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IZVLEČEK

Glede na pomanjkanje študij, ki bi proučevale vedenje, povezano s presingom v nogometu, je bil namen te študije predhodno preučiti vpliv uspešnega presinga ekipe na tekaško učinkovitost ekipe (TRP) in tehnično-taktično učinkovitost ekipe (TTP). Vsi podatki so bili pridobljeni s tekem UEFA Lige prvakov (UCL) (n=20) z uporabo optičnega sistema InStat Fitness. Spremenljivke TRP so vključevale skupno pretečeno razdaljo, tek z nizko intenzivnostjo (<4 m/s), tek (4-5.5 m/s), hiter tek (5.5-7 m/s) in sprint (>7 m/s). Spremenljivke TTP so vključevale skupno število strelav na gol, podaj, ključnih podaj, predložkov, preigravanj, vstopov v zadnjo tretjino in vstopov v kazenski prostor. Rezultati linearnega mešanega modela so pokazali, da (i) je bil TRP podoben, ne glede na število uspešnih presingov (t=-0.13 do 0.67, vse p>0.05, nepomembna do majhna velikost učinkov), (ii) se je TTP običajno povečal, ko je bilo uporabljenih več uspešnih ekipnih presingov (t=2.33 do 5.18, vse p<0.05, vse velike velikosti učinkov). Ti rezultati kažejo na pomemben vpliv ekipnega presinga na TTP in nobenega vpliva ekipnega presinga na TRP, kar nakazuje, da je sodelovalna in dobro organizirana interakcija med igralci pomembnejši dejavnik ekipnega presinga kot zgolj fizična zmogljivost. Ta študija lahko nogometnim trenerjem pomaga bolje razumeti fizične in tehnično-taktične profile ekip, ki uporabljajo slog igre, ki temelji na presingu.

Ključne besede: presing, tekaška zmogljivost, tehnično-taktična uspešnost, UEFA liga prvakov, analiza tekem

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INTRODUCTION

Soccer requires players to be competent across a number of physical and technical-tactical performance domains (Ari & Sözen, 2021; Modric, Versic, Sekulic, & Liposek, 2019). Due to the complex nature of the sport, players utilize their physical and technical-tactical skills in different manners during competition (e.g., sprints, high-intensity actions, or changes of direction modified for the match situation) (Krustrup et al., 2006; Petrucci et al., 2021; Taskin & Taskin, 2021). Specifically, soccer players during the match can cover between 9 and 14 km, and can perform 0.7–3.9 km of high-speed distance and 0.2–0.6 km of sprint distance (De Albuquerque Freire et al., 2022; Modric et al., 2022c). Also, most elite soccer players exhibit proficient technical-tactical skills including accurate passing and ball distribution that contribute to winning matches (Rampinini, Impellizzeri, Castagna, Coutts, & Wisløff, 2009). Therefore, optimization of both physical and technical-tactical performance of players would enhance match-play and success for teams (Clemente et al., 2019).

Both physical and technical-tactical performance in soccer are dependent on multiple factors (Trewin, Meylan, Varley, & Cronin, 2017), including style of play which could be considered as the general behavior of the whole team to achieve the attacking and defensive objectives in the game (Fernandez-Navarro, Fradua, Zubillaga, Ford, & McRobert, 2016). Indeed, previous studies highlighted the influence of styles of play when measuring physical and technical-tactical aspects in soccer (Bradley et al., 2011; Lago-Peñas, Lago-Ballesteros, & Rey, 2011). For instance, styles of play affect distance covered by the players or high-intensity running activities, due to players' different movements as a result of specific behaviors typical of a style of play (Fernandez-Navarro et al., 2016). Moreover, styles of play can also affect technical-tactical performance such as percentage of ball possession and distance of passes and passing distribution (Lago & Martín, 2007). These studies showed that styles of play should be accounted for during data interpretation (Fernandez-Navarro et al., 2016).

In general, studies have identified attacking and defending styles of play. While attacking styles have previously been defined as direct, possession, counterattacking, total soccer and crossing (Bangsbo & Peitersen, 2000), defensive styles have often been defined as pressing (Bangsbo & Peitersen, 2000; Wright, Atkins, Polman, Jones, & Sargeson, 2011). In soccer, pressing can be described as the collective behaviour of a team to win possession of the ball from its opponents. This defending approach, particularly in more advanced pitch positions, has been widely

popularised by some successful European clubs, and its terminology is also well-understood in coaching and spectator vernacular (Low, Rein, Raabe, Schwab, & Memmert, 2021).

