Results depend on the degree of stabilization of the disorder and rational classification of occupational therapy in the clinics of rehabilitation functional recovery.

5. Conclusions

Following the development and application of an appropriate kinetic treatment the clinical symptoms and the functionality improved. A well appropriate kinetic treatment rebuilts the normal range of motion and combats the existing deficits.

According as the nerve recovers it was possible the improvement of the muscle strength at the affected segment, the electrical stimulation having an incontestable role achieving the objective.

In trauma of the hand with nerve palsy, sensitivity reeducation is very important, starting three months after the trauma, when the patient is able perceiving the tactil stimuli – „under the lesion".

The earlier kinetic recovery applied after the second surgical intervention determined the combat of adhesions formation and the combat of complications appearance.

Through adapted and individualized early kinetic techniques it was obtained a rapid reintegration in the social and professional life.

The increasing of the hand functionality determined an improvement of the life quality.

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LONGITUDINAL STUDY ON THE EFFECTIVENESS OF THE GAME ACTIONS AT THE EUROPEAN MEN'S HANDBALL CHAMPIONSHIP SENIORS (1998-2014)

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Abstract
During the 11 editions of the European Handball Championships the competition format has suffered some changes in the number of teams participating, number and structure of the group, the number of games played of the participating teams. This study may lead to the identification of evidence indicating trends of men's handball for the period 1998-2014, thus creating the conditions for the establishment of principles for achieving preparation and participation in high level competitions. As a result of comparing the data obtained from the analysis performed should be reconsidered margins effectiveness of actions to be monitored useful landmarks in training and competition, imposing to reconsider the role model of the performance handball game for seniors.

Keywords: handball, analysis, European Championships, men

1. Introduction

Handball is a relatively young sport, appeared at the end of the 19th century and quickly spread worldwide. Ancestors of this game are found in ancient cultures of Europe (Greece, the Roman Empire) and Asia (China).

The widespread it enjoys led to his inclusion among the Olympic sports as demonstration sport at the 1936 edition and is constantly in the Olympic program since the 1972 edition.

At the continental level in Europe, upon the establishment the European Handball Federation in 1991, it was decided to organize the first European championships. The first edition of the European Men's Handball Championship seniors held in 1994 in Portugal. The competition takes place from 2 to 2 years, during two weeks in January and February (from the 2000 edition).

During the 11 editions of the European Handball Championships the competition format has suffered some changes in the number of teams participating, number and structure of the group, the number of games played of the participating teams.

In the period 1994-2000 at the competition attended 12 teams divided into 2 groups, each team disputing five games in the group and first 2 ranked qualify in the semifinals. Other teams in the group (positions 3-6) played matches for final ranking with the similar ranked team from the other group. Thus the first 4 ranked disputed 7 games and other teams (places 5-12) played 6 games each.

Since the 2002 edition number of teams increased to 16, being formed 4 groups of 4 teams in the first phase, and then the first 3 classified in each group qualify for the main group (being formed two main groups of 6 teams). In the main group stage are matches only between teams that not met in the first group stage. The teams ranked first and second in each of the main groups qualify for the semifinals, while the third places play a game for places 5-6.

The exception to this rule was only in the 2002 edition when all the teams for the main groups played matches for final ranking. Thus the editions of 2002 and 2004 first 4 ranked were played 8 games, the ranked 5 to 12 each had 7 games, while the places 13 to 16 had each 3 games. Since the 2006 edition first 4 ranked were played 8 games, the places 5-6 had each 7 games, the teams ranked 7 to 12 had each 6 games, and those places 13-16 were 3 games each.

2. Material and method

Determination of efficiency of the game actions for the participating teams at the Handball European Championships may be a reference to the revaluation the role model of the game for seniors' level in high performance handball.

This study may lead to the identification of evidence indicating trends of men's handball for the period 1998-2014, thus creating the conditions for the establishment of principles for achieving preparation and participation in high level competitions.

