

Attack with Empty Goal (7 vs 6) in Team Handball - Analysis of Men's EHF Euro 2022

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Abstract

Team handball is constantly evolving. Since the beginning of the century some changes have been introduced but no rule has been as controversial and not consensual as the one introduced in 2016 that allows the change of a goalkeeper for a field player (Empty goal) allowing teams to play 7 vs. 6 (Prudente et al., 2022). With this study we intend to analyze and characterize the attack with empty goal (7 vs. 6) of the 12 best ranked teams in Men's EHF Euro 2022. Observational Methodology was used and it was built, validated by experts and subsequently used a mixed ad hoc instrument combining a 12 criteria field format with 77 category category system to observe and register data. Data were gathered from 28 matches involving teams classified in the first twelve places in the 2022 Men's EHF Euro 2022. These were recorded from TV broadcasts, and the total number of offensive sequences carried out in an organized attack game method 7 vs. 6 with empty goal (n = 121) was analyzed. For data analysis, prospective and retrospective sequential analysis and the technique of polar coordinates was used. The main results show a stronger association between: a) No Goal by Technical Fault and succeeded direct goal attempt; b) Direct Goal Attempt and Goal. Results also show that best ranked teams used less 7 vs. 6 attack system. According to the main results, teams that used 7 vs. 6 and lost the ball by technical fault had a stronger association with a direct goal attempt by the opponent team. That is positively associated with goal. This leads to a practical recommendation that teams that want to use 7 vs. 6 should practice this special option in order to achieve more efficiency, reducing the number of technical faults and consequently the opponents goal to goal attempts.

KEYWORDS: HANDBALL, 7 VS 6, EMPTY GOAL, ATTACK, EHF EURO 2022.

Introduction

Team handball is constantly evolving, which requires new rules to follow the evolution of the game, in order to keep it interesting and increasing its spectacularity. Since the beginning of the century some changes have been introduced but no rule has been as controversial and not consensual as the one introduced in 2016 that allows the change of a goalkeeper for a field player (Empty goal) allowing teams to play 7 vs. 6 (Prudente et al., 2022).

This opened possibilities for teams to use new strategies, leading to some new tactical behaviors in the attack (Prudente et al., 2022). Some studies have been made since 2016, in order to understand the impact of this change (Krahenbühl et al., 2019b; Korte and Lames, 2019; Gümüş et al., 2020; Maroja et al., 2020; Prudente et al., 2019; Spate, 2019, 2020). However, these studies showed differences according to the competition. Marczinka and Gal (2018) found that teams used twice as often the option of playing with empty goal when in numerical inferiority than in numerical superiority. These results were reinforced by Korte and Lames (2019) and Prudente et al. (2019) that showed that teams feared to suffer a goal after a turnover. On the other hand, Gumus and Gencoglu (2020) and Prudente et al. (2022) showed that teams that used this possibility had no increased risk. Since 2017 the use of 7 vs. 6 increased from 19 situations to 123 in 2020 (Prudente et al., 2022), showing that coaches and teams are adjusting and adapting strategies in order to improve this new possibility.

Some studies made with coaches (Krahenbühl et al., 2019a; Sousa et al. 2021b, Sousa et al., 2021a; Prudente et al., 2022) referred that the introduction of these rule were not consensual among coaches and that same coaches had the perspective of a negative balance of the use of these strategy. However results showed that Portugal National Team had a positive balance (Prudente et al., 2022), contradicting some coaches' opinion.

It is our perception that all high-level competitions are opportunities to evaluate and study the evolution of the game (Prudente et al., 2022). After a period for teams to understand and adapt, it is our opinion that we should continue deepening the implications of this change in the game, using a different sample, in order to improve knowledge about this rule.

With this study we intend to analyze and characterize the attack with empty goal (7 vs. 6) of the 12 best ranked teams in Men's EHF Euro 2022.

Methods

The study used an observational design, idiographic, multidimensional, follow-up, located in the first quadrant and type 1 data (Anguera, 2003; Anguera et al., 2011).

Sample

The sample included all of offensive sequences (n=121) with 7 vs 6 situations gathered from 28 matches of the first 12 placed teams.

All of the attacks occurred in numerical superiority 7 vs. 6 without a goalkeeper (empty goal). We considered the sequences that started and ended in 7 vs. 6 formation.