However, in scientific research, pressing behaviour is seldom investigated (Low et al., 2021), and consequently the knowledge on physical and technical-tactical profiles of teams which utilize large amount of pressing is still limited. As information on required physical performance for employing pressing style of play may be valuable for soccer coaches when preparing their teams, it is crucial to identify the influence of pressing on teams' physical performance. On the other hand, to clarify does such style of play is worthwhile to be utilized, it is important to identify the influence of pressing on teams' technical-tactical performance as well. Therefore, this study aimed to examine the influence of successful team pressing on team running performance (TRP) and team technical-tactical performance (TTP).

METHODS

Sample

In total, 547 individual match observations of 378 outfield players were used. The players were members of 24 teams that competed in group stage matches (n=20) of the UCL in the 2020/21 season. Individual players' performances were jointly evaluated into the teams' performance (Modric et al., 2022a) in order to identify the influence of successful team pressing on TRP and TTP. All data were anonymized in accordance with the principles of the Declaration of Helsinki to ensure player and team confidentiality. The investigation was approved by the local university ethics board (approval number: 2181-205-02-05-19-0020), while written permission for data used was obtained from Instat Limited (Limerick, Republic of Ireland, 5 June 2021). The descriptive statistics for TRP and TTP are presented in Table 1.

Table 1. The descriptive statistics for running performance and technical-tactical performance of UEFA Champions League teams.

	Mean	Minimum	Maximum	Standard deviation
Total distance (m)	116271	105653	125258	4376
Low-intensity running (m)	86279	78930	94733	3306
Running (m)	20396	17783	23494	1441
High-speed running (m)	8175	6032	10131	915
Sprinting (m)	1399	933	2260	307
Total actions (#)	824	546	1232	156
Shots on target (#)	3.95	0	11.00	2.45
Passes (#)	535.75	304.00	884.00	149.31
Key passes (#)	6.80	2	19.00	4.40
Crosses (#)	12.23	2	34.00	8.38
Dribbles (#)	24.33	13	52.00	7.85
Final third entries (#)	37.40	15	73.00	15.44
Penalty area entries (#)	13.83	2	31.00	7.42
Successful pressing (#)	7.90	0	18.00	4.40

Procedures and variables

TRP and TTP were collected using a multicamera semiautomatic optical tracking system (InStat Fitness, Instat Limited, Limerick, Republic of Ireland) that has a sampling frequency of 25 Hz. The system has passed the official Fédération Internationale de Football Association (FIFA) test protocol for electronic and performance tracking systems (EPTS) (authorization number: 1007382), demonstrating high levels of absolute and relative reliability (Modric al., 2022d). The reliability of the system has additionally been tested analysing passes, challenges, air challenges, tackles, dribbles, crosses, shots and key passes. All these variables had a bias < 0.2 and limits of agreement were all within 3 and -3, revealing that this system has a high reliability according to the analyzed variables (Silva & Marcelino, 2022). All the physical and technical-tactical performance variables with their associated definitions are presented in Table 2.

Table 2. Physical and technical-tactical performance variables and their definitions.

<i>Physical performance-related variables</i>	
Total distance (m)	Total distance covered in the match.
Low-intensity running (m)	Distance covered at speed ≤ 14.3 km/h.
Running (m)	Distance covered at speed 14.4–19.7 km/h.
High-speed running (m)	Distance covered at speed 19.8–25.1 km/h.
Sprinting (m)	Distance covered at speed ≥ 25.2 km/h.
<i>Technical-tactical performance-related variables</i>	
Total actions (#)	Total number of all types of actions (including passes, crosses, set pieces passes, tackles, challenges, shots, etc.).
Shots on target (#)	An attempt to score a goal which required intervention to stop the ball going in, or resulted in a shot that would have gone in without diversion.
Passes (#)	A ball sent from one player to another.
Key passes (#)	Passes to a partner who is in a goal scoring position (i.e., one-on-one situation, empty net, etc.), and attempted passes to a partner that “cuts off” the whole defensive line of the opponent’s team (3 or more players) in the attacking phase.
Crosses (#)	Passes performed by a player from an offensive zone (last 40 m of pitch between the short side of the penalty area and the lateral side of the field) directly to the penalty area.
Dribbles (#)	Active action of a player possessing the ball, an attempt to pass opponent by using dribbling.
Final third entries (#)	Entries into the opponent’s final third of the pitch,
Penalty area entries (#)	Entries into the opponent’s penalty area.
Successful pressing (#)	Successfully performed collective attempts to force the opponents to lose the ball or to stop the development of an attack.

