

An analysis of the performantial defense behavior of the top three male handball teams in comparison to the Romanian team in the World Championships, Sweden, 2011

Analiza comportamentului performanțial al apărării, la nivelul primelor trei echipe de handbal masculin, comparativ cu echipa României, în cadrul Campionatului Mondial din Suedia, 2011

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Abstract

Background. We started from the idea of the role that anticipation and decision making have in accomplishing motor actions in the defense of a handball game, identifying the effects of these mental processes and what determines their success or failure in a competitive game at a high scale confrontation (Olympic Games, World Championships etc.).

Aims. The analysis of the compartment's profile of defense and of some parameters recorded at the level of the first three teams from the general classification of men's handball World Championships Sweden 2011, to which the performance of the male national team of Romania is compared.

Methods. The comparative study was conducted on players components of the teams ranked in the first three places at the men's handball World Championships in Sweden 2011 and the Romanian team that occupied the 19th place in the competition. The results were statistically analyzed based on the outcomes obtained from the record sheets. Another method was synthesizing information resulting from the video recordings and viewed games sustained by the official teams of France, Spain, Denmark and Romania.

Results. The four parameters of defense were applied in 215 situations out of 838. The number of individual actions of defense was 177 and of collective actions 38. The experimental group recorded 71 individual actions and 14 collective actions while the control group cumulated 106.3 individual actions and 24.6 collective actions. 97.3 penalties were received by the two experimental groups with regard to the breaking of regulation.

Conclusions. The parameters of defense had a share of 26.3% out of 494.3 defensive within the control group and 24.7% defensive situations for the experimental group from a total of 344 such situations. Regarding individual tactics, the groups demonstrated close percentages - 21.5% the control group and 20.6% the experimental group; for applied collective tactic performances, the percentages were 4.9% for the control group and 4% for the experimental group. The cumulative sanctions for the two groups were 54.3 for the control group with an average of 5.43/game and 43 for the experimental group with an average of 6.14/game.

Keywords: high performance handball, defense, anticipation, efficiency, fair play.

Rezumat

Premize. S-a pornit de la ideea rolului pe care îl au anticiparea și decizia de acțiune în realizarea actului/acțiunii motrice în apărarea jocului de handbal, identificarea efectelor acestor procese psihice și ce anume le determină reușita sau nereușita lor într-un joc competițional, la confruntare de mare anvergură (Jocuri Olimpice, Campionate Mondiale etc.).

Obiective. Analizarea modelului compartimentului de apărare și a unora dintre parametrii înregistrați la nivelul primelor trei echipe din clasamentul general al Campionatului mondial de handbal masculin Suedia 2011, la care este raportată prestația echipei naționale masculine a României.

Metode. Studiul comparativ s-a desfășurat pe loturile de jucători componenți ai echipelor masculine de handbal clasate pe primele 3 locuri la Campionatul mondial din Suedia 2011 și lotul României ocupantă a locului 19. Rezultatele au fost prelucrate statistic, pe baza rezultatelor obținute din fișele de înregistrare aplicate. O altă metodă a fost sintetizarea informațiilor rezultate în urma înregistrărilor și vizionărilor video a jocurilor oficiale susținute de echipele Franței, Spaniei, Danemarcei și României.

Rezultate. Cei patru parametri de apărare s-au aplicat în 215 de situații din totalul de 838. Acțiunile individuale de apărare au atins valorile de 177, iar cele colective de 38. Lotul experimental a înregistrat 71 acțiuni individuale și 14 colective, în timp ce grupa de control a cumulat 106,3 acțiuni individuale și 24,6 acțiuni colective. S-au primit 97,3 sancțiuni de către cele două

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grupe experimentale pentru încălcarea regulamentului.

Concluzii. Parametrii de apărare au avut o pondere de 26,3% din totalul de 494,3 de situații defensive în care s-a aflat lotul de control și de 24,7% pentru lotul experimental din totalul de 344 de astfel de situații. La tactică individuală loturile au ponderi apropiate - 21,5% lotul de control și 20,6% lotul experimental; la tactica colectivă aplicată, performanțele sunt de 4,9% pentru lotul de control, 4% pentru lotul experimental. Sancțiunile aplicate cumulativ pentru cele două loturi au fost de 54,3 pentru lotul de control cu o medie de 5,43/meci și 43 pentru lotul experimental cu o medie de 6,14/meci.

