

TECHNICAL ERRORS AND THE VENUE OF THE MATCH IN HANDBALL

PAWEŁ KRAWCZYK

PhD studies Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education

Mailing address: Paweł Krawczyk, Medical University of Warsaw, Department of Physical Education and Sport, 81A Żwirki i Wigury Street, 02-091 Warsaw, tel.: +48 22 5720529, fax: +48 22 5720541, e-mail: pawel.krawczyk15@wp.pl

Abstract

Introduction. In sports success depends on how well the players are prepared for the match in terms of their technical, tactical and motor skills, as well as their mental attitude. The training process is focused on improving the players' capabilities and eliminating their errors. The aim of the study was to describe the errors made in handball matches taking into account their timing and quantity. **Material and methods.** The material consisted of recordings of 50 matches of men's handball held in the EHF Champions League in 2012-2013. The study included 8 teams that took part in the tournament. The following matches were analysed for each team: 4 matches in the knockout stage (2 played at home and 2 away) and 4 in the group stage (2 at home and 2 away). The errors were determined based on EHF regulations. **Results.** A difference was found between the errors committed in matches at home and away in the knockout stage. The most errors (35) in this stage of the tournament were made between the 25th and 30th minute, and the fewest (18) between the 30th and 35th minute, in both cases in matches played at home. In the group stage the most errors (36) were made between the 40th and 45th minute away, and the fewest (15) between the 10th and 15th minute at home. In the knockout stage the four teams made a total of 632 errors, including 71 errors made by the winner of the tournament, who committed the smallest number of errors. The smallest number of errors (53) in the group stage were made by HC Metalurg Skopje. **Conclusions.** The number of errors made did not have a direct influence on a team's position in the tournament, but the winner made the least errors in the knockout stage. The differences between the numbers of errors made in the knockout stage may indicate that the players were more comfortable when playing at home. The support of fans may be one of the factors which contribute to the fact that players commit fewer errors in this stage of the tournament. The rise in the number of errors made towards the end of the match, on the other hand, is most likely due to an increased level of physical and emotional fatigue, particularly considering the risk of being eliminated from the tournament.

Key words: handball, errors, game analysis

Introduction

Spectators are an inherent element of sporting events. Many of them are not only interested in watching the game, but they also wish to participate in it by supporting their team. Some authors have reported that this support has a negative impact on the players' performance [1]. The support of fans is somewhat different from other types of social support, as defined for instance by Sęk and Cieślak [2], who present two different approaches towards it. When approached structurally, social support is understood as objectively existing and accessible social networks which differ from other networks in that they play a supportive role for people who find themselves in a difficult situation owing to the contact and sense of belonging they offer [2]. According to the functional approach, as presented by Sęk and Cieślak [2], social support is a type of social interaction undertaken by one or two participants who find themselves in a difficult, problematic, stressful or critical situation. As far as support received by sports players is concerned, it may be given by the fans of the team the players are in. If the spectators do not support the players or are hostile towards them, they can still feel they are being supported by persons who are important to them, such as their spouses or parents [3].

Some analyses of matches in team sports reveal that the number of errors committed in front of one's own spectators increases in the final stage of the tournament [4]. The results of experi-

ments have shown that when faced with hostile and critical spectators, players tend to be highly effective in competing with their opponents, whereas if they receive strong support, their effectiveness tends to be worse [1]. The players' effectiveness may deteriorate if they are strongly supported by the spectators because in such situations players tend to be more careful and slower, which may be due to their increased fear of failure compared to playing without this support. This fear can be accompanied by anxiety related to losing the support of fans, as well as their potential disapproval and disappointment [3, 6]; the fear of losing one's fans is one of the factors which put players under pressure [6]. On the other hand, players have reported that they are more satisfied and confident about their skills when they are playing in front of their supporters [5, 6].

The presence or absence of spectators at sporting events is also of importance. The spectators' reactions or silence, the awareness that the players are being watched, including by people who are important to them, increases the risk that their effectiveness will be lower [7].

