Analysis of defense parameters in handball teams HCM Constanta and FC Barcelona in the competition Champions League 2011-2012

Analiza parametrilor defensivi înregistraţi de echipele HCM Constanţa şi FC Barcelona în competiţia Liga Campionilor 2011-2012

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Abstract

Background. The recent changes in male handball regarding the concept of the game, the increased speed in which the offense and defense phases are carried out, and the mobility of the players in different game systems with regard to attack and defense determined us to do a compared analysis on the evolution of male handball teams H.C.M. Constanţa, Team Champions of Romania, and FC Bracelona, winner of seven titles at international level, in the Champions League Competition 2011-2012.

Aims. The research had as an object of study the defensive performance of players in the left wing, right wing and pivot positions of teams HCM Constanta and FC Barcelona in the Champions League competition 2011-2012.

Methods. In conducting this research, we used the observation method, achieved by studying the video recordings of the games; statistical data collected was necessary to analyze the game parameters in defense obtained by the twelve players.

Results. 31 sanctions for the H.C.M. Constanta team and 19 penalties for F.C. Barcelona were given in 10 matches. Defense parameters blocked shots and interceptions had a share of 6.34% from the total of 820 defense situations regarding the Romanian team, and 8.96% for the Spanish team out of 825 such situations.

Conclusions. Defense actions performed by the players of the Spanish team in the wing positions, as well as the low number of penalties received by them, demonstrate that they have a correct technique regarding the defense elements, backed by high values of motor qualities.

Key words: high performance sport, male handball, defense parameters, game systems in defense.

Rezumat

Premize. Modificările apărute în jocul de handbal masculin privind concepţia de joc, viteza crescută în care se desfăşoară fazele jocului ofensiv şi defensiv, mobilitatea jucătorilor în diferite sisteme de atac şi apărare, ne-au determinat să efectuăm o analiză comparativă asupra evoluţiei echipelor de handbal masculin HCM Constanţa şi FC Barcelona în Liga Campionilor, sezonul competiţional 2011-2012.

Obiective. Demersul ştiinţific a avut ca obiect de studiu evoluţia defensivă a jucătorilor care activează pe posturile de apărători laterali şi centrali avansaţi, componenţi ai echipelor HCM Constanţa şi FC Barcelona în cadrul competiţiei Liga Campionilor 2011-2012.

Metode. În realizarea cercetării a fost utilizată metoda observaţiei pedagogice, prin utilizarea unei fişe de observaţie conţinând parametrii defensivi înregistraţi de către cei 12 jucători supuşi cercetării.

Rezultate. În ceea ce priveşte sancţiunile disciplinare, jucătorii echipei HCM Constanţa au primit 31 sancţiuni, iar sportivii echipei FC Barcelona, 19 penalităţi în 10 meciuri. Parametrii defensivi aruncări blocate şi intercepţii, utilizaţi de către echipa română, au înregistrat valoarea de 6,34% din totalul de 820 situaţii defensive, iar echipa spaniolă a obţinut un procent de 8,96% din 825 situaţii de apărare.

Concluzii. Acţiunile defensive efectuate de jucătorii echipei spaniole, sportivi care activează pe posturile de apărători laterali, precum şi numărul redus de sancţiuni disciplinare, demonstrează o tehnică corectă şi foarte bine însuşită a procedeelor şi acţiunilor de apărare, întărită de abilităţi fizice deosebite.

Cuvinte cheie: sport de performanţă, handbal masculin, parametrii defensivi, sisteme de joc în apărare.

Introduction

Handball is called a transition game, as players often switch between defensive and offensive game and the action of the game is characterized by alternating between running and sprinting. Technical skills, anthropometric characteristics and a high level of strength, muscle power and throwing speed are the most important factors to obtain a clear advantage for a successful participation in elite competitions (Rannou et al., 2001; Gorostiaga et al ., 2005).

During a handball match, players perform different actions such as running, jumping and various defensive actions. Handball players require repeated running actions alternating with short or long periods of recovery, which can be active or passive (Buchheit, 2005).

Malina et al., 2007 believe that the technique is complex in ball games and therefore, evaluation of technical parameters based on individual scores would be useful.