Procedures

For this study it was replicated the methodology previously used by Prudente et al. (2022).

Observational Methodology was used and it was built, validated by experts and subsequently used a mixed ad hoc instrument combining a 12 criteria field format with 77 category system to observe and register data. All of which was gathered from 28 matches involving teams classified

in the first twelve places in the 2022 Men's EHF Euro 2022. These were recorded from TV broadcasts, and the total number of offensive sequences carried out in an organized attack game method 7 vs. 6 with empty goal ($n = 121$) was analyzed. For data analysis, prospective and retrospective sequential analysis and the technique of polar coordinates was used.

In order to restrict the observation unit, we defined the offensive sequence from the moment the team started the attack in a 7 vs. 6 formation until the end of the opponents' team response.

The observation ended when the opponent team made a fast break, goal-to-goal attempt, an organized attack situation after the throw-off. Another situation that ended the observation unit was when a 2 minutes exclusion for one of the teams occurred. Either a throw-in or timeout were made it was considered a new sequence.

To observe and record data it was used Lince software v.1.2.1. (Gabin et al., 2012). To analyze data it was used SDIS-GSEQ v. 5.1.23 (Bakeman and Quera, 1995), and software Hoisan v. 1.6.3.3.5 (Hernández-Mendo et al., 2012; Rodríguez-Medina et al., 2019).

Instrument

The instrument used was a mixed *ad hoc* instrument consisting of a field format (with 12 criteria) with category systems (77 categories).

The following variables were studied: 1) Teams according to their order at the competition final table (T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12); 2) Playtime 10 minutes parts of first and second half plus extra-time (A1, A2, A3, B1, B2, B3, B4, P1, P2, P3, P4); 3) the partial score (E, V1, V2, V3, V4, D1, D2, D3, D4); 4) The defensive system (6:0, 5:1, 3:2:1, 3:3, 4:2, 5+1, 4+2, HxH); 5) Offensive Organization with one or two pivots; 6) Tactical Means (Individual Means, Group Means, Collective Means and No Action); 7) Shot (9 meters, wing shot, pivot shot, breakthrough shot, No shot) 8) Attack Result (Goal, No Goal, 7 meters with goal, 7 Meters No Goal, No shot by technical fault, No Shot by Opponent action); 9) the Shot Zone of the offensive sequence – a field map was designed with 10 zones: 9 zones on the offensive side (left/right wing, left/central/right zones from 6 to 9m; left/central/right zones from 9 to 15m; left/central/right zones from 15 to 20m) and 1 zone on the defensive side; 10) Opponent Response (Direct Goal attempt/ Straight Goal Attempt, Fast break, Sustained Fast break, Replacement, Fast Attack, Organized Attack, No Response); 12) Opponent Response Result (Goal, No Goal, No goal with Penalty, No Action).

Quality of data

The reliability of observers is tested after the training period (between .87 and .98 Intra-observer and .82 and .96 Inter-observer) and just before start the observation sessions. During the process of observation after each six sessions and finally in the last session of observation.

Results

Descriptive Analysis

We started with a simple descriptive analysis to verify both absolute and relative frequencies. This allowed us to take some decisions about the subsequent sequential analysis with lags and polar coordinate analysis. There were 121 offensive sequences in 7 vs. 6 situations with 1300 events registered, carried out by the first 12 teams in 28 games of the Men's European 2022 Championship. Results show (Figure 1) that best ranked teams used less 7 vs. 6 attack system (37%) than the others teams (63%).

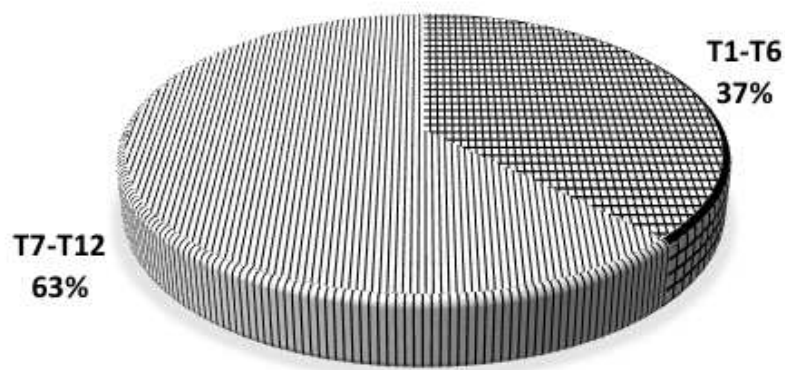


Figure 1. 1st to 6th ranked teams vs. 7th to 12th

In Figure 2, we can see that Denmark was the team that used more this option. This team was an outlier compared to all of the others best ranked teams. Results show that the winning team (Sweden) did not use this possibility quite often.