However, playing at a venue which the players know well, such as the court where they train, can also be advantageous, although this is usually attributed to environmental factors and not to the presence of supporters. According to Nervill and Holder [8], these factors include familiarity with the venue, the referee's bias in favour of the home team and the lack of fatigue caused by travelling [6]. The spectators can also, in some cases,

play a positive role, in that they increase the players' motivation and encourage them to put more effort into the game [9], although the benefits gained may not be significant if the players are already highly motivated for other reasons [6]. The venue of the match influences the players' psychological state: when playing in front of their supporters, players are more vigorous and self-confident, but they also tend to be more tense, depressed, angry, tired, confused and more prone to cognitive and somatic fear [10].

It is worth mentioning that not all studies confirm that there is a difference between the way the game is played in front of supportive and hostile spectators. The research carried out by Epting and Riggs shows that in team sports (baseball and basketball) the players' effectiveness does not depend on the support of the spectators, but this support does impact the performance of golf players [11].

The performance of players in matches played in front of their own spectators and away has been explored in several different studies. These studies have dealt with various types of sports, such as, among others, ice hockey [12], football [13] and rugby [14]. Many authors have analysed handball matches and have covered technical errors in their analyses [15, 16, 17]. Some of them ineffectiveness include technical errors in their assessment of the e of an entire team [18]. Error analysis can point to some practical guidelines for implementing training goals and tactics during the match. Analysing the opponents' errors, on the other hand, can help choose an appropriate strategy before the match.

The aim of the current study is to analyse the errors made by the players during the selected handball matches from a quantitative and temporal point of view to determine to what extent they depended on the venue of the match and stage of the tournament.

Material and methods

The material consisted of recordings of 50 matches of men's handball held in the EHF Champions League in 2012-2013. The material had been recorded according to the guidelines of EHF TV. The study involved 8 teams who participated in the quarterfinals of the tournament. A total of 8 matches were analysed for each team, including 4 matches in the knockout stage (2 at home and 2 away) and 4 in the group stage (2 at home and 2 away).

The technical errors of the teams were recorded. The errors were determined based on EHF regulations; an error was counted when a team lost the ball. The following types of errors were considered: errors in passing, catching and dribbling the ball; errors in taking steps with the ball; entering the goal area when penalised; offensive fouls; errors resulting in exclusion from the game; passive play; and a foul resulting in a penalty shot being awarded to the opponent. The errors were recorded for 12 five-minute periods.

The results were analysed statistically, in order to obtain basic statistical data such as the sum and mean. The non-parametric Wilcoxon rank test was used in order to analyse the differences in the data. Statistical significance was set at 0.05.

Results

The analysis of the data showed that in the matches played at home the teams made fewer errors (576) than when they played away (650). However, this difference is not statistically significant. According to the data, six out of the eight teams made fewer errors playing at their home venue than at that of their opponents. In home matches the fewest errors were committed by the

players of HG Metalurg Skopje (60), and the most were made by the players of FC Barcelona (88). As far as away matches are concerned, the smallest number of errors were made by the players of HG Metalurg Skopje (64), and the greatest by those of SG Flensburg-Handewitt (102). The number of errors made by the winner of the tournament, the HSV Hamburg team, is close to the mean number of errors, as shown in Table 1.

Table 1. Errors made and the venue of the match

TEAM*	HOME		AWAY		p
	SUM	MEAN	SUM	MEAN	
HSV HAMBURG	70	17.5	78	19.5	0.14
FC BARCELONA	88	22	80	20	
VIVE TARGI KIELCE	80	20	88	22	
THW KIEL	61	15.25	83	20.75	
ATLETICO MADRYT	78	19.5	72	18	
HG METALURG SKOPJE	60	15	64	16	
MKB VESZPREM	77	19.25	83	20.75	
SG FLENSBURG-HANDEWITT	62	15.5	102	25.5	
Total sum	576		650		
\bar{x}	72 ± 9.68		81.25 ± 10.47		

* - the teams are listed in the order in which they ranked in the tournament.

