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Original Article

Tactical actions during opponent throw-ins in soccer in the German Bundesliga

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Abstract:
Problem statement: Due to the high performance density and the high level of training in professional soccer, every opportunity is used to develop a possibly decisive advantage over the opponent, which underlines the relevance of analyzing tactical means. Purpose: This study aims to analyze team tactical behavior during opponent throw-ins in elite soccer. Approach: A video-based systematic soccer match analysis was conducted with the 18 German Bundesliga teams of the 2019/20 season. A total of 265 throw-ins from 85 five-minute match sequences were analyzed with regard to the zone and direction of the throw-in, the score, the match period, the pressure exerted, and the outcome. Frequency analyses, chi-square tests, ANOVA, and Duncan's post-hoc tests were applied. Results: In our study, the throw-in team remained in possession of the ball in more than half (54.0%) of the throw-ins. Putting higher pressure on the opponent facilitated a greater success rate of recovering the ball for the defending team, $\chi^2 = 57.221$, $df = 2$, $p < .001$. Trailing teams increased the pressure on the opponent during the throw-in, $F(2, 265) = 3.692$, $p = .026$, $\eta^2 = .027$; however, this behavior was not reinforced during crunchtime, $F(2, 1, 265) = 1.922$, $p = .148$, $\eta^2 = .015$. Conclusions: The findings suggest that coaches should consider opposing throw-ins as a trigger for team tactical pressing and highlight the importance of exerting a strong form of disruptive influence on the opponent during throw-ins, as this is an excellent opportunity for recovering the ball.
Key Words: **football; set piece; team tactics; defensive tactics; match analysis; elite soccer**

Introduction

The goal of competitive sports is to achieve maximum athletic performance in competition. In order to be able to specify training goals, it is of enormous importance to know the performance structure of a sport (Hohmann et al., 2020). The analysis of the competition requirements reveals how the structure of performance is composed in the respective sport. Once the relevant performance criteria have been determined, they can be specifically trained and optimized. In almost all sports, the performance factors include conditional, technical and coordinative requirements. In addition, there are tactical requirements. These are especially complex in sports games like soccer, due to the large number of players. This is one of the reasons why the observation, diagnosis and analysis of competitions in soccer play an eminently important role in identifying tactical performance criteria.

Due to the continuously increasing performance density in professional soccer in recent years, every opportunity in the sports game is used to develop a possibly decisive performance advantage over opponents in order to maximize the chance of success (Schwier & Kolb, 2005). Today, the training status is high in top-class teams with regard to physical performance. For example, field players in the Greek Super League covered average distances of over 10 km per game during the 2018/2019 season (Mitrotasios et al., 2021). But technical and tactical requirements are also very high in top-level soccer (Amatria et al., 2019). It can be deduced that the tactical behavior as a performance-determining factor is of great importance, especially in the professional field. This also results in a high relevance for the analysis of tactical means from a training science perspective.
Because of the technical observation possibilities, the number of studies on tactics has been increasing in recent years (González-Víllora et al., 2015), but the analysis of game actions from the running game is still difficult due to their complexity. Consequently, studies of team tactical game actions often focus on static dead ball situations. Due to the standardized procedures of set pieces, tactical behavior is relatively easy to train. In addition, the interruption of the game gives the opposing teams time, for example, to restore the basic tactical formation or to initiate a defensive pressing.

In the area of team tactics, free kicks near the goal, corner kicks or penalties were often analyzed and consequences for training practice were derived (Fernández-Hermógenes et al., 2017; González-Rodenas, Lopez-Bondia, et al., 2020; Izzo et al., 2020). As these situations can make the difference between victory and defeat with a quite relevant goal rate (González-Ródenas et al., 2015; Kubayi, 2020), the training is worthwhile from both an offensive and defensive perspective. Throw-ins, on the other hand, do not seem particularly relevant to scoring a goal (Frank, 2001). However, not only factors that are directly decisive for scoring goals should be used in training. In order to prevent the opponent from scoring from a defensive perspective,

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recovering the ball is the central factor. A disadvantage of the throw-in for the ball-bearing team is, for example, that the area into which the ball can be thrown is clearly limited compared to dead ball situations which are executed with the foot. This circumstance, on the other hand, offers the defending team the possibility to establish a numerical advantage near the ball. An opponent's throw-in could thus represent a good chance to recover the ball. In this respect, throw-ins seem to be a suitable situation for generating ball recoveries from a defensive perspective. In addition, the high frequency of throw-ins in competition, with an average of about 45 per game (Augste & Cordes, 2016), in conjunction with their good trainability, argues for a consideration of throw-ins from a defensive tactical perspective.