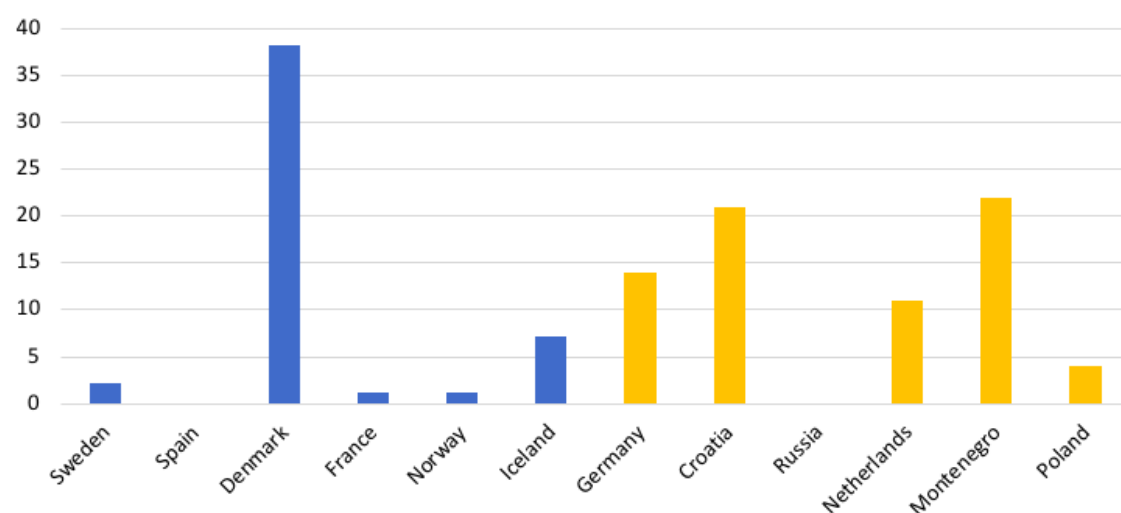


Figure 2. 7 vs. 6 Situations by Team

Figure 3 shows the use of 7 vs. 6 during the game. We can see that teams mostly used this tactic option during the second half (B1, B2, B3 and B4).