The analysis of the number of errors made in the knockout phase of the EHF Champions League in 2012-2013 showed that six out of the eight teams made more errors in matches played away. The total number of errors committed in home matches (300) was lower than the one in away matches (332). This difference is statistically significant. The fewest errors in home matches in this stage of the tournament were recorded for the HG Metalurg Skopje team (32), and the most for FC Barcelona (46). As for matches played away, the smallest number of errors were committed by the players of HSV Hamburg (35). The number of errors made by the winner of the tournament is below the mean number of errors made by the teams, both for matches played at home and away (tab. 2).

Table 2. Errors made in the knockout stage of the tournament

TEAM*	HOME		AWAY		p
	SUM	MEAN	SUM	MEAN	
HSV HAMBURG	36	18	35	17.5	0.034
FC BARCELONA	46	23	46	23	
VIVE TARGI KIELCE	39	19.5	45	22.5	
THW KIEL	34	17	37	18.5	
ATLETICO MADRYT	35	17.5	36	18	
HG METALURG SKOPJE	32	16	39	19.5	
MKB VESZPREM	44	22	51	25.5	
SG FLENSBURG-HANDEWITT	34	17	43	21.5	
Total sum	300		332		
\bar{x}	37.5 ± 4.74		41.5 ± 5.29		

* - the teams are listed in the order in which they ranked in the tournament.

Similarly, in the group stage fewer errors were made in matches played in front of the teams' own spectators (276) than in those away (318). However, this difference is not statistically significant. In matches played at home the fewest errors were made by the players of THW Kiel (27) and the most by those of Atletico Madrid (43), whereas in matches played away the fewest errors were found for HG Metalurg Skopje, and the most for SG Flensburg-Handewitt. The team who won the tournament,

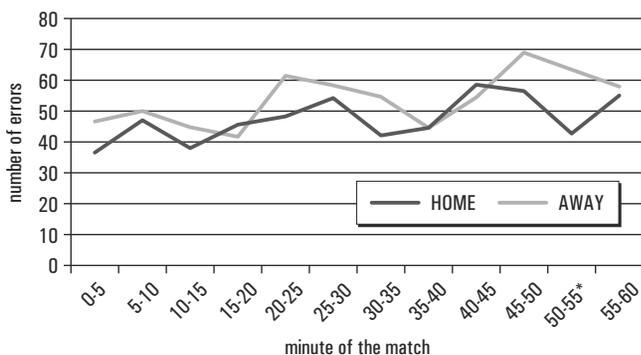
HSV Hamburg, made 34 errors in home matches, which is slightly below the mean number. When playing at their opponents' venue, the team made 43 errors, which is more than the mean number (tab. 3).

Table 3. Errors made in the group stage of the tournament

TEAM*	HOME		AWAY		p
	SUM	MEAN	SUM	MEAN	
HSV HAMBURG	34	17	43	21.5	0.48
FC BARCELONA	42	21	34	17	
VIVE TARGI KIELCE	41	20.5	43	21.5	
THW KIEL	27	13.5	46	23	
ATLETICO MADRYT	43	21.5	36	18	
HG METALURG SKOPJE	28	14	25	12.5	
MKB VESZPREM	33	16.5	32	16	
SG FLENSBURG-HANDEWITT	28	14	59	29.5	
Total sum	276		318		
\bar{x}	34.5 ± 6.26		39.75 ± 9.72		

* - the teams are listed in the order in which they ranked in the tournament.

The analysis of the timing of errors revealed that in 10 out of the 12 time periods in the matches the number of errors made away was higher. The results also show that in the last 5 minutes of the matches played at home the number of errors committed by the players increased. In the first half of home matches, the most errors were made between the 25th and 30th minute, whereas in matches played away the number of errors peaked between the 20th and 25th minute. In the second half of home matches, the most errors were made between the 40th and 45th minute, and in away matches the highest number of errors was recorded between the 45th and 50th minute (fig. 1).