While some analysis can be found on penalties, free kicks, and corner kicks (Fernández-Hermógenes et al., 2017; González-Rodenas, Lopez-Bondia, et al., 2020; Izzo et al., 2020), the tactical use of throw-ins has been rather neglected. Findings on throw-ins are scarce, and when they do exist, it is mainly in terms of technical execution, biomechanics, and the aim of throwing long (Cerrah et al., 2011; Gallegos et al., 2013; Linthorne & Everett, 2006; van den Tillaar & Marques, 2011). From a tactical perspective, the throw-in has been considered, for example, as a means of delaying play (Augste & Cordes, 2016; Greve et al., 2019; Morgulev & Galily, 2019). We have found a single study, which looked at the frequency of ball recoveries after throw-ins, which revealed that the German team had fewer ball recoveries than the Spanish team in the 2014 World Cup (Barreira et al., 2014).

The aim of this study was to use video-based systematic match analysis to shed light on the extent to which opposing throw-ins are currently used as a team tactical tool to recover the ball in the Bundesliga.

On the one hand, the analysis aimed to provide an inventory of team tactical behavior in opposing throw-ins, considering relevant factors. One of these factors is the pitch zone of ball recovery, which was found to be relevant for game success (Cooper & Pulling, 2020; Fernandez-Navarro et al., 2020). The level of pressure from the opponent is also a factor that can distinguish between winning and losing teams (Gamble et al., 2020). Therefore, we wanted to take a closer look at the pressure exerted by the defenders during throw-ins as an expression of the team's tactical behavior. As the final 15 minutes of the game is the most prolific time for scoring (Zhao & Zhang, 2019), the match period was considered as another factor.

On the other hand, some hypotheses should be tested regarding throw-ins depending on various factors. One of these hypotheses was that success in recovering the ball varies in different zones of the field. Another consideration was whether the rate of ball recoveries could be increased by applying more pressure on the opposing team. The third hypothesis to be tested related to the connection between the score and the disruptive influence exerted on the opponent. Thus, it was to be investigated whether trailing teams exerted more pressure than when they were leading. Extending this, we hypothesized that the urgency of recovering the ball, and thus the amount of pressure on the opponent, was influenced by the interplay between the score and the stage of play with trailing teams exerting higher pressure in crunchtime.

Material & methods

Based on the principles of observational methodology, a video-based systematic soccer match analysis was conducted. Official match videos were made available via the media portal of Sportcast GmbH, a subsidiary of the "Deutsche Fußball-Liga" (DFL).

Sample

The study was intended to provide a reliable statement on the current team tactical behavior of the 18 German Bundesliga teams with regard to opponent throw-ins. All teams of the 2019/20 Bundesliga season were observed. The sample was 85 five-minute match sequences. First, five matches were randomly selected from each of the 17 first-round match days. In the next step, a five-minute sequence was randomly drawn alternately from the first 75 minutes and from the 76th minute onwards. The reason for this stratified random sampling was that, as described above, in combination with the score of the game, different results of these strata were to be expected with regard to the disruptive influence on the opponent.

In two randomly selected game sequences, no throw-ins occurred. Since these sequences could not contribute to the selected research project, a new game sequence was selected as a substitute in both cases using the same random procedure. Furthermore, there were five cases of throw-ins as a result of fair play. Here, it was recognizable that possession of the ball was deliberately and purposefully transferred to the opposing team. Therefore, these throw-ins were excluded from the observation results.

Measure

In the following, the operational definitions of the used variables are explained. From the perspective of the defending team, the *throw-in zone* was divided into three cross sections of roughly equal size. As the standard pitch length in the German Bundesliga is 105 meters (Seven.One, 2015), the pitch areas were therefore about 35 meters long.

The *throw-in direction* “back” was when the ball was thrown into the 90° sector between an imaginary line perpendicular to the sideline and the sideline in the direction of the own goal. Corresponding, the throw-in was “forward” when it was thrown in the direction of the opponent's goal.