Cuvinte cheie: handbal de mare performanță, apărare, anticipație, eficacitate, fair play.

Introduction

The accelerated growth of sports results at world level, an essential feature in the last period of time, causes changes in the most important areas of sports activities. The Olympic Games, World Championships, continental and national competitions always require high quality training in full accordance with the competition profile (Gutierrez et al., 2011; Marczinka et al., 2011; Massuça et al., 2011). This superior training can be achieved only through a scientific activity that replaces spontaneity and routine in determining the training process of the athlete, ensuring rigorous scientific foundation (Cartwright et al., 2005; Hianik et al., 2011).

High performance handball has reached nowadays a high development level and therefore, a more pronounced need to analyze all its scientific aspects appears. Its continuous development leads both theoreticians and practitioners to study and constantly update issues regarding the content of the competitive game which directs the training process. In this training process the accent falls increasingly on defense actions, some of them having great significance in the team game (Foret et al., 2011; Taborsky et al., 2011).

According to specialists, performance in sports represents the result obtained in a specific activity designated by a number or a value of the rating scale (Epuran et al., 2001).

In an more detailed approach, "sport performance designates both the process and the results of an action, which in legal terms represents the mastery in performing a task the best way possible, being dependent on the interrelation of the endogenous factors - predispositions, skills - with exogenous factors - ambiental - expressed in the quality of the training process, training material and conditions, the level of motivation and the influence of social factors" (Bompa, 2003; Dragnea & Mate-Teodorescu, 2002).

Viewed through the prism of sport activity performance, anticipation is an essential procedure for athletes, especially for those practising team sports, to deal with long delays of reaction (Bard & Bard, 2006). High performance athletes know what stimuli can act, in what place, they can predict when these will occur and which are the appropriate responses. The player can perform movements in advance by processing the information, which normally takes place during the stages of selection and response programming (Michalsik et al., 2011, Atkinson et al., 2002). This allows him to initiate movement much earlier or at the same time with the environment movements, or to feel where and how a ball blocked by the goalkeeper from the wing position throw, will land. Based on these predictive capabilities, high level players respond to stimuli depending on the reaction time processes (Rivilla et al., 2011; Prisacaru, 2011).

For many viewers the attack is similar to the match in progress, but for the team, "defense is ... work and players must submit along training pure and hard work" (Krimboltz, quoted by Constantini, 2002b). A good attack wins games and defense wins championships even though this section of the game is far from being attractive in sports training. Although we recognize the undeniable value of the winners of various competitions in collective games, especially in the handball game, we often indicate the objective value of the champion team, club team or national team in defense. Defense is the soul of winners and it is known that winning teams must be balanced to provide strong defense and efficient attack, but when the attack has problems they will always carry solid defense (Constantini, 2002b; Guillen, 2003).

Nowadays, defense actions have assumed a major role in the progress of a spectacular game and taking initiatives and risks incites players and draws the public through the significant number of advantages obtained through successful interventions. The main objectives of defense did not change and the primary goal is to prevent the opponent to score goals and at the same time the concern to take possession of the ball or in a more realistic concept to recover the ball without receiving a goal (Constantini, 2002; Prisăcaru, 2011).

This objective requires the defense to have some basic objectives and tasks that must be achieved as soon as possession of the ball is lost. Therefore, defenders either individually or together must oppose to the movements of the attackers and the ball passing or at least to create difficulties in receiving and handling the ball, thus creating favorable situations for its recovery, or challenging the opponent to commit mistakes. "To defend means to perform an active opposition, the action of preventing the opponent with the ball to enter easily and efficiently in his favorable areas in order to exploit an instant tactical situations" (Estriga et al., 2011; Sibila et al., 2011). This means that the defense must resist at all the game times in order to block as many throws as possible, obviously building zones clearly in danger.

Aims

- study of sources in the field of sports psychology with regard to the factors contributing to support motor performance;
- recording of the official games taking place in a major international confrontation;
- nomination of the measurable parameters in the defense compartment, determining the role of decision and anticipation in the handball game.

The aim was to find out some technical specifications about the teams of France, Denmark and Spain, knowing that they played along with Germany the best games of

the moment. At the World Championship held in 2011 in Sweden, the Romanian team performed lamentably, occupying the 19th position of 24 listed, which led us to analyze the evolution of the Romanian players in this competition.