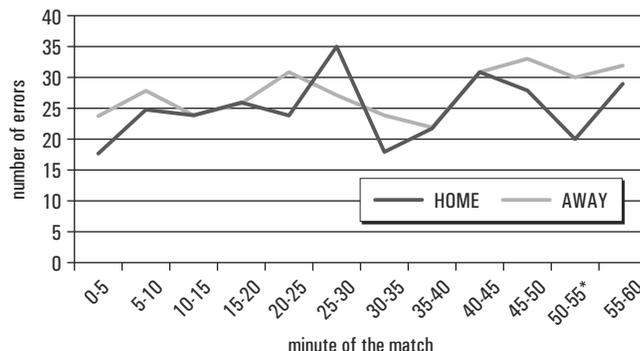


* - p<0.05.

Figure 1. The number of errors in a given time period in the match

As far as the timing of the errors in the knockout stage is concerned, there was only one period of time where a significant difference was found. In four time periods the number of errors made by the players was the same for both matches played at home and away. However, the number of errors made at home and away peaked at slightly different periods during the matches. In those played at home it was the highest between the 25th and 30th minute in the first half of the game, and from the 40th to 45th minute in the second half. In matches played away, the number of errors was the greatest between the 20th and 25th minute in the first half, and between the 45th and 50th minute in the second half. It was found that the number of errors committed by the team fluctuated more significantly in the matches played before their own spectators than in those played away.

There was also a tendency for the number of errors to increase in the last 5 minutes of the match. In matches played away, the number of errors increased between the 40th and 45th minute and remained high until the end of the match (fig. 2).



* - p<0.05.

Figure 2. The number of errors in the knockout stage in a given time period in the match

As shown in Figure 3, in four out of twelve time periods in the matches in the group stage, the teams made more errors in home matches than in those played away, although there was one time period where the same number of errors was recorded for both types of matches. In the first half of home matches, the teams made the fewest errors between the 10th and 15th minute and the most between the 20th and 25th minute. In the second half the smallest number of errors were committed between the 30th and 35th, and then the 50th and 55th minute. In contrast, in the first half of away matches the fewest errors were made between the 15th and 20th minute and the most between the 25th and 30th minute. In the second half of these matches the fewest errors were recorded between the 35th and 40th minute and the most between the 45th and 50th minute. Similarly to the knockout stage, the number of errors made at home increased in the last 5 minutes of the match. However, in contrast to the knockout stage, in the matches played away the number of errors committed decreased between the 55th and 60th minute (fig. 3).

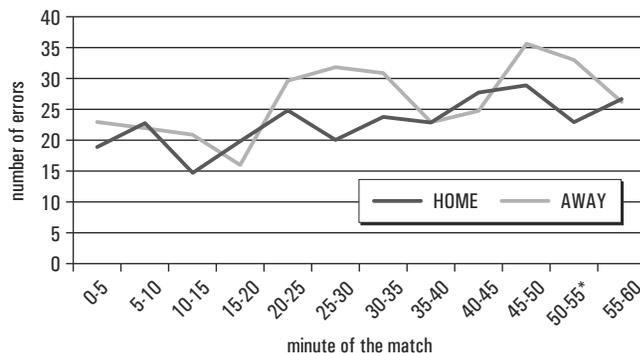


Figure 3. The number of errors in the group stage in a given time period in the match

Figures 2 and 3 which illustrate the results of the study show that the number of errors was not static, but it was dynamic and changed in a sinusoidal way. During the match there were stretches of time when the number of errors made by the players increased dramatically and then, sometimes after remaining relatively stable for a certain time, it decreased. This is clearly visible in Figure 2 for home matches (minutes 0-25, 20-35, 30-55 and 50-60) and in Figure 3 for away matches (minutes 0-20, 15-

40 and 35-60). Figure 1, which is based on the data presented in the Figures 2 and 3, naturally also illustrates this tendency.

