Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 326–332

An analysis of throws/goals scored by the male handball team HCM Constanţa during the "Champions League" competition 2011-2012

Analiza aruncărilor la poartă/goluri marcate, la echipa de handbal masculin HCM Constanţa în cadrul competiţiei „Liga Campionilor" 2011-2012

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Abstract

Background. We started from the supposition that because of the changes that appeared in men's handball on an international level, the growth rate, the mobility of the players in different game systems in defense and offence determined us to do a critical analysis on the evolution of the Romanian male handball team HCM Constanţa, Romania's Champion team, in the Champions League Competition 2011-2012.

Aims. The paper aims to show the evolution of the players that play in the left wing, right wing and pivot positions in the HCM Constanţa team. The data of this paper are based on the recorded games from the Champions League competition 2011-2012 and on the observation charts made during the competition.

Methods. To achieve this study on the evolution of the players that play in the left wing, right wing and pivot positions in the HCM Constanţa team, in round trip matches with teams that compose the qualified Group C from the Champions League competition 2011-2012, we used the following research methods: the observation method made by studying the video recordings of the match, in order to establish the concept of team play, game systems used, technical and tactical means to drive in different phases of the game, the statistical data collected was used to analyze individual performance, game records using an observation chart, made to obtain data on individual developments; statistical calculations helped us to draw the necessary conclusions on the evolution of players in the left wing, right wing and pivot positions of the HCM Constanţa team.

Results. The interpretation of the results led to establishing the evolution of the players in the right wing, left wing and pivot positions of the HCM Constanţa male team. Players in the right wing position achieved using the fast break a percentage of 50% and 60% and the evolution of the pivot players is shown by the percentages of 80% and 56.2% obtained using the 6 m throw. Regarding the left wing players at the side throws, they had a percentage of 26.6% and 37.5%.

Conclusions. After analyzing the video games and the observation charts we can say that the performance of the players in the left wing, right wing and pivot positions of the HCM Constanţa team was a low one. Regarding the technical knowledge, these players have a good technical knowledge, in offence and defense. The players use various procedures according to the game situations during the competition. Tactically speaking, both wing and pivot players are good in individual and collective defense tactics, being a part of combinations with all of their teammates.

Keywords: high performance sport, handball, efficiency.

Rezumat

Premize. S-a pornit de la presupunerea că datorită schimbărilor survenite în jocul de handbal masculin la nivel internaţional, creşterea ritmului, a mobilităţii jucătorilor în sistemele de joc, atât în fazele de atac, cât şi în cele de apărare, ne-au determinat să facem o analiză critică a evoluţiei echipei de handbal masculin Handbal Club Municipal (HCM) Constanţa, echipa campioană a României, în cadrul „Ligii Campionilor" 2011-2012.

Obiective. Cercetarea a avut ca obiectiv studierea evoluţiei jucătorilor care activează pe posturile de extremă stângă, extremă dreaptă şi pivot în cadrul echipei HCM Constanţa.

Metode. Au fost folosite următoarele metode de cercetare: studiul înregistrărilor video realizate în timpul meciurilor, fişa de observaţie utilizată pentru obţinerea datelor privind evoluţiile individuale, analiza rezultatelor obţinute din calculele statistice relative (procentuale).

Rezultate. Interpretarea datelor obţinute a dus la stabilirea evoluţiei jucătorilor care activează pe posturile de extremă stângă, extremă dreaptă şi pivot, jucători componenţi ai echipei de handbal masculin HCM Constanţa. Jucătorii care activează pe postul de extremă dreaptă au obţinut la aruncările de pe contraatac un procentaj de 50% şi 60%, iar evoluţia jucătorilor de pe

Received: 2012, August 30; *Accepted for publication:* 2012, October 15
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postul de pivot este arătată de procentajele de 80% şi 56,2% obţinute la aruncările de la semicercul de 6 m. În ceea ce priveşte postul de extremă stângă, în cadrul aruncărilor de pe partea laterală a terenului, aceştia au avut un procentaj de 26,6%, respectiv 37,5%.