In carrying out the study the main methods used were bibliographical research and statistics. Bibliographic method was used to study because of the analyzes conducted by EHF lecturers for European Championships (since 1998). Statistical method was used to process the data supplied by EHF for European Championships after deployment and game actions quantified we used in the study.

3. Results and discussions

The game actions which were performed statistical analysis are: throws efficiency (6m, wings, 9m, 7m) attack efficiency, goalkeepers' efficiency, interception and blocked shots.

For these actions the analysis was performed as follows: for all participating teams (12 or 16), places 1-4, places 5-8, places 1-8, places 9-16 (table 1-5).

Table 1 Game actions efficiency for all teams (places 1-12 / places 1-16)

Edition	Statistical parameters / Game actions	Throwings efficiency (%) 6m	wing	backcourt	Throwins efficiency (%)	7m throwings efficiency (%)	Fast break efficiency (%)	Attack efficiency (%)	Goalkeepers efficiency (%)	Interceptions (no.)	Blocked shots (no.)
1998		-	-	-	52,92±4,54	70,75±9,07	75,33± 6,21	50,75±4,64	34,25 ± 4,69	24,50±9,90	17,75±9,00
2000	X±S (1-12)	72,67± 10,09	51,75±4,92	37,67± 5,23	54,03± 4,25	71,58± 8,06	60,92± 7,32	50,50± 4,25	32,42 ± 4,85	20,25± 7,23	20,67± 9,41
2002	X±S (1-16)	63,61± 7,58	51,20±13,64	37,52± 5,89	53,13± 5,62	69,29± 15,74	72,26± 10,06	48,19± 3,80	33,13 ± 4,06	26,25± 14,21	23,63± 14,91
2004	X±S (1-16)	70,88± 8,40	53,75±6,71	36,38± 5,00	53,94± 3,84	71,25± 9,53	75,50± 7,23	47,69± 3,53	32,13 ± 4,72	29,56± 12,26	23,69± 12,39
2006	X±S (1-16)	73,44± 11,48	53,19±9,81	41,13± 5,77	55,69± 5,50	69,94± 9,58	73,19± 11,51	49,56± 4,66	31,88 ± 3,36	24,88± 12,09	18,00± 9,12
2008	X±S (1-16)	73,69±10,02	53,13±12,96	39,69± 6,46	54,81± 2,97	71,31± 11,91	75,94± 8,53	47,94± 2,79	32,00 ± 4,16	24,00± 9,03	19,31± 12,39
2010	X±S (1-	75,44±5,53	57,25±7,16	41,00±	56,31± 3,18	73,31± 7,01	75,88±	50,00± 2,71	31,88 ±	18,31± 9,39	19,31± 10,35

	16)			3,81			12,45		3,34		
2012	X±S (1-16)	69,44± 9,74	59,31±7,41	38,69± 3,65	57,00± 4,00	74,75± 12,53	74,31± 6,77	49,06± 2,95	31,31 ± 3,74	16,13± 7,72	16,31± 9,36
2014	X±S (1-16)	72,81± 10,36	58,75±6,60	42,63± 7,37	57,50± 4,63	74,75± 7,82	72,75± 9,78	50,63± 4,08	31,63 ± 3,58	16,81± 8,68	17,06± 11,36