Hypothesis

If a high-performance handball team has players with a high degree of intelligence and tactical thinking along with a well-built psychomotricity support, technical and tactical mastery but also competitive experience, perhaps at some time during its evolution, the team can position itself successfully in the top of the hierarchy in world competitions, achieving a game model based on rationality in action.

Material and methods

The research studied the behavior of players participating in the final of the 22nd Men’s Handball World Championship that took place in Sweden from 13 to 30 January 2011, namely, the teams of France, Spain, Denmark and Romania (2).

Groups and subjects

- The experimental group was the Romanian team consisting of 18 male subjects, aged between 24-35 years.
- The control groups were considered the team of France, consisting of 18 male subjects, aged 24-36 years, the team of Spain including 16 male subjects aged 24-39 years, and the team of Denmark formed by 18 male subjects aged between 24-39 years.

Tests applied

We used the study of video games performed in order to highlight the capacity to anticipate the opponent’s actions and decisions, based on his reaction to various collective and individual tactical maneuvers.

In order to carry out the analysis of the performance behavior and the playing pattern of the team players, the official games were recorded and then studied in detail regarding the problems and tasks of the study hypothesis.

For this, we used video and computer equipment with the help of which the behaviors were evaluated and the transcription of the teams was reflected by the data obtained in a recorded sheet summarized according to the statistics provided by the International Handball Federation (1, 3), comprising parameters related to defense in particular (Table I).

Statistical methods used

The data were processed statistically and mathematically using the significance of the differences between the means, uncorrelated samples, and descriptively and graphically interpreted using the Microsoft Excel application.

Table I

Model of the record sheet including the parameters of the defense compartment.

Parameters/Defense	France	Denmark	Spain	Romania
Interceptions	42	28	63	32
Blocked throws	49	44	27	28
Closing breakthroughs	21	19	26	11
Closing lanes of penetration	29	19	26	14
Sanctions	60	53	60	43

Results

Throughout the competition, 37 observation sheets of the games played by the teams of France, Spain, Denmark and Romania were recorded, centralized and analyzed. The statistical processing, the interpretation and graphic representation of the data revealed the importance of anticipation in the efficiency of defense for the first three teams over the 10 official games and the Romanian team only for 7 games (five games in the group and two games to position themselves in the overall standings, below the 10th place).

Some of the observed parameters were based on the capacity to anticipate the opponent’s actions in attack situations that were recorded during the games that were played by the teams under study. The parameters of the defensive game expected to be recorded and analyzed are presented in Tables II, III and Figs. 1 and 2.

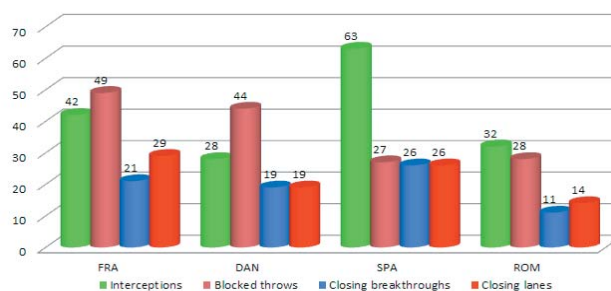


Fig. 1 – Expression of the effectiveness of individual actions in defense and technical faults made by the teams under study.

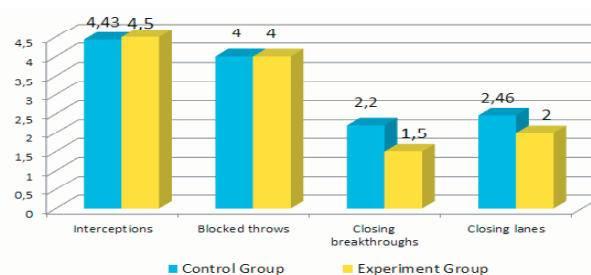


Fig. 2 – The graphical representation of the mean defense parameters in the experimental and control teams in Men’s Handball World Championship in Sweden 2011.

Table II

Parameters resulting from the capacity of anticipation and decision making for defense performed by the teams of France, Denmark, Spain and Romania.