Statistical analysis

The normality of the distributions was checked by the Kolmogorov–Smirnov test, and the homoscedasticity of all the variables was confirmed by Levene’s test. Linear mixed model was adjusted to examine the influence of successful team pressing on TRP and TTP. Teams’ identities were modelled as random effect to account for the repeated measures (Lorenzo-Martinez et al., 2021). The assumptions of the homogeneity and normal distributions of residuals were verified, without revealing specific problems. The t-statistics from the mixed model were converted to effect sizes (ES) (Cohen’s d) (Lovell, Bocking, Fransen, Kempton, & Coutts, 2018; Modric et al., 2022c), and interpreted as follows: trivial (<0.2), small (>0.2 – 0.5), moderate (>0.5 – 0.8) and large (>0.8) (Cohen, 2013). All the analyses were performed using the SPSS software (IBM, SPSS, version 25.0), and the significance level was set to $p < 0.05$.

RESULTS

No influence of successful team pressing on TRP was evidenced. Specifically, similar values of total distance ($t=-0.23$, $p=0.82$, trivial ES), low-intensity running ($t=-0.13$, $p=0.90$, trivial ES), running ($t=-1.33$, $p=0.20$, medium ES), high-speed running ($t=0.67$, $p=0.51$, small ES) and sprinting ($t=0.45$, $p=0.66$, trivial ES) were evidenced irrespective to the amount of successfully performed team pressings (Table 3)

Table 3. The influence of successful team pressing on team running performance.

Parameter	Estimate	SE	df	t	p	d	95%CI Lower	95%CI Upper
Total distance								
Intercept	116365.95	1415.01	38.00	82.24	0.01		113501.40	119230.50
Successful team pressing	-31.52	136.67	27.22	-0.23	0.82	-0.09	-311.84	248.80
Low-intensity running								
Intercept	86277.00	1104.39	37.55	78.12	0.01		84040.41	88513.59
Successful team pressing	-14.47	114.23	33.31	-0.13	0.90	-0.05	-246.80	217.85
Running								
Intercept	20799.53	445.60	37.94	46.68	0.01		19897.41	21701.64
Successful team pressing	-55.32	41.52	24.13	-1.33	0.20	-0.54	-141.00	30.35
High-speed running								
Intercept	8067.14	296.13	37.98	27.24	0.01		7467.65	8666.63
Successful team pressing	19.02	28.26	26.09	0.67	0.51	0.26	-39.07	77.11
Sprinting								
Intercept	1373.66	103.53	37.66	13.27	0.01		1164.02	1583.31
Successful team pressing	4.71	10.50	28.44	0.45	0.66	0.17	-16.79	26.20

CI Lower: confidence interval lower bound, CI Upper: confidence interval upper bound; df: degrees of freedom; SE: standard error

Significant influence of successful team pressing on TTP was evidenced for all variables. Specifically, greater amount of successfully performed team pressing resulted in increased passes ($t = 5.14$, $p = 0.01$, large ES), shots on target ($t=2.23$, $p=0.01$, large ES), key passes ($t=3.89$, $p=0.01$, large ES), crosses ($t=3.74$, $p=0.01$, large ES), dribbles ($t=2.17$, $p=0.04$, large ES), final third entries ($t=5.18$, $p=0.01$, large ES), penalty area entries ($t=5.15$, $p=0.01$, large ES) and total actions ($t=5.14$, $p=0.01$, large ES) (Table 4).

Table 4. The influence of successful team pressing on team technical-tactical performance.