Table 2 Game actions efficiency for places 1-4

Edition	Statistical parameters / Game actions	Throwings efficiency (%) 6m	wing	backcourt	Throwins efficiency (%)	7m throwings efficiency (%)	Fast break efficiency (%)	Attack efficiency (%)	Goalkeepers efficiency (%)	Interceptions (no.)	Blocked shots (no.)
1998	X±S (1-4)	-	-	-	54,75 ± 3,77	73,25±6,90	73,00 ± 5,23	53,25 ± 4,27	37,75± 3,59	27,50±8,54	28,75±6,65
2000	X±S (1-4)	76,50±11,15	53,50±1,73	39,25 ± 4,79	56,42 ± 3,58	72,50± 4,80	58,25 ± 3,10	52,00 ± 4,25	36,75± 2,50	26,75± 1,71	25,25± 11,09
2002	X±S (1-4)	61,48± 4,79	56,40±9,41	38,10 ± 6,03	55,00 ± 4,55	63,33± 9,66	79,08 ± 2,92	51,25 ± 2,06	35,00± 2,45	38,75± 10,87	42,50± 11,39
2004	X±S (1-4)	71,25± 4,92	56,25±5,91	39,25 ± 3,30	57,0± 1,41	77,25± 8,18	73,50 ± 9,33	51,50 ± 1,00	35,00± 3,56	38,00± 6,48	39,50± 7,55
2006	X±S (1-4)	73,75± 14,17	60,25±6,99	44,50 ± 4,43	59,50 ± 2,38	75,00± 5,94	70,50 ± 3,70	53,50 ± 2,52	35,25± 3,77	40,00± 9,02	25,00± 4,16
2008	X±S (1-4)	70,00± 7,70	60,75±4,57	39,25 ± 4,43	56,25 ± 1,50	74,25± 16,64	77,75 ± 5,91	50,50 ± 1,73	33,50± 3,79	31,50± 3,79	30,50± 9,00
2010	X±S (1-4)	70,00± 5,83	56,75±6,02	43,50 ± 3,51	57,25 ± 2,50	69,50± 4,80	74,75 ± 10,28	51,00 ± 2,58	35,00± 2,83	25,75± 9,22	26,50± 12,77
2012	X±S (1-4)	61,50± 5,80	60,25±5,56	36,75 ± 5,32	56,25 ± 5,19	77,50± 8,96	73,00 ± 4,97	49,50 ± 3,00	33,50± 4,43	20,25± 2,99	24,50± 5,00
2014	X±S (1-4)	75,50± 11,50	60,00±7,62	52,00 ± 3,16	64,00 ± 2,45	77,25± 7,23	78,50 ± 2,38	56,00 ± 2,16	32,25± 2,06	27,00± 4,62	31,50± 8,74

Table 3 Game actions efficiency for places 5-8

Edition	Statistical parameters / Game actions	Throwings efficiency (%) 6m	wing	backcourt	Throwins efficiency (%)	7m throwings efficiency (%)	Fast break efficiency (%)	Attack efficiency (%)	Goalkeepers efficiency (%)	Interceptions (no.)	Blocked shots (no.)
1998	X±S (5-8)	-	-	-	55,75 ± 3,10	73,25 ± 12,92	79,75 ± 2,99	53,50 ± 2,52	32,25± 6,65	24,00± 10,10	14,00 ± 3,16
2000	X±S (5-8)	66,75 ± 12,55	52,25±3,59	38,75 ± 7,80	52,59 ± 5,81	67,25 ± 8,38	61,50 ± 7,94	51,50 ± 4,25	30,25± 4,79	18,00± 9,49	14,25 ± 7,89
2002	X±S (5-8)	62,43 ± 3,93	55,40±7,53	42,85 ± 5,04	55,75 ± 4,27	67,85 ± 8,90	64,03 ± 6,06	49,00 ± 2,94	34,75± 2,06	30,00± 12,57	24,25 ± 11,95
2004	X±S (5-8)	74,75 ± 6,70	54,50±9,85	39,75 ± 5,91	56,75 ± 2,75	69,25 ± 7,63	77,50 ± 2,08	49,25 ± 1,50	32,25± 1,71	38,00± 6,16	23,00 ± 2,83
2006	X±S (5-8)	80,50 ± 6,03	59,25±6,85	44,00 ± 4,97	60,50 ± 3,42	72,25 ± 11,98	78,00 ± 9,09	52,75 ± 1,71	31,25± 3,77	25,25± 7,37	21,75 ± 9,46