Concluzii. Evoluţia jucătorilor care activează pe posturile de extremă stângă, dreaptă şi pivot, componenţi ai echipei HCM Constanţa s-a realizat la un nivel scăzut. Din punct de vedere al tehnicii însuşite, aceşti jucători dispun de un bagaj bogat de procedee tehnice, atât în atac, cât şi în apărare. Jucătorii de pe posturile de extreme şi pivot au utilizat în timpul competiţiei Liga Campionilor procedee diverse, în funcţie de situaţiile de joc. Din punct de vedere tactic, atât extremele, cât şi pivoţii sunt buni cunoscători ai tacticii individuale şi colective de atac, intrând în combinaţie de joc cu majoritatea coechipierilor.

Cuvinte cheie: sport de înaltă performanţă, handbal, eficacitate.

Introduction

Sports training is a complex process performed systematically and continuously graded to adapt the athlete body to intense physical and mental effort involved in participating in competitions (Dragnea & Mate-Teodorescu, 2002).

Adrian Dragnea (1996) believes that sports performance can be defined as a bio-psycho-social value achieved in an official competition as a result of multiple abilities caused and appreciated on the basis of rigorous criteria or established evaluation criteria.

Handball is a sports game that is part of the games invented to satisfy human needs of search, change, innovation. Through its quality of game it occupies a well deserved place in the field of sport education, implicitly of civilization and sport culture (Balint, 2004).

In high performance sport, great importance is given to physical condition. This is actually the concern for adapting the athlete's body to increased physical and mental efforts in which all the segments of the human body are involved (Acsinte & Alexander, 2007).

In terms of physical performance, handball is a complex sport that requires maximum intensity efforts in a short time period in which players jump, run and throw the ball with speed, followed by moments of low intensity (Jacobs et al., 1982; Chaouachi et al., 2009).

Due to a large number of players in the game with complex objectives and various ways of cooperation and confrontation, it is not plain to analyze the technical and tactical activities of the players and the entire handball team (Foretić et al., 2010).

The current stage of knowledge concerning the thematic area includes research regarding the efficiency of the handball players' positions (Gruić et al., 2006; Ohnjec et al., 2008), of the throwing areas (Pokrajak, 2008; Rogulj, 2000) and the efficiency of different throwing ways (Delija & Šimenc, 1994; Vuletic et al., 2003). Other studies have been conducted on the differences between the effectiveness of the team throws (Apitzs & Liu, 1997; Taborsky, 2008), the influence of tactical elements and the influence of completing the attack on the final result of a game (Srhoj et al., 2001; Rogulj et al. 2004, Rogulj & Srhoj, 2009).

Handball is characterized by a complexity of movements performed under changing conditions of strength and velocity, determined by the collaboration between teammates and direct combat with the opponents. The modern game of handball requires special somatic biotypes that operate in a fast pace, combining in terms of motricity speed and strength with resistance and skills. To be able to deal with such biological requirements, handball players need to have outstanding physical and mental skills (Hantău, 2000).

The tendencies and development directions of international handball are: fast game that increases constantly, individual technique aiming at perfection and maximum efficiency, technical and tactical training of the players for both the requirements of the position and good performance in other positions required by the actual situation of the game, general and specific physical training necessary to sustain high speed actions, variety and the mobility game systems, players' tasks in positions within the phases of the game resulting from the general requirements of the game (after Sotiriu, 1998).

The use of individual scores to achieve a unique technical action may also explain the effectiveness of the attack. The technique is a complex characteristic in ball games and therefore the use of one specific technique based on the individual scores concerning several relevant skills would be useful (Zapartidis et al., 2009, Cherif et al., 2011). Establishing the factors that affect the ball speed as well as distributing the role of players in the team, the position in which players perform, muscle strength and anthropometric characteristics would also be important (Malina et al., 2007).

Handball played by male teams is much appreciated by the public, because during its course players mobilize and show superior physical strength available to win a confrontation sport (Balint, 2005).

Exercise in the handball game

The study of physical exercise performed by players during a handball game is difficult because of the direct physical contact between players, which prevents the setting of various devices or medical equipment such as catheters, mobile devices to measure oxygen consumption. Also, the ball played with the hands makes it impossible to attach these devices.