Group	Team	Game parameters in defense and their efficiency							
		Interceptions	%	Blocked throws	%	Closing breakthroughs	%	Closing lanes of penetration	%
Experimental	Romania	32/344*	9.3	28/344*	8.13	11/344*	3.19	14/344*	4.09
	France	42/485*	8.65	49/485*	10.1	21/485*	4.32	29/485*	5.97
Control	Denmark	28/515*	5.43	44/515*	8.54	19/515*	3.68	19/515*	3.68
	Spain	63/483*	13.04	27/483*	5.59	26/483*	5.38	26/483*	5.38

*Defense situations

Table III

Calculation of the significance regarding the difference between the means for the parameters of defense.

Group	The calculation of the statistic significance regarding the defense parameters						
	Total actions	Mean	D	S_D	$S_{\bar{D}}$	t-calculated	P
Experimental**	85	12.1	0.93	0.46	0.23	4.04	0.05
Control *	130	13.03					

*Teams of France, Spain and Denmark

**Team of Romania

The statistical processing of defense parameters revealed mean values for actions/game achievements in the experimental group of 12.1 and 13.03 and in the control group a deviation of the differences of 0.46 and a significance of the mean differences of 0.23. T is calculated at the limit of 0.05 and 4.04 and at $f = n-1$.

Another important parameter for the efficient evolution of the team is represented by the penalties that the players received during the sustained games. The intervention of the defender, uncertain, with slow and late movement, with a higher level of physical and mental fatigue, entails the players to commit deviations from the sport behavior resulting in fouls sanctioned according to the gravity of the offense. These are presented in Table IV and Figure 3.

Table IV

Penalties received in response to the regulation faults committed in defense by the teams of France, Denmark, Spain and Romania.

Team	Yellow card	2 min suspension	Red card	Total
France	29/10 games	31/10 games	0	60
Denmark	29/10 games	24/10 games	0	53
Spain	26/10 games	33/10 games	1	60
Romania	19/7 games	24/7 games	0	43



Fig. 3 – The graphic expression of the sanctions received in defense by the teams under study.

Discussion

The dynamic game developed by the timely and effective defense intervention of the defenders determined the raising of the percentage of the overall effectiveness of the game. From the analysis of the results of each parameter we can see that the achievement rate weighs in favor of individual actions with a total of 177, compared to 38 collective actions. Therefore, the control group had an average of individual defense actions of 13.03/game as opposed to the team of Romania that had an average of 10.14/game and the average of collective actions was 7.4 and 2/game, respectively. The goalkeepers of the studied teams had meritorious behavior, the values of efficiency ranging between 30% for the team of France, 36% for

Spain, 24% and 36% for Romania and Denmark, increasing the team chances for a good classification.

In the control group, the French team had a number of 42 interceptions (8.65%), with most of them performed by BG-8 and NK-7, 49 blocked throws on goal (8.65%) with players NK-10, AW-10 and DD-16, closing lanes of penetration and breakthroughs with a total of 50 actions (10.3%). The team of Denmark in the 10 matches played recorded 28 interceptions (5.43%), 44 blocked balls (8.54%), and 38 individual and collective defense actions (7.36%). In the team of Spain we can observe that the interception parameter was performed 63 times (13.04%), with fewer blocked throws on goal, 27 (5.59%), and a total of 52 individual and collective actions to close the breakthroughs and lanes of penetration (10.76%).

The Romanian team under study as an experimental group had a number of 32 interceptions (9.3%), a higher percent than France and Denmark, a total of 28 blocked throws on goal (8.13%), and 25 individual and collective actions of closing breakthroughs and lanes of penetration (7.28%). In this segment of the game in defense, the differences between the values obtained by our team, ranked 19th, and the top three teams are relevant even if the Romanian team played only 7 games. However, the average of the individual and collective actions per game was 10.14 compared to the average of 13.03 actions performed by the control group.

The statistical indicators that were calculated reveal an advantage in favor of the control group, resulting in a t-calculated of 4.04 at a rate of 0.05 for $f = n-1$. This demonstrates that the hypothesis has been confirmed in a proportion of 99.95% and that the 1st, 2nd and 3rd positions in Men's Handball World Championship held by the teams of France, Spain and Denmark are not due to chance but to the capacity to anticipate, making efficient decisions, and an optimal mobilization of players in critical situations.

The smaller values obtained by the Romanian team in the defense compartment reveal the low physical training of the players, which leads to delayed reactivity and mobility in tracking the enemy.