2008	X±S (5-8)	66,50 ± 11,90	52,50±8,23	46,00 ± 6,22	56,00 ± 1,41	66,75 ± 13,84	68,50 ± 7,77	49,75 ± 0,50	34,50± 3,70	29,75± 9,11	28,75 ± 4,65
2010	X±S (5-8)	77,75 ± 0,96	58,75±4,35	37,75 ± 2,99	57,00 ± 2,31	74,75 ± 4,27	82,75 ± 10,44	51,25 ± 2,63	31,50± 3,11	24,00± 6,38	18,75 ± 4,79
2012	X±S (5-8)	65,50 ± 10,47	60,25±4,27	39,25 ± 2,63	58,25 ± 5,74	75,50 ± 7,14	80,00 ± 2,71	50,25 ± 2,06	32,50± 1,73	17,75± 4,99	16,00 ± 4,55
2014	X±S (5-8)	71,25 ± 5,85	63,50±2,65	44,00 ± 4,08	58,00 ± 1,41	69,00 ± 4,32	71,50 ± 6,24	51,00 ± 1,83	31,75± 1,50	20,50± 4,65	19,25 ± 6,90

Table 4 Game actions efficiency for places 1-8

Edition	Statistical parameters / Game actions	Throwings efficiency (%) 6m	wing	backcourt	Throwins efficiency (%)	7m throwings efficiency (%)	Fast break efficiency (%)	Attack efficiency (%)	Goalkeepers efficiency (%)	Interceptions (no.)	Blocked shots (no.)
1998	X±S (1-8)	-	-	-	55,25 ± 3,24	73,25 ± 9,59	76,38 ± 5,34	53,38 ± 3,25	35,00± 5,76	25,75± 8,86	21,38 ± 9,24
2000	X±S (1-8)	71,63 ± 12,16	52,88±2,70	39,00 ± 6,00	54,50 ± 4,91	69,88 ± 6,92	59,88 ± 5,84	51,50 ± 4,25	33,50± 4,96	22,38± 7,85	19,75 ± 10,67
2002	X±S (1-8)	61,95 ± 4,09	55,90±7,91	40,48 ± 5,74	55,38 ± 4,10	65,59 ± 8,93	71,55 ± 9,17	50,13 ± 2,64	34,88± 2,10	34,38± 11,84	33,38 ± 14,56
2004	X±S (1-8)	73,00 ± 5,76	55,38±7,58	39,50 ± 4,44	56,88 ± 2,03	73,25 ± 8,48	75,50 ± 6,61	50,38 ± 1,69	33,63± 2,97	38,00± 5,86	31,25 ± 10,28
2006	X±S (1-8)	77,13 ± 10,71	59,75±6,43	44,25 ± 4,37	60,00 ± 2,78	73,63 ± 8,88	74,25 ± 7,57	53,13 ± 2,03	33,25± 4,10	32,63± 10,97	23,38 ± 6,99
2008	X±S (1-8)	68,25 ± 9,47	56,63±7,58	42,63 ± 6,16	56,13 ± 1,36	70,50 ± 14,73	73,13 ± 8,08	50,13 ± 1,25	34,00± 3,51	30,63± 6,52	29,63 ± 6,70
2010	X±S (1-8)	73,88 ± 5,67	57,75±4,98	40,63 ± 4,31	57,13 ± 2,23	72,13 ± 5,06	78,75 ± 10,50	51,13 ± 2,42	33,25± 3,33	24,88± 7,40	22,63 ± 9,84
2012	X±S (1-8)	63,50 ± 8,12	60,25±4,59	38,00 ± 4,11	57,25 ± 5,18	76,50 ± 7,58	76,50 ± 5,26	49,88 ± 2,42	33,00± 3,16	19,00± 4,04	20,25 ± 6,34
2014	X±S (1-8)	73,38 ± 8,75	61,75±5,60	48,00 ± 5,45	61,00 ± 3,70	73,13 ± 7,06	75,00 ± 5,76	53,50 ± 3,25	32,00± 1,69	23,75± 5,52	25,38 ± 9,80