The variable *pressure* has three levels. In the situation “no pressure”, there was no recognizable pressure in the form of approaching the opponent or the distance of the defending player to the player in

possession of the ball was too great to disturb him in the controlled continuation of play. “Light pressure” was stated when a certain distance was initially allowed to the player who has received the throw-in. However, after the first contact with the ball the player was immediately put under pressure. In addition, the player was considered to be under light pressure if he was covered but not actively tackled, e.g. if the player was receiving pressure by an opponent in the back, but it was possible to continue play forward or to the side. “High pressure” was when the player being thrown at was attacked by a defending player in a clearly man-oriented manner before the throw-in was taken. The defending player immediately tried to exert the highest possible pressure on the opponent through direct duel. At best, the defender tried to force the first contact with the ball after the throw-in in order to be able to continue the game himself.

In addition to these factors, the following levels were established for the *outcome* of the tactical action during the throw-in from the perspective of the defending team. In the case of “no ball recovery” the defenders failed to recover the ball. The consequence was a continuation of the game by the opposing team. The “chaos” category included all situations in which possession of the ball changed uncontrollably in the immediate vicinity of the throw-in or an attempt to clear the ball was recognizable. This uncontrollability was characterized either by a contact without possible pre-orientation due to high pressure or a contact in an unstable body position. Thus, in the area where the ball was located immediately after the throw-in, there was no clear possession of the ball by the throwing team, nor was there a clear recovery of the ball by the defending team. Consequently, a chaotic continuation of play took place. We speak of “ball recovery” when possession changed after the throw-in and some form of controlled continuation of play was recognizable.

In the event of a successful ball recovery by the defending team, there were three possible types of *play continuation*: “counterattack”, “build-up of play” and “dead ball situations”. Dead ball situations included all goal kicks, free kicks, corner kicks, throw-ins, etc. taken in possession of the ball. Counterattacking was understood as a form of play in which, after recovering the ball, the attack was carried out immediately, purposefully and quickly in the direction of the opponent's goal. During the build-up of play, the ball was held securely in one's own ranks. The variable *score* was not meant as the exact score but simply differed between “leading”, “even score” and “trailing”.

The *stage of play* was divided into two sections. The section “from kick-off up to minute 75” was considered risk-reduced because, according to the coaching experts interviewed in advance, a team's willingness to take risks is not particularly high in this section of the game, but the team is more concerned with safety. „Crunchtime“ was the section from minute 76 until the end of the game. According to the experts, the risk-taking of the trailing teams increases visibly with the onset of the final quarter-hour.

Reliability

There were no concerns about reliability for some of the parameters recorded. For example, the score and the minute of the game could be taken directly from the video. For the other variables, the categories were supposedly more difficult to separate. Therefore, a reliability test was performed for slightly more than 10% of the throw-ins. The throw-ins were categorized by two independent raters according to the observation system and the inter-rater reliability was calculated by Kappa statistics. For the variable *zone* both raters agreed 100%. For the *direction* of the throw-in, *Cohen’s kappa* = .923, $df = 30$, $p < .001$, and the *outcome*, *Cohen’s kappa* = .886, $df = 30$, $p < .001$, there was nearly perfect agreement. If a ball recovery was detected, the raters again agreed 100% on the type of game *continuation*. Substantial agreement was also found for the supposedly most difficult variable to assess, pressure on the opponent, *Cohen’s kappa* = .791, $df = 30$, $p < .001$.

Statistical analysis

All the analyses were performed using SPSS software (IBM SPSS, Version 26.0). An analysis of frequencies was carried out to describe the occurrence of each throw-in parameter from the defensive team's perspective. Chi-square tests were applied to test the hypotheses of whether the number of ball recoveries differed in different zones and in dependence of the opponent pressure exerted. To test the dependence of pressing behavior on the score we used ANOVA, and Duncan's post-hoc test to identify possible subgroups. ANOVA was also applied to test the hypothesis whether opponent pressure from trailing teams increased in crunchtime.

Results

Descriptive Statistics

A total of 265 throw-ins were observed in the 85 chosen 5-minute sequences in the preliminary round matches of the German Bundesliga in the 2019/2020 season. In more than half of the cases, the defending team failed to recover the ball or at least provoke a chaotic situation. The direction of opponent throw-ins in the own defensive zone was almost as often forward as backward, whereas in the middle and offensive zone throw-ins were more often thrown forward. In their own defensive zone, teams rarely exerted no pressure on opponents. Most often, the defending team exerted high opponent pressure in their offensive zone. If a team recovered the ball after the opponent's throw-in, about one third of the time it carried out a counterattack. In more than 40% of cases, recovering the ball was followed by another dead ball situation. It is rare for a team to build up play in its own defensive zone after winning the ball. In the middle and front zone, on the other hand, an ordered build-up of play follows a ball recovery for more than a third of the time.