Discussion

The results of the study show the number and timing of errors made by the selected teams in the group and knockout stages of the tournament. This number, however, is not the same as that recorded in other studies. The mean number of errors committed by the teams included in this study ranged from 16-19 errors per match. In matches played at home this number was 18, and in away matches it was 20-31. In comparison, the players in Paterka's [15] study made 14 errors per match, whereas those in Krawczyk's [16] made 16-27 errors. The differences in the findings of studies related to this issue may be due to the different stages of the tournament which were analysed. The EHF Champions League tournament includes the best teams in Europe. Both defensive and offensive play are difficult due to the fact that the players are very well prepared in terms of their technical, tactical and motor skills, which can cause the teams to make more errors. It is also worth mentioning that the number of errors recorded in the studies has been increasing. This is caused by the changes introduced in handball: the game is becoming faster and faster, and the players are increasingly well prepared for defensive play. It has been found that the tendency to play the game fast, which makes the players more tired, can influence the way players perform technical elements during the game [19]. Another issue is that the two studies quoted above [15, 16] dealt with lower-level matches. It can be assumed that when playing higher-level matches, especially final matches in international tournaments, the players are under more stress than during lower-level ones. Based on the analysis of the data used in this study, it may be hypothesised that this type of stress can indeed have a negative impact on the players' performance.

As far as the results for errors committed in the knockout stages in matches played at home and away are concerned, they also differ from those reported by other authors [1, 3, 4, 5, 7]. This can be explained by the increased motivation of the players participating in such high-stake matches, which may lead to a higher level of involvement in the game and greater accuracy. Although professional players are intrinsically motivated, the extrinsic motivation connected with ranking high in the tournament, being recognised internationally and receiving financial rewards can play a major role. Playing handball requires a significant amount of energy and very efficient use of motor skills; the physical effort is so great that high motivation is necessary for the players to be fully involved in the game [9]. Psychometric tests performed on rugby players during matches played at home show that such matches cause players to behave in a particular way [10]. Based on the results of these tests for rugby players, handball players can be expected to be in a better psychological state when playing at home. Kerr and Schaik have also observed a difference in the emotional states of players depending on whether the game is played at home or away [14]. The fact that players prefer to play in front of spectators who support them may be seen as confirmation. Apart from emotional factors, the difference between the players' performance at home and away can also be caused by the need to travel to the venue of the match; Goumas found that this necessity to travel has a greater influence of the players' effectiveness than the lack of support from the spectators [13]. The fatigue and boredom caused by travelling can lower the level of concentration and result in the players' poor performance. Another factor which impacts on the number of errors made is the level of the opponent. In the knockout stage the teams face the best teams of the tournament; strong opponents make it difficult for the players to play smoothly, and for this reason they tend to make more errors when facing

a strong team. In terms of the impact that the venue of the match has on the players' performance, the results of the current study correspond with those of studies conducted by other authors [20, 21].

The lack of such differences in the matches in the group stages which was found in the study can be explained in several ways. First of all, losing a game in this stage did not make it impossible for the team to participate in the next rounds of the tournament. Secondly, both teams that are potentially strong and potentially weak play in the group stage, which can cause stronger teams to make fewer errors when playing against weaker teams. Thirdly, the players' motivation can be assumed to be lower, since the matches in this stage of the tournament are not as prestigious as those played in the knockout stage; matches in the group stage do not attract as many spectators or as much attention from the media, therefore the players are under less pressure.

The analysis of the errors committed in particular periods during the matches showed that there were periods when the number of errors was particularly high and particularly low. There are several factors which may affect the occurrence of errors, such as the situation in the match, the tactics of the attacking and defending teams, the decisions of referees and the players' fatigue. There was a tendency for the number of errors to increase in the last 5 minutes of the match; however, in home matches played in the knockout stage the number of errors increased in the last 5 minutes of both the first and second half of the match. This may be seen as evidence of a higher level of fatigue, caused by more strenuous effort [9]. There were periods during the match when the number of errors increased and then fell, which shows that the players' performance during the match fluctuated.

Conclusions

The following conclusions were drawn based on the results of the study.

1. When playing matches at home in the knockout stage, the players made fewer errors.
2. The number of errors made increased in the last 5 minutes of the match.
3. In order to provide practical guidelines for players, their performance in matches played at home and away, as well as in particular periods of the game in different stages of the tournament should be analysed.
4. Preparing the players mentally for matches should be part of the training process in order to minimise the impact that the venue and particular period of the match has on the number of errors they make.
5. Team coaches should be able to change the style of the game in a conscious way and change players when the team is making an increased number of errors so that the team's own errors can be eliminated and those committed by the opponent can be taken advantage of.

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