Table 5 Game actions efficiency for places 9-16

Edition	Statistical parameters / Game actions	Throwings efficiency (%) 6m	wing	backcourt	Throwins efficiency (%)	7m throwings efficiency (%)	Fast break efficiency (%)	Attack efficiency (%)	Goalkeepers efficiency (%)	Interceptions (no.)	Blocked shots (no.)
2002	X±S (9-16)	65,26 ± 10,01	46,50±16,89	34,56 ± 4,63	50,88 ± 6,27	73,00 ± 20,49	72,96 ± 11,47	46,25 ± 3,92	31,38± 4,90	18,13± 11,89	13,88 ± 6,88
2004	X±S (9-16)	68,75 ± 10,38	52,13±5,74	33,25 ± 3,41	51,00 ± 2,78	69,25 ± 10,66	75,50 ± 8,26	45,00 ± 2,73	30,63± 5,80	21,13± 11,19	16,13 ± 9,63
2006	X±S (9-16)	69,75 ± 11,68	46,63±8,14	38,00 ± 5,48	51,38 ± 3,81	66,25 ± 9,32	72,13 ± 14,96	46,00 ± 3,66	30,50± 1,77	17,13± 7,45	12,63 ± 7,96
2008	X±S (9-16)	79,13 ± 7,61	49,63±16,56	36,75 ± 5,63	53,50 ± 3,63	72,13 ± 9,26	78,75 ± 8,51	45,75 ± 2,05	30,00± 3,96	17,38± 5,66	9,00± 6,41

2010	X±S	77,00		41,38	55,50	74,50	73,00	48,88			16,00
	(9-16)	±		±	±	±	±	±	30,50±	11,75±	±
		5,26	56,75±9,19	3,50	3,89	8,75	14,25	2,64	2,93	5,97	10,36
2012	X±S	75,38		39,38	56,75	73,00	72,13	48,25			12,38
	(9-16)	±		±	±	±	±	±	29,63±	13,25±	±
		7,54	58,38±9,72	3,25	2,71	16,49	7,72	3,37	3,66	9,62	10,58
2014	X±S	72,25		37,25	54,00	76,38	70,50	47,75			
	(9-16)	±		±	±	±	±	±	31,25±	9,88±	8,75±
		12,36	55,75±6,43	4,53	2,07	8,67	12,66	2,49	4,92	4,58	4,77

Statistical analysis was performed on several levels: for all participating teams (12 or 16), places 1-4 places 5-8 places 1-8, places 9-16 (table 1-5); and the results are sometimes surprising considering the fact that the number of games played is variable: the first 4 ranked disputed 8 games, the 5-6 ranked had 7 games, the teams ranked 7 to 12 were each 6 games, while the places 13 to 16 had each 3 games. Should be taken in mind that the higher stages of the competition were qualifying the best teams and game results are closer.

To determine the efficiency of all variants were quantified all throws centralized: 6m, wing, 9m, 7m, fast break and breakthrough. Thus for all participating teams throwing efficiency is on average 55% (minimum-52.92%, maximum-57.50%), while for the first 4 ranked the average is 57.4% (minimum-55%, maxim-64%). For teams ranked 5 to 8 average is 56.7% (minimum-52.59%, maximum-60.50%); situation for places 1-8 shows an average of 57% (minimum-55.25%, maximum-61%) and for places 9-16 average is 53.3% (minimum-50.88%, maximum-56 .75%). These issues are summarized in figure 1.