In terms of energy, physical exercise in the handball game has a mixed structure, anaerobic exercise being used in over 60% of the actual play and aerobic exercise in 40% of the time, which shows a very good anaerobic capacity paralleled by a very good aerobic capacity. In other words, high performance in handball is conditioned by: speed, strength-speed, endurance-strength, endurance-speed, speed, reaction rate, displacement and repetition speed, based on good general physical endurance (Drăgan, 2002).

Exercise in the handball game has a high intensity. Handball is a fast, explosive, high-energy game with

repeated ongoing actions, for 20 to 40 times during a match. Recovery periods are of 3-7 seconds (Bompa, 2003).

In handball, training is normally developed during four stages

Stage I is training or basic training depending on the specific branch of sport and represents the initial stage of sports training with the primary general task to create the premises for the long term development of performance capacity. This stage lasts about three years and ends before puberty. The most important objective of this phase is to increase exercise capacity and develop fine coordination of movements related to the technical initiation in the sport branch.

Stage II is specialized training or early specialization in a sport branch and involves the beginning of specialization, the development of exercise capacity, training of the ability of fine coordination of specific motion in the branch of sport, development of tactical and technical capacity, development of speed and strength under speed, to which the following psychological objectives are added: developing cognitive processes, maintaining the affective balance and developing a correct motivational system.

Stage III is extensive and specialized training oriented towards high performance and ensures the transition to the training stage of high performance, reaching the values of international recognition. In this stage, the volume and intensity of training significantly increase along with the increased competitive activity. The programming and planning of training will be determined by competitive activity performance and therefore the periodization and cyclicity of training will primarily depend on the competition calendar, taking into account the principles for obtaining physical fitness in sports competitions (Alexa, 2000).

Stage IV of sports training, which is the subject of this research, corresponds to the training of the Handball Club Municipality (HCM) Constanţa team and involves working with devoted high performance athletes. This stage is the last stage of building on long-term training. In this research, the content and structure of training are focused on achieving maximum sports performance. Planning and training are personalized and the entire planning process is based on the competition calendar and the achievement of maximum physical fitness in the most important competition or in the series of competitions to be attended (Alexa, 2000).

The main tasks of high performance training are: the establishment by the athletes together with the coach and other actors of performance of the targets and necessary conditions for its achievement, the increase of performance capacity to the maximum level within each microcycle, the enhancement of exercise complexity to a high level by using with priority the competition means, the development of resistance to stress caused by training, competition and mass media by using some efficient means for physical and psychological recovery (psychotherapy, pharmacological), the clarification and understanding of contractual relationships by employing specialists in the field, the training of proper attitudes for the celebrity status, intended for athletes who are non-amateurs in most of the cases (professionals).

Professional athletes take to a large extent their own training responsibilities considering that sports practice ensures the necessary living resources.

Profile of the players in the wing and pivot positions (in attack)

The model of the player in a specific position must be entirely respected, but at the same time, the player must be able to act (if the tactical situation requires it) in other attack-defense positions. This increases the strength of attack or the solidity of defense. The profile of the handball player falls on the same coordinates of the modern approach of content in the handball game. Establishing a pattern means setting a maximum of requirements of the activity, which demands the knowledge of the possibilities of development of the body, the development of motor indices, the content of motor abilities and skills that must be learned by the subjects (Bota, 1984).

Several studies have shown differences in actions and distances covered in the game according to the specific game position of the players (Cambel, 1985, Luigi et al., 2008; Manchado et al., 2007; Sibila et al., 2004, Ziv & Lidor, 2009).

Pivots are positioned behind the opponents' line of defense and there they must maintain their balance position to withstand defense pressure by pushing and collision. The muscle mass combined with low center of gravity, strength in the upper body and relatively large body mass are needed to succeed in the playing conditions (Christodulidis et al., 2009).

The pivot can organize the game, may initiate tactical combinations, can come to the 9 m line to throw on goal and initiate specific actions that 9 m players use.

The wings become key markers using: throwing on goal by increasing the throwing angle and landing on the center on the 6 m line, throwing between the arms and head of the goalkeeper, lifted throws, throwing with vault over the goalkeeper, throwing with the ground and bypass effect, air throwing, throwing after outflanking at the 9 m line or by using the breakthroughs at the 6 m line, they are formidable particularly active attack peaks in phases I and II of the game.