Determining the factors that influence the speed of the ball, such as the distribution of players in different positions, muscle strength and anthropometric characteristics, could be important for the efficiency of the handball game (Zapartidis et al., 2009).

Vila et al., 2012 & Chaouachi et al., 2009 consider that each specific position of the players in the field requires unique physical and physiological attributes, due to technical and tactical requirements of each post, in order to maximize team performance.

The recent literature provides insight into the physiological requirements of modern handball. Contemporary handball game is a combination of aerobic and anaerobic efforts, mainly carried out at ~80% of maximum oxygen requirements. Players cover between 3.5 and 4.5 km/game, depending on their position in the field. Average speed varies around 6.4 km/h, but short sprints occur over very short periods of time, (on an average 50 sprints/player/game) (Michalsik et al., 2013; Michalsik et al ., 2013).

At each annual meeting worldwide, participating teams surprise us by implementing innovations in the competition. If in modern handball, the simplification of actions in the attack compartment becomes a problem, in defense, new approaches and characteristics of male handball teams appear, where the game is based on the high mobility of players, dynamism, high efficiency and activation (Pitney & Cartwright, 2005).

A good attack wins games and defense wins championships, although this section of the game is far from being attractive during the training hours. Defense is the key to winning, and it is known that winning teams must be balanced to provide a strong defense and an effective attack, but if the attack is down, a solid defense will compensate for it (Constantini, 2002b).

Nowadays, the defense compartment has assumed an important role in the progress of a spectacular game; taking initiative and risks incites players and attracts viewers through the significant number of advantages obtained using successful defensive actions. The main objectives of defense have not changed and the priority objective is to prevent the opponent from scoring goals and at the same time, to take possession of the ball or, in a more realistic concept, to recover the ball without receiving a goal (Prisăcaru, 2011).

To defend means to achieve an active opposition in order to prevent effective action of the opponent with the ball, for the purpose of exploiting a surprising tactical situation (Sibille et al., 2011). Defense requires basic objectives and tasks that must be performed surprisingly, in order to gain possession of the ball. Defenders, either individually or collectively, must oppose to attacking movements and ball circulation or cause difficulties in receiving and handling the opponents' actions, thus creating favorable conditions for ball recovery, causing the opponent to make mistakes.

Several studies have shown differences in actions and distances run in the game, depending on the specific position of players in the field (Luigi et al., 2008; Manchado et al., 2007; Sibilia et al., 2004; Ziv & Lidor 2009).

Tasks of the wing player - whose main opponent is the back player: he plays in an advanced position, aggressively, applies marking to interception or surveillance, doubles the intermediate defender, surveying the wing, closes penetration or decreases the angle of shot on goal, anticipates wing penetration behind the intermediate defender, is responsible for recovering balls rejected by the goalkeeper or coming from the goal bar (Balint, 2004).

Tasks of the pivot - whose main opponent is the back center: he is called top defender in the $3 + 2 + 1$ system and flyer in the $5 + 1$ system; he supervises the actions of the back center player, preventing him from organizing and leading the game, stops his actions of penetration or throwing at the goal; by marking for surveillance and interception, he impedes the movement of players and of the ball in the center zone, covering the field of action of the line player, stopping his assists; he attacks back players who throw in the central zone, closes lanes of penetration occurring between intermediates and central defenders, in case of penetration of the second pivot, he retires to cover him or marks closely the back player (Balint, 2004).

Objectives

The objectives are to learn technical aspects regarding the defensive performance of the HCM Constanta and FC Barcelona teams, in order to eliminate technical and tactical mistakes and improve the game of the Romanian team, knowing that the HCM Constanta team is the only team representing Romania in the Champions League, and FC Barcelona is the winner of seven titles in this competition. In the Champions League competition held in 2011-2012, HCM Constanta failed to qualify in the next stage, and the Spanish team reached the quarterfinals.

Hypothesis

Analyzing and comparing the technical and tactical defensive performance of the Romanian and Spanish teams can bring significant improvements to increase individual and team efficiency depending on the defenders' movements and game situations.