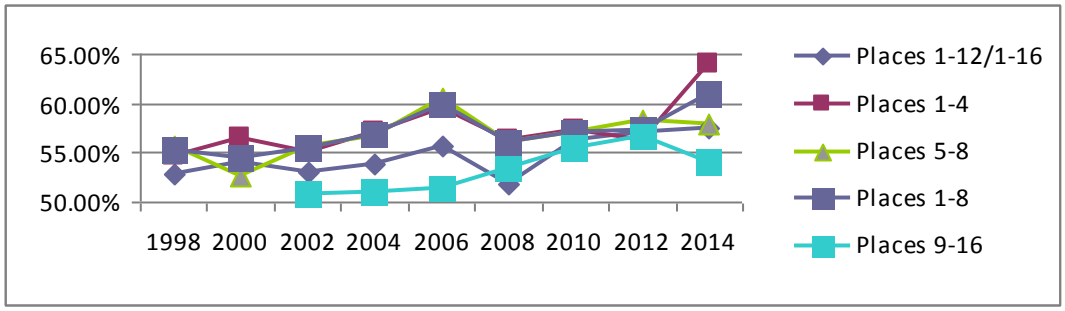

Figure 1. Throwing efficiency for 1998-2014 period

Attack efficiency is given that throws efficiency gather unforced errors made in the attack (interception passes, miss pass, fault in attack, passive attack) and lead to a loss of possession, so that the values are below the average efficiency of throws. For places 1-12 / 1-16 attack has an average efficiency of 49.4% (minimum-47.69% maximum-50.75%). For the first 4 ranked the average is 52% (minimum-49.50%, maximum-56%), while the average for 5-8 places is close to 51% (minimum-49%, maximum-53.50%). For 1-8 places the average is 51.50% (minimum-49.88%, maximum-53.50%), and for the last 8 teams the average is about 47% (minimum-45%, maximum-48.88%) (figure 2).

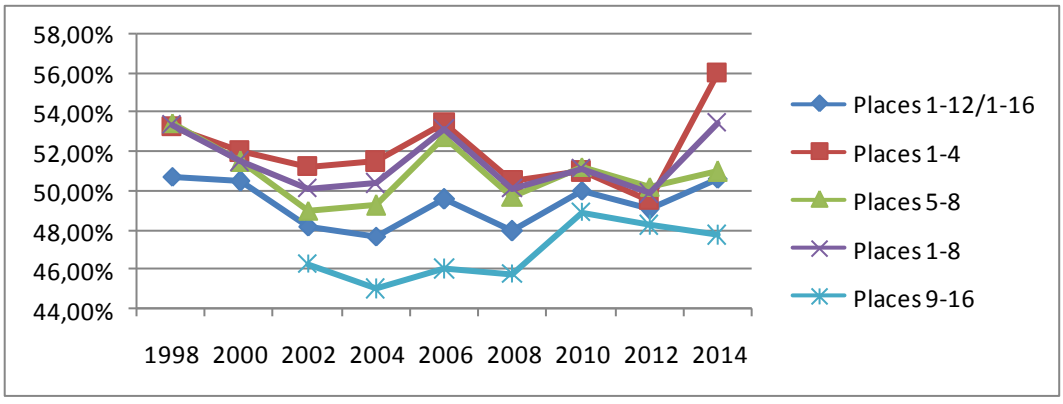

Figure 2. Attack efficiency for 1998-2014 period

Goalkeepers' efficiency is crucial to the fate of a game; making reference that often the goalkeeper is half of team, the reality says that on average their effectiveness in defense throws is 32.3% (minimum-33.31%, maximum-34.25%). On average goalkeepers efficiency for places 1-4 is nearly 35% (minimum-32.25%, maximum-37.75%); for places 5-8 average is 32.3% and for the places 1-8 average is 33.6%. For the last 8 teams the average efficiency is less than 29%. The evolution of efficiency for all 9 final tournaments analyzed by category is shown in figure 3.