The highest VO2 max values were observed in players that were active on the sides of the court. These differences are conclusive because of the specific tasks that wing players have during a match. Wings cover the greatest distance during a game compared to pivots and backcourt players. During the transition between defense and attack they are the only players that run from one end to another (about 35 m/transition), while pivot players must cover the area between the two 6 meter lines, which means that they must run less than 12 meters during any twists and turns that may occur in the game (Spori et al., 2010).

For the game in attack the wing player has the following tasks - requirements: fast and anticipated departure using fast break - every time the opponent loses possession - and conducting movement at high speed, even in situations in which he does not receive passes, if engaged, he occupies a position at the 9 m line, close to the side line, breaks through the 6 m line only if the lateral defender has not retreated or

moved to the backcourt side, performs breakthroughs with demarcation at the 6 m line in cases in which the defense is unorganized or applies an advanced temporary area, in organized attack he occupies a position closer to the goal line attacking the outside lanes, initiates successive breakthroughs by threatening the penetration lane between two defenders and quickly passes the ball, in the dynamic attack - in circulation – enters near the semicircle of 6 m, temporarily occupying a pivot position - performs block actions for backcourt players and continues his movement parallel to the 6 m line from one wing to another, in a 1x1 relation, in appropriate cases for throwing he breaks through lanes, surpassing defenders, either interior or exterior, throwing is made by jumping while increasing the shot angle.

The technical and tactical tasks of the wing player include: single and double firewall, single and double block - with pivot and line player for the backcourt player, combinations with two wing players – line player; wing - pivot; wing – backcourt player, specific combinations between three players backcourt player - pivot – wing player, line player – wing player – backcourt player, line player – wing player - pivot, backcourt player - backcourt player – wing player, combinations with the backcourt player from the opposite side to which single and double firewall is added, block – departure from the block.

The attributions – requirements of the pivot player are the following: in fast break situations he runs at high speed according to the movement of the other 9 m players and plays the ball in attack, positions himself on the 6 m line at the end of phase II for a possible pass from the 9 m players, in positional attack he stands between the lateral and backcourt defenders or in the center of defense, in special situations he provides ball possession by coming to the 9 m line or blocks the movement of defense players in the center or on the sides, recovers the ball and passes it safely for completing the attack, delays the launch of the opponent's fast break - in case of possession loss – using regulatory actions in the first phase, then comes to defense (Balint, 2004).

It is necessary to master the following technical and tactical actions: combinations between two players – with the wing, exterior block of the backcourt defender for the wing to break through, firewall on the backcourt or central defender for throwing, combination with the backcourt player - simple and double firewall with the wing or line player, crossing followed by firewall; block for the breakthroughs; block - departure, combinations with the line player - block (Balint, 2004).

Hypothesis

We started from the assumption that by analyzing the players of the male HCM Constanţa handball team playing in the left wing, right wing and pivot positions and observing the technique and tactics used by them, we could bring improvements to their individual evolution and to the evolution of the entire team through the possibility of self-performance, allowing them to repair previous faults through actions chosen according to the defenders' movements and depending on the game situations.

Material and methods

a) *Research Protocol*

The research was conducted during the competition year 2011-2012, studying the evolution of the HCM Constanţa team in the "Champions League" competition. The reason for choosing this team for research is that this is the only men's handball team in Romania that plays in this European competition. In the Champions League competition 2011-2012, based on the results obtained, the HCM Constanţa team has failed to leave the qualifying group.

b) *Subjects*

The subjects of the research were members of the Romanian champion team, HCM Constanţa, GV (28 years) and TL (31 years), who play right wing position, NM (32 years) and IA (32 years) as pivot players, BG (33 years) and SA (30 years) in the left wing position. The results obtained from the observation sheets concerning the evolution of the six players of the HCM Constanţa team are shown below.

c) *Methods*

- Documentation through the study of the websites of the European Handball Federation and the International Handball Federation for the collection of data concerning the composition and evolution of the HCM Constanţa team in the matches played in the Champions League competition (1, 2).

- Observations made by studying the video recordings of the matches.