Material and methods

Research Protocol
a) Subjects and groups
The research subjects were the 12 male players, members of the HCM Constanta and FC Barcelona club teams, who play in the wing and pivot positions. The study

was conducted on 10 games played by the two teams in the Champions League competition. The research players were aged between 27-36 years.

The study focused on the defensive behavior of the players in the wing and pivot positions of the HCM Constanta and FC Barcelona teams, who participated in the Champions League 2011-2012.

b) Methods

Documentation by studying the European Handball Federation and the International Handball Federation sites, to collect data on the composition and performance of the HCM Constanta and FC Barcelona teams in the Champions League matches held in the competition. The observation method was applied by studying the videos of the matches and by using the record sheets of the defensive game parameters, in order to obtain data on the individual performance of the players.

c) Statistical processing

Statistical calculation of the collected data was necessary to analyze individual performance using the following techniques: percentage calculation of efficiency in the defense compartment, by comparing defensive situations to the analyzed defense parameters. This calculation was performed using the formula:

Percentage = number of defense parameters x 100/ defense situations.

Statistical analysis was carried out using the Excel program, with the parametric test for the comparison of the means – the Student test.

Results

Throughout the competition, 20 observation sheets of the games, developed after the matches played by the two teams, were recorded, summarized and analyzed. Statistical processing and interpretation of data revealed the importance of technical and tactical actions for the effective performance of the teams in the defense compartment.

The HCM Constanta handball team, which represented Romania in the Champions League competition 2011-2012, played a total of ten games, of which one victory and nine defeats. The players in the wing and pivot positions received from their direct opponents 90 goals out of 820 defense situations. Regarding the players of FC Barcelona in the positions mentioned above, they received from direct opponents 85 goals out of 825 defense situations, obtaining in the qualifying group nine wins and a draw (Table I).

Table I

Efficiency of players in the wing and pivot positions of the HCM Constanta and FC Barcelona teams, in the Champions League competition 2011-2012.

Teams	Defense situations	Goals received from direct opponents	Percentage	p
FC Barcelona	825	85	10.3	t=0.739
HCM Constanta	820	90	10.97	p>0.05

Statistical processing of the defense parameters showed that the Romanian team had worse results in the case of the defensive parameters analyzed (Table II).

Another parameter of the defense compartment responsible for the effectiveness of performance is represented by the sanctions received by players in the wing and pivot positions during the competition. The hesitant and slow action of the defenders, with a high degree of physical and mental fatigue, caused them to deviate from sporting behavior, which resulted in penalties awarded proportionally to the seriousness of the faults. These penalties are listed in Table IV.

Table II

Defensive parameters of players in the wing and pivot positions in the Champions League competition 2011-2012.

Teams	Interceptions	Percentage	p	Technical fouls	Percentage	p	Blocked shots	Percentage	p
HCM Constanta	42//820*	5.12	t=1.190	74//820*	9.02	t=2.826	10//820*	1.21	t=2.5
FC Barcelona	57/825*	6.9	p>0.05	61/825*	7.39	p<0.05	17/825*	2.06	p<0.05

* Defense situations

Table III

Observation sheet model including defensive parameters after 10 matches played by the two teams

Teams	HCM Constanta	FC Barcelona	p	HCM Constanta	FC Barcelona	p	HCM Constanta	FC Barcelona	p
Parameters/Defense	Left wing	Left wing		Right wing	Right wing		Pivot	Pivot	
Received goals	30/820*	28/825*	t=0.526 p>0.05	32/820*	25/825*	t=1.66 p>0.05	28/820*	32/825*	t=1.29 p>0.05
Interceptions	17/820*	23/825*	t=0.5 p>0.05	10/820*	16/825*	t=2.14 p<0.05	15/820*	18/825*	t=1.15 p>0.05
Technical fouls	17/820*	14/825*	t=0.65 p>0.05	18/820*	13/825*	t=1.13 p>0.05	39/820*	34/825*	t=1.31 p>0.05
Blocked shots	3/820*	5/825*	t=1 p>0.05	4/820*	6/825*	t=1 p>0.05	3/820*	6/825*	t=1.5 p>0.05

* Defense situations

Table IV

Disciplinary sanctions received for illegal actions of the players.