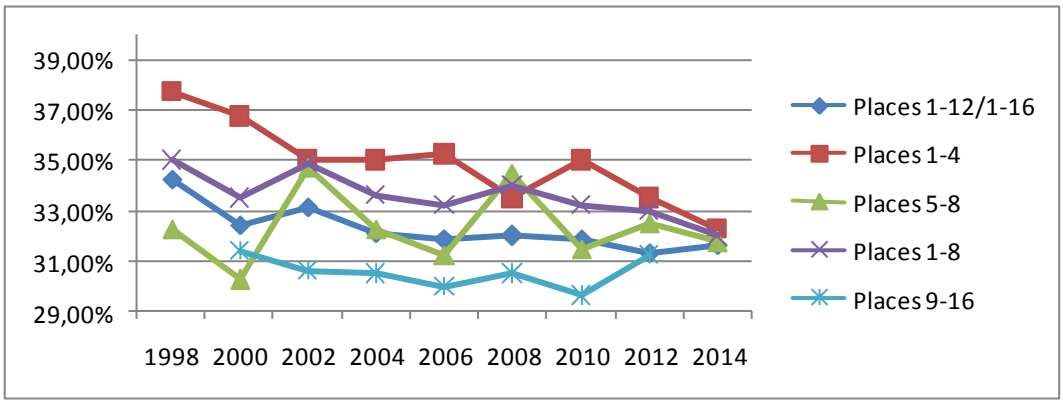

Figure 3. Goalkeepers efficiency for 1998-2014 period

The number of interceptions made indicates the offensive tendency of the team and the ability to score goals easily on fast break and for this indicator are large discrepancies between the teams participating in each edition, the minimum being below 1 per game interception and maximum is 6 interceptions per game. The overall average is 19.3 interceptions for participating teams or 3.2 interceptions per game. For the first 4 ranked the average is 30.6 interceptions or 5.1 interceptions per game for each team; for places 5-8 the average is 25.25 interceptions team or 4.2 interceptions per game; for 1-8 places average is 24.1 interceptions or 4 interceptions per game; and for the last 8 teams the average is 15.5 interceptions or 3.4 interception per game. The decreasing trend depending to the final ranking is easily visible in figure 4.

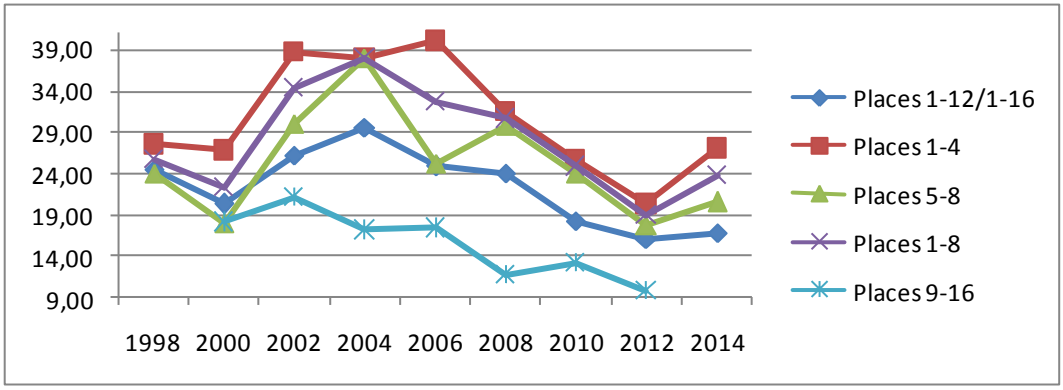

Figure 4. Interceptions number for 1998-2014 period

Another action that could lead to a rebound and increase efficiency defense is blocking shots, and things are not the same for all teams, so the minimum is 0.5 blocked shots per game, and a maximum of about 6, the average of all teams is 19.5 blocked shots or 3.25 per game. For places 1-4 the average is 30.4 and 5.1 per game; for places 5-8 the average is 20 per team and 3.3 per game; for the top 8 ranked team the average is 25.2 and 4.2 per game, and for the last 8 teams the average is 12.7 per team and 2.8 per game (figure 5).