- Recording sheets of the games, used for obtaining data on individual play, analyses of the results obtained from statistical calculations, based on which the conclusions concerning the evolution of the wing players and pivot players of the HCM Constanţa team were drawn.

d) *Statistical methods*

Statistical calculation of the collected data was necessary to analyze individual performance using the following techniques: percentage calculation of the throws on goal, which indicated efficiency, as the ratio between the number of goals and the total number of throws. This calculation was made using the formula: % = Number of scored goals x 100/ Total throws, using Microsoft Excel.

Results

Presentation of the results obtained from the observation sheets

Table I presents the efficiency of the teams that played in Group C of qualification in the Champions League competition 2011-2012. It can be seen that the HCM Constanţa team occupies the last position in the group, with a percentage of 82.10%.

Table I

The efficiency of teams playing in Group C of qualification in the "Champions League" competition 2011-2012.

Teams in Grup C of qualification	No. of throws/ No. of goals	%
HSV Hamburg	310/245	79
RK Cimos Koper	287/248	86
HC Metalurg	281/254	90
Orlen Wisla Plock	290/269	92.70
St. Petersburg HC	301/241	80
HCM Constanţa	286/235	82.10

Table II

Analysis of the evolution of players in the wing and pivot positions in the Champions League competition.

Name	Total		%	Goals/Throws (G/T)											
	Goals (G)	Throws (T)		7 m throws			6 m line throws			Wing throws			Fast break throws		
				G	T	%	G	T	%	G	T	%	G	T	%
GV	20	39	51.20	12	15	80	1	2	50	4	10	40	3	6	50
NM	15	18	83.30	-	-	-	14	17	82.30	-	-	-	1	1	100
TL	27	52	51.90	9	16	56.20	2	2	100	11	23	47.80	3	5	60
IA	19	30	63.30	-	-	-	17	25	68	1	2	50	2	3	66.60
BG	14	29	48.20	-	-	-	2	5	40	4	15	26.60	8	9	88.80
SA	17	37	45.90	-	-	-	4	7	57	9	24	37.50	2	3	66.60

Table II presents the performance of the HCM Constanţa team players that play in the left wing, right wing and pivot positions, after ten matches held in the Champions League Competition 2011-2012, and the criteria used for analyzing the evolution of these players are 7 m throws, 6m line throws, wing position throws and fast break throws.

In the HCM Constanţa team, the 7 m throws are performed by players in the right wing position, TL and GV, players with high tactical and technical skills that achieved high efficiency percentages of over 50% (Table III).

Table III

Efficiency of 7 m throws.

Name	7 m throws		
	Goals	throws	%
GV	12	15	80
TL	9	16	56.20

The importance of pivot players in the modern handball game is decisive, creating numerical superiority through ball and player circulation, by using blocks and departures from the block. Of the two pivots, NM had a percentage of 82.30% for the 6 m line throws (Table IV).

Table IV

Efficiency of throwing from the 6 m line.

Name	Throws from the 6 m line		
	Goals	Throws	%
GV	1	2	50
NM	14	17	82.30
TL	2	2	100
IA	17	25	68
BG	2	5	40
SA	4	7	57

The role of wing players in the handball game has become particularly important. Therefore, the static handball game based on throws from the center of the court has been gradually replaced with a wide game, using the side lanes. For the throws performed from the wing position, player TL obtained the best percentage, scoring 11 goals out of 23 throws (Table V).

Table V

Efficiency of throwing from the wings.

Name	Throws from the wings		
	Goals	Throws	%
GV	4	10	40
NM	-	-	-
TL	11	23	47.80
IA	1	2	50
BG	4	15	26.60
SA	9	24	37.50

Fast break in the tactical version of each team became a game phase in attack used by most teams. Completion being individual, we refer to the values of its effectiveness. Analyzing the efficiency of the throws performed after a fast attack, we conclude that the percentage of the players of the HCM Constanţa team is a good one, the left wing BG scoring 8 goals from a total of 9 throws (Table VI).

Table VI

Efficiency of throwing using fast break.

Name	Throws using fast break		
	Goals	Throws	%
GV	3	6	50
NM	1	1	100
TL	3	5	60
IA	2	3	66.60
BG	8	9	88.80
SA	2	3	66.60

The efficiency of throws performed at distance (from the 9 m line) by the players under study evidences very low percentages, indicating that the HCM Constanţa team does not use collective tactical actions to engage the players positioned on the sides of the court (Table VII).