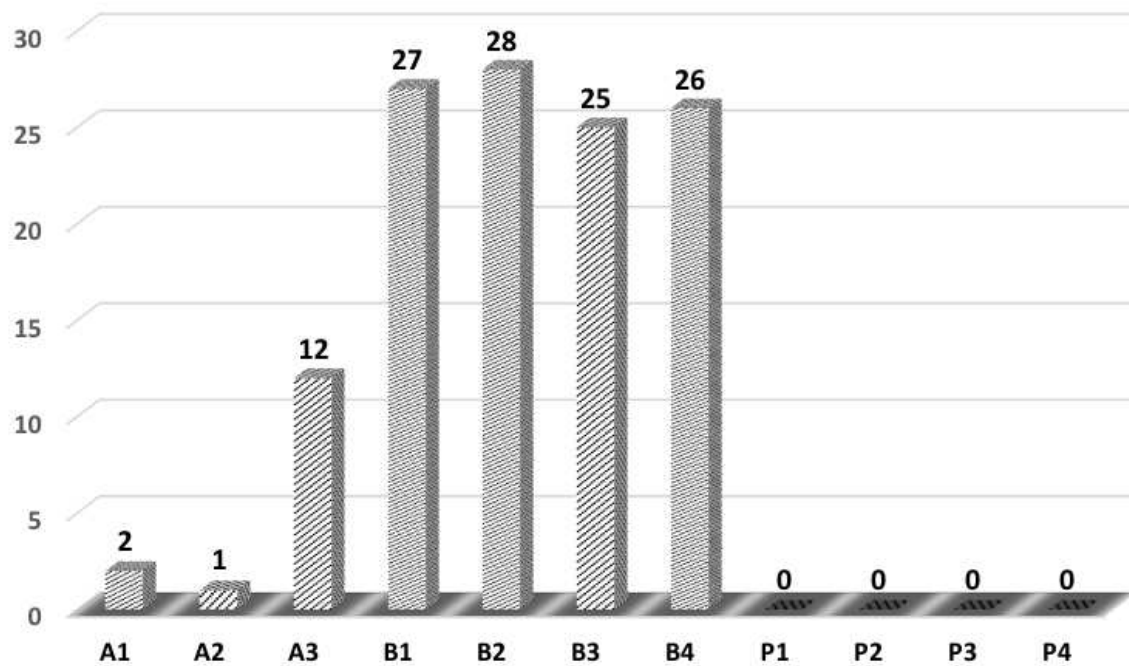


Figure 3. 7 vs. 6 by Playtime. A1 – From 0 to 10 min; A2 – From 10:01 to 20 min; A3 – From 20:01 to 30 min; B1 – From 30:01 to 40 min; B2 – From 40:01 to 50 min; B3 – From 50:01 to 55 min; B4 – From 55:01 to 60 min.

We tried to analyse the use of 7 vs. 6 according to partial score. Figure 4 shows that 7 vs. 6 situations occurred when teams were losing the game (mainly by 4 or more goals).

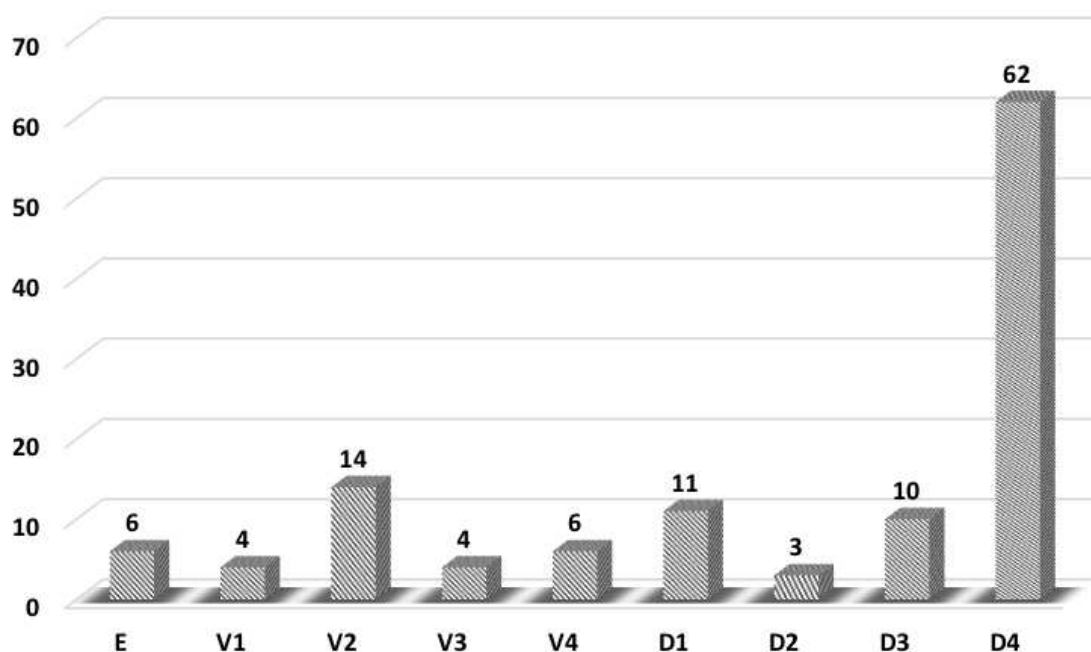


Figure 4. 7 vs. 6 by Partial Score. E – Draw; V1 – Team winning by 1 goal; V2 – Team winning by 2 goals; V3 – Team winning by 3 goals; V4 -Team winning by 4 or more goals; D1 - Team losing by 1 goal; D2 - Team losing by 2 goals; D3 - Team losing by 3 goals; D4 - Team losing by 4 or more goals.