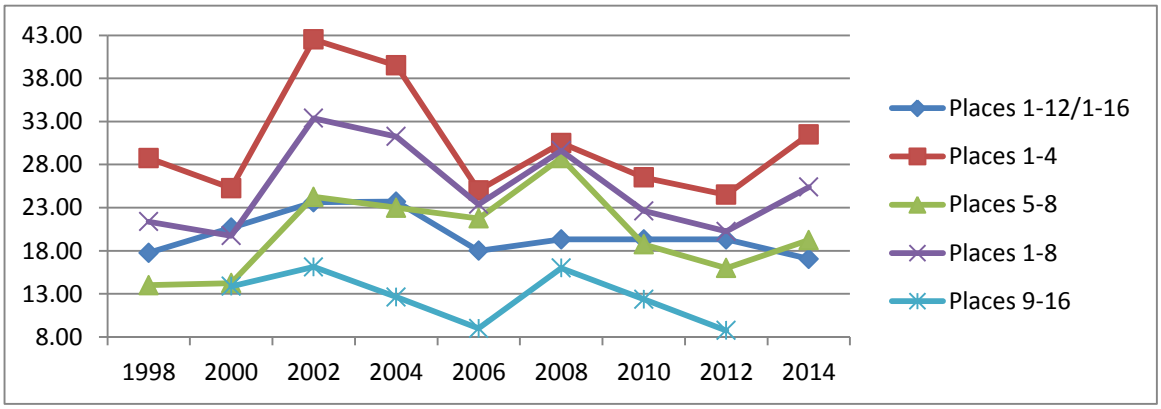

Figure 5. Blocked shots number for 1998-2014 period

This study took as benchmark the data of special literature, data regarding the minimum actions efficiency (Taborsky F., 2001) and comparing with what we find (table 1):

Table 1 Actions efficiency of our study comparing to the data of special literature

Actions efficiency	**Efficiency (Taborsky F., 2001)**	**Efficiency for all participant teams (our study)**	**Efficiency for places 1-4 (our study)**	**Efficiency for places 1-8 (our study)**
attack	60%	49,4%	52%	51,5%
backcourt shots	40 – 45%	39,3%	41,5%	41,6%
wing shots	55 – 60%	54,8%	58%	54,2%
6 m shots	60 – 65%	71,5%	70%	70,3%
fastbreak shots	70 – 75%	72,9%	73,4%	73,4%
7 m shots	75 – 80%	71,9%	73,3%	72%
attacks without shots	15 – 20%	3,2 interceptions 3,25 blocked shots	5,1 interceptions 5,1 blocked shots	4,2 interceptions 4,2 blocked shots
goalkeepers	35 – 40%	32,3%	35%	33,6%

The attack efficiency is far below the recommended level and for that value approaching just throws efficiency. In the same situation, but much closer to the minimum, is goalkeepers' efficiency. Within the limits are wing throws, 9m throws, 7m throws, on the fast break and the 6m throw exceeding the maximum, this is a positive one.

4. Conclussions

One of the concerns of participating teams at the European championships for the period under review was to increase attack and throws efficiency manifested by an average upward trend although there were some gaps in some edition (figures 1 and 2).

This positive trend for throws and attack efficiency had repercussions on goalkeepers' efficiency that showed a decreasing trend (figure 3).

The average number of interceptions, respectively blocked shots is important for teams ranked in the top of the final standings because it favors increasing the defense efficiency and scoring goals easier (Figures 4 and 5).

As a result of comparing the data obtained from the analysis performed should be reconsidered margins effectiveness of actions to be monitored useful landmarks in training and competition, imposing to reconsider the role model of the performance handball game for seniors. Thus for the teams seeking a qualification at the European Championship is recommended that game action efficiency to be places in the margins of the places 1-8 from Table 1 in the context of the playing games with teams that constantly qualify for the final tournament. ***In the European Championship qualifying games the efficiency must be much higher because the teams encountered are a lower value.***

Teams that aspire to win the competition or medals is need to exceed average requirements for places 1-4 (table 1).

Taking into account that the study covers a period of 16 years which took place 9 editions of European Handball Championships, the data obtained and analyzed got a high degree of reliability and can be used as benchmarks for the following competitions.

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