Table 1. Frequency of different parameters of throw-ins in zone 1 (opponent throw-in in own defensive zone), zone 2 (opponent throw-in in middle zone), and zone 3 (opponent throw-in in own offensive zone).

Category		Zone 1 (n = 92)	Zone 2 (n = 132)	Zone 3 (n = 41)	Total (n = 265)
Direction	backward	45 (48.9%)	49 (37.1%)	14 (34.1%)	108 (40.8%)
	foreward	47 (51.1%)	83 (62.9%)	27 (65.9%)	157 (59.2%)
Pressure	no pressure	12 (13.0%)	34 (25.8%)	11 (26.8%)	57 (21.5%)
	light pressure	47 (51.1%)	50 (37.9%)	11 (26.8%)	108 (40.8%)
	high pressure	33 (35.9%)	48 (36.4%)	19 (46.3%)	100 (37.7%)
Outcome	no ball recovery	48 (52.2%)	73 (55.3%)	22 (53.7%)	143 (54.0%)
	chaos	13 (14.1%)	24 (18.2%)	8 (19.5%)	45 (17.0%)
	ball recovery	31 (33.7%)	35 (26.5%)	11 (26.8%)	77 (29.1%)
Continuation after ball recovery (n = 77)	counterattack	12 (38.7%)	12 (34.3%)	4 (36.4%)	28 (36.4%)
	build-up of play	2 (6.5%)	12 (34.3%)	4 (36.4%)	18 (23.4%)
	dead ball	17 (54.8%)	11 (31.4%)	3 (27.3%)	31 (40.3%)

Percentages are relative to the frequency of the variable in the corresponding zone.

Inferential Statistics

The first hypothesis to be tested was whether different numbers of ball recoveries occurred in different zones. However, there was no statistical incidence, $\chi^2 = 1.062$, $df = 2$, $p = .588$. In the own defensive zone, the ball was recovered 31 times, which meant only a slight increase in comparison to the number expected (26.7). In the middle zone the ball was recovered 35 times (number expected: 38.4), and in the offensive zone with 11 cases almost identical as often as expected (11.9).

Table 2. Pressure exerted during throw-ins according to score and time of the game.

Score	Time	Pressure		n
		M	SD	
Trailing	up to min. 75	1.33	.802	30
	crunchtime	1.38	.684	45
	total	1.36	.729	75
Even score	up to min. 75	1.06	.765	62
	crunchtime	1.09	.733	45
	total	1.07	.749	107
Leading	up to min. 75	1.29	.654	38
	crunchtime	.93	.809	45
	total	1.10	.759	83
Total	up to min. 75	1.19	.748	130
	crunchtime	1.13	.761	135
	total	1.16	.754	265

Next, the hypothesis was tested whether, after the throw-in, the ball was more likely to be recovered when higher pressure was applied by the defending team. The observed number of instances was 0 for the level "no pressure", 23 for "light pressure", and 54 for "high pressure". Thus, the observed number differed from the expected number (25.7) highly significantly in the chi-square test, $\chi^2 = 57.221$, $df = 2$, $p < .001$. It follows that

higher pressure actually had a greater success rate for recovering the ball after opponent throw-ins. The success rate was 54.0% for “high pressure”, 21.3% for “light pressure” and 0.0% for “no pressure”.

The next hypothesis in the study was whether teams that were behind increased the pressure on the opponent during the throw-in (s. Tab. 2). ANOVA confirmed an interdependence of pressing behaviour and the score, $F(2, 265) = 3.692$, $p = .026$, $\eta^2 = .027$. Duncan's post-hoc test revealed two subgroups indicating that trailing teams exerted significantly greater pressure than leading teams or when the score was tied.

We hypothesised that, during crunchtime, the pressure on the opponent during throw-ins would increase even more when the team was trailing. However, this was not confirmed in the ANOVA, $F(2, 1, 265) = 1.922$, $p = .148$, $\eta^2 = .015$.

Discussion and conclusions

The results of this study can be used to draw practical conclusions for soccer training and competition concerning the team's tactical behavior with regard to opponent throw-ins. Since each team was observed several times with different opponents in the course of the study, the results can claim a high degree of representativeness for statements about the German Bundesliga. Even though no matches from other leagues were included, it can be assumed that the results also apply to other top European leagues such as the English Premier League, the Spanish La Liga, the Italian Serie A or the French Ligue 1. In contrast, a one-to-one transfer to the amateur sector is rather not possible due to the different physical conditions of the players.