Sequential Analysis

It was used sequential analysis technique in search of patterns of behavior.

Some patterns were found. Figure 5 shows that is significant (≥ 1.96 ; $p=0.05$) the probability of teams playing 7 vs. 6 that lost the ball by the opponent's action were associated positively to the Goal to Goal Attempt (3,56) and to Fast Break (3,85) and to the Goal (5,46) by the opponent team.



Figure 5. Association between the focal conduct “No Shot by Opponent Action” and the conditioned conduct opposing team’s response “Goal to Goal Attempt” and “Direct Fast Break” and the result of the opposing team’s response “Goal”.

The results show that is significant (≥ 1.96 ; $p=0.05$) the probability of the Teams Ranked between 7th and 12th places activate the use of 7 vs. 6 when losing by 4 or more goals (6,68) (Figure 6).

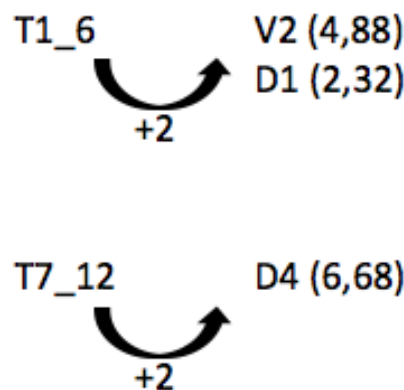


Figure 6. Association between the focal conduct “Teams Final Standing” and the conditioned conduct “Partial Score”. T1_6 – Teams ranked from 1st to 6th place; T7_12 – Teams ranked from 7th to 12th place; V2 – Teams winning by 2 goals; D1 – Teams Losing by 1 goal; D4 – Teams losing by 4 or more goals.

Polar Coordinate Analysis

We also used the polar coordinate analysis technique in order to find some more consistent results.

There were some associations between conducts. Figure 7 shows that is significant the probability of Teams Losing by 4 or more Goals being associated to Individual Tactical Means (2.78; 55°) and to the Break Through Shot (2,90; 72°), inhibiting Group Tactical Means (2.33; 252°) and Shot from Pivot (2.68; 252°);

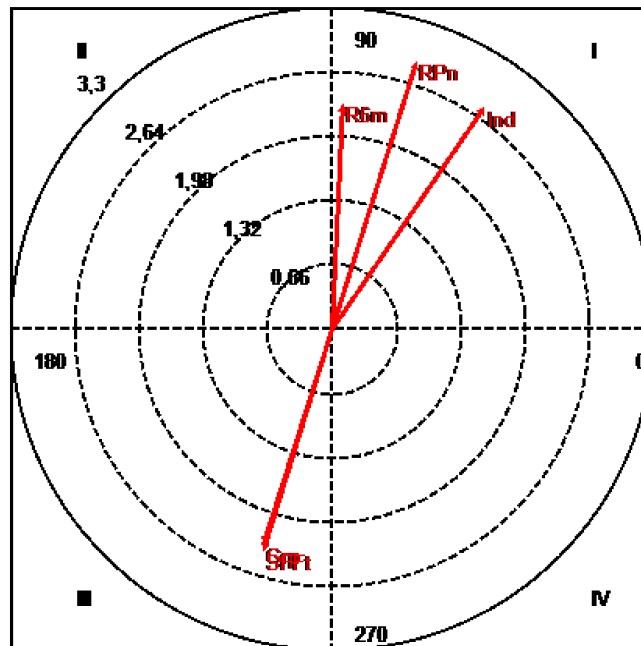


Figure 7. Polar coordinate analysis map: focal conduct “Partial Score L4” - Team losing by 4 or more goals. Conditioned conducts Tactical Means: “Ind” – Individual Tactical Means; “Grp” – Group Tactical Means and Finalization Position: “R6m” – 6 meters shot; “RPn” – Break Through Shot”; RPv – Shot from Pivot.

Figure 8 presents the vectorial map of the polar coordinates analysis. According to the map it is significant the probability of Teams Winning by 1 Goal being associated to Group Tactical Means (3.23; 52°) inhibiting Individual Tactical Means(3.36; 232°).