Deficient mental training is another cause of low performance, which was expressed by a weak capacity for concentration and mental strength in front of a sustained attack rhythm imposed by the teams of France, Denmark and Spain, which had various quick and subtle ways of passing the ball and were very good players able to make the difference in all field areas.

Another weak point in our team's defense was the lack of reserve players to rise to the players from the first team or having the ability and willingness to work upon request.

The received disciplinary sanctions is another aspect of the techniques and tactics used in defense that reflect fairness in mastering defensive procedures and the specific physical training for a competition. Studying the sport behavior among teams who respected their opponents, we can observe that Romania ranked third regarding fair play in the World Championship with a total of 67 points (out of 7 games) Spain ranked fourth with 97 points, France sixth with 101 points, and Denmark ranked seventh with 103 points (the three teams having 10 official games). For calculating the points we used the formula: $(Ex) \times 10 + (RC) \times 5 + (2min) \times 1 = \text{total points}$ (3; 4).

After analyzing the previous parameters, the control group had 173 penalties with an average of 17.3/game, most of which were made by the team of France - 60, of which 29 yellow cards and 31 2-minute suspensions, Spain 60 - game faults punished with 26 yellow cards, 33 2-minute suspensions and one red card for accumulation of 3 2-minute suspensions. The team of Denmark committed 53 penalties, including 29 yellow cards and 24 2-minute suspensions (an average of 5.3/game), Spain had 60 offenses, 26 sanctioned with yellow cards, 33 2-minute suspensions and a red card for accumulation of 3 2-minute suspensions. The Romanian team gathered in 7 matches played 43 sanctions as follows: 19 yellow warnings and 24 situations of elimination for 2 minutes (Tables III, IV, and Figure 2).

Regarding sanctions, the experimental group had an average of 6.14/game less than the average of the control group (17.3/game). Individual analysis shows that the experimental group had a higher percentage of sanctions in the 7 games played (6.14) compared to each component of the control group, namely Denmark (5.3/game), France and Spain (6/game). These values reveal several causes underlying the obtaining of these sanctions by the Romanian players, which can be technical, physical - insufficient training, the lack or minimization of the importance of psychological training for competition, apathy, indifference, moral collapse, desperate situations.

Conclusions

1. The defense parameters studied were applied by both groups in 215 out of 838 defense situations, with a percentage of 25.6% of the total defense means that the high performance player possesses.

2. For the control group, individual actions were used in 106.3 out of 494 defense cases, representing 21.5%, while collective actions were used 24.6 times, with a rate of 4.8%. Therefore, the following statistics were obtained from 10 official matches: a number of 44.3 interceptions with a rate of 41.6%, 40 blocked throws with a percentage of 37.6%, closing the breakthroughs 22 times with a success rate of 23.1%. The experimental group had 344 defense situations in which players applied 85 defensive tactics: 71 individual and 14 collective. Out of the individual actions, interception was performed 32 times (37.6%), blocked balls 28 times (32%), and closing breakthroughs 11 times (12.9%).

3. Although defense parameters had an efficiency of application of 26.3% out of the total number of defense situations in the control group and 24.7% of the 344 such

cases for the experimental group, the differences between the average values are not important and cannot be explained in terms of the low development of the team and its ranking on the 19th place. For a full and correct analysis, the attack compartment, the efficiency of players in the field positions and the overall effectiveness of the game in attack must be explored. Deficiencies in the physical training of the defenders underlay the application of individual actions in defense, the decisions made by the defenders in the opposing attack. Interceptions and blocked throws on goal require a high level of intuition and anticipation of what one's opponent is planning to do and our team achieved an average for a global competition.

4. The game offenses and penalties applied cumulatively for the two groups were 54.3 for the control group with an average of 5.43/game, and 43 for the experimental group with an average of 6.14/game.

Practical and methodological recommendations

1. Coaches, people responsible for the training of national teams should aim to keep up to date with the latest specialized studies in the field, which are currently published in journals of education in the country and abroad.

2. Without a high level of technical skills, the established objectives cannot be successfully attained through the tactical plan of the game. This is why an important point in training should be the continuous raising of the performance level of the technical content.

3. The problematization of training is also a goal to pursue. Tactical preparation should be part of training, with the aim of ensuring multiple ways to solve a game task in direct confrontation with the opponent.

Conflicts of interests

Nothing to declare.

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