Table VII

Efficiency of throws from the 9 m line.

Name	Throws from the 9 m line		
	Goals	Throws	%
GV	1	6	17
TL	2	6	33
SA	2	3	66.60

Discussion

Table I presents the effectiveness of the teams that played in Group C of qualification in the Champions League competition 2011-2012, after ten matches. The team with the best percentage was Orlen Wisla Plock with 92.7%, followed by HC Metalurg with 90%, the HCM Constanţa team ranking fifth in terms of effectiveness of the throws on goal, with 286 throws, 235 goals scored, and a percentage of 82.10%.

Table II analyzes the performance of the players of the HCM Constanţa team, who played in the left wing, right wing and pivot positions in the ten matches of the Champions League qualifying group. The best percentage was obtained by the pivot NM, 83.3%, representing the throws on goal from the 6 m line, with 14 scored goals out of 17 throws, and one throw from fast break that was successful. The lowest percentage of 45.9% was achieved by the left wing SA, who scored 17 goals out of 37 throws.

Regarding the effectiveness of the players in terms of 7 m throws, the two players in the right wing position, GV and

TL, had 80% and 56.2%. The two wings performed better in this area, managing to score 12 goals out of 15 throws and 9 goals out of 16 throws, respectively (Table III).

Table IV presents the throws performed from the 6 m line. The two pivots from the HCM Constanţa team, NM and AI, had the best percentage, 82.3% and 68%, and the right wing TL had a 100% percentage compared to players GV, 50%, BG, 40% and SA, 57.1%. The analysis of these results shows that the team players have good technical and tactical skills because the two pivots use different procedures of throwing on goal under great adversity.

Table V shows the effectiveness of the players in the left wing, right wing and pivot positions of the HCM Constanţa team. We observed that players GV and TL (right wing position), with a percentage of 40% and 47.8%, had a satisfactory evolution compared to players BG and SA (left wing position), with a percentage of 26.6% and 37.5%: left wing BG managed to score 4 goals out of 15 throws in ten matches, and SA 9 goals out of 24 throws. Regarding the pivot player IA, he obtained a 50% percentage, scoring once out of two throws using the method of throwing on goal from the wing position.

Table VI shows the effectiveness of the players by analyzing the throws of the six players using fast break. Fast break represents phase I of the attack and at international level is frequently used and exploited each time. The results obtained showed that the pivot NM achieved a maximum percentage with a throw and a scored goal. The player in the left wing position, BG, scored 8 goals out of 9 throws, achieving a percentage of 88.6%, while the lowest percentage was achieved by the right wing GV, 50%.

Table VII examines the throws from the 9 m line of the players in the left wing, right wing and pivot positions. After an analysis of the ten matches in the Champions League competition 2011-2012, we found that the two right wings had a percentage of 16.6% for GV and 33.3% for TL, and left wing player SA had a percentage of 66, 6%, scoring 2 goals out of 3 throws.

Conclusions

1. The number of goals scored from 7 m throws performed by the studied players depended on several factors: collective actions (or couples of positions), individual actions, fast breaks illegally stopped or poorly improved individual technique of the defenders, overcome by the strength or individual technique of the attackers.

2. The effectiveness of the throws performed from the right wing position, by players TL and GV, with a total of 20 and 27 goals and a percentage of 51.2% and 51.9%, indicates a wide tendency of the game that the team provides and the value of the players occupying this position.

3. The throws performed from the 6 m line presented in the observation chart show the performance of pivot players IA and NM. The percentage of efficiency has a large margin (68%-82.3%). The 6 m throw percentages are due to collective tactics aimed at placing in a good position the pivots and to the exceptional qualities of the players in this position.

4. Fast break has become a phase of attack that is widely used, both with a wing and two wings, as direct and intermediate fast break. Completion being individual, we refer to the values of its effectiveness. Both players in the right wing position, left wing position and pivot position have a good efficiency, achieving a percentage higher than 50%. However, attack is a phase that requires training because given the current tendencies of world handball play, errors and failures in clear situations of goal can lose a match.

Conflicts of interests

Nothing to declare.

Acknowledgement

This article is based on the partial results of the first author's PhD thesis, which is ongoing.

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