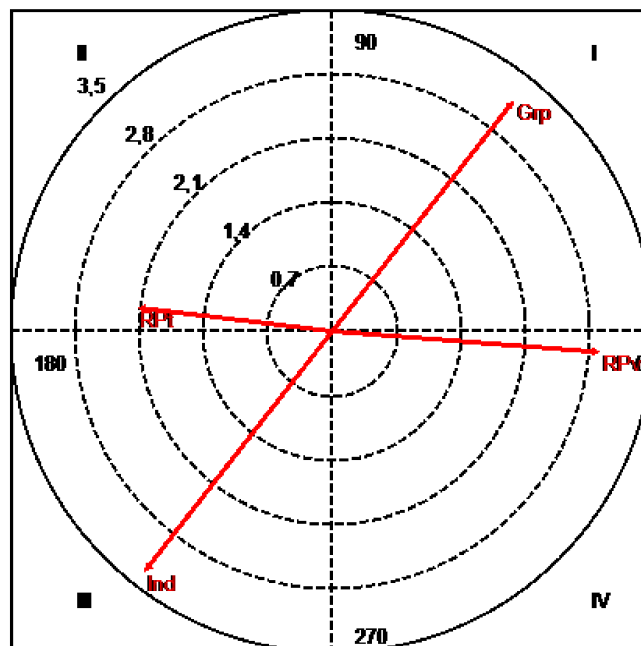


Figure 8. Polar coordinate analysis map: focal conduct “Partial Score W1” – Team winning by 1 goal. Conditioned conducts Tactical Means: “Ind” – Individual Tactical Means; “Grp” – Group Tactical Means and Finalization Position: “RPt” – Wing Shot; RPv – Shot from Pivot.

Discussion

This study aimed to analyze and characterize the attack with empty goal (7 vs. 6) of the 12 best ranked teams in Men's EHF Euro 2022. Our data suggests that the game and this rule is still evolving. However, comparing to recent studies, results show that the use of this strategic option is stabilizing. During the 2020 European Championship there were 123 occurrences, in this same competition two years later there were 121 occurrences (Prudente et al., 2022). The bigger difference is that Portugal National Team was the one that used more 7 vs. 6 situation (Prudente et al., 2022) and now Denmark was the leader. Despite the difference, Portugal used quite more that possibility than the Nordics (68 vs 38). Although it was not our goal for this study, we can refer that the teams ranked between 1st to 6th places used the 7 vs.6 option in more quantity with better efficiency, with a 55% success rate out of 40 attempts, while teams from 7th to 12th only achieved 35% in 37 attempts. Prudente et al. (2022) showed that Portugal National Team had 60% successful attempts using this strategic option against values below 50% from the other teams that used 7 vs.6 in Men's Euro EHF 2020.

There are some studies that concluded no extra-efficiency by the use of 7 vs. 6 (Gumus and Gencoglu, 2020; Bonjour et al., 2021), but results suggest that coaches still believe that the use of this option is reliable, even though teams that used more were teams between 7th and 12th place. A trend that is still in our results that reinforces previous studies is that 7 vs. 6 is more used by teams that are losing (Marlzinke and Gal, 2018) and in the second half of the game.

This study confirmed that partial score and game time influenced different patterns as some authors already referred (Gumus and Gencoglu, 2020; Maroja et al., 2020, Prudente et al., 2022), According to Prudente et al. (2022), teams used more individual tactical means, that lead to more errors and giving opportunity to the opponent team to responde. Our polar coordinate results confirm that use of individual tactical means by teams losing by 4 or more goals. Probably this occurs because of their despair, contrary to best ranked teams, that use more often group tactical means.

This study identified significant relationships between given conduct and conditioned conducts. We identified positive association between no shot by opponents action with goal to goal attempt (3,56) in lag 2 and goal (5,46) in lag 3. This results reinforced the results on the study of Prudente et al. (2022) that all teams except Portugal had this behaviors.

Conclusion

According to our analysis, we can describe some existing associations between the use of 7 vs 6 tactic with success. We also identified some differences between teams that used that strategy in the attack. It is our belief that this subject must be study in a longer timeline in order to be better understood. We can conclude that the 7 vs. 6 use has been increasing during the all game and not only in special occasions.

We recommend this study to be made since the beginning of this rule, in all major competitions, increasing the sample.

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