Teams	HCM Constanta				FC Barcelona	
Penalties	Left wing	Left wing	Right wing	Right wing	Pivot	Pivot
Yellow card	4	2	6	1	2	7
Red card	1	-	-	-	-	-
2 minute suspension	8	7	3	2	2	5
Total	13	9	9	3	4	12

Discussions

From the results in Table I, it can be seen that FC Barcelona had a better percentage regarding the goals received from direct opponents, 10.3%, primarily due to the tactical and technical knowledge of players in the wing and pivot positions and to the competitive experience of the team, in major competitions. We mention that the players of the HCM Constanta team obtained a percentage of 10.97%, receiving 90 goals out of 820 defense situations.

Table II shows the defense parameters analyzed: interception, technical fouls, goals received from the direct opponent, blocked shots. We analyzed these parameters in order to show the performance of defensive players from both teams, given that defense is considered to be a game phase that offers a number of solutions for increasing the potential of the team by playing a quality game. By analyzing the results, it can be seen that FC Barcelona had 57 interceptions out of 825 defense situations and an efficiency of 6.9%, compared to the HCM Constanta team, which had 42 interceptions out of 820 defensive situations, with an efficiency of 5.12%. Regarding the technical fouls parameter, the players of the HCM Constanta team had a higher value, 9.02%, compared to those of FC Barcelona, who obtained a value of 7.39. By using the Student test, the calculated t is higher than the table t at a significance threshold of $p < 0.05$, which shows that there are differences between the players of the two teams regarding the technical mistakes parameter.

Table III shows the defensive parameters recorded in players in the three analyzed positions. The best results were obtained by players in the left wing position of the FC Barcelona team, who had a total of 23 interceptions compared to the left wing players of the Romanian team, who had 17 actions. Regarding the blocked shots parameter, it can be seen that the pivot players of the Spanish team had a total of six blocked shots compared to the Romanian players, who had 3 blocked shots.

The penalties received for the errors committed in the defense compartment by the teams subjected to the research are listed in Table IV. Disciplinary sanctions are another aspect of the technique and tactics used, which reflect fairness in mastering the techniques and specific physical preparation for a competition. The study of the sport behavior of the players in the game revealed that the pivot players of FC Barcelona received 19 penalties, ten yellow cards and nine 2-minute suspensions compared to the players of HCM Constanta, who had six yellow cards and three 2-minute suspensions. The analysis of the penalties awarded to the FC Barcelona players in the wing positions evidences a fair play behavior of these players, who received a total of 3 and 4 penalties, respectively, in 10 games.

Conclusions

1. The techniques, individual and collective defense actions as well as defensive game systems can become the main weapon of a team and they can compensate for the shortcomings of the offensive compartment. The defense parameters analyzed were used and applied in matches by both teams, from a number of 820 defense situations for the Romanian team and 825 defense situations for the Spanish team.

2. The defense actions initiated by the FC Barcelona players, athletes working on the sides of the field, and the low number of penalties received by them show a proper acquisition of technical defense elements and procedures, supported by the value of individual players and the ability of the entire team to work together, in order to stop the opponents' attack.

3. The efficiency of goals received from direct opponents had a better value for FC Barcelona players, who had a percentage of 10.03%.

4. In terms of the number of disciplinary sanctions received by the two teams, the pivot players of the HCM Constanta team had a total of 18 penalties, which evidences the tough game practiced by them.

5. The Student test shows that the differences in defense performance between the wing and pivot players of the two teams included in the study are insignificant. In the case of two analyzed parameters, technical errors and blocked shots, significant differences are observed, the calculated t value being superior to the threshold value $p < 0.05$.

6. Most of the techniques belong to the game of attack, the defense game is poorer in terms of technique, so that these elements must be properly used in the game. If a flaw in the game of attack can be corrected, in the defense compartment any technical mistake can lead to an opportunity for the opponent to score. A thorough preparation of defense players and their guidance for playing a technical game, without brutality, are requirements of the modern handball game.

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