	Estimate	SE	df	t	p	d	95%CI Lower	95%CI Upper
Total actions								
Intercept	649.98	42.91	37.84	15.15	0.00		563.10	736.86
Successful team pressing	21.89	4.26	18.34	5.14	0.00	2.40	12.96	30.83
Shots on target								
Intercept	1.63	0.73	37.72	2.23	0.03		0.15	3.11
Successful team pressing	0.28	0.07	32.04	3.75	0.00	1.32	0.13	0.43
Passes								
Intercept	360.71	40.78	36.93	8.85	0.00		278.07	443.35
Successful team pressing	21.70	4.12	16.23	5.26	0.00	2.61	12.97	30.43
Key passes								
Intercept	2.63	1.26	36.62	2.08	0.04		0.07	5.19
Successful team pressing	0.53	0.14	34.56	3.89	0.00	1.32	0.25	0.80
Crosses								
Intercept	4.25	2.48	36.87	1.72	0.10		-0.77	9.28
Successful team pressing	0.98	0.26	34.29	3.74	0.00	1.28	0.45	1.52
Dribbles								
Intercept	21.10	2.30	37.94	9.17	0.00		16.44	25.76
Successful team pressing	0.46	0.21	25.84	2.17	0.04	0.85	0.02	0.89
Final third entries								
Intercept	19.25	4.21	37.19	4.57	0.00		10.72	27.78
Successful team pressing	2.25	0.43	29.76	5.18	0.00	1.90	1.36	3.14
Penalty area entries								
Intercept	5.27	2.05	37.82	2.57	0.01		1.11	9.43
Successful team pressing	1.06	0.21	27.91	5.15	0.00	1.95	0.64	1.48

CI Lower: confidence interval lower bound, CI Upper: confidence interval upper bound; df: degrees of freedom; SE: standard error

DISCUSSION

This is the one the first study to examine the influence of team pressing on TRP and TTP. The main results indicated that (i) total distance covered, low-intensity running, running, high-speed running, and sprinting were similar irrespective to the amount of successfully performed team pressings, showing no influence of team pressing on TRP, (ii) increased successful team pressings resulted in increased total actions, shots on target, passes, key passes, crosses, dribbles, final third entries, and penalty area entries, showing significant influence of team pressing on TTP.

It has been hypothesized that pressing style of play is high physical demanding due to the possible energy expenditure required to employ such a tactic (Wright et al., 2011). However, as significant influence of team pressing on TRP was not evidenced in current study, our findings do not support such considerations. Specifically, we evidenced similar values of total distance, low-intensity running, running, high-speed running, and sprinting irrespective to the amount of successfully performed team pressings. Such findings suggest that utilizing pressing style of play does not require increased physical performances. Considering that pressing is collective behaviour in which cooperative and well-organised interaction between players is crucial (Low et al., 2021), it seems that team organization (i.e., timing and decision when to start pressing) is more important aspect of pressing style of play than pure physical performance.

The essence of pressing is to win the ball from the opponent and regain possession (Low et al., 2021). Therefore, greater amount of successfully performed pressings almost certainly result in the high-ball possession. As high-ball possession strategies are in general associated with increased TTP (da Mota, Thiengo, Gimenes, & Bradley, 2016), it is logical that greater amount of successfully performed team pressing may results in greater TTP. Indeed, as we evidenced significant influence of team pressing on TTP in current study, our results support such considerations.

Specifically, teams which performed high number of successful pressings achieved more shots on target, passes, key passes, crosses, dribbles, final third entries and penalty area entries (all large ES). Moreover, teams which performed high number of successful pressings had high amount of total actions as well (large ES). Since TTP is considered crucial for achieving success in soccer (Lago-Peñas et al., 2011; Lorenzo-Martínez, Padrón-Cabo, Rey, & Memmert, 2020; Modric, Versic, & Jelcic, 2022b), it seems that efficiently employed pressing style of play may be strongly related to the team success. However, considering that the relationship between success and technical-tactical performance is highly complex in soccer (da Mota et al., 2016), more research is needed to confirm these speculations.

The present investigation has some limitations that should be considered. This study included only 20 randomly selected matches from the group stage of the UCL; therefore, herein drawn conclusions cannot be generalized as they are exclusively related to the UCL. In addition, contextual factors such as match outcome, match location and quality of opposition, which have been shown to influence match performance in soccer (Jerkovic, Modric, & Versic, 2022), were

not considered in the current study. Future studies should confirm current findings analysing larger sample, including matches from knock-out stage of UCL while controlling for the influence of contextual factors. Finally, future studies should examine the influence of team pressing on TRP and TTP stratified by soccer-specific playing positions to determine players' individual contributions within pressing pattern.

CONCLUSION

The findings from this study show that TRP was similar irrespective to number of successful pressings, while TTP tend to increase when playing style with high rate of successful team pressings was utilized. Given that TTP is considered as essential for match success in soccer, such findings suggest that team pressing may be an effective tool for achieving greater success in highest-level soccer matches. Meanwhile, no influence of team pressing on TRP emphasize that cooperative and well-organised interaction between players is more important factor of team pressing than pure physical performance. The findings from this study may help soccer coaches to better understand physical and technical-tactical profiles of teams that utilize pressing style of play.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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