In the 85 five-minute periods analyzed, the throw-in was taken backwards in more than 40% of the cases and forwards in almost 60% of the cases. While in the defensive and middle zone of the throwing-in team, more throws were made forward than backward, the ratio in the offensive zone was roughly balanced. We attribute this to the fact that throwing forward close to the opponent's goal line at some point no longer allows a meaningful continuation of the game.

Even though more balls are generally recovered in one's own defensive zone (Cooper & Pulling, 2020), there were no differences between the zones in terms of recovering the ball after the throw-ins we examined. In literature, there are different findings on whether it is advantageous to recover the ball in one's own defensive zone or in advanced zones of the pitch. Fernandez-Navarro et al. (2020) found that winning teams were more likely to recover the ball near their own goal, whereas losing teams recovered more balls in advanced zones of the pitch. Cooper and Pulling (2020), and Gonzalez-Rodenas et al. (2016), however, have found that recovering the ball in the offensive or pre-offensive zone is more likely to result in goals or in shots on goal. According to our study, the tendency seems to be that when opponents throw in the ball in the offensive zone of the defending team, the defending team increasingly aims at recovering the ball. Our analysis showed that high pressure was applied slightly more often in the offensive zone than in the middle and defensive zones. At first glance, this may seem a little surprising, as one might assume that high pressure is more likely to be applied in one's own defensive zone. We explain this by the fact that when opponents take throw-ins in the offensive zone, the defending players are still far inside the opponent's half and then immediately generate counterpressure. On the other hand, the players don't like to be lured out of the center for opposing throw-ins in their own defensive zone and therefore sometimes don't exert as much pressure at the throw-ins.

Once the team has recovered the ball in its own defensive zone, it is, somewhat surprisingly, rare for a team to build up play in its own defensive zone (6.5%). This might be, in the same manner as written above, due to the fact that the opponents are still far forward when the ball is thrown in, which immediately creates a lot of counterpressure. Therefore, recovering the ball was often followed by another dead ball situation (54.8%) such as another throw-in. But also, counterattacks were a frequent continuation of play (38.7%). Since some studies have shown that counterattacks were more effective than elaborate attacks in creating scoring opportunities (González-Rodenas, Aranda-Malaves, et al., 2020; Lago-Ballesteros et al., 2012), teams could focus on putting high pressure on opponents who are far forward when they take a throw-in, in order to recover the ball and start a counterattack.

In fact, we were able to show that higher pressure significantly increased the chance of recovering the ball. However, the analysis showed that a good fifth (21.5%) of throw-ins did not involve any opponent pressure at all. This is, obviously, because it requires a great running performance from the entire team to shift into the throw-in section with so many players that the opponents are all covered. However, the forces must be well distributed over the 90 minutes. Therefore, this team tactical measure should be considered for selected game situations.

One of our assumptions was that trailing teams increase the pressure against the throwing team. This assumption was confirmed in the inferential statistical analysis. Going further, we assumed that this trend would be even more pronounced in crunchtime than in the period up to the 75th minute. However, the pressure exerted in crunchtime was almost identical to the pressure in the first 75 minutes for trailing and tied teams. Leading teams tended to exert even less pressure at the throw-in in crunchtime than until the 75th minute, but not significantly. In our opinion, they do this because it is more important for them to stand compactly and secure the center than to take a lot of risk and put the opponents under pressure on the sidelines. The tactical behavior of not applying higher pressure in crunchtime is consistent with the findings of Gamble et al. (2020), who found

that high press efficiency contributed significantly more to winning in quarters one and two, respectively, in comparison to quarter four.

Overall, it can be stated that the opponent's throw-in is not yet used very intensively as a team tactical action to recover the ball. In our study, the throw-in team remained in possession of the ball in far more than half of the throw-ins (54.0%). In 17.0% of the cases, according to our categorisation, chaotic game situations occurred in which possession of the ball following the throw-in could not be directly assigned to any team. Only in 29.1% of the cases did the defending team clearly recover the ball. In the opinion of the authors, coaches should think about considering opposing throw-ins even more as a trigger for team tactical pressing behavior. Based on the results of this study, it seems advisable to exert a strong form of disruptive influence on the opponent during throw-ins, as this is an excellent opportunity of recovering the ball. Since the number of throw-ins in the game is relatively high (Augste & Cordes, 2016), the coach could demand this behavior selectively in certain situations or crucial phases of the game.

Conflicts of interest - The authors have no conflicts of interest to declare.

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